National Character Area profile:

16. Durham Coalfield Pennine Fringe

www.naturalengland.org.uk

Introduction

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

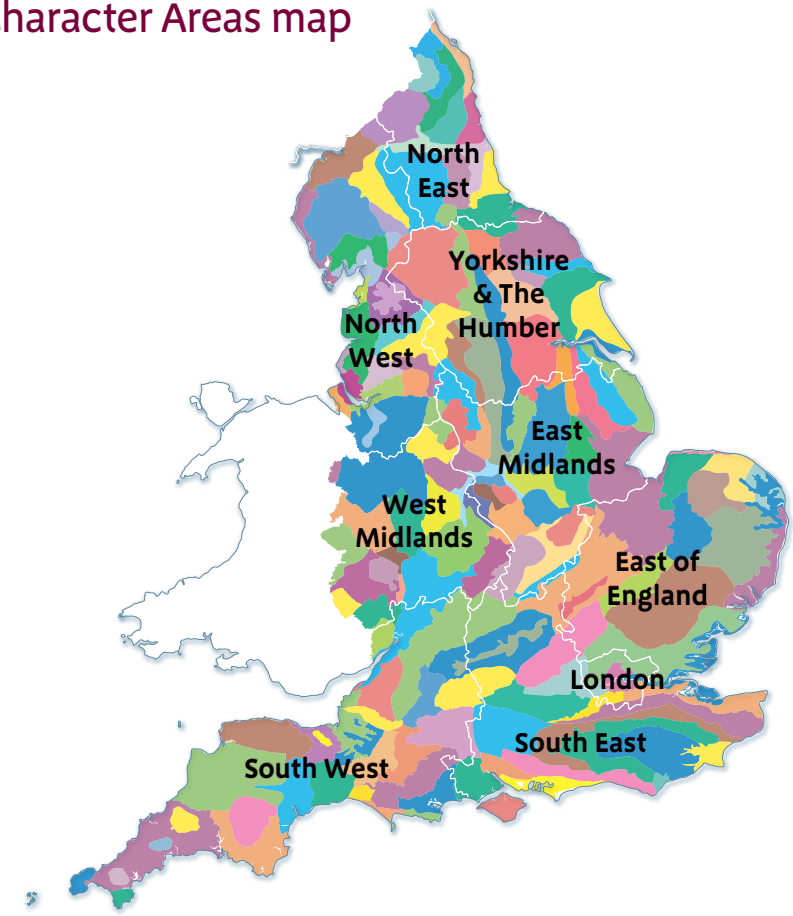
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



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

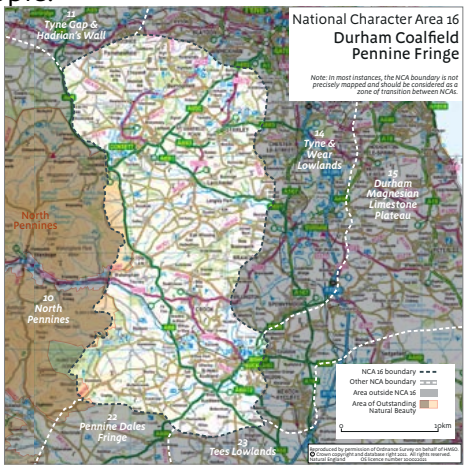
Summary

The Durham Coalfield Pennine Fringe National Character Area (NCA) is a transitional landscape between the North Pennines NCA to the west and the Tyne and Wear Lowlands NCA to the east. It is formed by a series of broad ridges, separated by river valleys, with a strong west–east grain. Some 3 per cent (2,252 ha) of the NCA lies within the North Pennines Area of Outstanding Natural Beauty, and 204 ha falls within the North Pennine Moors Special Area of Conservation and Special Protection Area, designated for its habitats (including dry heath, blanket bog and old sessile oak woodland) and upland breeding birds (including golden plover, curlew, dunlin, hen harrier and merlin).

The west is more upland in character, with large, open, regular fields bounded by drystone walls or fences, and is primarily used for sheep and cattle grazing. In the east the farmed landscape becomes more mixed, with arable crops grown on the richer land, and more irregular fields divided by hedges rather than walls. Networks of hedges and strips of woodland in river valleys and alongside streams, combined with shelterbelts and large conifer plantations, give parts of the area a well-wooded appearance. A number of major rivers run through the area, including the Wear and Derwent, and their tributaries, Browney, Deerness and Gaunless.

Settlement is denser in the north and the east, with larger towns such as Consett, Stanley and Bishop Auckland giving these sections a more urban feel. The area's industrial history has left a strong mark on the landscape: historic coal mining and steel processing have a strong influence on settlement patterns, culture and infrastructure such as wagonways and railways. The area has a high proportion of 'reclaimed sites' restored after mining activity, and in some areas this has given the landscape a rather featureless, 'manmade' feel. Restoration schemes are now carried out with more attention to improving the wildlife and recreational value of the sites and can enhance quality of life for local people.

The most prominent ecosystem services in the area are food production, biomass production (wood fuel), water quality/availability and sense of history. The major rivers are very important assets that provide a wide range of recreational opportunities, water for domestic and industrial use and important wildlife corridors linking the uplands in the west to the lowland flood plains in the east. Important challenges for the area include the need to increase and connect habitats to allow species to move around and the need to ensure that any future development is sustainable and enhances quality of life and ecosystem services for local people.



Click map to enlarge; click again to reduce

Statements of Environmental Opportunities:

- **SEO 1:** Protect, manage and enhance the major rivers, including the Wear and Derwent rivers, and their tributaries, to improve water quality, reduce flood risk and enhance their wildlife value and recreational use.

- **SEO 2:** Protect, expand and connect semi-natural habitats, particularly heathland, and enhance the management of agricultural land to provide a range of benefits to people, wildlife and the wider environment.

- **SEO 3:** Protect, enhance and connect trees and woodland in the area to improve their wildlife value, climate regulation capacity, biomass production and potential for access and recreation.

- **SEO 4:** Protect, restore and enhance ex-industrial and brownfield sites, particularly former coal mines, for their historic and wildlife value, and improve access and interpretation in order to celebrate local tradition and culture and increase understanding of the area's industrial history and geodiversity.

- **SEO 5:** Seek to ensure that where there is new development it retains tranquil areas, is appropriate in a changing climate, provides high-quality green infrastructure and improves quality of life for local residents.

River valleys shelter ancient woodland, and some higher ground affords far-reaching views to the North Pennines to the west.

Description

Physical and functional links to other National Character Areas

The Durham Coalfield Pennine Fringe National Character Area (NCA) marks the transition between the open, windswept uplands of the North Pennines NCA to the west, in which 2,252 ha of the North Pennines Area of Outstanding Natural Beauty (AONB) lies, and the Tyne and Wear Lowlands NCA to the east. The Pennine Dales Fringe NCA, immediately to the south, is also a transitional landscape between upland and lowland but has a more rural, less industrial character. Higher ridges offer panoramic views into adjacent valleys and beyond to the North Pennines and Tyne and Wear lowlands.

The rivers Wear and Derwent, and their various tributaries, drain from the high Pennine moors into the area, then flow to the east into the Tyne and Wear lowlands, and out into the North Sea. The Kielder Water Scheme (England's only regional water grid) uses water from Kielder Reservoir to maintain minimum flows in the area's rivers. The water draining from the Pennines provides an important supply of drinking water, as well as water for industry, but can give rise to some flood risk within the area and also downstream. Migratory salmon and sea trout travel through the area on their journey from the sea to spawning grounds in the North Pennines.

A number of major roads pass through the NCA, including the A68, which runs north–south through the length of the area between Darlington and Corbridge. Long-distance access routes include the Sea to Sea Cycleway. Livestock rearing in the area produces a steady supply of meat and replacement breeding stock, much of which is transported to other areas. Short rotation coppice from the area is transported to the Wilton 10 power station in the Tees Lowlands; and wind turbines, such as those around Tow Law, supply power to the National Grid. Wildlife designations shared with other NCAs include the North Pennine Moors Special Protection Area and Special Area of Conservation, which straddles the boundary with the North Pennines NCA.

Lowland heath occurs in scattered patches, such as Greencroft and Langley Moor, where heathland is interspersed with mires and small ponds, as a result of local subsidence.

Key characteristics

- A rolling upland landscape of broad, open ridges and valleys with a strong west–east grain.
- A transitional landscape with pastoral farming on higher ground in the west giving way to arable and mixed farming in the valleys and to the east.
- A landscape heavily influenced by the mining and steel industries, in particular to the north and east, with scattered mining and industrial settlements of terraced and estate housing occupying prominent sites linked by a network of main roads.
- Open cast coal workings forming intrusive features in some areas, and restored open cast areas giving a manmade feel to parts of the landscape. Early restoration sites are often lacking in character, topography and natural and historic features, while later schemes are of more value for wildlife and amenity.
- Numerous small plantations of conifers or mixed woodland, as blocks or shelterbelts, on hillsides; in places more extensive conifer woodlands on ridgetops and hillsides.
- Wide, open, windswept ridges of regular, large fields bounded by drystone walls and fences and crossed by straight roads, with isolated farmsteads.
- Broad valleys of arable and mixed farmland with low hedges, with hedgerow trees, strips of broadleaved woodland following rivers and streams, and conifer plantations on valley sides.
- Narrow, steep-sided river valleys sheltering fragments of ancient woodland.
- Scattered small country houses, set within parkland and well-wooded estates.

Planting trees along watercourses could help to connect isolated woodlands, provide wildlife corridors and protect water quality.

Durham Coalfield Pennine Fringe today

The Durham Coalfield Pennine Fringe NCA is a transitional landscape between the North Pennines NCA to the west and the Tyne and Wear Lowlands NCA to the east. It is a large-scale landscape comprised of broad, gently rounded ridges and valleys with a strong west–east grain. The soils of the area are predominantly heavy clays, with alluvial sands and gravels in the valleys. The area is underlain by Coal Measures geology, which has had a profound impact on the landscape seen today, particularly through the mining of coal close to the surface and the use of local stone for building material. Elevation rises from 11 m in the river valleys of the Wear and the Derwent to 370 m in the foothills of the Pennines. Some 3 per cent (2,252 ha) of the NCA lies within the North Pennines AONB.

The area drains from west to east, with a number of rivers carrying water from the North Pennines through this area into the Tyne and Wear Lowlands NCA and ultimately the North Sea. The rivers and their valleys form important wildlife corridors linking upland and lowland. There are numerous small ponds and oxbow lakes and, although there are no reservoirs or lakes within the NCA's boundaries, the main rivers are connected to the Derwent and Kielder reservoirs by the regional water grid, which maintains minimum river flows by releasing and redirecting water from the reservoirs.

Tree cover is mostly confined to ancient broadleaved woodland on steep valley sides, shelterbelts and conifer plantations on valley sides and higher ground, parkland trees and hedgerow trees. Broadleaved woodland in the area is a mixture of oak in more sheltered positions, particularly the steep-sided valleys, grading in to mixed ash woods and wet woodland on valley bottoms. Over a quarter of the woodland in the area is classed as ancient woodland; veteran trees also survive in historic parklands such as Auckland Castle Park.

The agricultural landscape varies from one of livestock rearing on the higher ground in the west to mixed farming in the east. The open, windswept higher ground is divided by drystone walls into large regular fields, mostly dating from 18th-century Parliamentary enclosure, with long straight roads featuring wide verges. The more sheltered valleys to the east have richer soils that support more arable cropping, with fields separated by low-cut hedges with hedgerow trees. Annual hedge cutting with autumn crop harvests and cultivation leads to dramatic seasonal changes in the colour, texture and feel of the landscape.

Upland moorland and hay meadows on higher ground in the west and lowland heathland, native woodland/parkland, ponds and wetlands in the east are the most characteristic habitats of the area. They occur mainly in small isolated patches that are vulnerable to impacts from surrounding land use. Hedgerows and riparian woodland form important wildlife corridors, especially in view of the fragmented nature of other habitats. The area's rivers are very important for wildlife, supporting salmon, sea trout and lamprey, as well as otter. The area is important for a number of other priority species, including red squirrel, red kite and grey partridge. Wildlife sites with international and national conservation designations are few, but there are many Local Wildlife Sites, which cover about 5 per cent of the area. Many ex-industrial sites have been reclaimed and planted and are now sites of widely varying wildlife and landscape value.

Settlement takes the form of smaller rural villages and mining settlements in the west and south and more urban and industrial development in the north-

east, where large parts of the landscape have an urban fringe character. The siting, layout and building materials of settlements give a very strong sense of history, with traditional agricultural villages tending to have buildings of local sandstone or gritstone with pantile or stone roofs, and mining settlements tending to have a core of 18th-century brick or stone terraces with Welsh slate roofs, surrounded by estates of post-war public housing. The larger urban areas have a mix of building styles and are often surrounded by allotments and pony paddocks.

The coal mining and steel industries have had a strong influence on the landscape and sense of place and many industrial historic features remain, such as railway lines, bridges, viaducts and coke works, along with several country houses built by wealthy colliery owners. Other prominent historic features include Roman infrastructure, such as the military route of Dere Street that links forts at Binchester, Lanchester and Ebchester.

Rights of way and open green spaces in this area are primarily used by local residents, with the exception of the Sea to Sea cycle route and notable sites such as Hamsterley Forest and Gibside. Upland open access areas to the west give valuable access to larger and more tranquil open spaces, and some of the woodland and forestry plantations, including Chopwell Wood and Hamsterley Forest, also provide large open access areas with good routes for cyclists. Footpaths and cycleways along disused railways, such as the Waskerley Way, are an important asset, often giving good connections between settlements and presenting opportunities for car-free travel to work. The river corridors also provide opportunities for walking, wildlife watching, fishing, swimming and kayaking.

Towns, such as Stanley, developed around coal mines and steel works as the industry developed from the 16th century. These settlements of terraced houses form distinctive features in the landscape.

The landscape through time

The area overlies Coal Measures rocks that were laid down during the Carboniferous Period, comprising thinly bedded sandstones, mudstones, ironstones and coal seams, which dip gently to the east along the flanks of the Alston Block, which forms the higher ground of the North Pennines to the west. Millstone Grit underlies the western part of the area, and dips down below the Coal Measures to the east. These rocks were eroded by glacial rivers flowing eastwards from the Pennine ice sheets, to form a series of alternating ridges and valleys running east–west. Boulder clay or till was deposited from the ice sheets during the last glacial period and covers much of the area, especially the lower valley slopes. Valley bottoms have deposits of alluvial sands and gravels.

The area has evidence to suggest Neolithic settlement, including a possible burial mound and signs of prehistoric tool-making. The Bronze and Iron Ages brought greater settlement, tree clearance and expansion of agriculture, particularly cattle and sheep husbandry, and created a pattern of dispersed farmsteads, moors and woodland and a network of routeways. Roman activity in the area included the creation of forts at Binchester, Lanchester and Ebchester on strategic river crossing points, and the construction of Dere Street, which ran all the way from York to Caledonia, linking the three forts in this area en route.

During the Anglo-Saxon period, the area fell within the Anglian Kingdom of Northumbria under the influence of the monastic community of St Cuthbert. This era saw the development of small villages surrounded by communal fields, separated by areas of common and waste. The distribution of different types of farming was similar to that of today, with cow and sheep production predominant in the west and more mixed agriculture on the lower land to the east. The pattern of agriculture and settlement in the landscape remained through the Middle Ages, as did the power and influence of the Church, with the Prince Bishops of Durham enjoying royal privileges and owning substantial estates, including deer parks and coal mines.

The landscape was dramatically redrawn in the 17th and 18th centuries, with large-scale enclosure of the common fields. Higher land to the west was much reorganised during this time into large holdings with large regular fields, although some older, more irregular fields survive in the valleys to the east.

Coal mining has a long and significant history in the area, going back to at least the 12th century. It intensified in the 16th century with the development of large collieries that exported coal to the south of England and Europe. Networks of wooden wagonways were created to transport coal using horses, and were replaced by railways with the advent of steam power in the 19th century, which also enabled deeper mines to be dug and drained and more coal extracted. Ironstone associated with coal seams led to the development of a local steel-making industry. Settlements developed around coal mines and steel works, such as Stanley and Consett. The wealth derived from the coal and steel industry enabled mine and factory owners to build a number of country houses, some surrounded by grand estates and parkland, such as Gibside. Coal mining settlements also had a good supply of allotments, many owned until the 1980s by the National Coal Board, which were provided for miners to grow vegetables and keep livestock.

In the 20th century, transport infrastructure continued to grow, as did settlements, particularly along railway lines. From the Second World War onwards the agricultural use of land intensified: walls and hedges were removed to create

larger fields, and more land was converted to arable cropping. Conversely, the coal and steel industries started to decline from the 1930s. The last two decades of the 20th century saw the final demise of these industries, followed by the clearance of most of the associated infrastructure. Despite the closure of the mines, coal mining still forms an important part of local culture and identity, as shown by the continued participation in the nearby Durham Miners' Gala.

During the 21st century, the landscape of this area has been marked by the advent of environmental concerns. Much work has been done (with varying success) to reclaim old industrial sites and convert them to woodland, farmland or nature reserves. The condition of the rivers, particularly in terms of their water quality and wildlife, has improved, with the River Wear being named by the Environment Agency in 2011 as one of the most improved rivers in England and Wales; salmon catches increased from 2 in 1965 to 1,531 in 2010. Renewable energy production has also increased in prominence, with an increase in the number of wind turbines, some on former mining sites, and increased production of short rotation coppice for biomass fuel. Environmental agreements taken up in the area for farming and forestry have a particular emphasis on grassland management, hedge/wall restoration and restocking of conifer plantations with broadleaf tree species. Conversely, development has increased, particularly in the urban fringe, and the sense of tranquillity has diminished.

Industrial archaeological sites form prominent features in the landscape, such as Bantling Lime Kilns.

Ecosystem services

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

Provisioning services (food, fibre and water supply)

- **Food provision**: The area has a mixture of livestock and arable farming to the east and upland livestock to the west. It produces primarily cereals, oilseeds, beef and lamb. Dairy farming has declined in recent years. There is a strong tradition of people growing their own food on allotments, particularly around ex-mining towns, where there are large numbers of allotment sites.

- **Timber provision**: There are some substantial conifer plantations in the area, and large commercial woods include Chopwell Wood and Hamsterley Forest. Woodland covers 14.3 per cent of the NCA and includes some ancient semi-natural woodland, particularly along streams and rivers. There are four sawmills.

- **Biomass energy:** The area has high potential for short rotation coppice production, and there are already some substantial plantations supplying fuel for the Wilton 10 power plant at Teesside. Timber processing waste from local sawmills is also used for wood fuel, with potential for more use of waste in this way.

- **Water availability:** A number of major rivers give the area good water availability, although there are no major aquifers. Some of the area's rivers are connected to the Kielder Water Scheme, whereby a regional water grid transfers water from Kielder Reservoir to maintain supplies of water to the conurbations of Tyneside and Wearside.

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

- **Regulating water quality:** The ecological status of rivers is generally moderate, with some notable exceptions rated as poor and bad; the chemical status of the Derwent and the Wear is good (the chemical status of smaller tributaries has not been assessed). The main threats to water quality include pollution from waste water treatment plants, as well as disused mines and diffuse pollution from agriculture, with changes in land management – such as reedbed, wetland and buffer strip creation – offering opportunities to address the latter sources of pollution.

- **Regulating water flow:** Settlements within the NCA with the greatest flood risk are Lanchester on the River Browney, and West Auckland and South Church on the River Gaunless. The greatest flood risk from the rivers that pass through this NCA is to properties downstream in settlements such as Newcastle and Gateshead in the Tyne catchment, and Durham and Chester-le-Street in the Wear catchment. Land management practices upstream, within the North Pennines, are important in moderating flood flows, while within this area more flood storage in the river valleys, with grassland and woodland along stream sides and river corridors, will contribute to slowing run-off of rainfall into watercourses, therefore lessening the severity of peak flow events.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** The landscape is transitional between upland and lowland, with a series of broad ridges running approximately west–east divided by river valleys. The geology has a defining impact, with the coal seams giving rise to strong coal mining and steel production industry in the past. This has left a legacy of industrial archaeology and terraced colliery and steel towns. Wooded river valleys are also a strong feature, and are of great value for wildlife and recreation. The character of the farmed landscape changes from west to east, with grassland and moorland divided by stone on the higher land to the west, and more mixed farming and arable with fields divided by hedges to the east. Reclamation of open cast mines has given rise to some featureless areas lacking time-depth, but schemes are now vastly improved and can create new areas of real wildlife, landscape and recreation value.

- **Sense of history:** There is a very strong sense of history due to the large number of historic mining and mineral extraction/processing sites. This has left behind not only infrastructure such as old wagonways and railways (now often converted to footpaths and cycle routes) and distinctive mining settlements and 'steel towns' but also a strong association with mining in local culture and identity, despite the demise of the deep coal pits in the 1990s. Conversely, some early restoration schemes of open cast mining sites have resulted in the removal of historic features and creation of obviously manmade landscapes that lack time-depth.

- **Recreation:** The NCA has good recreational opportunities, providing potential health benefits for users. Recreation is supported by the area's rights of way network (with a density of 1.9 km per km^2), as well as open access land (4 per cent of the NCA) and a number of key sites such as Chopwell Wood and Hamsterley Forest. The access network is particularly important in enabling links to the wider countryside from urban areas, allowing for recreation opportunities such as angling, horse riding, golfing, bird/wildlife watching and walking.

Many old wagon and railways have been converted into access routes, which provide good links between settlements and recreational opportunities for a wide range of users, such as these cyclists supported by the Gateway Wheelers charity.

Statements of Environmental Opportunity

SEO 1: Protect, manage and enhance the major rivers, including the Wear and Derwent rivers, and their tributaries, to improve water quality, reduce flood risk and enhance their wildlife value and recreational use.

For example, by:

- Seeking opportunities to improve the potential of the major rivers and their tributaries to support salmon and sea trout, for example by installing fish passes and removing structures that pose an obstacle to migration.
- Securing better management of riparian habitats to conserve existing water vole and otter populations and to encourage expansion of populations into new areas where viable, while being careful not to exacerbate the spread of alien invasive species, such as mink.
- Encouraging good soil management on arable land near watercourses in order to maintain soil structure, thereby optimising infiltration of rainwater and minimising run-off, soil erosion and sedimentation of watercourses.
- Working with farmers to secure good farming practice and creation of features such as buffer strips to reduce run-off or leaching of nutrients, bacteria or agricultural chemicals into watercourses, while also enhancing soil structure, organic matter and fertility.
- Planning for continuation of measures to prevent water from disused mines from polluting groundwater and surface water, such as pumping and filtration through reedbeds.
- Managing access and recreational uses of river corridors to enhance recreation opportunities (walking, wildlife watching, angling, kayaking and swimming) while minimising disturbance, maintaining water quality and avoiding/resolving conflict between different users.
- Seeking opportunities and working with landowners to create new wetlands in river valleys and at the foot of slopes to reduce flood risk and water pollution, and to create permanent grassland on land at high risk of erosion.
- Allowing, where feasible, rivers to follow their natural courses, thereby promoting the geomorphological processes that support the development of diverse riparian habitats and greater species diversity.
- Encouraging incorporation of sustainable urban drainage systems into new development and retrofitting into existing developments, to ensure that clean and dirty water are separated, minimising transmission of rainwater to water treatment works and reducing the risk of rivers receiving polluted water.

SEO 2: Protect, expand and connect semi-natural habitats, particularly heathland, and enhance the management of agricultural land to provide a range of benefits to people, wildlife and the wider environment.

For example, by:

- Expanding and buffering existing heathland, woodland, grassland and wetland sites, particularly where this will help to protect them from negative influences from surrounding land, such as nutrient run-off.
- Seeking opportunities to link existing heathland, woodland, grassland and wetland sites, where this will increase the permeability of the landscape for native species.
- Encouraging farmers to retain permanent grassland, and on all land to use best farming practice to optimise soil structure and organic matter/carbon content, by clearly communicating the potential benefits for food production, animal health/welfare, sense of place, water quality, flooding and carbon storage.
- Encouraging creation of grassland buffer strips in strategic locations on arable land: alongside hedges and watercourses, between fragments of species-rich grassland, on land vulnerable to erosion to benefit water quality and wildlife, as well as soil erosion, pest control, pollination and, consequently, food production.
- Encouraging and supporting farmers to create feeding and breeding habitats for scarce farmland birds such as grey partridge and corn bunting.
- Encouraging farmers with grassland on higher land in the west to manage it for the benefit of wading birds by creating a more tussocky sward, wet ground conditions and avoiding disturbance during the nesting season.
- Encouraging appropriate timing of farming operations, such as avoiding machinery use in very wet conditions (where possible), to avoid pollution incidents, damage to soil structure and soil erosion.
- Encouraging production and marketing of meat, particularly of rare breed livestock, from low-intensity grazing of heathland and species-rich grassland/wetland sites, to maintain sites at risk of neglect and to contribute to preserving rare breeds.
- Exploring sustainable intensification on arable land using new techniques such as yield mapping, precision farming, integrated crop management and agri-environment schemes to optimise food production, while also minimising environmental damage and improving conditions for farmland wildlife.
- Encouraging less frequent cutting of hedges and appropriate cutting of road verges to allow more profuse flowering, thereby supporting more nectar-feeding insects; providing food and shelter for insects, birds and mammals over winter; and providing movement corridors for a range of species. This will have benefits for pollination, pest control and, consequently, food production.
- Supporting research into potential agronomic benefits of habitats such as hedges, grass buffer strips, flower-rich grassland, beetle banks (particularly for their potential to improve pollination) and natural pest control. Promote results to local farmers.
- Conserving and improving the management of the field boundary network of hedges and stone walls, and associated traditional features, for their contribution to sense of place and sense of history, at the same time as improving access infrastructure to enhance recreational opportunities.

SEO 3: Protect, enhance and connect trees and woodland in the area to improve their wildlife value, climate regulation capacity, biomass production and potential for access and recreation.

For example, by:

- Enhancing, expanding and buffering existing semi-natural broadleaved woodland, for the range of wildlife, recreation and carbon sequestration/storage benefits they can provide.
- Creating new woodlands, using native broadleaved species, where they will link existing native woodlands.
- Creating buffer strips of woodland, scrub and permanent grassland along rivers and streams, where appropriate, to support riparian wildlife and reduce soil erosion and run-off of agricultural chemicals and nutrients.
- Ensuring that new woodland planting complements existing local patterns of woodland cover, has appropriate species composition, avoids archaeological sites, is not detrimental to priority species and habitats (such as wading birds or species-rich grassland) and provides access and recreational opportunities where appropriate.
- Protecting and maintaining mature and veteran trees, particularly in parklands and hedgerows, by carrying out sympathetic management (such as avoiding compaction or cultivation of ground around tree roots) and by planting or encouraging regeneration of new trees to replace veteran trees as they die.
- Reinstating native broadleaved species on Plantations on Ancient Woodland Sites (PAWS), especially along the Derwent valley, to provide timber and woody biomass, restore native woodland, enhance the landscape and improve the value of the sites for wildlife.
- Making best use of waste and by-products from local sawmills and timber processing in the area, particularly for biomass fuel to supply locally installed boilers.
- Ensuring that conifer plantations are designed and managed in a sustainable way to minimise carbon emissions and soil erosion and maximise the benefits for wildlife, recreation and supply to local processors and markets.
- Promoting opportunities for using woodland for educational activities, such as forest schools, and for the physical and mental health benefits of exercise in and engagement with woodlands.

SEO 4: Protect, restore and enhance ex-industrial and brownfield sites, particularly former coal mines, for their historic and wildlife value, and improve access and interpretation in order to celebrate local tradition and culture and increase understanding of the area's industrial history and geodiversity.

For example, by:

- Continuing to encourage high-quality restoration schemes for ex-open cast mining sites that provide maximum value for the natural environment and local people, through creation of heathland, semi-natural oak and oak-birch woodland, species-rich grassland and wetlands, as appropriate, and a well-considered network of access routes that provides appropriate access for all abilities and for a variety of user groups.
- Improving the management and design of existing sites, engaging local communities where feasible, to help these sites to deliver more value for wildlife and to enable local people to have greater involvement in planning and managing its future through volunteering.
- Providing enhanced interpretation material to make the historic significance and geodiversity of key sites more accessible and better understood by visitors, increasing their knowledge and enjoyment.
- Avoiding damage to sensitive natural landforms, historic sites, mature landscape features and semi-natural habitats in selecting, operating and restoring mineral sites.
- Conserving the last few remaining examples of industrial infrastructure, such as bridges and coke ovens, maintaining public access where appropriate and providing information at key viewpoints to improve the visitor experience.

SEO 5: Seek to ensure that where there is new development it retains tranquil areas, is appropriate in a changing climate, provides high-quality green infrastructure and improves quality of life for local residents.

For example, by:

- Encouraging incorporation of features into new development that will help communities to adapt to a changing climate (such as strategic tree planting for shade/shelter, permeable ground surfaces to reduce run-off, and sustainable drainage and rainwater harvesting systems).
- Seeking to ensure that new development is designed and sited so that it protects and enhances existing wildlife sites, access routes and other elements of green infrastructure.
- Exploring opportunities for using biomass planting to help to assimilate new development into the landscape and provide local wood fuel.
- Seeking opportunities to improve the green infrastructure and sustainability of existing urban and industrial areas, providing accessible and high-quality local green space close to where people live and work.
- Retaining allotments, creating new sites where justified by demand, and encouraging their active use for food production and for increased benefits to local health and wellbeing.
- Enhancing access networks by identifying and addressing key gaps and obstacles in the existing network, and making existing routes easier to use for a wide range of users.
- Protecting the tranquillity of the denes, woodlands and heathlands, while providing appropriate opportunities for informal recreational activities such as walking and bird/wildlife watching.

Additional opportunity

1. Encourage greater engagement with and access to the natural and historic environment of the area by local communities to increase pride of place, enjoyment and quality of life.

For example, by:

- Engaging local people in discussions about potential enhancements to local amenities and wildlife sites.
- Encouraging and facilitating volunteering at nature reserves, industrial reclamation sites, historic sites and other local green spaces, to yield benefits for the health and wellbeing of local people, increase sense of 'ownership' and enhance the wider environment and people's understanding of it.
- Encouraging active use of allotments, as a continuation of local culture and for the health, psychological, social and nutritional benefits it can provide.
- Encouraging and facilitating the use of Local Nature Reserves and historic sites through provision of accessible information and good cycling/walking routes and public transport that connect settlement centres with the high-quality sites on their outskirts.
- Ensuring that new development includes green infrastructure and transport links that will facilitate access to the surrounding countryside and engagement with the local environment.

Wooden wagons, such as this one at Causey Arch, were pulled by horses and used for transporting coal, particularly during the 18th Century.

Supporting document 1: Key facts and data

Durham Coalfield Pennine Fringe National Character Area (NCA): 66,122 ha

1. Landscape and nature conservation designations

3 per cent (2,252 ha) of this NCA lies within the North Pennines Area of Outstanding Natural Beauty (AONB) – which is subject to an existing management plan (2009-2014).

Management Plans for the protected landscape can be found at:

- www.northpennines.org.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Site(s)	Area (ha)	% of NCA
International	Ramsar	None	0	0
European	Special Protection Area (SPA)	North Pennine Moors SPA	204	<1
	Special Area of Conservation (SAC)	North Pennine Moors SAC; North Pennine Dales Meadows SAC	214	<1
National	National Nature Reserve (NNR)	n/a	0	0
National	Site of Special Scientific Interest (SSSI)	A total of 11 sites wholly or partly within the NCA	417	1

Source: Natural England (2011)

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

There are 143 Local sites in the Durham Coalfield Pennine Fringe, covering 3,542 ha which is 5 per cent of the NCA.

Source: Natural England (2011)

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

1.1.1 Condition of designated sites

Condition category	Area (ha)	% of SSSI land in category condition
Unfavourable declining	1	<1
Favourable	90	22
Unfavourable no change	7	2
Unfavourable recovering	317	76

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 11 m above sea level in the river valleys of the Derwent and Wear to a height of 370 m at the fringes of the North Pennines in the west. The average elevation of the landscape is 180 m above sea level.

Source: Natural England 2010

2.2 Landform and process

This NCA is a rolling, large scale transitional landscape, lying to the east of the uplands of the North Pennines, and dipping down gently eastwards to the heavily settled Tyne and Wear Lowlands. Soft and thinly bedded strata of Carboniferous sandstones, shales and coals give rise to gently rounded ridges with occasional steeper bluffs. The glacial drift covering the valley floors and lower slopes is incised in places by small becks and burns which now occupy the broad valleys of once much larger, glacial streams.

Source: Northumbria Coal Measures Natural Area Profile, Durham Coalfield Pennine Fringe Countryside Character Area

2.3 Bedrock geology

Landscape in this NCA is mainly formed from Coal Measure rocks of Carboniferous age, comprising thinly bedded sandstones, mudstones and coal seams, which dip gently from the west to the east. This NCA flanks the Alston Block, which forms the higher ground of the North Pennines to the west. Millstone Grit underlies the western part of the area and dips down below the Coal Measures to the east. These rocks were eroded by glacial rivers flowing eastwards from the Pennine ice sheets, to form a series of alternating ridges and valleys running east to west.

Source: Northumbria Coal Measures Natural Area Profile, Durham Coalfield Pennine Fringe Countryside Character Area

2.4 Superficial deposits

Boulder clay or till, deposited from the ice sheets during the last glacial period, covers 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. The higher ridges in the west are generally clear of till, and here the soft shales and sandstones form gently rounded ridges with occasional steep bluffs. Exposed coal seams have been exploited both by deep mines and open- cast methods. Ironstones associated with some of the seams have also been exploited for the steel industry, and sandstones have been quarried for building stone.

Source: Northumbria Coal Measures Natural Area Profile, Durham Coalfield Pennine Fringe Countryside Character Area

2.5 Designated geological sites

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

There are 0 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 soil types in this NCA.

Slowly permeable seasonally wet acid loamy and clayey soils, dominate, covering 72 per cent of the total area.

Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils; cover 8 per cent of the NCA , mainly in the southern western edge of the NCA around Hamsterley to West Auckland and centrally around Wolsingham and Brandon.

Restored soils mostly from quarry and opencast spoil, cover 10 per cent; these are largely allied to central regions between Esh Winning and Lanchester, although pockets are distributed across the northern area from above Consett in the west to Burnopfield in the east.

Freely draining slightly acid loamy soils; cover 5 per cent and lay in pockets typically on the west edge of the NCA from north above Consett to south around Tow Law.

Slowly permeable wet very acid upland soils with a peaty surface; cover 2 per cent, in two small isolated pockets on the western edge of the NCA above Wolsingham and at St. Johns Hall

Freely draining floodplain soils; cover 2 per cent of the NCA following the course of the Rivers Wear and Browney.

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).

Source: Northumbria Coal Measures Natural Area Profile, Durham Coalfield Pennine Fringe Countryside Character Area description

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	n/a	0
Grade 2	257	<1
Grade 3	33,503	51
Grade 4	24,663	37
Grade 5	1,716	3
Non-agricultural	2,162	3
Urban	3,822	6

Source: Natural England (2010)

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 in NCA (km)
River Wear	26
River Gaunless	24
River Browney	20
River Derwent	20

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 area is dissected by the middle reaches of the rivers Wear and Derwent and their several tributaries flowing mainly from west to east.

All the main rivers flow through distinct individual valleys with typically incised denes or larger gorges in their upper reaches. Middle reaches meander across relatively narrow floodplains, some with low artificial levees, and with alternating shallow quick flowing riffles and broader slow moving reaches.

The River Wear meanders across a broader floodplain, defined in places by low bluffs of broadleaved woodland or steep pasture with scrub.

There are occasional small natural ponds and ox-box lakes and larger wet lands in flooded abandoned or restored gravel workings.

Many of the NCA's rivers were subject to serious long term pollution but, with the decline of heavy industry and improved treatment facilities, their condition is improving.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 332,862 ha, 50 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

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

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 9,477 ha of woodland (14.3 per cent of the total area), of which 2,690 ha 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 7,071 ha of this NCA, which is 11 per cent of the NCA.

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

4.2 Distribution and size of woodland and trees in the landscape

Coniferous plantations and mixed woodland are found on the higher valley sides and ridges planted as blocks or shelterbelts, or as at Hamsterley and Chopwell Woods where there is more extensive afforestation. Ancient oak woods are found in more sheltered, narrow steep-sided valleys or denes and along the banks of rivers and streams, particularly the tributaries of the Wear and Derwent, grading into mixed ash woods and wet woodlands on the valley sides and bottoms. Estate and farm woodlands, occasional parklands and wooded estates surrounding small country houses are a feature of the lower lying land in the north and south of the area. Wet woodland particularly along riversides is often characterised by alder and willows, occur on poorly drained or seasonally waterlogged soils. The Derwent Valley contains the highest concentration of Planted Ancient Woodland Sites (PAWS) in the north-east.

Source: Durham Pennine Fringe 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	3,770	6
Coniferous	3,957	6
Mixed	508	<1
Other	1,242	2

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

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

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	1,115	2
Ancient re-planted woodland (PAWS)	1,574	2

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Drystone walls are found on the wide open ridges and to the west, while hedgerows and sheep fencing dominate the lower valley slopes and floodplains. The estimated boundary length for the NCA is 4,929 km, and the total length of Countryside Stewardship agreements between 1999-2003 was equivalent to about 5 per cent of this total. Environmental Stewardship Agreement boundary option uptakes in 2010 were: ditches 64 km; hedgerows 397 km; drystone walls 304 km; stone-faced hedgebanks 190 m.

Source: Durham Coalfields Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

Field patterns vary but the dominant type is regular rectangular fields, typical of enclosures of later periods. The ridges are characterised by large, regular grids of mainly dry stone walls and some gappy thorn hedges, crossed by straight enclosure roads and lanes. Fields in the valleys are generally smaller and bounded by hawthorn hedges with few, scattered hedgerow trees of oak and ash. Fields on reclamation sites of former open cast workings are generally large and rectangular, and lack traditional field boundaries.

Source: Durham Coalfield Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

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

6.1 Farm type

The total farmed area is 47,942 ha, comprising a total of 769 holdings. Grazing livestock form the majority of holdings (43 per cent), while 13 per cent are cereals and general cropping. Farms classified as other (horses, specialist grass, fallow) account for 212 holdings (28 per cent).There has been a 42 per cent increase in the number of farms classified as other between 2000 and 2009, a 37 per cent increase in cereal holdings, and a decrease of 52 per cent dairy farms since 2000.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

43 per cent of farm holdings are under 20 ha, but this accounts for just 6 per cent of the farmed area. 17 per cent of holdings are over 100 ha, and these account for some 62 per cent of the farmed area. Since 2000 there have been small increases in the number of holdings of 5-20 ha in size (from 190 to 237 holdings), and of 20-50 ha in size (from 162 to 179 holdings).

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 47,942 ha; owned land = 32,815 ha 2000: Total farm area = 46,321 ha; owned land = 33,197 ha. 68 per cent of the total farmed area is owner occupied, accounting for 1,093 holdings. There has been a 1 per cent decrease in the area of owned land over the 2000 to 2009 period, and a 2 per cent increase in the number of holders.

Source: Agricultural Census, Defra (2010)

6.4 Land use

The dominant land use throughout the NCA is grass (grazing livestock) and uncropped land accounting for 35,044 ha (73 per cent). This is followed by cereals (8,494 ha or 18 per cent) and oilseeds (1,685 ha or 4 per cent). Agricultural landuse throughout the NCA is often mixed, a combination of both grazing and some arable production occurring on the same holdings. Although land predominantly to the west incorporates upland fringe, the many valleys extending eastwards from the west into the heartland of the NCA have gently rolling hills, whose inclines and soil types lend themselves to arable production. Between 2000 and 2009 there was an increase in the area of grass and uncropped land (by 2,761 ha, or 3 per cent) and oilseeds (by 693 ha, or 2 per cent), and a decrease in the area of cereals (by 248 ha, or 1 per cent).

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Sheep are the most numerous livestock type within this landscape (a total of 158,400 animals) followed by 36,500 cattle and 5,800 pigs. Between 2000 and 2009, the number of sheep have decreased by 24 per cent; pigs by 39 per cent and cattle by 15 per cent.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Figures suggest that in 2009 the majority of farms (77 per cent) were run by the 'principal farmer' (1,093). This is an increase of 6 per cent from the 2000 year figure of 1,036. Principal farmers include landowners, their spouses and other business partners. Since 2000 there has been a small increase in the number of salaried managers, and a decrease in full time workers. Part time workers and casual / gang workers have also fallen slightly in number. The overall figure for farm labour workers in 2009 is 1,428; which is a decrease from the 2000 year figure of 1,457.

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.

Regular rectangular fields and land reclaimed from industrial sites are typical features of the Durham Coalfield Pennine Fringe

7. Key habitats and species

7.1 Habitat distribution/coverage

Mixed deciduous lowland woodland is frequent in steep sided river valleys and tributaries of the Wear and Derwent. Examples include Derwent Gorge and Horsleyhope Ravine SSSI, Shipley and Great Woods SSSI. Lowland heath is scattered and restricted to a few sites, and most are now designated as SSSI. There are also fragmented areas of upland heath to the west particularly in the Annfield Plain and Lanchester area. Heathland areas are often associated with lowland dry acid grassland, wet woodland, areas of fen and small ponds. Fragments of lowland meadows can also be found on ridges to the west, while small areas of species-rich neutral grassland persist, especially in river valleys. Underground coal mining workings and other industrial mineral extraction uses have caused local subsidence often creating large ponds and areas of fen, and have left valuable examples of open mosaic habitats on previously developed land.

Source: Northumbria Coal Measures Natural Area Profile

7.2 Biodiversity Action Plan (BAP) 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.

UK BAP priority habitat	Area (ha)	% of NCA
Broadleaved mixed and yew woodland (Broad habitat)	2,796	4
Lowland heathland	809	1
Upland heathland	341	<1
Lowland meadows	9	<1
Upland hay meadows	9	<1
Reedbeds	4	<1
Fen	3	<1
Blanket bog	3	0

Source: Natural England (2011)

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

8. Settlement and development patterns

8.1 Settlement pattern

Old agricultural villages and farmsteads are found on ridge tops or valley floors, and in less densely populated areas of the south and west. To the north east, settlement is denser with several industrial and urban centres visually prominent along ridge tops. These settlements tend to sprawl across the landscape with an urban fringe effect and mosaic of paddocks and allotments. Many settlements now have more recent estates of modern housing and industrial development. Occasional parklands and wooded estates surround small country houses. Relics of the mining industry include disused railway lines and viaducts, old coke ovens and small spoil heaps.

Source: Durham Coalfield Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

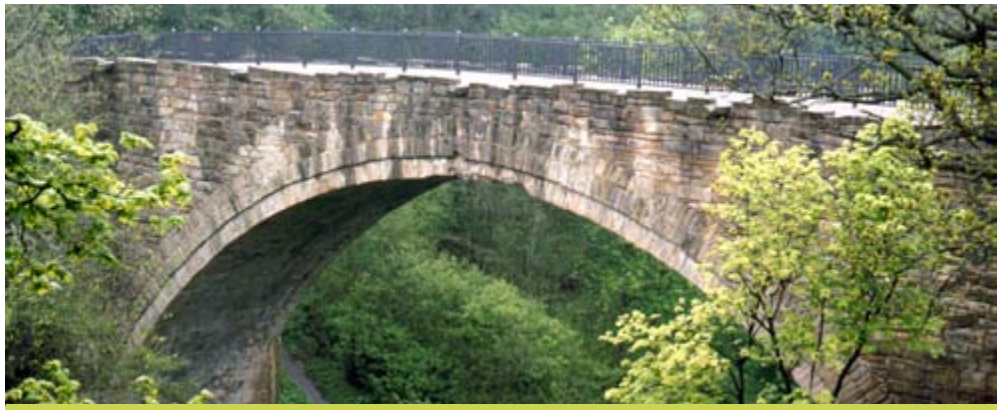
The main settlements are located primarily in the north along the ridges of the Annfield Plain from Consett in the east to Stanley in the west, and along ridges from Consett in the north- west via Crook to Bishop Auckland in the south east. The main settlements in population order are listed below: Bishop Auckland: Consett; Stanley; Crook; Shildon; Willington; Annfield Plain and Lanchester. The total estimated population for this NCA (derived from ONS 2001 census data) is: 198,136.

Source: Durham Coalfield Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

The denser settlements in the north-east vary in building styles, from local stone or brick workers' terraces to inter-war and post-war housing. The lower valleys have small nucleated villages and hamlets with outlying farmsteads - typically linear and courtyard forms, built in local sandstone with stone flag roofs.19th century regular courtyard farmsteads are a feature of the eastern and southern valleys. More common in western areas are traditional buildings, mostly dating from the late 17th century, and comprised of sandstone or Millstone Grit with stone flag roofs. To the west, linear farmsteads (mostly late 17th-19th century) predominate, with field barns of the late 18th and 19th century. Many settlements now have 20th century estates of modern housing and industrial development utilising modern conventional building materials

Source: Durham Coalfield Pennine Fringe Countryside Character Area description; Countryside Quality Counts (2003)



Historic structures, such as Causey Arch, serve as a reminder of the area's industrial past.

9. Key historic sites and features

9.1 Origin of historic features

The Pennine fringe has an essentially pastoral early history, with bronze and iron-age settlements based within a landscape of dispersed farmsteads, moors and woodland. The Roman Dere Street links forts at Binchester, Lanchester and Ebchester. During Anglo Saxon times, under the influence of the monastery of St Cuthbert, small villages surrounded by communal fields, separated by areas of common and waste, were established. Planned and highly regulated villages, often surrounding central greens, were frequent commonplace within the medieval Palatinate of Durham. Regular rows of facing house plots, tofts or garths are common. Coal mining on exposed seams dates back to pre- 12th century; but intensified in the 16th century as large collieries exported to the south of England and Europe. Wagonways gave way to railways as steam power also allowed greater depth of mining. The settled landscape across the north and east of the area was transformed as industrial villages were established and expanded next to the collieries in the 19th century.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 3 Registered Parks and Gardens covering 332 ha
- 0 Registered Battlefields covering 0 ha
- 32 Scheduled Monuments
- 787 Listed Buildings

Source: Natural England (2010)

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

10. Recreation and access

10.1 Public access

- 7 per cent of the NCA 4,479 ha is classified as being publically accessible.
- There are 1,282 km of public rights of way at a density of 1.9 km per km2.
- There are 0 National Trails within the NCA.

Sources: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	4	<1
Common Land	852	<1
Country parks	119	<1
CROW Access Land (Section 4 and 16)	2,868	4
CROW Section 15	283	<1
Village greens	124	<1
Doorstep greens	9	<1
Forestry Commission Walkers Welcome Grants	571	<1
Local Nature Reserves (LNR)	333	<1
Millennium Greens	21	<1
Accessible National Nature Reserves (NNR)	0	0
Agri-environment Scheme Access	5	<1
Woods for People	2,808	4

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 area is most tranquil in the core area and to fringe areas to the north and south west, where settlements are more widely dispersed. The larger settlements of Bishop Auckland, Consett and Stanley and their linking "A" roads are the least tranquil.

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

Category of tranquillity	Score
Highest	50
Lowest	-68
Mean	-3

Sources: CPRE (2006)

More information is available at the following address: **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 the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that the main area of intrusion follows the eastern boundary of the NCA from north to south linking to the adjacent Tyne and Wear areas of intrusion. In the north of the NCA, main road routes north east from Consett also show dense areas of intrusion. The southern NCA boundary going west to the fringes of the Pennines, and northwards to Consett remain largely rural with low levels of intrusion. A breakdown of intrusion values for this NCA are detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	45	51	53	8
Undisturbed	52	46	53	1
Urban	2	3	5	3

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are a minor increase in all categories of intrusion from the 1960s to 2007, with levels of disturbance rising by 8 per cent.

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

12. Data sources

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

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

Supporting document 2: Landscape change

Recent changes

Trees and woodlands

- There is evidence of tree planting between 1999 and 2003, especially in the Great North Community Forest area around Stanley.

- Between 1999 and 2003 there was a significant increase in the rate of uptake of Woodland Grant Scheme grants for management (~118 ha/yr), new planting (~56 ha/yr) and restocking (~28 ha/yr) of woodland.

Boundary features

- Between 2005 and 2013 Environmental Stewardship agreements in the NCA included options to: plant 3.29 km, restore 6.6 km and sympathetically manage 489.5 km of hedges; and restore 0.1 km and protect/maintain 397.5 km of drystone wall.

Agriculture

- Defra June agricultural census data shows that between 2000 and 2009 the number of holdings within the NCA classed as dairy farms fell from 58 to 28 (a reduction of 52 per cent), the number classed as cereal farms increased from 68 to 93 (+37 per cent) and the number classed as 'other types' of farms increased from 149 to 212 (42 per cent).

- Between 2000 and 2009 the area of oilseeds being grown in the NCA increased from 992 ha to 1,685 ha (+70 per cent), and the area of 'cash roots' (potatoes and sugar beet) increased from 72 ha to 97 ha (+35 per cent). Over the same period the number of all livestock classes fell: cattle from 43,036 to 36,490 (-15 per cent), sheep from 207,603 to 158,448 (-24 per cent) and pigs from 9,378 to 5,764 (-39 per cent).

- The numbers employed in agriculture remained roughly constant between 2000 and 2009, with the exception of the number of casual workers which reduced from 108 to 58 (-46 per cent).

Settlement and development

- Countryside Quality Counts evidence shows that there has been some expansion of urban fringe areas, and development in the rural areas beyond, especially in the north-east between Consett and Newcastle, which may be further affected by the additional housing development in the Newcastle-Gateshead Growth Point. Similarly, in the south around Bishop Auckland, there will be development connected to the Durham (South) Growth Point.

Semi-natural habitat

- Countryside Stewardship uptake for annual area features followed the national average between 1999 and 2003. Most extensive annual agreements in 2003 were for lowland pastures on neutral/acid soils (315 ha) and upland in-bye pasture (301 ha).

- Between 2005 and 2013 the most popular Higher Level Stewardship (HLS) options in the area related to maintenance/restoration of rough grazing for wading birds (114 ha and 61 ha respectively), maintenance of woodland

(99 ha), maintenance/restoration of species-rich grassland (81 ha and 62 ha respectively) and restoration of lowland heathland (51 ha).

- In terms of habitat creation, HLS agreements between 2005 and 2013 included 22 ha of arable reversion by natural regeneration, 21 ha of floristically enhanced field margins, 20 ha wet grassland for breeding waders and 2 ha of lowland heathland from arable and improved pasture.

- While some areas of semi-natural habitat will have been lost during the creation of open cast coal mines, restoration schemes now include restoration or creation of valuable semi-natural habitat, such as woodland, wetland and grassland.

- There have been a series of red kite reintroductions in the area, with 94 red kits being released around Gateshead between 2004 and 2006. Several locations within the NCA are now among the best places in the wider release area to view red kites, including Gibside, Burnopfield, Rowlands Gill and Barlow Fell.

Historic features

- In 1918 about 2 per cent of the NCA was historic parkland. By 1995 it is estimated that 46 per cent of the 1918 area had been lost. About 26 per cent of the remaining parkland was covered by a Historic Parkland Grant in 2003, and 23 per cent in an agri-environmental scheme. It is estimated that about 86 per cent of historic farm buildings remain unconverted and about 79 per cent are intact structurally.

- Loss of historic features has occurred on land used for open cast mining, with the restored landscapes thus lacking both archaeology and time-depth.

Rivers

- The biological water quality of rivers in 1995 was predominantly very good and chemical water quality predominantly excellent, and this status was maintained until 2003.

- Since 2007 the ecological status of water bodies has been monitored under the Water Framework Directive. In 2012 the ecological water quality of rivers within the NCA was generally moderate, with a few notable sections of poor status.

- The water quality in the River Wear has improved dramatically in the 21st century, and was named by the Environment Agency in 2011 as one of the most improved rivers in England and Wales.

Minerals

- No new open cast mines have opened recently in the area although new sites are still under consideration.

- A number of former open cast coal mines have been recently restored to create new semi-natural habitat (grassland, native woodland, heathland and ponds) and access routes, as well as agricultural land. These include a 55 ha site at Stoneyheap (completed in Oct 2007) and a 104 ha site at Southfield (completed in Oct 2005).

Drivers of change

Climate change

- Climate change in the north-east of England is predicted to result in warmer drier summers (increase of 1.5–4.5 °C, and decrease of 18–45 per cent precipitation by 2080), warmer wetter winters (increase of 1–3 °C, and increase of 10–28 per cent precipitation by 2080) and higher sea levels (6–66 cm by 2080). There are also likely to be increased frequency and intensity of extreme weather events in the form of heavy rainfall and storms leading to increased risk of flooding and coastal erosion.[4]

- Drier summers could lead to drought-stress for semi-natural habitats and agricultural crops. This in turn could lead to degradation and loss of certain habitats and species and increased abstraction of water for irrigation, with greater pressure on the Rivers Derwent and Wear, and the Kielder Water Scheme more widely. Increased levels of water abstraction and higher water temperatures could have negative consequences for water quality, fish and other aquatic species and may cause greater incidences of algal blooms.

- Warmer drier summers and warmer wetter winters could increase the growing season by between 40 and 100 days by 2080. This would provide improved conditions for the growth of biomass, both wood fuel and energy crops, and arable/horticultural crops.

- Warmer temperatures and changes in seasonal rainfall patterns could lead to changes in species composition of some habitats. There is likely to be a general northwards movement of species, possibly resulting in local extinction of those at the southern end of their range, with particular consequences for habitats characterised by presence of northern species.

- If summers become hotter and drier as predicted, this may lead to a drying out of peat soils beneath wetlands and moorland/heathland, which could lead to locally significant carbon loss (albeit from a relatively small area) as well as greater risk of wind/water erosion and colouration of drinking water supplies.

- Increased frequency of heavy rainfall events could increase water-logging of soil, run-off and flooding, in turn causing increased pollution, sedimentation of watercourses and flooding of vulnerable settlements. This, combined with increased frequency of rivers in spate, could have negative impacts on riparian species, such as water vole, and fish species, particularly those that rely on clean gravels for spawning.

- The fragmented nature of habitats in the Durham Coalfield Pennine Fringe means that many species may find it difficult or impossible to move as climatic conditions render current sites and habitats unsuitable.

[4] And The Weather Today Is – Climate Change in the North East, North East Assembly (2002)

Other key drivers

- There is likely to be continuing demand for renewable energy, notably for the installation of more wind turbines in the area. The location and design of wind farms and individual turbines will need to be carefully considered to maximise the energy contribution while avoiding negative impacts on the local landscape and environment.

- Development pressure is likely to continue with demand for additional housing and commercial premises bringing increasing urbanisation to parts of the landscape, and representing a potential threat to semi-natural habitats, species, water availability and quality, water flow, tranquillity and recreation. The challenge will be to meet the demand for development in ways that mitigate these risks and avoid priority sites and key landscape features. New development could present positive opportunities, such as creation of new green infrastructure, including provision of more access and recreation that help benefit health and wellbeing, installation of more permeable surfaces and sustainable drainage or rainwater harvesting systems and incorporation of energy/water efficient design.

- New development is most likely to be around existing settlement and transport routes to maximise economies of scale and reduce cost and pressure on transport infrastructure, thereby having greatest effect on the landscape of urban fringe areas. Opportunities for assimilating new development with tree or biomass planting should be explored.[5]

- The fragmented nature of many of the semi-natural habitats mean they are very vulnerable to outside influences such as agricultural run-off, invasive alien species and new diseases.

- Continuing and increasing demand for food provision, and subsequent economic and political encouragement to increase food production, could undermine ecosystem services if environmental impacts are not taken into account.

- Activities such as vandalism, inappropriate use of motorbikes, graffiti and fly-tipping are a problem in some parts of the NCA. Lighting fires is a particular threat to heathland sites.

[5] Durham Landscape Strategy, Durham County Council (2008)

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.

Lowland heath occurs in scattered patches, such as Greencroft and Langley Moor, where heathland is interspersed with mires and small ponds, as a result of local subsidence.

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: Protect, manage and enhance the major rivers, including the Wear and Derwent rivers, and their tributaries, to improve water quality, reduce flood risk and enhance their wildlife value and recreational use.	↘ *	↗ *	↗ **	↔ *	↗ **	↗ **	↑ ***	↑ ***	↗ **	↑ **	↗ **	↗ *	n/a	↗ **	↔ ***	↗ **	↗ **	↑ ***	↗ **
SEO 2: Protect, expand and connect semi-natural habitats, particularly heathland, and enhance the management of agricultural land to provide a range of benefits to people, wildlife and the wider environment.	↘ *	↗ *	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↑ ***	↗ **	↗ *	n/a	↗ ***	↗ *	↑ ***	↗ **	↑ ***	↔ *
SEO 3: Protect, enhance and connect trees and woodland in the area to improve their wildlife value, climate regulation capacity, biomass production and potential for access and recreation.	↘ *	↗ *	↗ *	↔ *	↗ ***	↑ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ *	n/a	↗ *	↔ *	↗ **	↗ **	↑ ***	↔ *
SEO 4: Protect, restore and enhance ex-industrial and brownfield sites, particularly former coal mines, for their historic and wildlife value, and improve access and interpretation in order to celebrate local tradition and culture and increase understanding of the area's industrial history and geodiversity.	↔ *	↗ *	↗ *	↔ *	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ *	n/a	↗ **	↗ *	↑ ***	↑ ***	↑ ***	↗ *
SEO 5: Seek to ensure that where there is new development it retains tranquil areas, is appropriate in a changing climate, provides high-quality green infrastructure and improves quality of life for local residents.	o	↔ *	↗ *	↔ *	↗ *	↗ **	↗ *	↗ **	↗ *	↗ *	↗ *	↗ *	n/a	↗ *	↗ *	↗ *	↗ *	o	o

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

National Importance; Regional Importance; Local Importance

Landscape attributes

Landscape attribute	Justification for selection
A rolling upland landscape of broad open ridges and valleys with a strong west to east grain.	■ Elevation ranges from 11 m to 370 m. ■ The main valleys are along streams and rivers that run primarily from the higher ground of the North Pennines in the west to the North Sea in the east. ■ The area overlies Coal Measures rocks (sandstone, mudstone and coal seams) of Carboniferous age, which were worn by glacial rivers into ridges and valleys running west to east during the last ice age.
A transitional landscape with pastoral farming on higher ground in the west giving way to arable and mixed farming in the valleys and to the east.	■ 73 per cent of land is grassland or uncropped, 18 per cent is used to grow cereals and 4 per cent for oilseeds.
A rural landscape heavily influenced by the mining and steel-making industries, in particular to the north and east.	■ Scattered mining and industrial settlements, of terraced and estate housing, occupying prominent sites linked by a network of main roads. ■ A number of settlements were built specifically to service local mines and processing plants and provide accommodation for their workers, particularly along railway routes in the 19th century. They include Stanley, Consett, Shildon and Tow Law.
Numerous plantations of conifers or mixed woodland, as blocks or shelterbelts, on hillside; in places more extensive conifer woodlands on hillsides.	■ 14.3 per cent of the NCA is covered with woodland (6 per cent conifers, 6 per cent broadleaved, less than 1 per cent mixed and 2 per cent other). ■ Many parts of the NCA are windswept and open; shelterbelts give important protection for buildings and livestock.
Wide, open, windswept ridges of regular large fields bounded by drystone walls and fences and crossed by straight roads. Isolated farmsteads.	■ Panoramic views from higher ridges into adjacent valleys and beyond to the North Pennines or Tyne and Wear lowlands. ■ Relatively low woodland cover, with the exception of some plantations and shelterbelts, on higher ground. ■ Stone walls are the primary boundary type, contributing to the openness of the landscape, as compared to hedgerows with boundary trees in the east.
Broad valleys of arable and mixed farmland with low hedges, strips of broadleaved woodland following rivers and streams, and conifer plantations on valley sides.	■ Ancient semi-natural woodland covers 4 per cent of the NCA and is largely confined to river valleys. ■ The lower eastern parts of the NCA have networks of hedges which have large numbers of hedgerow trees, contributing to a more wooded appearance in some areas.
Open cast coal workings form intrusive features in some areas and some restored open cast areas lack features.	■ Coal seams are close to the surface in the NCA, giving rise to numerous open cast mines, a small number of which are still active. ■ Restored soils, mostly from quarry and open cast spoil, cover 10 per cent of the NCA. ■ Early attempts at restoration have resulted in very obviously manmade landscapes with geometric patterns of boundaries and woodlands, unnaturally flat featureless landform and a lack of time-depth. ■ Large-scale, modern open cast coal mines are very different in terms of size, appearance, longevity, employment and local impact to the traditional smaller deep pit mines.
Scattered small country houses, set within parkland and well-wooded estates.	■ Many smaller country houses and estates with parkland and woodland, as well as 3 Registered Parks and Gardens, fall partly or wholly within the NCA, covering 332 ha (Gibside, Auckland Castle Park and a small part of Raby Castle).

Landscape opportunities

- Expand and connect semi-natural habitats, particularly native woodland, grassland, heathland and wetland, to create more resilient ecosystems and allow native species to move through the landscape.
- Protect and maintain mature and veteran trees, particularly in parklands and hedgerows, by carrying out sympathetic management, such as avoiding compaction or cultivation of ground around tree roots, and by planting or encouraging regeneration of new trees to replace veterans as they die.
- Increase the broadleaved component of coniferous plantations.
- Restore plantations on Ancient Woodland Sites (PAWS) using local provenance broadleaved species wherever possible.
- Create buffer strips of grassland and woodland along watercourses to strengthen the natural character of watercourses, while improving the value of riparian habitat for wildlife and protecting water quality.
- Manage and restore field boundaries using materials and styles appropriate to the area.
- Improve landscape, biodiversity and access value of reclamation sites through improved design, planting and habitat management involving local communities where possible to foster understanding and a sense of ownership. Seek ways of improving the integration of restored industrial sites into the wider landscape, through tree and hedge planting that links with local patterns of hedgerows and woodlands, and providing access routes.
- Protect the few remaining tranquil areas from intrusion and development, particularly river valleys, woodlands and heathland.
- Protect industrial archaeology, and improve access to and information about, former coal mining and other industrial sites, in ways that celebrate the important contribution of coal mining and steel–making made to the identity and past economy of the area.
- Assimilate new development into the landscape, by using sympathetic and sustainable design, incorporating green space and using tree and shrub planting, including biomass where appropriate.
- Protect and maintain traditional farm buildings and archaeological sites, particularly earthworks.

Ecosystem service analysis

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

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

The number of wind turbines in the NCA have increased in recent years, such as these at Tow Law.

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Soils Farmland Semi-natural habitats (moorland, grassland, wetland) Allotments	The majority of agricultural land within the NCA (73 per cent) is grassland or uncropped land. Grassland is primarily pasture used for grazing sheep and cattle, and red meat is the main food product from this NCA, along with some dairy and poultry. Arable farming is primarily concentrated along the lower lying land on the northern and eastern sides and in the valleys, on the better agricultural land. 51 per cent of the agricultural land is classified as Grade 3, and 37 per cent Grade 4. There is a strong tradition of people growing their own food on allotments, particularly around ex-mining towns.	Regional	Continued high demand for food, high commodity prices, and possibly climate change are likely to encourage intensification of food production. Intensification of agriculture could be undertaken in a way that minimises negative impacts and maximises the contribution to local wildlife and ecosystem services. The fact that the arable crops in this area are part of a mixed farming landscape may be advantageous in that it facilitates management such as using manure on arable land to increase soil organic matter and it increases the chance of benefitting from insect pollinators and pest predators, which may be associated with adjacent grassland/ hedges/ semi-natural habitats. A number of farms sell direct to consumers through farm shops and run box-schemes, primarily for meat. Allotments are a strong cultural element in some parts of the NCA, particularly around mining villages where allotments were provided by the National Coal Board, on which people could keep livestock and horses, as well as growing vegetables. These sites have generally been bought by councils since the closure of the mines, and remain in use as municipal allotments.	Where intensification takes place, encourage sustainability through new techniques (such as yield mapping, precision farming, integrated crop management), and uptake of agri-environment schemes, to optimise food production, minimise environmental damage and improve conditions for farmland wildlife. Encourage the continuation of mixed farming. Encourage low intensity grazing with traditional breeds especially on under-managed semi-natural habitat. Protect existing allotment sites and encourage their use by a diverse cross-section of local people, for a range of environmental, social and quality of life benefits.	**Food provision** **Biodiversity** **Sense of place / inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Woodland Soils	The overall woodland cover is relatively high at 9,477 ha or 14.3 per cent of the NCA (compared to the national average of 9.9 per cent). There are nearly equal amounts of coniferous and broadleaved woodlands. Much of the NCAs woodland is confined to semi-natural woodland in steep river valleys and a few large commercial conifer plantations on higher ground. Commercial woodland includes, Chopwell Wood (360 ha mixed plantation with some PAWS restoration) and Hamsterley Forest (timber producing forest, well used for recreation). There are 4 sawmills in the area.	Regional	For the North East region as whole in 2006 over half a million tonnes of timber are harvested.[6] A million tonnes of timber are processed by the region's chipboard industry and sawmills, four of which are found in this NCA.	Sustainable management of coniferous plantations, with reversion to broadleaved where feasible (particularly on PAWS sites) could help to provide timber and woody biomass, restore ancient woodland and improve the value of the site for wildlife and offer opportunities for improved access and recreational activities. Make best use of waste and by-products from timber processing in the area, particularly for biomass fuel. Explore opportunities to strengthen the supply of the area's sawmills with locally produced timber, thereby reducing transportation distances and fuel use.	**Timber provision** **Biomass energy** **Recreation**

[6] The Regional Forestry Strategy for the North East of England, North East Forestry Action Group (2006)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Several major rivers and their tributaries High rainfall Woodland Other semi-natural habitats	The NCA has no major aquifers. Surface water resources of the NCA have 'water available' status. The upper quarter of the NCA lies within the Tyne CAMS (Catchment Abstraction Management Strategies) area and contains the stretch of its tributary, the River Derwent which lies downstream of Derwent Reservoir (in North Pennines NCA). The sensitivity to abstraction of the ecology of this stretch of the River Derwent within the NCA is rated as 'Very High'. Water levels in the River Derwent are supplemented from the Derwent Reservoir, to ensure availability of water for domestic and industrial abstraction. The remainder of the NCA lies in the Wear CAMS area and contains part of the River Wear as well as stretches of its tributaries the Rivers Browney, Deerness and Gaunless. Principal uses of water abstracted from these catchments are for domestic and industrial water supply. The area's rivers are connected to the Kielder Water Scheme, the first regional water grid in the UK. It allows for water to be fed from Kielder Water Reservoir (in the Border Moors and Forests NCA) into the Tyne, Tees and Wear rivers. This transfer system ensures a supply of potable water for industrial and domestic use in the conurbations of Tyneside and Wearside, maintains minimum flows to maintain the ecological quality of the rivers (to meet Water Framework Directive requirements) and enable upstream migration of salmonids. [7, 8]	Regional	As the area of development and settlement increase within the area, so too does the demand for water. Measures should be incorporated into new developments to minimise water use and to harvest and re-use rainwater. New woodland and wetland creation could help to slow run-off and regulate water movement through the NCA, ensuring a more consistent availability of water throughout the year. Tree planting to increase timber production should be focused on areas where it can help slow run-off, protect water quality, and will not detract from other ecosystem services (sense of place, food production, sense of history etc).	Ensure continued operation of the innovative Kielder Water Scheme to maintain water supply for homes and businesses, as well as the benefits it provides for water quality, habitats and wildlife. Plan for new development to include rainwater harvesting and features to minimise water consumption. Manage and expand areas of woodland and other semi-natural habitats to slow run-off of rainwater, thereby moderating peak and low-flow levels in rivers and helping to maintain consistent availability of water.	**Water availability** **Regulating water quality** **Biodiversity**

[7] The Tyne Catchment Abstraction Management Strategy, Environment Agency (2005)

[8] The Wear Catchment Abstraction Management Strategy, Environment Agency (2006)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Traditional breeds	The NCA has 4 HLS agreements which include the Native Breeds at Risk supplement, covering 161.64 ha.[9] Some of the farms in the area that sell direct to consumers supply rare breed meat. The NCA does not have a strong association with any particular rare breed. Farms within the area have a mixture of breeds, such as Aberdeen Angus and Belted Galloway, which originate from different parts of the UK.	Local	Traditional breeds can be valuable for managing semi-natural habitats that provide only marginal grazing, such as heathland and rough/wet grassland, because they are hardier and can thrive in poor weather and on exposed sites, they require little supplementary feeding and some are smaller breeds are smaller and lighter than conventional breeds and cause less damage and poaching to sensitive sites.	Encourage the promotion and development of supply chains and markets for high quality local produce from traditional breeds, Encouraging a green economy that supports local tourism. Encourage low intensity grazing with traditional breeds on under-managed semi-natural habitat to improve the quality of the habitat and maintain viable numbers of rare breed livestock in the NCA.	**Genetic diversity**

[9] Genesis Schemes Reporting System (GENREP), Natural England (January 2013)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Existing woodland Biomass crops Soils	Potential for woody biomass provision in this NCA is good, as woodland cover is 9,477 ha (14.3 per cent of the NCA). Areas of existing commercial woodland include Hamsterley Forest and Chopwell Wood. This NCA has generally high potential yield for Short Rotation Coppice although medium or low along parts of its western edge as the land rises up to the Pennines. Potential miscanthus yield is generally medium but low along parts of the higher ground in the west. Some short rotation coppice is grown in this NCA to supply the Wilton10 woodburning power station at Teesside, the whole of the NCA being within the prescribed 80-km radius for sourcing fuel. There are 4 sawmills, 3 major woodfuel suppliers and 4 major woodfuel boilers (total capacity of 830 kwH) in the NCA. This NCA has generally high potential yield for short rotation coppice and medium potential yield for miscanthus.[10]	Regional	Biomass crops, particularly short rotation coppice and miscanthus are tall and can have a significant impact on the landscape. They can also be used to assimilate new developments into the landscape. The management of conifer plantations and the timber processing industry will both give rise to waste wood products that can be used for energy generation. Such re-use of waste products should be encouraged and maximised wherever possible. Some of the existing woodland in the area is not actively managed. Re-introducing management such as thinning, selective felling and restocking, can provide a useful source of woody biomass and increase the wildlife value of the woodland. However, in some contexts the lack of disturbance in woodland can be extremely valuable for disturbance-sensitive species, so intrusive management should be avoided on the most sensitive sites. New woodland creation, to increase woody biomass production should be focused on areas where it will not detract from other ecosystem services such as, sense of place, food production, sense of history etc, and where it can contribute to other ecosystem services, for example, reducing flood risk/soil erosion, creating habitat networks.	Encourage use of waste products from forest management and timber processing for biomass for energy production. Reinstate management of unmanaged woodland, where appropriate, to extract or coppice trees and produce biomass fuel. Explore opportunities to use short rotation coppice or miscanthus to assimilate new developments and produce biomass. Create new woodlands for production of woody-biomass, where it will also help to tackle soil erosion, water pollution, flooding, and where it will connect existing woodlands.	**Biomass energy**

[10] Opportunities and Optimum Sitings for Energy Crops, Natural England (November 2010; URL: www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/015.aspx)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Soils Woodland Other semi-natural habitats	The soils over much of the NCA have a low carbon content (0–5 per cent) but there are scattered patches of peaty soil with higher carbon content. Carbon storage is also provided by the 9,477 ha of woodland within the NCA (14.3 per cent of its area). Higher soil carbon levels are also likely to be associated with the NCA's heathland and wetland habitats. Peaty soils under heather moorland provide significant carbon storage.	Local	The NCA currently offers limited carbon sequestration and storage, due to the low carbon content of its soils. This could be improved by the addition of organic matter to raise soil carbon. Small patches of peaty or high organic matter soils with a higher carbon content associated with the NCA's heathland and wet woodland habitats are a valuable asset, as is the woodland cover. The carbon sequestration and storage capacity of these habitats could be improved through expansion of the habitats and appropriate management, particularly maintaining vegetative cover in the case of heathland and avoiding or reversing drainage where appropriate. Expanding these habitats could also help to mitigate the effects of extreme weather events, for example by preventing soil erosion, catching sediment run-off, slowing down rainwater run-off, therefore reducing severity of flooding. Encouraging greater on-farm efficiency in fuel, machinery and input use, through measures such as precision and minimum-tillage farming, could help to reduce green house gas emissions from agriculture, particularly arable. This NCA has good potential to help with local adaptation to climate change. This should be taken into account in the design of new developments and associated planting, and in the targeting of agri-environment options.	Create, restore and expand areas of wetland, woodland and heathland to increase the carbon sequestration and storage potential of the area's land cover and soils. Secure appropriate management of heathland, wetland and woodland sites to maximise soil organic matter content, minimise greenhouse gas emissions and harness their potential to mitigate the effects of extreme weather events. Encourage agricultural best practice to protect and increase soil organic matter and reduce greenhouse gas emissions resulting from fuel, machinery and input use. Ensure that new developments include features to aid adaptation to a changing climate, such as green roofs, tree-planting for shade and sustainable drainage systems.	**Climate regulation** **Regulating soil quality** **Regulating water quality** **Biodiversity** **Regulating soil erosion** **Regulating water flow**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Several major rivers and their tributaries Soils Semi-natural habitat	The ecological status of rivers in the NCA is generally 'moderate', as is that of the Tyne and Wear estuaries into which they ultimately drain. This means they are currently failing Water Framework Directive requirements. A few short sections of watercourses are rated as poor and bad, with Smallhope Burn being of bad ecological status at Lanchester and South Grain, Bedburn and Euden Beck among those with stretches of 'poor' ecological status. The Derwent and Wear are good chemical status within the NCA, with smaller tributaries not assessed. Specific pollutants affecting watercourses include phosphates and hydrocarbons from coal.[11] The chemical status of groundwater is poor, although there are no major aquifers.[12] The water quality in the River Wear has improved dramatically in the 21st century, and was named by the Environment Agency in 2011 as one of the most improved rivers in England and Wales. 50 per cent of the NCA is designated as Nitrate Vulnerable Zone. There are no Catchment Sensitive Farming priority catchments in the area. There is some grip blocking in upland areas outside this NCA which has improved water quality by reducing the amount of peat suspended inflowing water. Pollution in rivers and streams from minewater and industrial effluent has improved significantly over recent years, although some remain severely polluted.	Regional	Threats to water quality in the area include: ■ Diffuse pollution from agriculture (particularly in the south east of the area). ■ Water pollution from disused coal and metal mines. ■ Pollution from urban areas and water treatment works. Durham Wildlife Trust have worked with Durham University to identify priority areas where land management changes are most needed to address diffuse pollution of watercourses by agriculture. The top ten priority sites for the Tyne and Wear catchment that also fall within this NCA are: Smallhope Burn at Lanchester; Deerness north east of Esh Winning, Deerness at New Brancepeth; Wear south west of Willington; Wear west of Binchester; and Cong Burn north and north west of Edmondsley. Creation of foot slope wetlands is suggested as one way of reducing the sediment and pollution risk in these areas. The Kielder Water Scheme can help to lessen the impact of pollution incidents, by releasing water if there are pollution incidents downstream, thereby diluting the pollutants and minimising negative impacts.	Create buffer strips of grassland or woodland along rivers and streams to reduce soil erosion, reduce run-off of agricultural chemicals and nutrients and to support riparian wildlife. Explore a range of options for reducing pollution of watercourses by disused mines, including creation of reedbeds and mine restoration schemes. Incorporate reedbeds into mine or quarry restoration schemes where appropriate. Encourage sympathetic management of farmland adjacent to rivers and streams, in the form of buffer strips, appropriate application of fertilisers and pesticides, application of manure and chemicals in appropriate weather conditions, good soil management, good farm infrastructure and other measures to minimise the risk of pollution incidents. Establish permanent grassland in arable areas at high risk of soil erosion, through actions such as arable reversion on the most vulnerable fields, creation of in-field grass strips on vulnerable sloping ground or creation of settlement ponds/sediment traps to intercept run-off. Explore opportunities for creation of wetlands in areas of high erosion and pollution risk, particularly at the foot of sloping land where they can intercept run-off and act as a sediment trap. Encourage use of sustainable drainage systems in new development, with measures such as permeable ground surfacing, green roofs and rainwater harvesting.	**Regulating water quality** **Biodiversity** **Recreation** **Food production** **Water availability** **Regulating water flow** **Regulating soil erosion**

[11] Environment Agency Interactive Maps – River Basin Management Plans, Environment Agency (accessed June 2013; URL: www.environment-agency.gov.uk/homeandleisure/37793.aspx)

[12] 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 flow	Soils Semi-natural habitats	The NCA falls into two main catchments – the Wear and the Tyne, incorporating stretches of the Rivers Wear, Derwent, Browney, Deerness and Gaunless. The headwaters of these rivers drain from the remote moorland, over soils often saturated by heavy rainfall, and flow rapidly through narrow, steep valleys, leading to downstream flood risk. There has previously been some localised flooding of low lying agricultural land and areas such as Stanley Burn. Settlements within the NCA with greatest flood risk are Lanchester on the River Browney, and West Auckland and South Church on the River Gaunless. The greatest flood risk from the rivers that pass through this NCA is to properties downstream in settlements such as Newcastle and Gateshead in the Tyne catchment, and Durham and Chester-le-Street in the Wear catchment. [13, 14] The Kielder Water Scheme helps to maintain minimum flow levels by transferring water from reservoirs upstream at times of low rainfall and allows additional flows to be released for both domestic and industrial abstraction. The forestry and woodland of the area help to reduce the speed at which rain runs off land into rivers and improve infiltration of rainfall. The extensive area of grassland (35,044 ha, 73 per cent of the NCA) will also aid infiltration of rain water and slow run-off.	Regional	Good upland land management practices upstream of the NCA for example, managing heather moorland to ensure a good vegetative cover so that rainfall infiltrates and is captured, and grip blocking in some instances, can help to mitigate extreme flows. Climate change may result in more frequent and intense storm events, and this combined with the already high rainfall and impermeable geology may give rise to a greater number of flood events. There may be scope for expanding flood storage areas in some parts of some of the wider river valleys, and for using wetlands and wet woodlands, to store water within flood plains and to reduce speed of run-off from other land. Maintaining good soil structure on agricultural land can play an important role in slowing run-off of rain, and reducing the incidence of standing water. Management practices such as incorporation of organic matter, minimum tillage and aeration, alongside avoidance of compaction and capping (through controlled farm traffic, varied cultivation depth and avoiding machinery use in very wet conditions) can help to maintain good soil structure.	Ensure continued operation of the innovative Kielder Water scheme to maintain minimum flow levels in the NCA's rivers. Encourage planting of buffer strips, of grassland or woodland, alongside watercourses and on slopes vulnerable to high-speed run-off, to slow run-off of rainwater into watercourses. Encourage agricultural practices which enhance and protect soil structure (such as incorporation of organic matter, minimum tillage, aeration, 'controlled farm traffic', varied cultivation depth and avoiding machinery use in very wet conditions), to aid infiltration of rainwater and slow run-off and flooding.	**Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Regulating soil quality**

[13] Tyne Catchment Flood Management Plan Summary Report, Environment Agency (December 2009; URL: www.environment-agency.gov.uk/research/planning/33586.aspx)

[14] Wear Catchment Flood Management Plan Summary Report, Environment Agency (December 2009; URL: www.environment-agency.gov.uk/research/planning/33586.aspx)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soils and soil biodiversity Semi-natural habitats	There are 6 main soilscape types in this NCA: ■ Slowly permeable seasonally wet acid loamy and clayey soils, covering 72 per cent of the NCA; ■ Restored soils mostly from quarry and open cast spoil (10 per cent); ■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (8 per cent); ■ Freely draining slightly acid loamy soils (5 per cent); ■ Slowly permeable wet very acid upland soils with a peaty surface (2 per cent); and ■ Freely draining flood plain soils (2 per cent). The 1,150 ha of heathland, the 3,770 ha of broadleaved woodland (particularly 1,115 ha of ancient semi-natural woodland) and to a lesser extent the large area of permanent pasture, are likely to have soil of higher quality in terms of organic matter content and structure, particularly where there is limited use of vehicles/heavy machinery.	Local	The main threats to soil quality in this area are from excessive vehicle use or poorly timed cultivation in arable areas (causing compaction, panning and poor structure) and poaching and compaction on livestock grazing land. The slowly permeable seasonally wet acid loamy and clayey soils that cover 72 per cent of the NCA are easily damaged when wet, and prone to compaction and capping. In turn this may lead to increasingly poor water infiltration and diffuse pollution as a result of surface water run-off. Management measures that increase organic matter levels can help reduce these problems. The restored soils, mostly from quarry and open cast spoil, that cover 10 per cent of the NCA are often made up of a mix of different soils, with a loss of the original topsoil layer, making them difficult to manage. These soils are frequently compacted which affects rooting and makes it difficult for moisture to penetrate, in turn making them droughty in summer and very wet in winter. Careful timing of farming activity can help to minimise these threats by avoiding machinery use in very wet conditions and heavy stocking on wet ground. Recent wet winters have made it very hard for farmers to avoid machinery use or grazing when ground conditions are unsuitable. If the pattern of wet summers or autumns continues this will present serious challenges for the protection of soil quality and may necessitate changes in farming practice, drainage or machinery – with knock-on implications for water quality, biodiversity and soil erosion. Climate change may result in prolonged spells or either drought or waterlogged conditions, with knock on effects for food production, soil erosion and water pollution. Increased levels of soil organic matter could help alleviate the most severe impacts in both cases.	Encourage agricultural practices which protect soil structure and organic matter content, such as incorporation of organic matter, minimum tillage techniques, controlled farm traffic, cover crops/green manure and appropriate timing of farming operations. For example, avoiding poaching and compaction where possible. Encourage use of integrated crop management (particularly minimising use of pesticides) and enhanced welfare livestock management (particularly to reduce use of veterinary medicines such as wormers) so as to protect soil micro-organisms, maintain soil quality and maximise food production. Encourage good management of existing semi-natural habitats and restoration/creation of other areas, for the benefit of the structure and organic matter of associated soils.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Biodiversity** **Food production** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Soils Semi-natural habitats	The slowly permeable seasonally wet soils and freely draining flood plain that cover 82 per cent of this NCA are at low risk of soil erosion. There are no Catchment Sensitive Farming priority catchments in the area. The 1,150 ha of heathland, the 3,770 ha of broadleaved woodland (particularly 1,115 ha of ancient semi-natural woodland) and to a lesser extent the large area of permanent pasture, are likely to have low risk of soil erosion, and by slowing the run-off of rainwater, limit erosion on land downslope.	Local	Areas at high risk of erosion include: ■ Restored soils from quarry, coal mining and open cast spoil (10 per cent of NCA), which are often compacted, preventing rainfall from infiltrating and leading to erosion by surface water flows. ■ Freely draining slightly acid loamy soils (5 per cent of NCA) can erode easily on steep slopes, especially where vegetation is removed or where organic matter levels are low after continuous cultivation. There is the potential for wind erosion on some coarse textured cultivated variants ■ Slowly permeable wet very acid upland soils with a peaty surface (2 per cent) are at risk of water and wind erosion and carbon loss when they dry out, for example as a result of drainage or climate change. Durham Wildlife Trust and Durham University have used fine sediment risk mapping of the Tyne and Wear Catchment to identify areas most at risk of receiving and delivering fine sediment, and priority areas for using wetland creation to help reduce erosion and delivery of fine sedimentation. Twenty high risk areas were identified in the NCA, including stretches of; the Derwent from Burnhope Burn to River Tyne; Cong Burn from source to Twizell Burn; Deerness from Hedleyhope Burn to Browney; Wear from Swinhope to Browney; and Gaunless from Hummer Beck to Wear.	Encourage creation of buffer strips in areas prone to erosion, such as steep slopes and restored industrial sites, to both slow run-off and intercept sediment. Encourage farming practices which enhance soil structure and organic matter content so as to maximise infiltration and minimise run-off, such as minimum tillage, incorporation of organic matter, cover crops/green manure and appropriate timing of farming operations. In severe cases of soil erosion, explore opportunities for conversion of arable land to permanent grassland. Ensure good vegetative cover on heathlands and grassland and good ground flora coverage in woodland, particularly newly planted woodlands.	**Regulating soil erosion** **Regulating soil quality** **Food provision** **Regulating water quality** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural habitats (heathland and moorland) Pollinator species	There is a lack of direct evidence about this service in the NCA. However, the lowland heath (341 ha), upland moorland (809 ha), hay meadows, hedgerows and flower-rich road verges will all act as valuable nectar sources for pollinating insects in the NCA. The proximity of these habitats to arable land means that there is good potential for this service to be provided within the NCA.	Local	The most significant need for pollination of agricultural crops in this NCA is for the 1,685 ha of oilseeds. The remainder of the arable crops in the area are largely wind or self-pollinated, with the exception of some of the crops grouped into the 'other arable crops' category of the June Census, which accounted for 169 ha in 2009 and includes insect-pollinated crops such as beans. Pollination is an important service for the large number of allotments around towns and villages in the area. The mixed nature of farmland, interspersed with hedges, in the east of the NCA will have good potential for pollination services. Hedgerows will be a particularly valuable food source and habitat for pollinating insects if they are left more than 1 year between cuttings, and if they have flower rich margins alongside them.[15] Less frequent cutting of hedges will also allow shrub species to produce more fruit, thereby benefitting a range of insects, mammals and birds. Creating nectar rich habitats to support pollinating insects benefits a range of other wildlife, particularly insectivorous small mammals and birds as well as bats.	Encourage less frequent cutting of hedges and manage the timing of cutting road verges to allow more profuse flowering, thereby supporting more nectar feeding insects, and providing fruit for insects, birds and mammals over winter. Create strips and small areas of nectar-rich habitat on/next to arable land, in the form of nectar flower strips, flower-rich grass buffer strips, beetle banks, arable-flora rich headlands, particularly where these can provide links between isolated flower-rich grasslands and heathlands. Protect and expand where appropriate, the existing flower rich habitats, particularly unimproved grassland, meadows and heathland, and create new areas where possible, to provide additional nectar sources and habitat. Encourage use of integrated crop management techniques, particularly use of biological rather than chemical pest control, to avoid harm to non-target pollinating insects. Support research into the extent and value of natural pollination services, and communicate results to farmers.	**Pollination** **Food provision** **Biodiversity** **Regulating water quality** **Sense of place / inspiration**

[15] Ecosystem Services from Environmental Stewardship that Benefit Agricultural Production, Natural England (2012)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Semi-natural habitats Beneficial predator species	There is a lack of direct evidence about this service in the NCA. However, good habitat likely to support beneficial predators next to arable crops, such as hedgerows/buffer strips/flower-rich road verges/beetle banks, act as valuable nectar sources for pollinating insects in the NCA.	Local	There is evidence to suggest that certain habitats, for example hedges, flower rich buffer strips and unimproved grassland, can support populations of beneficial predator species which can help control common agricultural pests (for example ladybirds and aphids).[16] Habitats which provide a nectar source, shelter and additional prey species, such as the NCA's hedgerows, grasslands, woodlands and heathlands all have the potential to increase beneficial predator numbers. Where these, or temporary flower-rich habitats such as buffer strips or beetle banks, occur alongside arable crops, as they do in the east of the NCA, there is good potential for this service to be provided within this NCA. If the approach could be perfected for this area, to maximise the agronomic benefits, it could play a valuable role in terms of increasing production of arable crops while reducing use of pesticides and associated risk to water quality, human health and non-target species.	Encourage less frequent cutting of hedges and manage the timing of cuts to road verges to allow better habitat to develop for species of invertebrate and birds which can control crop pests. Encourage creation of buffer strips and beetle banks in arable fields, particularly through agri-environment schemes. Encourage use of integrated crop management techniques, particularly use of biological rather than chemical control, to avoid harm to non-target beneficial predator species. Support research into the extent and value of natural pest control services, and communicate results to farmers.	**Pest regulation** **Food provision** **Biodiversity** **Regulating water quality**

[16] Ecosystem Services from Environmental Stewardship that Benefit Agricultural Production, Natural England (2012)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	Geology Topography Semi-natural habitats Several major rivers and their tributaries Field boundaries Historic assets	As this area is a transitional NCA between upland and lowland its sense of place changes, particularly from the upland west to the lowland east. Key elements making up the sense of place are the landform (ridges running west-east), river valleys, mining and mineral industries and associated settlements.	Local	The sense of place in the area has undergone dramatic changes in recent years, from one of heavy industry, with many coal mines and steel factories, to a more rural/urban fringe character as land has been restored and industrial infrastructure removed. Mining still plays a part in local culture and sense of place, as evidence by local people's participation in the Durham Miner's Gala. Higher land in the NCA can offer some dramatic windswept views, and historic parklands provide some very picturesque scenery. Communities value their local greenspaces as places of local distinctiveness that provide opportunities to engage with nature close to where they live and work, and that help encourage a sense of community.	Manage and restore field boundaries, as appropriate to their location, such as walls in the west, hedges to the east, use local stone, locally appropriate hedge-plants and traditional styles. Retain and sympathetically manage historic parkland and veteran trees, planting future replacements for veteran trees where appropriate. Retain and sympathetically manage characteristic semi-natural habitat, particularly heathland, riparian habitat and native woodland. Improve provision of information about key historic industrial sites, particularly where they have been converted to amenity uses such as access routes and nature reserves. Facilitate celebration of the coal-mining and steel-producing history of the area, and the contribution it made to local economy, culture and landscape.	**Sense of place / inspiration** **Sense of history** **Biodiversity** **Recreation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Geology Grassland (for well-preserved archaeological earthworks) Settlements Field boundaries (historic boundary patterns) Semi-natural habitats Historic assets	The overriding sense of history in this area is that of deep-pit coal mining and steel-production. This has left its mark not only in the settlement style and pattern and infrastructure such as railways, but also a strong mark on local culture and identity. 32 Scheduled Monuments, including several considered 'High Risk' by English Heritage such as Lanchester Roman Fort (cultivation), Remains of the Stockton and Darlington Railway (deterioration due to lack of management). 787 Listed Buildings. Some underground earthworks, including scheduled monuments, are still subject to arable cultivation (such as Lanchester Roman Fort). Three Registered Parks and Gardens covering 332 ha, and many smaller country houses and estates. In 1918 about 2 per cent of the JCA was historic parkland. By 1995 it is estimated that 46 per cent of the 1918 area had been lost. About 86 per cent of historic farm buildings remain unconverted, and approx. 79 per cent are structurally intact.[17] Particularly significant historic remains in the area include the Roman forts and Dere Street Roman road, substantial areas of ridge and furrow, early agricultural villages, and infrastructure, sites and settlements associated with the coal-mining and mineral industry from 16th century onwards.	Regional	Industrial infrastructure and sites have been given a new purpose in some cases, with creation of cycle routes along disused railways and nature reserves at reclaimed colliery sites. Provision of information at such sites could be strengthened to highlight the historical and cultural associations of these features/sites. Conversely, some early restoration schemes of open cast mining sites have resulted in the removal of historic features and creation of obviously manmade landscapes lacking time-depth. The location, layout and building materials of settlements give a very strong sense of history, from traditional agricultural villages to the 18th and 19th-century mining and steel towns. Small heathland sites, hay meadows and ancient woodland give a sense of history in that these habitats would once have been far more widespread in the area. Parkland and small country estates with ancient trees also make a valuable contribution to the sense of history.	Protect and maintain existing archaeological sites. Encourage farmers to reduce cultivation on earthworks either by reverting arable land to grassland or by introducing minimum tillage techniques. Encourage maintenance and restoration of historic buildings using traditional materials and techniques. Support provision of training in traditional building techniques. Improve provision of information about key historic industrial sites, particularly where they have been converted to amenity uses such as access routes and nature reserves.	**Sense of history** **Sense of place / inspiration** **Recreation** **Biodiversity**

[17] Countryside Quality Counts, Countryside Agency (2003)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Open spaces Semi-natural habitats Rivers and denes Woodlands	The NCA has relatively low levels of tranquillity, with a mean value of -3 (highest 50, lowest -68).[18] Undisturbed areas have decreased from 52 per cent in the 1960s to 42 per cent in 2007 (CPRE Intrusion Map, 2007).[19] Large parts of the NCA are classified as having 'brighter' night skies.[20] The most tranquil parts of the NCA with the least intrusion and light pollution are in the more rural south west section of the NCA.	Local	As the NCA has generally low levels of tranquillity, the small pockets of peace and quiet are particularly important. The river valleys, ravines and denes are very important in this respect, as are the more rural areas of the NCA with their dark night skies. Allotments, parks and other greenspaces also provide spaces of relative tranquillity for local residents. Reclaimed industrial sites could be improved to enhance their sense of tranquillity.	Protect existing tranquil sites from intrusion by development and new infrastructure. Encourage use of non-motorised transport, particularly to local green spaces. Plan for reduced light pollution and increased green infrastructure in associated with new developments. Seek opportunities to promote the calming and restorative effect that contact with tranquil and sensory environments have on public health and wellbeing.	**Tranquillity** **Biodiversity** **Recreation**

[18] Mapping Tranquillity, Campaign to Protect Rural England (CPRE) (2006)
[19] England's Fragmented Countryside: North East – Intrusion Statistics, CPRE (2007)
[20] Light Pollution Map North East, CPRE (2003)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Open spaces Semi-natural habitats (woodland, heathland, moorland) Rivers Restored industrial sites Disused wagonways and railways	The NCA offers a network of rights of way totalling 1,282 km at a density of 1.9 km per km^2 as well as open access land covering 1,168 ha (~4 per cent of the NCA). There is particularly good access to open green space for residents in the west of the NCA. In addition, the paths that now follow disused railway lines and wagonways provide connections between historic rural and industrial settlements and provide a valued recreational resource as well as a network of routes for commuting to work. Rivers form an important resource for recreation in terms of fishing, swimming and kayaking. Woodland and forestry plantations are another important resource. Hamsterley Forest and Chopwell Wood, in particular, provide recreational opportunities near the urban fringe. Bishop Auckland Castle and Auckland historic park and garden are some of the tourist attractions in the area.	Local	Woodland and forestry plantations in the NCA are a particularly important resource for recreation, and have in recent years been the focus of work to explore the benefits of recreation in woodland for physical and mental health benefits. The Chopwell Wood Health Pilot delivered educational visits for school children and a programme of activity for people referred for health reasons by local GPs. The pilot ran for 15 months from May 2004 and found that the activities for children increased awareness of healthy lifestyles and nature. Of the adults surveyed, 60 per cent felt visiting the woods had positive impacts on their physical health and 40 per cent felt there was a positive impact on their mental health. Adults also reported that the pilot had helped them form new social networks. Large parts of the NCA, particularly around larger settlements, have poor access to green space and communities in bigger settlements can feel cut off from the wider countryside. Main roads also create obstacles in the rights of way network. A relatively high proportion of the local population live in large villages or small towns, putting large numbers of people in relatively easy reach of open countryside – thus opening up opportunities for greater engagement, enjoyment and interpretation. Local greenspace provides opportunities for recreation and outdoor education close to where people live, allowing local communities to enjoy their environment, take action to improve it, and to benefit from the health and social rewards it affords them.	Promote opportunities for using woodland for educational activities, such as Forest Schools, and for the physical and mental health and wellbeing benefits of exercise in and engagement with woodlands. Address key gaps/obstacles in the rights of way network, by measures such as providing safe crossing points across main roads and creating safe appealing cycle/footpath links from town/city centres to green space and access routes on the outskirts. Plan for significant new green infrastructure provision within, and in association with, areas of new urban development, providing safe links to the rights of way network, and expanding and connecting existing ecological networks. Improve access to and information about key historic, heritage and wildlife sites providing opportunities to interpret this legacy for the understanding and enjoyment of all. Improve links between residential areas of large towns and cities and the surrounding countryside, green space and rights of way network, by providing new routes and ensuring paths are maintained and well signposted, and that some surfaced paths are provided for use by all levels of ability and interest, in order to encourage greater public access, an enhanced visitor experience, an understanding of the local environment and improvements to health and wellbeing.	**Recreation** **Sense of place / inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Semi-natural habitats Urban green spaces Rivers, watercourses and ponds Soils	The NCA holds parts of 2 SACs (North Pennine Moors and North Pennine Dales Meadows), covering 214 ha, and part of 1 SPA (North Pennine Moor) covering 204 ha. It also has 11 SSSI, covering 417 ha. There are 143 Local Wildlife Sites, covering 3,542 ha and further habitat for wildlife is provided by the area's urban greenspaces. Priority habitats which are a particular feature of the NCA include lowland heath, upland heathland, upland hay meadows, ponds and riparian woodland. The Derwent valley contains the highest concentration of Planted Ancient Woodlands sites in the north east. The rivers in the NCA are of great biodiversity value. The Derwent and Wear rivers have otters, lamprey, salmon and sea trout. The NCA has been ranked by Natural England specialists as a priority NCA for red squirrel, great crested newt, adder and common lizard. It is one of the top 5 NCAs in England for grey partridge, willow tit and a species of ladies' mantle. It is also home to a thriving population of re-introduced red kites in the north of the NCA. The Durham Coalfield Pennine Fringe is considered to be one of the areas in County Durham most vulnerable to habitat destruction and fragmentation, due to a range of land-use pressures.[21] In general, semi-natural habitats occur in very small, isolated patches and are often in a highly modified state.	Regional	The fragmented nature of semi-natural habitats make them very vulnerable to damage from invasive species (small sites with large edge effect), particularly species that are distributed along watercourses, such as Himalayan balsam and Japanese knotweed. The permeability of the landscape for wildlife is poor, although it is strengthened by the river corridors (and associated woodland), the network of hedges (in lowland areas) and the large coverage of grassland. There is significant potential to create better connections in the habitat network, and to enhance existing fragments by expanding and buffering them.	Buffer and expand existing semi-natural habitat where possible, particularly heathland, woodland and wetland. Explore opportunities to link existing areas of woodland and heathland, and to provide wildlife movement corridors, particularly by building on those already provided by rivers and watercourses. Improve the design and management of reclaimed industrial sites to enhance their value for wildlife, contribution to the landscape and provision for access and recreation. Seek opportunities to improve the connectivity of semi-natural habitats, in particular by: ■ Enhancing river corridors (buffer strips, tree planting, and livestock exclusion). ■ Enhancing the hedgerow network (less frequent cutting, planting gaps, introducing hedgerow trees and leaving rough grass buffer strips alongside). ■ Creating/restoring habitat to link existing priority woodland, heathland and grassland sites. Working with landowners and managers to Improve the value of farmland for farmland birds through management which provides nesting and feeding habitat. Working with landowners to identify and control invasive species. Restore Plantation Ancient Woodland sites to native broadleaf woodland. Use country parks, Local Nature Reserves and other local green spaces, to encourage communities to become more engaged with wildlife close to where they live and work, taking part in biological recording through events such as bio-blitz, and by volunteering to be involved in site based conservation activities and in the future planning and management of these sites.	**Biodiversity** **Regulating water quality** **Sense of place / inspiration** **Climate regulation** **Recreation**

[21] County Durham Core Evidence Base. Technical Paper No 12: Biodiversity and Geodiversity, Durham County Council (2009; URL: http://content.durham.gov.uk/PDFRepository/TechPaper12BiodiversityandGeodiversity.pdf)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geology	The NCA is predominantly underlain by Westphalian Coal Measures (mudstone, sandstone and siltstone), which are seldom well-exposed, with the exception of local geological sites such as Craghead Crags and Binchester Crags. The NCA has 6 local geological sites, some of which have good public access. [22, 22]	Local	The geology of the area has had a profound effect on the culture, economy and landscape of the NCA. The underlying coal, metal ores have been the basis for significant industry and sandstone has been quarried for building stone.	Seek opportunities to identify and designate additional sites where this would have a clear benefit in promoting geodiversity and making links with other aspects of the NCA. Protect and maintain geological sites, improving access and interpretation where appropriate in order to increase visitor understanding and enjoyment of these sites. Allow rivers to follow their natural courses, thereby promoting the geomorphological processes that support the development of diverse riparian habitats and greater species diversity. Enhance access and interpretation at restored mining sites, to aid understanding of the important role geology has had in shaping the land use of the area, and therefore the culture and heritage.	**Geodiversity** **Sense of place / inspiration** **Recreation** **Biodiversity**

[22] County Durham Core Evidence Base. Technical Paper No 12: Biodiversity and Geodiversity, Durham County Council (2009; URL: http://content.durham.gov.uk/PDFRepository/TechPaper12BiodiversityandGeodiversity.pdf)

[23] Durham Geodiversity Audit, DJD Lawrence, CL Vye and B Young, Durham County Council (2004)

Photo credits

Cover photo: The Durham Coalfield Pennine Fringe is formed by a series of broad ridges, separated by river valleys, with a strong west–east grain. © Natural England/Mike Williams

Pages 1, 4, 6, 8 & 24 © Natural England/Mike Williams

Pages 5, 17 & 34 © Natural England/Nick Brodin

Page 10 © Natural England

Page 12 © Natural England/Simon Warner

Page 26 © Clive A Brown

Page 38 © Natural England/Andy Tryner

NATURAL ENGLAND

Natural England is here to secure a healthy natural environment for people to enjoy, where wildlife is protected and England's traditional landscapes are safeguarded for future generations.

Catalogue Code: NE458 ISBN: 978-78367-015-4

Should an alternative format of this publication be required, please contact our enquiries line for more information: 0845 600 3078 or email enquiries@naturalengland.org.uk

www.naturalengland.org.uk