National Character Area profile:

7. West Cumbria Coastal Plain

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Introduction

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

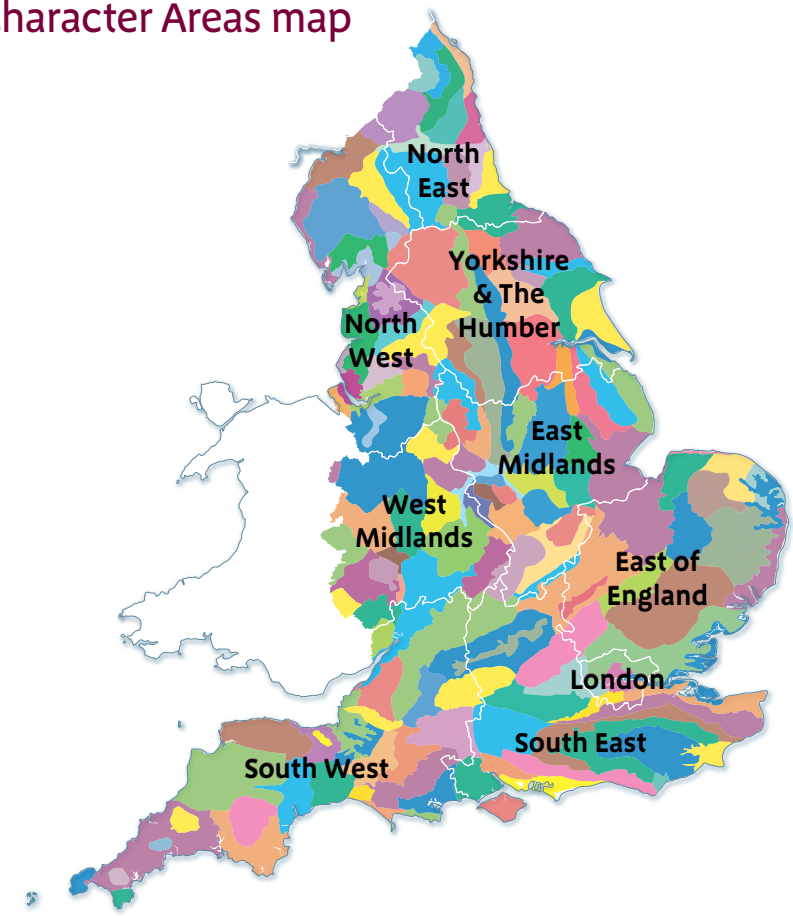
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



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

Summary

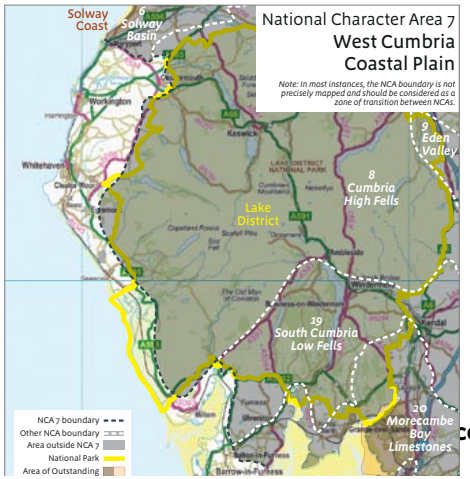
The West Cumbria Coastal Plain National Character Area (NCA) forms a plain of varying width between the Cumbrian High Fells NCA in the east and the Irish Sea to the west. Views inland are set against the Lake District mountains, with long-distance views to the Isle of Man and southern Scotland across the sea. The coastline encompasses a diverse range of habitats including mudflats, shingle and pebble beaches, honeycomb worm reefs, soft cliffs, the high sandstone cliffs of St Bees, dune systems, expansive estuarine systems and the barrier islands of Walney and Foulney.

Inland the wind-swept and open pastoral farmland of the undulating plain is dissected by more sheltered lowland river valleys. These valleys are delineated by woodland and grade into coastal landscapes as they approach the sea. The arable landscape of the St Bees area provides a contrast with the surrounding pastoral landscape. A large part of the area is designated as part of the Lake District National Park. To the north there are extensive areas of land reclaimed from coal mining, iron and steel industries, and processing industries around the towns/ports of Whitehaven, Workington and Maryport. The energy industry is highly visible and an important employer, with ship-building important around Barrow-in-Furness in the south.

The coast from Walney Island to St Bees, including the Duddon Estuary and the estuary complex at Ravenglass, has a number of internationally and nationally designated nature conservation sites. These are important for their coastal sand dune, vegetated shingle and salt marsh communities as well as for breeding seabirds, wintering waders and wildfowl, natterjack toad and specialist flora. As well as the coastline, the area supports nationally and internationally protected lowland rivers in the form of the Ehen and Derwent and lowland raised bogs around the Duddon Estuary.

In the north, access by road historically follows the Roman routes through the Derwent Valley and along the margins of the Solway Basin. In contrast, the southern route via Furness and Barrow is more recent, being 19th century in origin, with earlier routes being across the sands of Morecambe Bay. The railway, also of 19th-century origin, follows the coastal periphery and links all the main coastal settlements.

The area has a diverse economy historically based on coal mining, open cast mining, ship-building and agriculture, with the developing and expanding energy industries and tourism being important employers and adding to development pressures. Tranquillity as well as a strong sense of place and history all contribute to the area's recreational value which, combined with its nature conservation interests associated with the rivers and the coast and strongly influenced by water quality, makes the area attractive to both residents and visitors. The West Cumbria Coastal Plain NCA provides the access gateway to the western fells and lakes of the Lake District National Park for those seeking quiet recreational experiences. The St Bees Heritage Coast, Hadrian's Wall World Heritage Site and Hadrian's Cycleway (part of the National Cycle Network), and the Coast to Coast path and England Coast Path all cross the NCA, bringing visitors to experience the area's natural and cultural heritage.



Click map to enlarge; click again to reduce

Statements of Environmental Opportunities:

- **SEO 1:** Conserve and enhance the unique open coast and estuarine landscapes with their distinct geology, improving and connecting habitats and their species, and enabling natural coastal processes to occur to enhance and improve the coast's ability to adapt to and mitigate the impact of climate change.

- **SEO 2:** Manage and enhance the farmed environment to secure viable and sustainable farming, improving water quality of the rivers and coast, reducing soil erosion, strengthening historic landscape character, conserving heritage features and archaeology, supporting species populations that are dependent on this area, and improving habitat connectivity.

- **SEO 3:** Improve and enhance sustainable recreation, enabling people to experience the peace and beauty of the area and learn more about its biological, geological and heritage assets and natural processes, while managing visitor pressure to conserve the highly valued tranquillity and protect the sensitive semi-natural habitats and species found there.

- **SEO 4:** Manage industrial and former industrial sites to accommodate both their economic and environmental potential by managing new energy industries, growth areas and their associated infrastructure to provide social and environmental gain while minimising pollution and disturbance and to improve ecological connectivity in the landscape, particularly in urban-fringe areas.

The importance of the honeycomb worm reefs along the coast has been recognised in the first tranche of Marine Conservation Zone designations.

Description

Physical and functional links to other National Character Areas

The West Cumbria Coastal Plain National Character Area (NCA) forms an undulating band of varying width between the mountains of the Lake District to the east and the Irish Sea to the west. In the south of the area, the narrow coastal plain around the Duddon Estuary is abutted by the South Cumbria Low Fells NCA, and Morecambe Bay Limestones NCA fringes the coast around Barrow-in-Furness. To the north, the coastal plain widens into the Solway Basin NCA. The eastern boundary with the Cumbria High Fells NCA is marked by the change from enclosed pastoral lowlands to open fellside. Throughout the area, extensive views inland are set against the High Fells, while along the coast it is the influence of the Irish Sea that dominates long-distance views, and on a clear day the Isle of Man and the peninsulas of Galloway can be seen.

The NCA is crossed by a series of rivers including the Derwent, Ehen, Irt, Mite, Esk and Duddon, which descend from the Cumbria High Fells NCA and South Cumbria Low Fells NCA to discharge into the Irish Sea.

North of St Bees the coastline consists of a mix of intertidal flats, beaches and coastal defence works. Coastal processes move material northwards with erosion feeding the beaches of the Solway Coast Area of Outstanding Natural Beauty (AONB). The central section of the coastline is dominated by the red sandstone cliffs of St Bees Head with shingle beaches, intertidal sands and mudflats, salt marsh and sand dunes. South of St Bees the pattern is more complicated, with a general southwards movement of material along the coast being interrupted by the estuaries. The southern parts of the NCA share sediments with the Morecambe Bay Limestones NCA in Morecambe Bay itself. The estuarine landscapes of the Esk and Duddon lead to a series of islands – Walney, Foulney and Piel – formed by material brought down predominantly from the Cumbria High Fells during past ice ages.

Coastal trade and Roman routes have been adopted today as A roads linking the area with the Solway Basin NCA. Further routes connect through the valley of the River Derwent to Keswick in the Lake District High Fells Special Area of Conservation (SAC) and beyond. The southernmost parts of the NCA were formerly reached over the sands of Morecambe Bay until Victorian trade drove improvements in road and rail access around the southern part of Cumbria through the Morecambe Bay Limestones NCA.

Juxtapositions of important wildlife sites with past and present industry and their associated communities are a common feature throughout the NCA.

Key characteristics

- The NCA consists of an undulating coastal landscape of varying width with open views to the Cumbria High Fells NCA and across the Irish Sea to Galloway and the Isle of Man.
- The area has a diverse, open coastline ranging from depositional sand, shingle and pebble beaches and sand dunes, through low soft cliffs of glacial or industrial origin, to high sandstone cliffs with a rich and varied flora and fauna, including dune grasslands, seabird colonies and the natterjack toad.
- There are lowland river valleys with limited ancient semi-natural woodland, and expansive estuarine landscapes with lowland raised mires, salt marshes, mudflats and intertidal habitats with large numbers of wintering waders and wildfowl.
- Important areas of brownfield biodiversity, often in urban-fringe locations, are characterised by rare plants, reptiles and invertebrates including the small blue butterfly.
- The area includes open pastoral farmland with occasional woodlands, basin and valley fens, remnant semi-natural grasslands/meadows associated with streamsides, low-lying land, and localised pockets of arable land supporting species such as curlew and wintering hen harrier.
- There are areas of ancient enclosure with medium to large rectilinear fields and few hedgerow trees. They are bounded by hedges (often gappy and augmented by wire fences), stonewalls on higher ground, and stone-faced earthbanks locally known as 'kests' along the coast.
- There is limited tree cover, with most woodland to be found on steeper slopes and along river corridors. There are some plantation woodlands and shelterbelts associated with the upland margins of the area and former open cast mining sites.
- There is a dispersed rural settlement pattern of hamlets and isolated farmsteads with some villages.
- Distinctive building materials are a combination of locally quarried red sandstone, red brick and render augmented by coastal pebbles along the southern coast.
- Larger urban settlements and coastal towns are closely linked with the growth and location of the area's strong industrial history of coal and iron ore mining, processing ore, smelting and ship-building.
- Extensive urban-fringe influence is linked to highly visible industrial past and present, including quarrying, open cast mining, restoration and reclamation initiatives, manufacturing and processing plants and the nuclear energy industry.
- A rich history is evident in the pattern of land use and heritage features dating from the Neolithic period onwards, including earthworks, forts and castles and all the Roman coastal forts that form part of the Hadrian's Wall World Heritage Site.

West Cumbria Coastal Plain today

The West Cumbria Coastal Plain NCA is one of the most varied NCAs in England. It combines dramatic coastal landscapes and wind-swept farmland, punctuated by meandering river valleys flowing across the plain from east to west to the Irish Sea, with industrial towns all set against the backdrop of the Lake District mountains. All along the coast and elevated areas inland, there are extensive views across the Irish Sea and towards the hills of southern Scotland and the Isle of Man.

In the south there are extensive shingle and sand systems around Furness and the Duddon Estuary, and the open barrier islands of Walney and Foulney where the open expanses of Morecambe Bay grade first into beaches, dunes and marshes and then low-lying farmland. Between the mouth of the Duddon Estuary and St Bees is a coast of soft sediments and slumping cliffs, broken by the estuary system at Ravenglass, with its associated dunes.

At St Bees Head, the soft cliffs give way abruptly to 100-metre-high red sandstone cliffs, capped by a narrow band of species-rich grasslands. North of St Bees the coast consists of a mix of intertidal flats, soft cliffs of natural or industrial origin and narrow beaches. This area is also dominated by the broad flood plain of the River Derwent and its tributaries as it flows westwards from Bassenthwaite Lake through Cockermouth to the sea at Workington.

The coast from Walney to St Bees has a number of designated sites, nationally and internationally important, for their coastal sand dune, vegetated shingle and salt marsh communities as well as breeding seabirds, wintering waders and wildfowl, the natterjack toad and specialist flora. It includes national strongholds for species such as the Isle of Man cabbage, the oyster plant and the Walney geranium, an endemic form of bloody cranesbill.

Inland, from the coast, the agriculture changes from mixed arable and improved pasture near the coast, to predominantly livestock grazing inland. Fields are irregular and anciently enclosed with some medium to large-scale rectangular fields of the late 18th to 19th centuries, especially along the coast. They are bounded mainly by hedgerows on lower-lying ground, with stone walls on higher ground, and traditionally built, stone-faced 'kest' banks along the coastal margin. In exposed areas, hedgerow trees are stunted and sheared by prevailing salt-laden westerly winds. Broadleaved woodland, including remnant ancient woodlands, is found along the river corridors. Small mixed and coniferous plantations, and shelterbelts, are scattered inland and on the lower fringes of the Lake District fells. They are also a feature of reclamation schemes from past coal and ore mining, open cast and degraded industrial land, especially around Workington.

The barrier island landscape surrounding Barrow-in-Furness is expansive and constantly changing with the light, tide and weather.

Inland the area supports a number of nationally and internationally important lowland wetlands. These include lowland raised bogs, with their unique vegetation of peat-forming sphagnum mosses and dwarf shrubs, the rivers Ehen and Derwent with populations of salmonid fish, lamprey, freshwater pearl mussels and water crowfoot beds, and an assortment of basin and valley fens.

The main access routes into the area are from the southern and northern extremities of the NCA. By road, northern access routes through the Derwent Valley and along the margins of the Solway Basin date back to Roman times. In contrast, the southern route into Furness and Barrow is more recent, being 19th century in origin, with earlier routes being mainly across the sands of Morecambe Bay. The railway is also 19th century in origin, running along a single route around the coastal periphery of the NCA and linking all the main settlements.

Throughout the area there is a strong juxtaposition between industrial, or post-industrial, and rural landscapes: former mining towns sit in restored farmland; industrial towns, such as Barrow, and complexes, such as Sellafield, suddenly give way to undeveloped coasts; modern wind farms, both onshore and offshore, are set against mountains or the open sea.

The area retains a diverse economy. Energy and chemical industries, ship-building, agriculture, aquaculture, shellfisheries and tourism are all important employers whose roots lie in the area's natural assets. The energy industry is particularly apparent in the landscape with nuclear and biomass power stations and many, onshore and offshore, wind farms being highly visible from many areas.

Remaining areas of tranquillity are associated with the undeveloped stretches of coastline and the farmland abutting the higher fells, as well as the patches of ancient woodland that are a feature of the more sheltered valleys. Popular features for visitors and locals seeking quiet recreational experiences include the coastline, coastal ports, historical assets such as Hadrian's Wall /forts, the Lake District National Park and the St Bees Heritage Coast. The area also acts as gatekeeper to the isolated, 'dead-end', west-facing valleys of the western Lake District. National Trails include the Hadrian's Wall Cycleway (part of the National Cycle Network) from Ravenglass northwards, the Coast to Coast Walk heading east from St Bees Head, and the England Coast Path National Trail.

The Sellafield complex is a dominant feature of the landscape and seascape between St. Bees and the Duddon.

The landscape through time

The landscape of the West Cumbria Coastal Plain NCA is geologically complex. Predominantly sedimentary, and dominated by sandstone, there is a significant presence of metamorphic and igneous rocks as a result of volcanic activity in central Cumbria. The geology can be split into two broad areas. North of St Bees Head, Carboniferous-age Coal Measures and Limestones outcrop, the latter with pockets of iron ore. These rocks are overlain in the Whitehaven area by small outliers of Permo-Triassic red sandstones ('New Red Sandstone'). South of St Bees Head, the area is dominated by Permo-Triassic red sandstones, with some of the overlying mudstones present in the Barrow-in-Furness area. In the east of the area, between Ravenglass and Millom, older Ordovician-age mudstones, sandstones and igneous rocks outcrop as a result of volcanic activity in central Cumbria.

This landform was moulded through the ice ages by glacial processes, being covered by ice originating both from southern Scotland and from the Lake District. This affected the whole area, and the eventual retreat left a widespread mantle of till with, in places, sand and gravel and, importantly, coastal drumlin features that evolved into the barrier island of Walney and its adjacent islands. Walney itself is the largest barrier island in England and is unusual in its macro-tidal location. In the post-glacial period, coastal processes on the open coast have re-worked coastal sediments, redistributing glacial material along the coast and forming extensive sand dune systems and areas of slumped soft cliffs. In the more sheltered environments of the estuaries, salt marshes have evolved and, particularly around the Duddon Estuary, peat formation in raised bogs has adapted the underlying landform.

Extensive evidence for land use and settlement from the Neolithic period onwards includes bronze-age clearances, stone circles and one of the most important settlement sites in northern England, at Ehenside Tarn, where there is evidence of some of the earliest arable cultivation in the country. The Romans formalised trade and established ports at Ravenglass, Workington and Maryport at the edge of the Empire for trade and to support the frontier defences of Hadrian's Wall and its numerous associated forts, now afforded World Heritage Site status.

The area of Copeland to the south of Whitehaven was important in Norman times as the seat of the barony which was located at Egremont. Between the 12th and mid-16th centuries the area was dominated by monasteries, with Calder Abbey, Furness Abbey and St Bees Priory having major urban and coastal landholdings. The monks had considerable regional influence in the establishment of improved agricultural systems and in the management of the woodlands for the production of fuel and timber for building purposes. A number of castles and other fortified buildings evidence the need for defence and the development of estate centres during the medieval period.

The discovery of coal and iron ore deposits stimulated early industrial development with mines and processing industries, and adjacent mining communities were established around Whitehaven, Workington and Maryport. Trade grew in importance and led to the development of the ports acting as the gateway for the export of the area's natural resources, in particular mined materials such as coal, alabaster, sandstone and iron ore, as well as slate from the adjoining fells.

Growth in the coastal ports was dramatic with the development of a number of planned 'civic' central areas and buildings usually constructed in local red

sandstone. Whitehaven was planned on a formal grid pattern by Lord Lonsdale in the 1640s. Maryport was developed by Humphrey Senhouse in 1749 and the town's prosperity was based on the local coal and iron ore mines and the extensive port facilities. Barrow-in-Furness, originally a small fishing village, was influenced by the iron and steel industry and transformed into a major ship-building centre with extensive dockyards during the Victorian period that were strategically significant during the Second World War.

The development of the railway network from the 1850s led to the prosperous development of further mining communities based on the extraction of iron ore, coal, alabaster, gypsum and sandstone. Villages with rows of terrace houses of red brick were built adjacent to the mines, but subsequent industrial decline – as a result of the introduction of new technologies, depletion of mineral resources and recession – has meant that many towns have been through boom and bust periods of rapid growth then decline, social deprivation and depopulation as mines have closed or demand for industrial products has dwindled. This has led in many places to a juxtaposition of rural landscapes with post-industrial urban landscapes, including spoil heaps, waste tips, mineral railways, semi-derelict land and abandoned houses. The 1950s saw the construction of Calder Hall to generate nuclear power and has become a major source of employment. Subsequent decades have seen the establishment of nuclear waste reprocessing plants and underground storage at Windscale, now Sellafield. These industrial complexes dominate the coastline between St Bees and Ravenglass, and views from the surrounding uplands. The end of the 20th century saw re-working of mineral spoil heaps, open cast coal mining and subsequent land restoration/reclamation schemes.

Away from the coast, the settlement pattern is dispersed, with farmsteads and hamlets interspersed with some villages: housing for industrial workers is a prominent feature, although agriculture remains the predominant land use. Isolated farmsteads are scattered over the upland fringes where sheep/cattle grazing predominates. Agriculture intensified through the 20th century, with arable cropping increasing on the coast. In some areas of marginal land, more extensive low-intensity pastoral systems have survived for livestock rearing/grazing. As well as the upland fringes, this includes the sand dune systems flanking the Ravenglass and Duddon estuaries, and areas on the urban fringes of larger towns such as Barrow-in-Furness, and on Walney Island.

The decline of industry and changes in agriculture have led the area's economy to turn more to the tourist industry centred around the quiet coastline, long-distance trails – such as Wainwright's Coast to Coast walk – and the re-use of former mineral railways as cycle ways. Recreational facilities are paramount to the Lake District National Park 'brand' and the role of the area as gatekeeper to the western Lake District fells and valleys.

Many former industrial sites are now recognised as being nationally important for both their geology or biology, or both as here at Clints Quarry.

Ecosystem services

The West Cumbria Coastal Plain 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 West Cumbria Coastal Plain NCA is contained in the 'Analysis' section of this document.

The intertidal expanses of Morecambe Bay have long been an important resource for fishermen.

Provisioning services (food, fibre and water supply)

- **Food provision:** Agricultural land in the NCA is mainly managed as pastoral systems for livestock grazing, mainly sheep and beef. Arable systems, mainly cereals, are locally dominant on the free-draining sandstone geology around St Bees. Unimproved grasslands, particularly in the coastal zone and on higher fellsides in the east, are sometimes used for extensive grazing by rare breeds, particularly cattle. Morecambe Bay and the Duddon Estuary support traditional coastal fisheries for cockles and mussels.

- **Biomass energy:** The existing woodland cover (5.9 per cent) offers some potential for the provision of biomass through bringing existing unmanaged woodland under management or as a by-product of commercial timber production. The recent opening of a biomass power station in the northern part of the NCA at Workington has increased the potential market for wood fuel from existing woodland, new woodland and planted short rotation coppice. Although much of the material to fuel the power station is imported from abroad, there is likely to be an ongoing increase in woodland cover in this area.

- **Water availability:** The NCA's main rivers – the Derwent, Ehen, Calder, Irt, Mite, Esk and Duddon – all have their headwaters in the Cumbria High Fells NCA where many of these rivers also drain major lakes such as Bassenthwaite Lake, Crummock Water, Ennerdale Water and Wastwater. The West Cumbrian coast and the Furness area in the south of the NCA are home to significant amounts of industry, including nuclear power generation and manufacturing, and these are some of the key water abstractors.

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

- **Climate regulation:** Carbon is stored in those of the NCA's habitats where soils have remained undisturbed for very long periods, including its coastal and flood plain grazing marsh, lowland heath, reedbeds and fens and, in particular, the peat soils of the lowland raised mires at the head of the Duddon Estuary. The latter act as both carbon stores and active sequesters of carbon when in good condition. Carbon storage is also provided by the 2,931 ha of woodland within the NCA (6 per cent of its area) and its underlying humus-rich soils.

- **Regulating soil erosion:** Parts of the River Derwent catchment, the immediate catchment of the Duddon Estuary and the River Ehen catchments are priority catchments under the Catchment Sensitive Farming Programme in this NCA. Soil erosion and diffuse pollution into watercourses are identified as key issues in all areas. Around the St Bees peninsula, the dominance of arable systems on sloping ground puts soils at risk of erosion from rainfall. The salt marsh soils around the estuaries are subject to coastal erosion.

- **Regulating water flow:** The catchments in the South West Lakes flood management area (for example, the rivers Duddon, Esk, Irt and Ehen) are relatively small, rising on the high, rugged and steep-sided, western fells of the Lake District, before flowing in a westerly or south-westerly direction via lakes such as Wastwater and Ennerdale Water across the narrow coastal plain to discharge into the Irish Sea. The River Derwent catchment starts in the Cumbria High Fells NCA and crosses the northern coastal plain via Bassenthwaite Lake and the town of Cockermouth before joining the sea at Workington.

- **Regulating coastal flooding and erosion:** The coastline comprises of extensive areas of coastal and estuarine habitat, including coastal sand dunes and salt marshes that act as the primary defence against coastal flooding and erosion. Also by allowing natural coastal processes to take place unimpeded can provide a natural defence to increased sea level rise and storminess experienced along this coastline, thus reducing the risk of flooding to built-up areas. In different areas, estuarine tidal flooding or direct coastal flooding is of greatest threat. Along a significant portion of the coast, the railway line provides the primary sea defence, an important piece of transport infrastructure at risk from coastline change. The railway line affects the sediment supply to other areas around the coast by interrupting and limiting the sediment available to build/sustain coastal habitat and hence provides a natural defence to climate change.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** Sense of place is provided by the varied, open coastline of mudflats, shingle and pebble beaches, sand dunes, high red sandstone cliffs and soft cliffs, each with its own character derived from local variations in geology. Some 12 per cent of the coastal plain is part of the Lake District National Park, mainly in the south. The agricultural hinterland is open and wind-swept, with medium to large fields grazed by livestock. There is a strong industrial character permeating throughout, clustered around the main towns with former coal mining and mineral extraction sites and current open cast, industrial and energy sites contributing to the rich cultural heritage and sense of place. The views out from the NCA are expansive and embrace the Lake District fells, Irish Sea, Isle of Man and south Scotland. In recent years these views have been modified by the increase in coastal and offshore wind developments and increasing nuclear energy processing plants.

- **Sense of history:** The chain of Roman coastal forts, stretching north from Ravenglass, form part of the Hadrian's Wall World Heritage Site. There is a strong, industrial, built heritage associated with the stone cottages and brick terraced rows of the coalfield settlements, which contrast with the influential parkland estates such as Muncaster Castle, Workington Hall and Egremont Hall. There is also a wealth of archaeological features as well as the legacies of mining, steel-making and ship-building industries. This is supported by a local vernacular architecture and use of red St Bees sandstone as a building material. In the south, a series of First World War and Second World War anti-invasion defences such as pillboxes and observation posts built to defend Barrow-in-Furness and vital shipping lanes remain. Remnants of an enclosed landscape of small to medium-scale pastures dating from the 14th to 17th centuries exist around Walney Island in the south.

- **Tranquillity:** Although industry has a significant influence on the area, tranquillity is still an important feature, with 43 per cent of the NCA classified as 'undisturbed'. The majority of 'undisturbed' land occurs along the undeveloped coastline to the south of Seascale and the farmland and sheltered river valleys inland of Workington and Whitehaven.

- **Recreation:** Recreation is supported by 595 km of rights of way (at a density of 1.21 km per km2), plus around 1,350 ha of open access land covering 2.7 per cent of the NCA. Statutory access is supplemented by a series of nature reserves along the coast providing various levels of permissive access and common land. Hadrian's Cycleway (part of the National Cycle Network), the Coast to Coast path and the England Coast Path National Trail are all important assets. The coastline, distinctive coastal settlements, historic assets, Hadrian's Wall World Heritage Site and associated forts, the Lake District National Park (12 per cent of which is in the NCA) and the St Bees Heritage Coast are also popular features for visitors and locals seeking quiet recreational experiences.

- **Biodiversity:** The NCA supports a wide range of nationally and internationally important habitats and species – the latter including seabird colonies, honeycomb worm reefs, wintering waders and wildfowl, freshwater pearl mussel and the natterjack toad – and contains five Special Areas of Conservation, two Special Protection Areas and two Ramsar sites, with over 3,300 ha nationally designated as Sites of Special Scientific Interest. In addition, the area has five Local Nature Reserves and 163 Local Wildlife Sites, which provide further habitats for wildlife and also opportunities for communities to engage with and enjoy nature close to where they live.

- **Geodiversity:** The area's diverse geology supports a number of nationally important sites for sedimentary (including both sandstone and limestone sites), igneous and glacial geologies. In the intertidal zone, the cobble skears that are the remains of glacial drumlins are an important feature as they form the substrate on which biogenic reefs of honeycomb worm and mussels establish. Walney Island is exceptional as a barrier island both in its origins and scale. Peat-forming bogs and dynamic intertidal environments are both examples of dynamic geomorphological processes, with the former also maintaining an important palaeo-environmental record. Most peat bogs have been damaged but many sand dunes and salt marshes are well managed.

Statements of Environmental Opportunity

SEO 1: Conserve and enhance the unique open coast and estuarine landscapes with their distinct geology, improving and connecting habitats and their species, and enabling natural coastal processes to occur to enhance and improve the coast's ability to adapt to and mitigate the impact of climate change.

For example, by:

- Implementing actions identified in the Shoreline Management Plan, to secure a sustainable management regime for the coast.
- Developing a series of coastal nature reserves that, through best practice visitor management, provide a high-quality visitor experience without compromising environmental assets, and promote better appreciation and respectful use of the wider coastal environment.
- Ensuring that habitat quality is sufficiently high to support specialist species such as the natterjack toad, Isle of Man cabbage, northern dune tiger beetle, breeding colonial seabirds including auks, gulls, terns and eider, and wintering waders; and including species that have been lost in the past, such as roseate tern and oyster plant.
- Raising awareness of coastal dynamics, including coastal change, and habitats such as coastal sand dunes, vegetated shingle, and salt marsh in protecting the coast and ensuring that coastal development is sustainable. Also the interdependence between coastal erosion and accretion in supporting naturally functioning coastal systems that also provide coastal protection.
- Encouraging and promoting local volunteering opportunities to further public engagement with the natural environment.
- Developing physical and educational links between the urban centres and the adjacent high-quality coastal environment.
- Restoring the lowland raised bogs of the Duddon Estuary as part of a series of sites that spans the boundary with the South Cumbria Low Fells National Character Area (NCA).
- Supporting programmes that bring together the different elements of the heritage of the coastal environment, including its rich social, cultural, historical and natural histories, and presenting them as a single package to access the economic potential of the coastal environment.
- Securing shellfisheries, and aquaculture, management that supports internationally important coastal sites and their bird populations and is economically sustainable.
- Producing a plan of key actions for the protection and enhancement of the St Bees Heritage Coast.
- Providing a high-quality England Coast Path National Trail that informs visitors to the sensitivities of the coastal environment and promotes informed enjoyment of the coast and adjacent areas.
- Restoring stone-faced earthbank 'kests' as field boundaries in the coastal zone.
- Seeking opportunities to reduce man-made marine litter washed up on beaches.
- Raising awareness of the distinctive geological, particularly glacial, origins of the coastal landscape and the role of active processes in maintaining it.

SEO 2: Manage and enhance the farmed environment to secure viable and sustainable farming, improving water quality of the rivers and coast, reducing soil erosion, strengthening historic landscape character, conserving heritage features and archaeology, supporting species populations that are dependent on this area, and improving habitat connectivity.

For example, by:

- Supporting the delivery of key actions in the Lake District National Park Management Plan aimed at protecting and enhancing National Park landscape and its surrounds.
- Protecting wetland communities, in particular valley and basin fens, from diffuse pollution and securing appropriate land management in their catchments.
- Promoting farming practices that reduce the loss of soil and nutrients from farmland into watercourses causing diffuse pollution, particularly along the River Marron tributary of the River Derwent.
- Securing integrated water supply sources for the area currently dependent on abstraction form the River Ehen catchment.
- Restoring and enhancing the series of biological and geological Sites of Special Scientific Interest (SSSI), through both targeted measures and wider promotion of the social, cultural, historical and economic value of these sites.
- Restoring and establishing woodlands along watercourses to improve water quality, control erosion and flooding, and improve habitat connectivity and resilience.
- Securing management of arable crops that provides for the needs of farmland wildlife such as lapwing, skylark, yellow wagtail and grey partridge, and including lost species such as corn bunting, especially around St Bees.
- Restoring drystone walls where these have fallen into decay and maintaining the link between walls and local geology such as St Bees sandstone in the northern part of the NCA and field stone on the upland fringes.
- Exploring opportunities for better management of below-ground archaeology on arable land, such as establishment of permanent grassland, shallow cultivation or minimum tillage agriculture, and encouraging uptake of agri-environment schemes to fund such work.
- Maintaining and restoring the extensive areas of species-rich, rush pasture grasslands and transitional heathlands in the West Cumbria coalfields with their series of specialist species, including breeding curlew and wintering hen harrier.
- Strengthening traditional field patterns by managing, restoring and replanting hedgerows where they are the traditional boundary type.
- Increasing woodland cover in appropriate areas to buffer, connect and extend woodland habitats and increase productive woodland where it will not damage semi-natural open habitats.
- Delivering more natural river processes through re-naturalisation of modified stretches of the River Derwent as identified in the River Restoration Strategy.

Continued on next page

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- Managing river corridors to provide high-quality habitat for specialist aquatic species such as freshwater pearl mussel, salmon and lamprey.
- Protecting and restoring ancient woodlands, especially Plantations on Ancient Woodland Sites, and increasing management of existing under-managed woodlands to provide multiple benefits.
- Managing invasive non-native species such as Himalayan balsam and Japanese knotweed so they do not damage the area's biodiversity, and monitoring the impacts of new tree pests and diseases.
- Maintaining and restoring traditional farm buildings, through continued agricultural use where possible, and ensuring that through re-use their heritage interest is retained.
- Maintaining the diversity of geology and traditional buildings that contributes to the NCA by using, promoting and encouraging locally sourced materials and skills for walling and building repair and construction.

The extensive unimproved pastures of the NCA are important both for biodiversity and as a part of the farming system.

SEO 3: Improve and enhance sustainable recreation, enabling people to experience the peace and beauty of the area and learn more about its biological, geological and heritage assets and natural processes, while managing visitor pressure to conserve the highly valued tranquillity and protect the sensitive semi-natural habitats and species found there.

For example, by:

- Increasing the awareness of nature reserves in urban and industrial landscapes, such as Siddick Ponds, and develop their role as sites that deliver education, promote health and support the local economy alongside their nature conservation value.
- Enhancing the recreational potential of assets of the Lake District National Park both in the NCA and in the areas accessed through it for visitors and residents alike, improving economic and social appreciation of the area.
- Making use of the new England Coast Path National Trail to articulate messages about the environmental sensitivity of the coast and the role played by coastal processes and habitats in providing coastal protection.
- Protecting where appropriate, documenting and raising awareness of the area's rich archaeological heritage from Neolithic times to the First World War and Second World War.
- Conserving archaeological and other historic features in the landscape with heritage interest, raising awareness of how land use and other historic processes have shaped the landscape while also recognising the potential for undiscovered remains.
- Supporting programmes that bring together the different elements of the heritage of the coastal environment, including its rich social, cultural, historical and natural histories, and presenting them as a single package to access the economic potential of the coastal environment.
- Developing the role played by the coastal railway as an access route to the coast and as an asset that can be linked to the area's recreation offers such as Hadrian's Cycleway (part of the National Cycle Network) and the Coast to Coast path.
- Protecting the expansive views across the Irish Sea to the Isle of Man and south Scotland and across Morecambe Bay.
- Documenting and where appropriate protecting archaeology at risk from coastal processes or loss to vegetation.
- Seeking opportunities to restore former railway lines as access routes.
- Encouraging better management of dogs to reduce disturbance of sensitive species and reduce fouling in areas important for wildlife and recreation.
- Supporting and assisting the World Heritage Committee in giving effect to the operative management plan and delivering agreed-upon priorities in support of the Statement of Outstanding Universal Value, as is required of the government by treaty.

SEO 4: Manage industrial and former industrial sites to accommodate both their economic and environmental potential by managing new energy industries, growth areas and their associated infrastructure to provide social and environmental gain while minimising pollution and disturbance and to improve ecological connectivity in the landscape, particularly in urban-fringe areas.

For example, by:

- Increasing the value of brownfield sites as providers of both urban greenspace and biodiversity.
- Making links between urban greenspace and rural greenspace for the benefit of both wildlife and people, including brownfield areas.
- Using understanding of the area's traditional and historic architecture, and its distinct patterns of settlement, to inform appropriate conservation and use of historic buildings, and to plan for and inspire any environmentally beneficial new development that makes a positive contribution to local character.
- Increasing awareness of the value of brownfield sites in the coastal zone for biodiversity, including local specialities such as small blue butterfly, pyramidal orchids and purple broomrape, and seeking appropriate management or mitigation where sites are subject to change.
- Seeking opportunities to achieve better-quality habitat for wildlife as a component of future industrial development through good design and planning.
- Enabling the natural environment to act as an asset to attract investment and skilled professionals to the area to drive economic growth based on a high-quality natural environment.
- Developing programmes around Whitehaven and St Bees that make use of the high-quality natural environment and mining heritage as an asset in urban regeneration programmes.
- Seeking opportunities to restore ex-quarrying and other post-industrial sites as species-rich, semi-natural habitat that supports amenity use while retaining an identity that embraces their historical heritage.
- Seeking opportunities to establish green infrastructure that supports economic, social and environmental outcomes and promoting the wider green infrastructure benefits of development that accommodate biodiversity, with a particular focus on species characteristic of the area.

A number of former mine buildings have been adapted into museums securing links with the area's mining past.

Supporting document 1: Key facts and data

West Cumbria Coastal Plain National Character Area (NCA): 49,293 ha

1. Landscape and nature conservation designations

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

The NCA includes part of one designated landscape, the Lake District National Park, of which 6,117 ha is in the NCA (covering 12 per cent of the NCA). The NCA also includes the entirety of the St Bees Head Heritage Coast which covers 573 ha (1 per cent of the NCA).

Management plans for the protected landscape can be found at:

- www.lakedistrict.gov.uk

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Designated site(s)	Area (ha)	% of NCA
International	Ramsar	Duddon Estuary, Morecambe Bay	1,958	4
European	Special Protection Area (SPA)	Duddon Estuary SPA, Morecambe Bay SPA	1,958	4
	Special Area of Conservation (SAC)	Morecambe Bay SAC, Drigg Coast SAC, Duddon Mosses SAC, River Derwent and Bassenthwaite Lake SAC, River Ehen SAC	2,916	6
National	National Nature Reserve (NNR)	Sandscale Haws NNR, North Walney NNR, Duddon Mosses NNR, Hallsenna Moor NNR, High Leys NNR	570	1
National	Site of Special Scientific Interest (SSSI)	A total of 23 sites wholly or partly within the NCA	3,306	7

Source: Natural England (2011)

There are 163 local sites in West Cumbria Coastal Plain covering 1,681 ha, which is 3 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	148	4
Favourable	2,088	63
Unfavourable no change	403	12
Unfavourable recovering	632	19
Part destroyed	2	<1
Destroyed	27	1

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

The elevation of this NCA ranges from sea level to 268 m. From the Irish Sea coast there is a general rise to the east with the highest parts of the NCA generally along the boundary with the Cumbria High Fells NCA. The highest points in the coastal zone are at the St Bees headland which rises to 141 m.

Source: Natural England (2010)

2.2 Landform and process

The landform of the NCA is transitional between the generally lower lying coastal strip (including both open and estuary coasts and barrier islands, on both and hard and soft geologies) forming the NCA's western boundary and the elevated edge of the central Lake District massif on its solid geology forming the eastern boundary.

Source: West Cumbria Coastal Plain Natural Area Profile, West Cumbria Coastal Plain Countryside Character Area Description

2.3 Bedrock geology

The geology of the West Cumbria Coastal Plain can be split into two broad areas. North of St Bees Head, Carboniferous age Coal Measures and Limestones outcrop, the latter include pockets of iron ore. These rocks are overlain in the Whitehaven area by small outliers of Permo-Triassic red sandstones ('New Red Sandstone'). South of St. Bees Head, the area is dominated by Permo-Triassic red sandstones, with some of the overlying mudstones present in the Barrow in Furness area. In the east of the area, between Ravenglass and Millom, older Ordovician age mudstones, sandstones and igneous rocks outcrop, these are a result of volcanic activity in central Cumbria.

Source: West Cumbria Coastal Plain Natural Area Profile, West Cumbria Coastal Plain Countryside Character Area Description

2.4 Superficial deposits

Away from watercourses and the coastal zone the superficial geology of the NCA is dominated by glacial till. Around watercourses and in the coastal zone this is replaced by materials such as sands, silts, clays and gravels which have been deposited by glacial, fluvial and coastal processes. There are small but significant areas of peat associated mainly with lowland raised bogs and valley mire complexes.

Source: West Cumbria Coastal Plain Natural Area Profile, West Cumbria Coastal Plain Countryside Character Area Description

Inland the expansive, open and windswept agricultural landscape is set against a backdrop of the Cumbrian Fells or the Irish Sea.

2.5 Designated geological sites

Designation	Number
Geological Site of Special Scientific Interest (SSSI)	5
Mixed interest SSSI	4

There are 44 Local Geological Sites within the NCA.

Source: Natural England 2011

The high sandstone cliffs of St. Bees, a product of coastal erosion of the sandstone deposits.

- 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

The NCA is dominated by acid soil types of varying permeability, reflecting the underlying acid geologies, but with a variety of ancillary soil types reflecting coastal influences and areas modified by past land use (for example, restored opencast sites).

Source: Natural England (2010)

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

Agricultural Land Classification	Area (ha)	% of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	28,514	58
Grade 4	9,873	20
Grade 5	2,936	6
Non-agricultural	2,088	4
Urban	4,986	10

Source: Natural England (2010)

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

3. Key water bodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
River Derwent	20
River Ehen	20
River Keekle	12
River Calder	4
River Cocker	4
River Irt	4
River Ellen	2
River Duddon	<1
River Esk	1
River Mite	1

Source: Natural England (2010)

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

The NCA is crossed by a number of rivers which arise in the adjacent Cumbria High Fells NCA and flow westward to discharge into the Irish Sea. The Calder and Cocker form part of the Derwent system which discharges to the Irish Sea at Workington. The Keekle is part of the Ehen system while the rivers Esk, Irt and Mite, though independent, all converge on a single estuary complex at Ravenglass. The only river not to arise in the Cumbria High Fells is the Ellen, which flows from the Solway Basin NCA to discharge into the outer Solway at Maryport.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 4,666 ha, 9 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**

The ancient woodlands in the NCA are closely associated with the area's river corridors.

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 2,931 ha of woodland (6 per cent of the total area), of which 510 ha is ancient woodland.

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

Pests and diseases, such as Dutch elm disease, have changed the character of many woodlands in recent decades and are an ongoing threat.

4.2 Distribution and size of woodland and trees in the landscape

Woodland cover is generally sparse across the NCA with native woodland types particularly associated with river corridors. Otherwise woodland cover is mainly composed of conifer plantations, particularly on the higher ground associated with the margins of the NCA and plantings associated with former opencast mine sites where they have been planted either as screening shelterbelts or as part of a restoration programme.

Source: Natural England (2010)

4.3 Woodland types

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

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

Woodland type	Area (ha)	% of NCA
Broadleaved	1,574	3
Coniferous	736	1
Mixed	159	<1
Other	462	1

Source: Forestry Commission (2011)

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

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	275	1
Ancient re-planted woodland (PAWS)	234	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Across the NCA there are estimated to be about 3,018 km of boundaries, mainly hedgerows but with stonewalls and stone-faced hedgebanks the dominant type in areas.

Source: West Cumbria Coastal Plain Countryside Character Area Description; Countryside Quality Counts (2003)

5.2 Field patterns

Field patterns vary through the NCA reflecting the transitional nature of the NCA with its variations in local landform. In general, however, medium to large sized fields of improved pasture inland from the coast, are subdivided by a mix of hedgerows, hedgerow trees and wire fences. Stone walls and hedges established on stone banks form boundaries along minor roads.

Source: West Cumbria Coastal Plain Countryside Character Area Description; Countryside Quality Counts (2003)

Inland the expansive, open and windswept agricultural landscape is set against a backdrop of the Cumbrian Fells or the Irish Sea.

6. Agriculture

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

6.1 Farm type

The majority of holdings were based on grazing livestock (293) with 95 dairy holdings. Crop based enterprises tend to be found in the coastal part of the NCA.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farm size was varied with enterprises evenly spread across all size categories. However, there was a trend away from smallholdings, and enterprises of over 50 ha accounted for 86 per cent of the farmed area.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 36,620 ha; owned land = 25,304 ha
2000: Total farm area = 61,139 ha; owned land = 43,164 ha

Farms were predominantly owned in the NCA with the proportion of owned farms remaining at about 70 per cent over the period 2000 to 2009, despite a 40 per cent decline in the overall area farmed.

Source: Agricultural Census, Defra (2010)

6.4 Land use

Over 87 per cent of the agricultural land was managed as grass and uncropped land supporting the predominantly livestock orientated businesses. Of the other land uses, cereal crops, for both grain and stock feed, were the most widespread accounting for a further 8 per cent of agricultural land.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Livestock numbers in the NCA were dominated by sheep which made up 73 per cent of animals, with cattle accounting for the majority of the other livestock. Between 2000 and 2009 there were reductions in all livestock types (cattle by 52 per cent, sheep by 68 per cent, and pigs by 84 per cent from figures of 92,300, 390,900, and 19,200 respectively).

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Of the 1,305 people employed in agriculture, the majority (68 per cent) were principal farmers, with full-time workers and casual workers making up the majority of the rest.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

This is a very diverse NCA with semi-natural habitats spread throughout, many of which form parts of designated sites. Of particular note are the extensive areas of coastal habitats. Away from the coast habitat distribution is more localised but probably under recorded on national inventories. More specific information on habitats is provided below:

The suite of coastal habitats is notable and includes internationally designated sites encompassing vegetated shingle, sand dune, saline lagoon, and both hard and soft cliff representations of maritime cliff and slope habitats. Notable features include the sea bird colonies at St Bees Head where a number of sea bird species breed including fulmar, guillemot, black guillemot, razorbill and puffin. The vegetation here contains species such as rock sea-lavender and sea spleenwort. Around Drigg, the outer Duddon Esturay and Walney and Foulney, large areas of vegetated shingle and sand dune are present with species such as coral root orchid, small adder's tongue, round-leaved wintergreen, Isle of Man cabbage and dune helleborine, and the Walney variety of bloody cranesbill known as Walney geranium. In some areas, such as Hodbarrow, south Walney and Foulney, the shingle extents hold important gull and tern colonies. On the more sheltered estuary coasts saltmarshes have developed. Grazed marshes on the Duddon Estuary are important for wintering waders and wildfowl. The saltmarshes and sand dunes are also the stronghold of the natterjack toad which is nationally rare and for which Cumbria supports 50 per cent of the UK population.

Away from the coast there are other localised semi-natural habitats including grassland communities, some on brown-field habitats around former industrial sites at Maryport and Workington. These support species such as pyramidal and bee orchids, purple broom-rape and small blue butterfly. Some former quarry sites have notable limestone grassland communities, and there are also extents of species-rich rush-pasture similar to the Clum grasslands of Cornwall and Devon, alongside traditional hay meadows. Other wetland habitats include reedbeds at Siddick Pond in Workington, the largest in Cumbria and support otters and wintering bittern, and a number of basin mires between St. Bees and Drigg. The rivers crossing the NCA area are notable for their fish communities, including three species of lamprey, salmon and bullheads and their flora including extensive water-crowfoot.

Source: West Cumbria Coastal Plan Natural Area Profile

The seabird colonies adorning the cliffs at St. Bees Head are the most important in the north-west and their guano has turrned the red cliffs white over time.

7.2 Priority habitats

The Government's new strategy for biodiversity in England, Biodiversity 2020, replaces the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in Biodiversity 2020, but references to BAP priority habitats and species, and previous national targets have been removed. Biodiversity Action Plans remain a useful source of guidance and information. More information about Biodiversity 2020 can be found at; http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx

Coastal habitats have a rich and varied flora.

The NCA contains the following areas of mapped priority habitats (as mapped by National Inventories). Footnotes denote local/expert interpretation. This will be used to inform future national inventory updates.

Priority habitat	Area (ha)	% of NCA
Coastal and flood plain grazing marsh	3,294	7
Coastal sand dunes	1,148	2
Broadleaved mixed and yew woodland (broad habitat)	935	2
Maritime cliff and slope	343	1
Lowland raised bog	238	<1
Saline lagoons	159	<1
Lowland heathland	110	<1
Upland heathland	59	<1
Purple moor grass and rush pastures	54	<1
Lowland meadows	29	<1
Coastal vegetated shingle	23	<1
Mudflats	20	<1
Reedbeds	16	<1
Lowland dry acid grassland	2	<1
Fens (1)	0	0

Source: Natural England (2011)

Maps showing locations of priority habitats are available at

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

7.3 Key species and assemblages of species

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

8. Settlement and development patterns

8.1 Settlement pattern

Although settlement in the NCA can be traced back to Neolithic times, since at least Roman times the principle settlement pattern in the NCA has focused on the coast with all the main towns being, or having been, trading ports. Roman settlements with surviving fort remains include those at Maryport and Ravenglass while other towns such as Whitehaven and Barrow are much more recent, both having 19th century origins in their current form. Many of the older coastal towns are associated with rivers which provided safe anchorage and links between coastal trading routes and inland resources, but the sitting of later towns reflect industrial centres such as mining at Whitehaven and ship-building at Barrow. Away from the coast the settlement pattern is more dispersed with rural settlements having originally grown up around farming steads, but there is also a strong link with the areas mining heritage with many small towns having developed around mine sites.

Source: West Cumbria Coastal Plain Countryside Character Area Description; Countryside Quality Counts (2003)

8.2 Main settlements

The main settlements in the NCA are Barrow, Workington, Whitehaven, Maryport, Cockermouth, Egremont and Millom. The total estimated population for this NCA (derived from ONS 2001 census data) is 186,985.

Source: West Cumbria Coastal Plain Countryside Character Area Description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

Use of St Bees sandstone as a building and walling material is a common feature in much of the NCA, though its dominance in the vernacular style drops away the main sites where it was quarried. Later towns, such as Barrow and many of the mine-related settlements are dominated by red brick buildings.

Source: West Cumbria Coastal Plain Countryside Character Area Description; Countryside Quality Counts (2003)

As part of 'Britain's energy coast' the energy industry is likely to continue to shape the character of the area into the future.

9. Key historic sites and features

9.1 Origin of historic features

The principal assets of the historic landscape date to four main periods, each will different contexts. The earliest period with strong representation in the historic landscape is the Neolithic period with a number of stone circles. From the Roman period is the frontier, with Hadrian's Wall afforded World Heritage status. The ports at Maryport, and Ravenglass and the forts both here and at other sites were an important part of the Roman frontier defences. A number of castles and other fortified buildings remain from the middle ages, and this is also the period when Furness Abbey was a dominant influence in the development of the Furness peninsula from the late 1100s until its dissolution in 1537. More recent remains are decidedly utilitarian in origin relating to mining either directly, in the remains of a range of mines including coal, gypsum, alabaster and iron, or indirectly in the industries that the mines supported. The most recent notable features date to the Second World War and the defences that were built in and around Walney and Barrow to safeguard the ship-building industry.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 2 Registered Parks and Gardens covering 360 ha.
- 0 Registered Battlefields.
- 56 Scheduled Monuments.
- 969 Listed Buildings.
- 1 World Heritage Site covering 13 ha.

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/

The Candlestick above Workington Harbour - a former mine vent. Industrial developments, such as sub-sea mining have long shaped the evolution of the area's settlements and its trade connections.

10. Recreation and access

10.1 Public access

- 6 per cent of the NCA 2,973 ha is classified as being publically accessible.
- There are 595 km of public rights of way at a density of 1.2 km per km2.
- There are no National Trails within the NCA.

Source: 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)	1	<1
Common Land	2,763	6
Country Parks	0	0
CROW Access Land (Section 4 and 16)	1,351	3
CROW Section 15	27	<1
Village Greens	28	<1
Doorstep Greens	3	<1
Forestry Commission Walkers Welcome Grants	567	1
Local Nature Reserves (LNR)	230	<1
Millennium Greens	3	<1
Accessible National Nature Reserves (NNR)	570	1
Agri-environment Scheme Access	2	<1
Woods for People	904	2

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.

Long-distance paths are popular with walkers with Wainwright's Coast to Coast route starting at St. Bees.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) the most tranquil part of the NCA is along the coast, particularly between Millom and St Bees Head and at either end of Walney Island. Around the principal towns and their connecting roads tranquillity is reduced.

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

Category of tranquillity	Score
Highest	118
Lowest	-73
Mean	0

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 that the highest levels of intrusion are associated with the main towns in the NCA and their connecting trunk roads and the presence of the Sellafield complex. The less intruded areas include the rest of the St Bees to Millom coast and the less developed zone inland from Whitehaven. A breakdown of intrusion values for this NCA is detailed in the following table.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	34	44	49	15
Undisturbed	53	40	43	-9
Urban	5	5	8	3

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 were an increase in the area classified as disturbed of 15 per cent associated with declines in both areas 'not classified' in the 1960s (decline from 8 per cent of the NCA to 0 per cent) and undisturbed areas.

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

Natural coastal change enhanced by climate change will increase the dynamism of coastal processes with an array of impacts.

12. Data sources

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

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

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- A lack of woodland management has resulted in the decline of broadleaved woodland and ancient semi-natural woodland in some areas.
- There have been some small increases in woodland cover in small stands in some areas but overall woodland cover is generally sparse at six per cent of the NCA.
- Some large blocks of mixed and coniferous woodland have been planted east of Whitehaven, many of which are part of reclamation schemes associated with the restoration of former open-cast mining sites, quarries, and other abandoned industrial areas.
- The impact of Dutch elm disease has changed the character of many woodlands in the last two decades with the nearly compete loss of what was formerly one of the dominant species in many areas.

Boundary features

- The estimated boundary length for the NCA is 3,018 km of which approximately 12 per cent was managed under agri-environment schemes between 1999 and 2003. By 2011, this had significantly increased to 22 per cent suggesting an improvement in the maintenance and management of boundary features, particularly hedgerows. However, today is largely achieved by mechanical means, which may impact on their form, and condition and the majority of hedges will now be reinforced by fencing to make them stockproof.
- The condition of stone-faced earthbanks, known as kests, has generally declined through a lack of active management.

Agriculture

- There has been a general loss of moorland, acid grassland and rough pasture from the lower fells in the east over time in the area. While the rate of decline has slowed in recent years, marginal land/unimproved or semi-improved grasslands are still subject to agricultural improvement.
- Defra data (2000 and 2009) indicates a small increase in the number of holdings with cereal and other cropping as their main activity. The same period has seen a similar decrease in the number of holdings where dairy is the main activity.
- With a move from dairy to other stock systems have seen a relaxation in the intensity of land management with some former rye grass leys reverting to species poor rushy pasture.

Settlement and development

- Urban, housing and industrial developments and associated infrastructure, principally in the vicinity of Workington, Whitehaven and Maryport, including the large plants at Siddick–Flimby, and Sellafield, have continued to expand.
- Some derelict industrial sites have been redeveloped but others have been cleared to leave brownfield sites.
- Former open cast sites inland have, with one exception, been restored to either agricultural land or woodland.
- Incremental erosion of character of the mining villages located between Workington and Egremont due to the addition of new, locally uncharacteristic, housing development and small-scale commercial development often linking isolated communities.
- Decline of fishing and mining industries has led to the increasing importance of recreation and tourism and associated pressures for holiday accommodation and other visitor facilities.
- There has been some upgrading of transport routes in the area, most recently the route between Lillyhall and Whitehaven.
- Wind turbines have become an increasing feature in the landscape with an expansion from their former limited coastal presence between Workington and Flimby to both inland sites, including a number of developments between Whitehaven and Cockermouth, and offshore where wind farms in the outer Solway and off Walney are widely visible.
- Establishment of a major biomass plant at Workington has increased the demand for local biomass crops including wood and short rotation coppice.

Semi-natural habitat

- The condition of the SSSI in the area is generally improving through positive management with 79 per cent in favourable or unfavourable recovering condition in 2011. Some SSSI sand dune systems and raised mires communities are still in decline.
- Loss of semi-natural habitat has led to a decline in some species, such as nesting gulls and eider on Walney, oyster plant on the coastal shingle, northern dune tiger beetle on sand dunes and red squirrels across the area.
- Alien invasive species including Himalayan balsam and Japanese knotweed are increasing and are a particular issue along many watercourses.
- Loss of brownfield sites due to reclamation, redevelopment or scrubbing over.

Historic features

- Along the coast, a number of historic sites are being lost to coastal erosion, for example First World War and Second World War emplacements on Walney, as well as Mesolithic and Neolithic sites.
- Ongoing restoration and regeneration programmes for past industrial buildings include the mine buildings at Saltom Bay and the 'Candlestick' at Whitehaven, a former air vent.

- A number of farm buildings across the area have been restored using agri-environment funding.

- Increasing demand for housing and second homes outside the Lake District National Park has led to a rise in barn conversions, securing their integrity but adapting their context.

Coast and rivers

- Natural coastal processes including erosion and accretion are changing the profile of the coast where there are no sea defences. Locally this has resulted in development of often privately funded sea defences, including around some caravan parks, former mineral waste tips, and along parts of the railway line from Ravenglass to Maryport.

As part of 'Britain's energy coast' the energy industry is likely to continue to shape the character of the area into the future.

- Marine rubbish, particularly plastics, is an increasing problem on the beaches with material from different sources including marine debris brought onshore by currents, rural and urban waste transported by drainage and river systems and from coastal erosion exposing former tip sites.

- Coastal fisheries have generally declined in recent years particularly around Morecambe Bay where shellfish stocks have been low in recent years. Around Morecambe Bay, aquaculture for oysters has become established.

- In some coastal sand dune systems, particularly around Ravenglass, the invasive and locally non-native shrub, sea buckthorn has become a significant issue in over-stabilizing dunes and smothering native vegetation.

- Recent years have seen increased instances of flooding in the rivers systems. This has caused significant damage to infrastructure in some areas such as Workington and Cockermouth, resulting in adaptations to transport routes.

Minerals

- There are no longer any active coal mines or mineral workings in the area. Most former open-cast sites have been restored to farmland while mine sites have either been lost or are subject to heritage preservation programmes. The mining-based economy of the rural landscape has declined in tandem.

- Quarrying of sand, limestone and sandstone continues at a few sites and remain important industries locally.

Drivers of change

Climate change

- Evidence from the UK Climate Impacts Programme (UKCP09) shows that over the coming century the area's climate is expected to become warmer and wetter in winter and hotter and drier in summer. There will be an increased frequency of extreme events (floods/drought).

- The North West Landscape Framework Climate Change Assessment 2010/11 identifies urban areas as having a higher vulnerability to climate change due to their lack of habitats and for generally being located on the flattest areas of land. These two factors restrict species movement and ecosystem functionality.

- Projected rises in sea level and increased storminess are likely to result in an increased risk of flooding, high tides and tidal surges. While the existing flood defences will provide much protection in urban areas, there is a risk that coastal infrastructure such as the railway and isolated residences will be impacted. The extensive mudflats and salt marshes could be lost. This would have a major impact on the internationally significant bird feeding grounds in these areas. Increased storminess and storm surges may impact on coastal breeding seabirds.

- The increase in sea levels and storm surges might change the rate of sediment input to dunes and even the location of sand dunes along the coast. Pressures for hard sea defence works to combat this risk may themselves alter the dynamics of sand movement.

- Prolonged periods of drought could lead to reduced ground water and drying out of peat habitats making them more prone to soil erosion and wildfire events.

- Changing climates on an international scale may impact on bird communities in the designated sites, with reductions in species which area able to 'short stop' in wintering areas closer to their breeding ranges but potentially increases as more southern breeding species move into the area.

- Smaller, fragmented patches of habitat are vulnerable to loss of biodiversity arising from changes in rainfall and temperature.

- More intense and more frequent rainfall may lead to an increase in flooding and an increased risk of soil erosion or weakened soil structure due to flash flooding. There is also an associated greater likelihood of pollution of watercourses downstream, and a potential increased risk of landslides, during times of increased rainfall.

- The potential for more favourable conditions for crops and other farming practices not presently possible within this area may also lead to an alteration in the character of the landscape as a result of changing cropping patterns.

- There may be increasing threat to trees and woodland from changing pests and diseases and extreme weather events.

- A possible expansion of arable or energy crops into areas currently under permanent grassland may occur.

Other key drivers

- Economic decline within the area has resulted in locally uncharacteristic housing and commercial expansion and development continuing to add to the extent of built-up areas. Much of the existing housing stock is considered to be of low value, and economic redevelopment pressures may encourage the development of higher value properties, which may differ from the traditional style of housing and building materials.

- Economic regeneration schemes may also seek to upgrade transport infrastructure, particularly in the south of the NCA.

- With the area labelled as Britain's Energy Coast, power generation is likely to remain a key driver for development in the area. Increased demand is likely to need a mix of renewables, wind power, wood fuel, biomass and nuclear developments with associated research development and waste management industries becoming important. Applications for development of wind turbines are increasing on and off-shore. These are all likely to impact on the visual character of the NCA.

- The decline of open cast mining for coal and the incentive to maximise economic return from land may result in increased investment in land through agricultural improvement, particularly around the Cumbria Coalfields east of Whitehaven. This may affect the character of less improved areas of the agricultural landscape. Continuing restoration of mineral sites may provide opportunities for large scale habitat creation, greenspace and access initiatives.

- A growing tourist industry based on assets such as the Lake District National Park, its dramatic coastline and access to the western fells/ valleys, the St Bees Heritage coast and Hadrian's Wall World Heritage Site.

- Increased demand for coastal access may be a driver for improving and enhancing the perceived value of the environmental assets of the NCA.

- Designation of areas of coastline as Marine Protected Zones may affect the usage of the coastal zone.

- The England Coast Path, a new National Trail around all of England's open coast, will for the first time give people the right of access around all of England's open coast, including –where appropriate, –'spreading room' along the way where they can rest, relax or admire the view. The Coastal Access scheme sets out to avoid negative impacts on sensitive features found on and along the coast and supports future work to protect or increase existing, access to and from the coast that may provide links to circular walks with the England Coast Path so may act as driver for positive change.

- Marine, coastal and freshwater ecosystems may be impacted by increasing populations of alien invasive species such as Chinese mitten crab, Sargassum weed, skunk cabbage, Himalayan balsam and Pacific oyster.

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.

Specialist flora of coastal vegetated shingle banks helps stabilise the coast and provide protection from storms.

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 flooding and erosion	Sense of place / Inspiration	Sense of history	Tranquillity	Recreation	Biodiversity	Geodiversity
SEO 1: Conserve and enhance the unique open coast and estuarine landscapes with their distinct geology, improving and connecting habitats and their species, and enabling natural coastal processes to occur to enhance and improve the coast's ability to adapt to and mitigate the impact of climate change.	↗ **	↔ **	↔ **	↗ **	↔ **	↑ **	↔ **	↔ **	↔ **	↗ **	↗ **	↗ **	↑ **	↑ ***	↑ ***	↗ ***	↑ ***	↑ **	↑ **
SEO 2: Manage and enhance the farmed environment to secure viable and sustainable farming, improving water quality of the rivers and coast, reducing soil erosion, strengthening historic landscape character, conserving heritage features and archaeology, supporting species populations that are dependent on this area, and improving habitat connectivity.	↗ **	↗ **	↗ **	↗ *	↗ **	↑ *	↑ **	↑ **	↑ **	↑ **	↑ **	↗ **	↑ ***	↑ **	↔ **	↑ **	↑ **	↑ ***	↗ **
SEO 3: Improve and enhance sustainable recreation, enabling people to experience the peace and beauty of the area and learn more about its biological, geological and heritage assets and natural processes, while managing visitor pressure to conserve the highly valued tranquillity and protect the sensitive semi-natural habitats and species found there.	↔ **	↗ *	↗ **	↗ *	↔ *	↗ *	↗ **	↗ **	↗ **	↗ ***	↗ **	↗ **	↗ **	↑ **	↗ **	↗ **	↑ *	↑ **	↗ *
SEO 4: Manage industrial and former industrial sites to accommodate both their economic and environmental potential by managing new energy industries, growth areas and their associated infrastructure to provide social and environmental gain while minimising pollution and disturbance and to improve ecological connectivity in the landscape, particularly in urban-fringe areas.	↗ **	↔ **	↗ *	↗ *	↔ **	↗ *	↑ ***	↗ **	↗ **	↑ **	↗ **	↗ **	↔ **	↗ **	↗ **	↗ *	↑ *	↑ **	↗ **

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
An expansive and wind-swept diverse and transitional landscape.	■ Presence of a suite of landscape types including urban, soft coast, high coastal cliffs, sheltered valleys upland fringe shaped by glacial modification of the landform. ■ Varying field boundaries including stone faced earthbanks near the coast, drystone walls of glacial cobbles and St Bees sandstone, hedges and hedges with ditches. ■ A diverse geology derived from the uplifting of sedimentary deposits by, sometimes exposed, volcanic process with overlying glacial deposition and active geomorphological process particularly in the coastal zone. ■ A generally exposed topography that faces the predominant westerly winds. ■ Expansive views across the Irish Sea, Outer Solway and Morecambe Bay.
Diverse open coastal landscape of beaches, sand dunes and cliffs.	■ Suite of internationally and nationally important nature conservation sites including SPA, SAC, Ramsar, Marine Conservation Zone (MCZ), SSSI and NNR sites supporting important coastal sand dune and vegetated shingle complexes, saline lagoons, seabird colonies and honeycomb worm reefs as well as extensive areas of non-designated priority habitat. ■ Large stretches of coastline shaped by past industry. ■ One of the first areas of England to receive coastal access provision. ■ Specialist species such as natterjack toad, wintering waders and wildfowl, Isle of Man Cabbage and breeding seabirds. ■ Rich archaeological heritage stretching back to Roman times. ■ Barrier island character of Walney and Foulney with their rare glacial origin. ■ Suite of First World War and Second World War defensive sites around Barrow-in-Furness, including pill boxes, gun emplacements, practise ranges and search light emplacements. ■ Open views across the Irish Sea to the Isle of Man and Galloway and inland to the High Fells. ■ Coastal honeycomb worm reefs supporting Marine Conservation Zone status. ■ Ancient coastal shell fisheries, particularly around Walney.
The sheltered and dynamic estuary landscapes of Duddon and Ravenglass and open estuary of Morecambe Bay.	■ Internationally important estuarine systems with SAC, SPA and Ramsar and SSSI designations supporting intertidal , coastal sand dune, vegetated shingle, salt marsh, and mudflat communities. ■ Lowland raised mires and reclaimed grazing marshes backing the Duddon. ■ Internationally important populations of wintering waders and wildfowl on the Duddon and around Morecambe Bay. ■ Suite of former industrial sites associated with Iron smelting. ■ The Ravenglass estuary with its three rivers is one of the least modified estuaries in England. ■ Low-lying estuaries framed by the adjacent uplands.

Landscape attribute	Justification for selection
Distinctive shallow lowland river valleys including the Derwent, Keekle and Ehen separated by pastoral farmland with isolated wetlands.	■ Pastoral landscape divided by hedgerows, hedgerow trees and small broadleaved woodlands ■ Important areas for livestock grazing. ■ Suite of lowland freshwater wetlands including nationally important reed beds, kettle holes, basin and valley mires, lowland raised bogs and rivers with their associated species. ■ Ancient semi-natural woodland and riparian corridors. ■ Extensive areas of unimproved rush pasture and wet heath in the area of the Cumbria coalfields.
Industrial character in a rural setting with energy generation highly visible and important brownfield biodiversity.	■ Larger urban settlements and coastal towns closely linked with the growth and location of the area's strong and diverse industrial history of coal and mineral mining, ore processing, smelting, chemical production, ship-building and energy generation. ■ Distinctive building materials are a combination of locally quarried red sandstone, red brick and render with settlement character often linked to the period and type of industrial development. ■ Nationally important brownfield sites for species such as small blue butterfly and purple broomrape as well as important populations of other species. ■ High visibility of energy industries including nuclear, onshore wind, offshore wind and biomass. ■ Past and present industry is central to all the coastal towns from Barrow to Maryport. ■ Past mining has shaped the distribution and character of many of the larger rural settlements. ■ Many former mining and quarry sites scattered across the rural landscape. ■ Extraction industries linked to a range of geological assets including coal, alabaster, gypsum, limestone, iron ore and St Bees Sandstone. ■ Iron and steel industry production has shaped both settlements and large areas of the coastline through disposal of waste materials.
Transitional context and outward-looking culture.	■ Culturally outward-looking towards the Irish Sea and beyond with many industrial communities founded on immigrant work forces and technologies from areas such as Liverpool (ship-building) and Cornwall (mining). Coastal settlements that can be traced back to Roman times and the Roman frontier. ■ Designed towns including Whitehaven, Maryport and Barrow linked to coastal trade. ■ Coastal resort towns developed along the Victorian railway.

Landscape attribute	Justification for selection
The St Bees heritage coast with its distinct landscape derived from its high cliffs and sandstone geology.	■ Iconic high cliffs of red St Bees sandstone. ■ Largest colonies of cliff nesting seabirds in north-west England. ■ Distinct landscape of large arable fields with associated farmland bird populations. ■ Active sandstone quarries. ■ Geological SSSI with interests spanning the Permian to the post-glacial periods. ■ One end of the Wainwright's famous Coast to Coast Walk. ■ Unique mining heritage. ■ Expansive views to the Lake District Fells, Isle of Man and South Scotland.
Pastoral farmed landscape.	■ A dominant rural land use of semi-improved and improved grasslands cut for silage and grazed by sheep and cattle. ■ Medium to large rectangular fields bounded by gappy hedges, wire fencing and walls on higher ground. ■ Historic kests/stone earthbank boundaries in the coastal zone. ■ Lack of woodland cover. ■ Rough grazing/acid grasslands of lower fellsides on higher ground in east. ■ Remnant semi-natural grasslands and wetlands in low-lying areas.
Historic landscape reflecting early settlement patterns, ecclesiastical influences, coastal fishing and mineral industries.	■ Diverse range of archaeological sites from the Neolithic to Second World War. ■ World Heritage Site status of the Roman Fort network. ■ Designed towns such as Barrow-in-Furness, Whitehaven and Maryport. ■ Archaeological sites that include the earliest evidence of arable cultivation in England. ■ Modern transport links that adopt routes established in the Roman period or before. ■ A trade history that has shaped the development of English trade across the Atlantic, including the slave trade, and has resulted in the development of distinct Cumbrian foods. ■ A suite of Medieval and ecclesiastical sites, which have shaped the development of the surrounding agricultural landscape. ■ Presence of historic strip fields on Walney.
Limited tree cover with most woodland to be found on steeper slopes and along river corridors.	■ Mixed/woodland areas planted as part of reclamation schemes on former open cast mining sites. ■ Some plantation woodlands and shelterbelts associated with the upland margins of the area. ■ Pockets of coastal woodland from Barrow-in-Furness to Whitehaven, many associated with former industrial sites. ■ Ancient semi-natural woodland. ■ Few hedgerow trees on farmland.

Landscape opportunities

- Maintain, manage and enhance the distinctive coastal landscape with its diverse range of coastal salt marsh, sand dune, and vegetated shingle communities, pebble beaches, honeycomb worm reef s, open coast soft cliffs and St Bees Head high sandstone cliff characters and their associated semi-natural habitats.
- Maintain, manage and enhance the expansive estuarine landscapes with a range of intertidal habitats, mudflats, raised mires, mosses and wetlands important for over- wintering waders and wildfowl, breeding seabirds and waders, such as the Duddon and Ravenglass estuary systems.
- Conserve and maintain areas of undisturbed coastline from development to protect its open views and tranquillity.
- Promote sustainable management of coastal fisheries and shell fisheries particularly around Walney and Morecambe Bay.
- Protect and restore areas of lowland peatland, such as the lowland raised bogs of the Duddon Mosses, and the suite of valley and basin mires between Drigg and Egremont.
- Manage, enhance and restore areas of species rich grassland in particular acid pastures on higher fellsides in the east and remnant meadows such as around Drigg Holme and High Leys.
- Manage, conserve and restore lowland river valleys and their riparian habitats, in particular those in the catchments of the rivers Derwent, Ehen, Esk, Irt and Mite.
- Protect and manage brownfield sites on abandoned industrial land important for their biodiversity in particular around Maryport, Workington and Whitehaven.
- Strengthen the field boundary patterns/network by maintaining and restoring boundary features, including hedgerows, hedgerow trees, walls and kested hedge banks, and especially historic landscapes on the coast at St Bees Head and Walney.
- Protect, conserve and enhance important historic sites, features and cultural heritage particularly Hadrian's Wall World Heritage site and the forts at Ravenglass and Whitehaven.
- Manage existing, link and provide improved access to quiet enjoyment and recreational opportunities associated with the NCA's natural scenery and distinctive historic industrial heritage in particular making use of long distance trails such as the Coast-to-Coast Walk, Hadrian's Wall cycleway and the England Coast Path National Trail.

- Protect and conserve the character of traditional rural villages, linear mining settlements and historic civic buildings by using local vernacular styles and building materials for restoration and new developments, such as use of red St Bees sandstone.

- Manage and enhance the quality of the woodland resource by restoring planted ancient semi-natural woodland sites to native species cover, protecting all ancient woodlands, promoting woodland management, planting new woodlands and hedgerow trees, connecting and creating riparian woodlands and restoring open habitats as appropriate.

- Develop opportunities to restore, reclaim and link derelict industrial landscapes and mitigate urban-fringe impacts as part of a regeneration programmes that provide and enhance green infrastructure through new development and settlement expansions, eg in the Whitehaven-St Bees area.

- Seek developments that allow the natural environment to act as an asset to attract investment and skilled professionals to the area to drive economic growth based on a high quality natural environment.

- Promote the wider green infrastructure benefits of development that accommodates biodiversity, with a particular focus on species characteristic of the area for both economic and environmental benefit.

- Seek opportunities to protect and document surviving industrial and cultural heritage sites.

- Protect, manage and interpret archaeological evidence and historic features, sites and landscapes, in order to raise awareness, and to increase public engagement, understanding and enjoyment of these features.

The area has a diverse range of nationally important freshwater wetlands including rivers, kettle holes, valley and basin mires, lowland riased bogs and reedbeds, as here at Siddick Ponds.

Ecosystem service analysis

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Dairy and arable farming Horticulture Soils Water/rainfall	The NCA is dominated by agriculturally poor soils with 58 per cent Grade 3 soils and 20 per cent grade 4. Non-agricultural soils and urban areas make up 14 per cent of the area. Long tradition of livestock/ pastoral farming, predominantly sheep, with some cattle and dairy and few pigs. Significant reduction in livestock between 2000 and 2009. Localised pockets of arable for grain/stock feed. Unimproved grasslands, particularly in the coastal zone and higher fellsides in the east, are sometimes grazed by rare breed animals, particularly cattle. Morecambe Bay and the Duddon Estuary support traditional coastal fisheries for cockles and mussels.	Regional	Around the Duddon Estuary and to a lesser extent elsewhere along the coast are areas of reclaimed farmland now dependent on flood banks, and artificial drainage. There may be increasing pressure on these types of management systems with the impacts of climate change. Reclaimed land of estuarine origin often has low organic matter content which can make it prone to soil compaction, waterlogging and poor soil structure which can limit its agricultural adaptability. In some areas former organic soils have been lost through historic peat cutting for fuel, or more recently as a consequence of intensive management, such that in many areas only a thin soil layer is left over underlying estuarine clay deposits. Food security is likely to be increasingly important. The expansion of food provisioning needs to be managed in a sustainable way, which does not impact upon other ecosystem services. Coastal shell fisheries are highly variable from season to season and have not always been managed sustainably. Securing sustainable management would be beneficial to fishery health, food supply and biodiversity. Aquaculture cultivation of pacific oysters has been introduced and developed in the Morecambe Bay area. It will be important to manage this without impacting on the adjacent internationally designated estuarine systems. The extensive areas of semi- natural agricultural habitat are well suited to production of rare breed meat which along with traditional fisheries supports the rural economy.	Manage and protect soil resources to ensure long term viability to supply food/grazing land. Support and promote the development of food products, rare breeds and markets associated with local produce from low-input and extensive management of livestock systems. Work with farmers and landowners to encourage uptake of agri-environment schemes are used to best effect to maintain food production, conserve landscape, historic environment and wildlife-rich habitats and traditional skills associated with meat and dairy production. Encourage best agricultural practice, through adoption of good land, water and soil management, to protect soils resources, water quality and availability, for example increased organic matter content, sustainable grazing regimes, changing machinery access. Support protection of flood defences to maintain grazing land, for example Duddon Estuary. Promote and support new practices and activities leading to sustainable fisheries and aquaculture to secure a long term food resource and sustainable management of the habitats.	**Food provision** **Biodiversity** **Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Sense of place/ inspiration** **Sense of history** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Native broadleaved woodlands Ancient semi-natural woodland Conifer plantations Mixed reclamation scheme/ restored land woodlands High regional rainfall Soils	Woodland cover is 2,469 ha (5.9 per cent of NCA area) of which 1,574 ha is broadleaved woodland (3.2 per cent), 736 ha is coniferous (1.5 per cent) and 159 ha is mixed woodland (0.3 per cent). 510 ha (17 per cent of woodland total) is ancient woodland of which 234 ha is plantation ancient woodland. Cover of mature woodland is low. Woodland cover is sparse with native woodlands mainly associated with the river valleys. Conifer plantations and mixed shelterbelts associated with higher ground/upland fringes and restoration planting on former open-cast mining sites.	Local	With limited mature woodland cover and access difficult on slopes in river corridors, the potential for timber provision is low in the short term. A number of conifer plantations are nearing maturity and are ready for extraction and replanting. Open wind-swept landscape and salt laden rainfall is difficult for growing good quality timber. A number of young mixed woodlands and shelterbelts are associated with restoration planting on former open cast sites so potential for timber provision will likely increase in future. Woodland cover is higher in some adjacent upland areas so, despite the limited resource in the NCA, some timber production may be sustainable, by complementing production centred in adjacent areas.	Seek opportunities to increase timber production based on mature woodlands. Encourage management and re-introduction of management to broadleaved woodlands and ASNW within river valleys where access is good to supply sustainable timber for local markets, enhance riparian habitats, protect soils, improve infiltration and stabilise riverbanks. Encourage planting to create new woodlands, including commercial conifers where appropriate, especially in river valleys and on former open-cast coal sites where beneficial to sense of place and not detrimental to biodiversity, historic environment. Encourage new tree planting to link existing woodlands, plantations and restoration schemes to improve green infrastructure in order to connect habitats and help ameliorate impacts of climate change. Seek opportunities to manage woodlands for small scale/local provision of timber and wood fuel.	**Timber provision** **Biodiversity** **Sense of place/ inspiration** **Sense of history** **Biomass energy** **Regulating water flow** **Regulating soil erosion** **Regulating water quality** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	High rainfall Sandstone aquifers Rivers and streams Surrounding upland catchments Soils	The coastal parts of the NCA overlay two major sandstone aquifers, the West Cumbria Aquifer which has a 'water available' Catchment Abstraction Management Strategy (CAMS) status and the Furness Aquifer which is 'over licensed'. The NCA's main rivers, the Derwent, Ehen, Calder, Irt, Mite, Esk, and the Duddon all have their headwaters in the Cumbria High Fells NCA. Many of these river catchments drain into and through major lakes such as Bassenthwaite Lake, Crummock Water, Ennerdale Water and Wastwater (all outside NCA) before flowing westwards through the NCA to the Irish Sea. These surface water resources in the NCA are generally 'over licensed' or have 'no water available'. Significant industry and processing plants, including nuclear power generation and manufacturing, are key water abstractors. Abstraction is also to meet both demand for public water supply and for agricultural use.	Regional	Surface water availability, is largely regulated upstream in the upper part of the catchments outside the NCA. Seasonal and high intensity events cause problems of rapid run-off and flooding on coastal plain. Land management practices upstream are critical. Over-abstraction is an issue in the Derwent catchment, impacting on, parts of the River Derwent and Bassenthwaite Lake SAC and River Ehen SAC which are internationally designated sites for nature conservation value. Water from the River Ehen system supplies a discreet 'service zone'. To address the dependency of this area on abstraction of water from the River Ehen catchment, United Utilities is establishing an integrated supply zone which will reduce abstraction pressure on the SAC. Abstraction of groundwater associated with mining and the nuclear industry has ceased. However, future development of a new generation of nuclear power stations may restart large scale groundwater abstraction. Some farm businesses use ground water sources.	Promote sustainable use of local water sources. Restore and enhance semi-natural habitats in the upper catchments and fells, native woodlands, lowland raised bogs and reedbeds to improve water storage capacity while also reducing flood risk and soil erosion and improving water quality, climate regulation, habitat networks and ecosystem resilience to climate change. Work with and support the farming community to ensure continued sustainable management of water resources to improve soil structure and water retaining habitats to increase infiltration and reduce surface flow. Encourage farmers and landowners to adopt good land, water and soil management practices to protect and enhance water and soil resources. Encourage sustainable and water conscious use schemes in new developments. Increase capacity for temporary water storage in river valleys. Ensure the establishment of the integrated water supply zone in the area currently dependent on abstraction form the Ehen catchment.	**Water availability** **Regulating water quality** **Regulating water flow** **Regulating soil quality** **Regulating soil erosion** **Biodiversity** **Food provision**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Native livestock/ rare breeds particularly cattle	Traditional rare breeds, particularly cattle, are a feature of the land management regime of many areas of semi-natural habitat.	Local	Although no individual cattle breed is particularly associated with the NCA, the extensive areas of semi-natural habitat are well suited to grazing by rare breed beef cattle. In different parts of the NCA breeds including Galloway, Welsh Black, Highland, Shorthorn and Aberdeen Angus, can be found. These cattle maintain areas of semi-natural habitat, often managed as part of extensive systems benefiting biodiversity and local landscape character. The presence of the National Park and the heritage coast both offer enhanced opportunities to promote markets for rare breed products in association with the maintenance of landscape character.	Promote rare breeds for their suitability in managing rough pastures, sand dunes, heathlands, species-rich grasslands and other semi-natural habitats. Encourage the development of supply chains and markets for high-quality local produce.	**Genetic diversity** **Sense of place/ inspiration** **Biodiversity** **Food provision**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Existing woodland High rainfall Biomass/ energy crops Soils Biomass power station	The existing woodland cover (6 per cent) within the NCA offers some potential for the provision of biomass through bringing existing unmanaged woodland under management or as a by-product of commercial timber production. Short rotation coppice is grown in the NCA. Biomass power station located at Workington. There is one wood fuel supplier in the NCA.	Regional	The NCA has low to medium potential yield for short rotation coppice (SRC) with exposed coastal locations being unsuitable. Growth of miscanthus has high potential yield. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables on the Natural England website at: http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/default.aspx There is potential to bring under-managed broadleaved woodlands under active management to supply wood fuel/biomass. Also to plant new woodlands for multiple benefits. The recent opening of a biomass power station in the northern part of the NCA at Workington has increased the potential market for wood fuel from both existing woodland and planted short rotation coppice. Currently, much of the material to fuel the power station is imported from abroad although there is likely to be an option to supply local biomass from increased woodland cover in the area. At a local scale there is potential to increase woodland cover, and increase utilisation of existing woodland cover, to supply domestic wood fuel demand. Some former open-habitats, such as raised bogs, have become covered in secondary woodland as a consequence of abandonment. Restoration of these open habitats may provide a source of biomass material in the short term for local or commercial use.	Seek opportunities to bring existing broadleaved woodlands into active management to increase production of woodfuel for local use. Encourage re-introduction of traditional coppice management particularly where woodlands have been coppice managed in the past. Develop local woodfuel markets and seek opportunities to link potential resource to markets. Restore areas such as lowland raised mires to open habitat, using the one off crop of wood fuel in local markets. Encourage planting of new broadleaved woodlands under coppice management especially in river valleys and in locations that would not impact on biodiversity or historic environment interest, and would enhance local landscape character. Encourage planting of SRC especially on former open-cast coal sites and urban fringe areas. Support the planting of new native-species woodlands particularly where these link existing woodland blocks and do not damage to other important habitats and to help ameliorate climate change and enhance sense of place. Encourage the development of biomass boilers/power stations in the area to create a local market.	**Biomass energy** **Timber provision** **Sense of place/ inspiration** **Biodiversity** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Carbon-rich soils Woodlands Wetlands, in particular lowland bogs and grazing marsh Semi-natural grasslands Coastal habitats including salt marshes, dunes and mudflats	The soils of the NCA generally have a low carbon content (0–5 per cent). Woodlands with their underlying humus-rich soils sequester and store carbon. Other areas with semi-natural vegetation cover where soils have remained undisturbed for very long periods act as carbon stores. These, include unimproved grassland, intertidal habitats, coastal and flood plain grazing marsh, lowland heath, reedbeds and fens and in particular the high carbon peat soils of the raised mires at the head of the Duddon Estuary. The latter act both as carbon stores and active sequesters of carbon when in good condition. Many fens and mires are however in poor condition resulting in them being net emitters of greenhouse gases. Woodlands in the area are undermanaged with regards their climate regulation potential and ability to offset other carbon releasing energy sources. Intertidal habitats are also important carbon stores with the salt marshes of the NCA generally considered to be under favourable management.	Regional	Woodland cover which is under active management is able to sequester and store more carbon. Loss or disturbance of permanent semi-natural vegetation cover such as drainage of wetlands and felling of woodlands will result in the loss of soil carbon and that stored in the vegetation. Restoration and sensitive management of semi-natural vegetation can aid their abilities as a carbon sink. Of particular importance in this area are the lowland raised peat bogs of the Duddon Estuary, the wet heaths of the Cumbria coalfields and the suite of valley mires. Here, management measures to remove secondary woodland and restore hydrology can improve the condition of peat as a carbon store. Increasing the active management of woodlands, particularly to supply the woodfuel industry, offers a low-carbon energy source reducing pressure on fossil-fuel carbon energy as well as increasing carbon storage in standing biomass. The carbon sequestration potential of sand dune systems, salt marshes and mudflats can be improved through good management. Carbon is trapped through the sequestering of atmospheric carbon by vegetation and the trapping of mobile sediments. The removal of artificial landward barriers allowing the extension of habitats inland and reducing nutrient load from rivers, sea water and agricultural land where appropriate, is likely to increase carbon storage potential.	Encourage restoration of lowland wetlands, in particular peat forming systems by establishing improved hydrological regimes and vegetation cover so they can sequester and store carbon. Maintain and increase woodland cover on non-peat soils such as restored open-cast coal sites. Encourage and promote re-introduction of active woodland management. Work with the farming community to ensure continued sustainable low-input and extensive livestock farming systems that allow for carbon sequestration and soil development. Encourage schemes to enable movement and expansion of dynamic coastal habitat such as sand dunes and salt marsh. Promote opportunities for a low carbon economy through development of local supply chains for wood fuel.	**Climate regulation** **Biodiversity** **Sense of history** **Sense of place/ inspiration** **Regulating water flow**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality *Continued on next page*	Surface water catchments Woodlands Wetlands Agricultural land Riparian vegetation Semi-natural vegetation Soils Aquifers Rivers and streams	Ecological river water quality is judged to be moderate or good along the NCA's main rivers, except the Annas, which is poor. Water chemistry is good for most assessed rivers except the River Derwent which is currently failing. The ecological water quality of the west coast estuaries and coastal waters into which the NCA's rivers drain is generally moderate. Where recorded, their chemical status is good. The chemical status of groundwater is good over the majority of the NCA but poor in the north. Bathing water quality meets Environment Agency standards on most of the area's beaches except at Seascale, which fails. Parts of the River Derwent catchment, the catchment of the Duddon Estuary and the River Ehen catchment are classed as priority catchments under the Catchment Sensitive Farming Programme.	Local	Much of the main rivers' water quality in the NCA is determined upstream in the Cumbrian High Fells which highlights the importance of catchment scale management and the importance of links between upland and lowland systems. Much of the underground aquifer is fed by groundwater from the uplands to the west by in areas such as around St Bees surface water is important to aquifer recharge. Water quality targets of the Rivers Ehen and Derwent are determined by their SAC designation status which requires then to meet favourable condition status. The rivers that flow through the NCA are important for a number of species-dependent on high water quality including salmon and freshwater pearl mussels. Maintaining good water quality in the rivers is important for these species, so measures are needed throughout the catchments. Principal issues in the Derwent system include sedimentation and diffuse pollution associated with cross land flows as a result of steep slopes, potentially compacted soils, and high rainfall. Chemicals associated with diesel run-off from A roads are also a localised pollution issue. Similar issues are experienced in the Ehen catchment while the Duddon Estuary also experiences issues from livestock faeces which affects the water quality of nearby bathing waters. To protect water quality nitrate vulnerable zone (NVZ) measures are in place on the River Derwent flood plain for surface water protection and around the St Bees peninsular for ground water protection.	Promote and implement catchment wide water management plans to ensure a co-ordinated and integrated approach to reducing impacts of pollution on water quality, flow and availability. Support and promote through uptake of agri-environment schemes and catchment sensitive farming measures, the adoption of land management practices especially on land with high run-off potential that minimise off site impacts, such as reducing nutrient inputs, and improving soil structure to reduce soil erosion. Identify point sources of pollution and promote management solutions to reduce run-off and soil compaction. Encourage management of existing and establishment of new riparian vegetation, including woodland, in areas of high erosion risk to stabilise banks, reduce sediment run-off, erosion. Maintain and establish permanent grassland, Buffer strips or other permanent vegetation alongside watercourses, especially in areas of soil and nutrient run-off. Manage and limit stock access to watercourses by fencing, water gates and provision of troughs to minimise bare ground, poaching, sediment loss and risk of erosion.	**Regulating water quality** **Regulating water flow** **Water availability** **Biodiversity** **Regulating soil quality** **Regulating soil erosion** **Food provision** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality *Continued from previous page*		Nitrate vulnerable zones (NVZ) cover 9 per cent of the NCA – the River Derwent flood plain for surface water protection and around the St Bees peninsular for ground water protection. The coastal parts of the NCA overlay two major sandstone aquifers, the West Cumbria Aquifer and the Furness Aquifer.		Nutrient run-off issues from agricultural land in NVZ can cause for example elevated nutrient levels, algal blooms in localised areas. Restrictions this places include limits on volume of nitrate that may be applied as fertilizer and the timings of applications to minimise loss of nutrients to waterbodies. Locally point source pollution is an issue, for example septic tank discharges affecting basin mires and in some areas mine workings and deposits of industrial waste generate issues of land and water pollution. Catchment sensitive farming measures identified to address these issues include; excluding stock from water courses to reduce muck contamination; reducing dirty water run-off from manure stores, silage, animal handling areas and yards; increasing slurry and midden storage capacity by roofing stores; moving and upgrading sheep dip/pen facilities to ensure protection of the watercourse; reducing soil erosion in fields as a result of farm traffic; restoring poached gateways and farm tracks; removing stock from watercourses to stabilise banks; and separating clean and dirty water to reduce dirty water volume. In the Duddon Estuary catchment, additional measures to reduce agricultural faecal matter being carried downstream to the bathing waters of Haverigg, Askam-in-Furness and Roan Head have also been identified as a priority management issue. Issues associated with road contaminants will require better management of surface water run-off including measures such as sustainable drainage systems	Identify opportunities to better manage surface water run-off from roads and urban areas including new developments through sustainable drainage schemes. Encourage farmers and landowners to increase and link semi-natural vegetation to help slow surface water run-off, reduce erosion, for example improve filtering of pollutants and sediments, while enhancing biodiversity and sense of place. Encourage adoption of good land, water and soil management practices. Work with water companies to reduce pollution incidents from waste water treatment works.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Agricultural land Rivers and streams Grazing marsh and flood plain storage areas Woodlands Other semi-natural vegetation Catchment areas River flood defences Geology and soils	Main rivers are the Derwent and its tributaries the Keekle, Ehen, Calder, Irt, Mite, Esk and Duddon, which all flow into Irish Sea. The catchments in the Southwest Lakes flood management area (eg the Rivers Duddon, Esk, Irt and Ehen) are relatively small and generally rise on the high, rugged and steep sided, western fells of the Lake District, flowing via lakes including Wastwater and Ennerdale Water before flowing in a westerly or south westerly direction along the coastal plain to discharge into the Irish Sea. The River Derwent catchment crosses the coastal plain in the northern part of the NCA includes a large part of the northern Lake District Fells and a number of Lakes including Bassenthwaite. Workington and Cockermouth are towns at highest flood risk in NCA.	Regional	The catchments in the Cumbrian High Fells respond quickly to heavy rainfall and storm events which impact on the lower lying coastal plain. The scale of flood risk is low. The main areas of river flood risk are in Whitehaven from the Pow Beck, Egremont from the River Ehen, and Dalton in Furness from Poaka Beck and Mill Beck. The risks of river flooding are likely to increase as a result of climate change. This could be addressed through the restoration and creation of multi-functional wetlands within the main river corridors and by encouraging river systems to operate naturally. More recent flood events have also affected Workington and Cockermouth (River Derwent) and the coastal road network. The Environment Agency's preferred approach to managing flood risk on lower stretches of rivers includes flood attenuation upstream and provision of more flood storage areas. Improving infiltration speeds of water and reducing run-off rates within loamy clayey soils will help to moderate peak flows. There is also potential for the creation of intertidal habitats to aid the accommodation of increased river levels at peak flow.	Seek opportunities to improve and create more flood storage within floodplains, particularly in the River Derwent corridor. This should include restoring and expanding wetland habitats (for example wet pastures, water meadows and reedbeds), thus improving infiltration rates, increasing storage capacity of flood waters and reducing risk to infrastructure and adjacent towns such as Workington and Cockermouth. Seek opportunities to manage existing and establish new woodlands and riparian vegetation alongside watercourses to reduce run-off into rivers, increase infiltration and enhance biodiversity and sense of place. Seek opportunities to manage soils and agricultural land in the upper catchment areas to improve soil structure, encourage increased infiltration, reduce run-off and increase water holding capacity. Promote and plan for agriculturally restored areas of river flood plains to act as seasonal/temporary rain water and/or flood storage areas in order to protect villages and towns. Ensure all new developments are built in low flood risk areas and include Sustainable urban drainage schemes.	**Regulating water flow** **Biodiversity** **Sense of place/ inspiration** **Regulating water quality** **Water availability** **Regulating soil quality** **Regulating soil erosion**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Geology and soils Trees, woodland and scrub Lowland raised mires and other wetland peat habitats Permanent grassland Coastal grazing marsh and salt marsh	There are 13 main soilscape types in this NCA: ■ Freely draining slightly acid loamy soils, covering 29 per cent of the NCA. ■ Slowly permeable seasonally wet acid loamy and clayey soils (27 per cent). ■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (17 per cent). ■ Sand dune soils (4 per cent). ■ Freely draining slightly acid sandy soils (4 per cent). ■ Restored soils mostly from quarry and open cast spoil (3 per cent). ■ Loamy and sandy soils with naturally high groundwater and a peaty surface (3 per cent). ■ Freely draining slightly acid but base-rich soils (2 per cent). ■ Freely draining acid loamy soils over rock (2 per cent). ■ Loamy and clayey soils of coastal flats with naturally high groundwater (2 per cent). ■ Naturally wet very acid sandy and loamy soils (2 per cent). ■ Loamy and clayey flood plain soils with naturally high groundwater (1 per cent). ■ Freely draining flood plain soils (1 per cent).	Local	The freely draining slightly acid loamy soils (29 per cent) allow good water infiltration and have potential for increased organic matter levels through management interventions. These soils are valuable for aquifer recharge (West Cumbria Aquifer and the Furness Aquifer) which require the maintenance of good soil structure to aid water infiltration and the matching of nutrients to needs to prevent pollution of groundwaters. The slowly permeable seasonally wet acid loamy and clayey soils (27 per cent) and the slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (17 per cent) may suffer compaction and/ or capping as they are easily damaged when wet. 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. Common issues across soil types affecting soil quality include compaction, low organic material content and fertility, and loss of structure. Compaction arises from stock and machinery movement, particularly on wet soils, and especially in association with a reduction in soil fauna. The loss of soil fauna derives from artificial and slurry inputs that have the effect of shifting soil ecosystems from fungus based systems to bacterial based systems and can lead to direct loss of key species. Organic material loss results from soils not being able to sequester carbon from vegetation. Fertility loss results from the loss of soil carbon and nitrogen reserves. The management consequence of these changes is often an increased reliance on artificial inputs to maintain agricultural productivity despite falling soil quality. These issues will be most strongly felt in the reclaimed soils of grazing marshes where soils are most prone to water logging and have naturally high carbon contents. Addressing these issues to restore and improve soil quality requires a move to more sustainable management of pastoral systems and is likely to require the integration of a number of different measures. These include a reduction in soil nutrient loading and decreasing the need to spread waste on damaged soils benefiting soil fauna; use of legumes to fix nitrogen to maintain fertility with decreased reliance on artificial inputs, decreasing stock numbers to allow some annual productivity to be integrated into soils and decreasing compaction risk, and adapting stock management to avoid areas of sensitive soils compaction risk. Actions to improve soil quality and improve their structure would have wider benefits, for example, improving regulation of water flow by enhancing water infiltration, reducing the risk of soil erosion and improving water quality by lessening surface run-off, improving biodiversity and securing long-term food provision.	Work with land owners to promote sustainable farming practices to increase the organic matter content, improve the structure of agricultural soils and protect soil biodiversity. Protect and enhance salt marshes to develop new soils. Identify, encourage and apply grazing regimes that increase sward diversity and encourages the build-up of organic matter. Encourage farmers and landowners to Introduce and manage extensive grazing regimes to reduce stocking densities and avoid soil compaction and poaching such as through increased uptake of agri-environment schemes. Seek management regimes that avoid compaction through unnecessary machinery use particularly during protracted periods of wet weather. Work with the farming community to promote and adopt good nutrient and land, water and soil management practices. Implement measures to reduce diffuse pollution from land management.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Water availability** **Climate regulation** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Semi-natural vegetation Woodlands Hedgerows Arable land Wetlands Permanent grassland Soils Sand dune systems	The soils that cover 67 per cent of this NCA are not susceptible to erosion. Of the remaining soils, the freely draining slightly acid loamy soils (13 per cent) and the freely draining slightly acid sandy soils (4 per cent) are erosion prone. Naturally wet very acid sandy and loamy soils (1 per cent) are susceptible to wind erosion and some are also easily eroded by water. Slightly acid loamy and clayey soils with impeded drainage (6 per cent) are easily compacted increasing the risks of soil erosion by surface water run-off, especially on steeper slopes. Lowland raised bog peat soils (3 per cent) and fen peat soils (1 per cent) are at risk where cultivated land is susceptible to flooding and when bare wind erosion. Salt marsh soils (3 per cent) are at risk of coastal erosion, Parts of the River Derwent catchment, the catchment of the Duddon Estuary and the River Ehen catchments are priority catchments under the Catchment Sensitive Farming Programme in this NCA with soil erosion into watercourses identified as an issue in all areas. Arable cropping on steeper slopes such as around the St Bees peninsula the dominance of arable systems on sloping ground puts soils at risk of erosion from rainfall.	Regional	Soil erosion causing sedimentation of water courses is identified as an issue within the Catchment Sensitive Farming (CSF) area, particularly in the form of riverbank erosion due to livestock access and in-field erosion of steep slopes. High rainfall exacerbates the problems, which is likely to increase with future impacts of climate change due to more frequent and more intense rainfall in winter, more storm events and drier warmer summers. Improved land management would reduce the potential for topsoil loss and diffuse pollution. Priority actions identified by the Catchment Sensitive Farming programme include reducing soil erosion in fields as a result of farm traffic; restoring poached gateways and farm tracks; and removing stock from watercourses to stabilise banks. Increasing and linking semi-natural vegetation will help to bind soils together, aid water infiltration and penetration, aquifer recharge and reduce soil erosion, also strengthening sense of place and habitat networks. Sensitive management of arable land will help to minimise soil loss through retaining permanent vegetation buffers on erosion prone slopes and around field margins.	Encourage restoration of permanent vegetation cover, grasslands, woodlands and replanting/gapping up of hedgerows. Increase organic matter content to improve soil structure by growing green cover crops or converting to grassland, especially in arable cropping regimes on steeper slopes. Promote, plan and create buffer strips of permanent grassland and woodland alongside watercourses to reduce sediment run-off. Protect riverbanks, enhance connectivity of riparian habitats and strengthen sense of place in the river valleys. Ensure well-timed cultivations (early autumn) and manage access onto land by machinery to prevent compaction and poaching. Promote and employ minimum tillage methods such as direct drilling to avoid damage to soil structure. Control livestock access to riverbanks and consider introduction of water troughs. Encourage extensive grazing regimes to reduce poaching, ensure animal feeding areas are carefully placed to avoid pollution and erosion of watercourses. Encourage uptake of agri-environment schemes and CSF measures. Promote adoption of good land, water and soil management practices.	**Regulating soil erosion** **Water availability** **Climate regulation** **Regulating soil quality** **Regulating water quality** **Regulating water flow** **Biodiversity** **Sense of place/ inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Flood plain grazing marsh Hedgerows Riparian grassland Ancient woodland Roadside verges Pollinating insects Gardens	This NCA on the whole offer relatively poor habitat for pollinating insects. The area's semi-natural habitats support a variety of pollinators Nectar sources may also be provided by the many gardens of the built-up areas.	Local	All semi-natural habitats such as flood plain grazing marsh, hedgerows, verges, ancient semi-natural woodland (ASNW) and riparian habitats should be sensitively managed in good condition and expanded to ensure flowering plants and nectar sources are maximised for pollinating insects. Semi-natural habitats which are, more limited in extent, in particular species-rich grassland are more fragmented and limited in their distribution should be maintained and linked to improve connectivity and develop a stronger network for pollinators. Planting and managing wild flower meadows within urban greenspace and encouraging a wide range of flowering plants in urban gardens will contribute to pollen and nectar sources for pollinating insects. Introduction of buffer strips, margins and wild flower/pollen and nectar mixes within arable areas will increase nectar sources.	Maintain, manage, restore and expand semi-natural habitats such as flood plain grazing marsh, coastal grasslands, riparian habitats, ASNW and hedgerows. Encourage sustainable environmentally friendly farming practices such as managing uncropped field margins, buffer strips and planting of pollen and nectar mixes in arable areas will increase pollen/nectar sources and also increase connectivity. Encourage partnership working with farmers, landowners and a range of organisations to manage road side verges and hedgerows so that they are cut less frequently and sensitively managed to produce a range of nectar producing species, extended flowering times and form a network of nectar sources. Promote and encourage wider range of flowering plants within urban greenspace and private gardens, new developments.	**Pollination** **Food production** **Biodiversity** **Sense of place/ inspiration**
Pest regulation	Flood plain grazing marsh Hedgerows Ancient woodland Riparian grassland Roadside verges	A variety of semi-natural grassland and woodland habitats support populations of pest-regulating species (invertebrates, birds and mammals).	Local	Semi-natural habitats within the NCA are localised and fragmented and would benefit from management and expansion to improve connectivity and allow effective movement of predatory species to control pests. New pests and diseases are a particular issue for woodlands and maintaining a broad genetic base to tree populations with increase the resilience of woodland stands to new pathogens. The existing field boundary hedgerows are sparse and increasing diversity in species and structure of field margins will increase the ability for these areas to support populations of pest-regulating species.	Encourage sustainable farming practices to manage and expand existing semi-natural habitats, and create new areas of habitat; especially hedgerows, woodlands, flood plain grazing marsh and riparian grassland along waterways. Encourage woodland planting to include a genetic mix of key species. Seek opportunities to improve and link the network of semi-natural habitats across the NCA to improve connectivity. Encourage uptake of agri-environment schemes to introduce margins/buffer strips.	**Pest regulation** **Food production** **Pollination** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal erosion and flooding *Continued on next page*	Geology Coastal processes Coastal semi-natural vegetation and habitats including coastal sand dunes, coastal vegetated shingle, coastal salt marsh, soft cliffs and reefs The intertidal zone of the estuaries including salt marsh, sand and mudflats Sand dunes Soft cliffs and barrier islands 'Hard' sea defences	This NCA forms part of 'sub-cells 11c, d and e' of the Shoreline Management Plan 2 (SMP2). The primary areas of tidal flood risk in the northern part of the NCA are on the estuaries of the Ellen at Maryport and the Derwent[4] at Workington. Direct coastal flood risk is significant in the coastal strip between the towns of Workington and Maryport. South of St Bees the main areas affected by tidal flooding are the Duddon and Drigg estuaries and Barrow and Walney Island.[5] Along a significant portion of the coast the railway line provides the primary sea defence, an important piece of transport infrastructure at risk from coastline change. The line impacts on the sediment supply to other areas around the coast by interrupting and limiting the sediment available to build/ sustain coastal habitat and hence provide a natural defence to climate change.	Regional	Tidal flooding is caused by storm surge and wave action during times of high tides. The impacts of climate change with increased sea levels, increased storm events and increased river flows associated with high rainfall events will all impact on the coastal margin, making lower sections of rivers and estuaries particularly subject to tidal flooding and coastal squeeze. The sediment pathways in the NCA that govern coastal regulation are complex. Broadly material is brought onshore from the Irish Sea at St Bees and moves either north or south from this point. Offshore material is added to by material eroded from soft cliffs south of St Bees and soft cliff material derived from industrial slag and spoil to the north. Around the estuaries this is augmented by material carried from upland areas. Erosion dominates along much of the coast but deposition is dominant around the estuaries, including their sand dune systems. Around Walney material is being eroded from the seaward side of the island and moved to the northern and southern ends and the channel between Walney and Barrow. Along most of the coast there are few barriers to sediment transport although some towns such as St Bees have sediment trapping groyne systems. Sediment accretion around the estuaries as salt marshes and dunes provides an important coastal defence reducing the impact of storm events by reducing flood risk and dissipating tidal energy. Maintaining sediment supply to these systems will be important in maintaining this function. In some	Promote and encourage adoption and implementation of Shoreline Management Plans. Seek realignment opportunities along the reclaimed coast of the Duddon Estuary. Protect and enhance naturalness of coastline and seek opportunities to enable natural coastal processes to take place unimpeded and coastal habitats to develop which are more sustainable. Seek opportunities for adaptive management of shorelines on Walney. Explore opportunities for allowing coastal habitats to move inland, by removing artificial barriers where appropriate, to help them expand/ roll back as the coastline responds to coastal change, providing a natural coastal defence that supports flood protection, semi-natural habitat and coastal species. Encourage timely excavation of important coastal archaeological sites, so that they can be recorded before they are lost to the sea. Pursue opportunities for the restoration and creation of coastal wetlands to provide temporary or seasonal areas to deliver benefits for coastal flooding and erosion, as well as biodiversity, water	**Regulating coastal erosion and flooding** **Biodiversity** **Food provision** **Sense of place/ inspiration** **Sense of history** **Climate regulation** **Geodiversity** **Recreation**

[4] River Derwent Catchment Flood Management Plan Summary Report, Environment Agency (December 2009; URL: www.environment-agency.gov.uk/research/planning/33586.aspx)
[5] South West Lakes 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 coastal erosion and flooding *Continued from previous page*				areas sediment starvation as a consequence of 'upstream' defences trapping sediments is exacerbating erosion issues around areas of habitation. As well as making an important contribution to 'soft' coastal flood defences the salt marshes, sand dunes, reefs and soft cliffs that regulate coastal erosion, are an internationally important biodiversity asset, and a source of income for land managers. They are also part of the cultural identity of the NCA. Current policies for the coast include ongoing defence of main coastal settlements, and minimal intervention on much of the rural coast. Allowing natural coastal processes to take place unimpeded creating a natural defence against increased sea level rise and storminess. Erosion in some areas affects isolated properties and historic assets such as Second World War archaeology on Walney.	quality, and sense of place. Conserve, enhance and manage coastal habitats to ensure that they are robust and functioning well (for example by dissipating wave energy, being resilient to high tides and storm events) to maintain a dynamic coastal environment able to adapt to climate change. Encourage and promote Increased awareness among farmers, landowners, residents and visitors of the role played by healthy coastal habitats in regulating coastal process and the need for sediment supply and transport along the coast.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration *Continued on next page*	Geology and soils Open wind-swept, low-lying coastal plain Diverse coastline Diverse protected wildlife habitats Woodlands, including ancient woodlands River valleys and riparian habitats Extensive livestock farming Field boundary network National Nature Reserves, country park and Local Nature Reserves	Sense of place is provided by the varied open coastline of mudflats, shingle and pebble beaches, coastal reefs, sand dunes, high cliffs and soft cliffs all subtly different and each with their own character derived both from their local variations and the varying landscape context within which they sit. Much of the coast is of national or international importance for its habitats and associated species. From Drigg to Silecroft the area is part of the Lake District National Park. Inland stone walls and hedges on stonebanks, locally known as kests, are common along minor roads and form some ancient field boundaries, while characteristic stunted and wind-sculpted hedges and trees reflect the influence of the harsh, salt-laden Irish Sea winds. Undulating pastoral plain dominated by extensive livestock grazing with medium to large scale rectilinear fields of semi-improved and improved grasslands bounded by hedgerows and walls. Small localised pockets of arable cropping and semi-natural vegetation in low-lying areas and river valleys with rougher grazing on higher fellsides towards east. Ancient semi-natural woodland (ASNW) is a feature of some of the more sheltered pastoral river valleys, with semi-natural	National	The sense of place offered by the NCA is highly varied but sits within a context of an area that occupies the transition between adjacent uplands of the Lake District National Park to the east and the Irish Sea to the west. The sense of place has evolved over time as driven by industrial development within a rural context. Mines, quarries and processing sites have come and gone and currently energy generation dominates the industrial landscape, supplemented by ship building at Barrow. Maintaining this evolution without losing character will require planning and a regard to landscape context. Many early industries were inherently linked to local geology and resources; however this may not be the case with future development. The extensive semi-natural habitats, particularly in the coastal zone, but also inland in areas such as the former coal fields east of Workington will need tailored management to ensure they retain their character, while the coastal areas are in many cases designated most areas inland are not leaving them at constant risk of change be it through industrial development or agricultural improvement. Part of the legacy of past industry in the area is a suite of ex-industrial sites where nature has re-established itself leading to bespoke character that blends historic and natural heritages. These sites are often locally valued as green space but area also	Protect the suite of environmental assets the NCA holds and seek to enhance and restore features where appropriate. Encourage retention of expansive views across out to the Irish Sea and the uplands of the Isle of Man, Scotland and the Lake District. Ensure new developments, vertical structures do not impinge on sense of place, tranquillity, recreational assets and wildlife habitats. Ensure that appropriate access is provided to allow all levels of ability and interest to be able to appreciate and be inspired by the landscapes of the area. Conserve and enhance undeveloped areas of coastline. Conserve and manage key features of the Lake District National Park and St Bees Heritage Coast through adoption and implementation of integrated actions from the respective management plans. Promote the use of traditional building materials for restoration, and new developments in rural villages and mining communities to strengthen local character. Manage, restore, gap-up and re-plant hedges.	**Sense of place/ inspiration** **Biodiversity** **Sense of history** **Regulating water quality** **Tranquillity** **Recreation** **Geodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration *Continued from previous page*	Historic rural villages and small mining communities Expansive landscape and seascape views Distinctive urban and cultural heritage from fishing and mining industries Lake District National Park and St Bees Heritage Coast Archaeology and historic features including forts and castles	habitats including wetlands and grasslands. Semi-natural vegetation has reclaimed former industrial sites such as limestone quarries that now support areas of species-rich calcareous grassland and coastal grasslands on former factory sites. Former and current industrial sites include deep mining, iron ore mining and processing , iron and steel works, open cast mining, fishing and ship-building concentrated around Maryport, Workington and Whitehaven in north and Barrow-in-Furness in south. The views out from the NCA are expansive and embrace the Lake District Fells, Irish Sea, Isle of man and south Scotland. In recent years these views have been modified by the increase in coastal and offshore wind developments and nuclear energy processing plants. Much of the built environment north of the Duddon Estuary is characterised by the use of locally quarried St Bees sandstone. As well as the industrial sites, visible archaeology includes Roman forts and First World War and Second World War infrastructure.		considered as brownfield sites and seen as potentially attractive development sites. Maintaining the blend of historic and natural character will require planning policy to recognise the cultural importance of the areas and seek to maintain their unique identities and features. The designation of part of the NCA as part of the Lake District National Park and the recognition of St Bees Heritage Coast both reflect the strong sense of place offered by the NCA landscape. Maintaining that bespoke character without erosion over time will require active management of a suite of environmental assets – natural, cultural and built – but offers opportunities to promote the local sense of place as an economic asset.	Manage, expand and replant broad leaved woodland, ASNW sites and riparian habitats. Conserve and manage grassland patterns and link semi natural vegetation to maintain tradition of livestock farming and strengthen pastoral character. Maintain and conserve wealth of historic features and buildings. Support local green spaces as places of local distinctiveness that provide local communities opportunities to come together and engage with nature close to where they live and work.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Archaeological sites Industrial heritage First and Second World War sites and artefacts Rural and mining settlement patterns Forts and castles World Heritage Site Registered parks and gardens Scheduled Monuments Listed Buildings Historic farm buildings and field boundaries Heritage Coast	A suite of visible archaeological sites from bronze-age stone circles through to Second World War infrastructure including 56 Scheduled Monuments and 969 Listed Buildings. Bronze-age stone circle at Beckermet and standing stones at Millom. The chain of Roman coastal forts stretching north of Ravenglass, form part of the Hadrian's Wall World Heritage Site. Strong industrial heritage around Whitehaven and Workington from mining and steel making industries with mine workings and adjacent planned mining villages with stone cottages and rows of brick-built terraces. Parkland estates such as Muncaster Castle, Workington Hall and Egremont Hall. Local vernacular farm buildings, rural villages and civic buildings that includes red St Bees sandstone for lintels, stonework. Ship-building legacy and dockyards. A suite of First World War and Second World War anti-invasion defences such as pillboxes and observations posts built to defend Barrow-in-Furness and prevent damage to shipyards. The history of land management is reflected in the enclosed landscape (mostly 14th to 17th century) of small to medium scale fields.	National	Among the historic assets of the NCA are 17 sites on English Heritage's Heritage at Risk Register. These built sites are mainly at risk from decay and the action of vegetation destabilising structures. However, one site, Saltom mine, is also at risk from coastal erosion. These built sites are all visually prominent local landmarks whose loss would be very apparent. In addition, the conservation area at Maryport is at risk from character change. A suite of prehistoric cairnfields which stretch across the NCA boundary into the Lake District High Fells NCA are under threat from lack of management and destabilisation from vegetation overgrowth. English Heritage's coastal zone assessment has also identified 26 sites along the coast at risk from coastal erosion including medieval fishtraps, mine sites, roman sites, salt works, the two industrial sites on the at risk register, churches, bronze-age sites, a hill fort and a number of First and Second World War sites. Where protecting these sites from coastal change over time is not possible it will be important to document these sites and where appropriate secure ex situ preservation of the archaeology before they are lost.[6]	Promote, protect and encourage management and restoration of the built landscape such as cairnfields, fortified farmsteads, forts, castles and religious, industrial and farm buildings using local materials and styles to conserve the built heritage. Support and promote the training of practitioners/craftsmen in the use of vernacular building styles and materials such as St Bees Sandstone to conserve the built environment and support the local economy. Increase interpretation, awareness and understanding of the importance of the defensive First World War and Second World War archaeology of Walney Island. Promote, support and build on the World Heritage Status of the Roman history and the areas mining legacy as part of the area's economic identity. Raising awareness of the links between its cultural history and geodiversity. Seek opportunities to record and interpret sites at risk from coastal change and secure ex situ conservation where appropriate.	**Sense of history** **Sense of place/ inspiration** **Biodiversity** **Geodiversity** **Recreation**

[6] North West Rapid Coastal Zone Assessment: Phase 2, Eadie, G. (2012); English Heritage)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history				The Roman fort at Ravenglass marks the southern point of the World Heritage Site associated with Hadrian's Wall. The forts and ports were important components of the Roman supply and support infrastructure for the defences of the wall, are important visually and are regular tourist attractions. As well as the World Heritage site itself the chain of Roman sites along the coast are linked by the Hadrian's Cycleway. Restoration, repair of traditional buildings, styles and materials is important to cultural heritage. The use of St Bees red sandstone and other local stone in civic buildings, rural villages, farmsteads and barns maintains visual integrity. It is important to ensure continued supplies of local materials for new building and development and that traditional craftsmen/ building styles are deployed to continue traditional settlement patterns. In the rural landscape weakening/loss of field boundary pattern from changes in farmland management such as moves from traditional boundary types to post and wire field boundaries will also affect historic character.	Explore opportunities for better management of below ground archaeology such as scrub management, minimum tillage on arable land and reversion of arable to permanent grass supported by measures such as agri-environment schemes Encourage regular management and restoration of historic field boundary patterns through repair of walls, hedgebanks and kests, and restoration of neglected hedgerows. Support further research to identify archaeological and historic features, record new finds and provide interpretation and educational experiences to help people understand and appreciate their significance.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Expansive views Undeveloped coastline Ancient semi-natural woodland River valleys and estuaries Rural hinterland	Though industry has a significant influence upon the area, 43 per cent of the NCA is classified as 'undisturbed' in 2007, although this has declined from 53 per cent in the 1960s. The majority of 'undisturbed' and most tranquil land occurs along the undeveloped coastline from Seascale down to Millom associated with the Lake District National Park, within the wooded and sheltered river valleys, estuaries and the farmland inland of Workington and Whitehaven. Most intrusive and disturbed land associated with the main towns and industries and their connecting roads and infrastructure.	Regional	A sense of tranquillity is most associated with the undeveloped stretches of coastline, coinciding with the Lake District National Park in the south, and the farmland abutting the fells, as well as the patches of ancient woodland that are a feature of the more sheltered valleys. The expansion of settlements and urban-fringe influences associated with, industry and the main transport road network all have a cumulative and negative impact on tranquillity and require careful planning and consideration when assessing new developments, road upgrades. Increased pressures from the growing 'energy' industry to improve the local economy and provide employment will need to be carefully addressed for its impacts on light and noise pollution within the NCA. Pressures to modify and improve the current social infrastructure, housing stock and transport links are likely to be strong which may affect future tranquillity. Protection of the most tranquil and undeveloped areas will require sensitive management to ensure increased visitor numbers do not detract from quiet enjoyment of areas. Maintenance and management of wooded river valleys, estuaries and viable farming industry on the plain is essential to protect rural hinterland from development and intrusion. There is a need to protect open vistas along the coast and consider the impact of any new development, including vertical structures such as wind turbines to control visual intrusion and noise/light pollution in future.	Maintain and protect areas of high tranquillity including undeveloped coastal areas, enhance sheltered and wooded river valleys, estuaries and pastoral farmland. Maintain expansive uninterrupted views and undeveloped coastline from development through careful planning and management for public enjoyment, recreation and biodiversity interests. Manage and plan housing, industrial and transport infrastructure development to minimise disturbance, control spread of urban fringe and cumulative intrusion and further loss of tranquillity. Sensitively manage public access and visitor numbers to ensure tranquillity and recreation facilities are protected and risks of negative impacts are minimised allowing the area to continue to be enjoyed. Promote the calming and restorative effect that contact with tranquil and sensory environments has on people's health and wellbeing.	**Tranquillity** **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
Recreation *Continued on next page*	Rights of way network and other paths including National Trails Cycle routes Cultural and historical heritage The Lake District National Park and St Bees Heritage Coast Suite of Local and National Nature Reserves and a country park Varied coastline Rivers Restored landscapes Woodland Open access land Common land	Recreation is supported by 595 km of public rights of way (at a density of 1.21 km per km^2), plus 3 per cent open access land and 6 per cent common land within the NCA. Statutory access is supplemented by a series of accessible National and Local Nature Reserves along the coast and Longland Lake Country Park providing various levels of permissive access. The Hadrian's Wall National Cycleway crosses the area from Ravenglass north while the Coast to Coast path heads East form St Bees. The England Coast Path National trial, with associated spreading room, runs along the coast from Maryport to Whitehaven and is being extended southwards and will provide enhanced opportunity to rest, relax and admire the view. The coastline, distinctive coastal settlements, historic assets, the Lake District National Park (12 per cent of which is in the NCA) Hadrian's Wall World Heritage Site and the St Bees Heritage Coast are also popular features for visitors and locals seeking quiet recreation experiences. Other recreation in the areas includes some water sports along the coast and walking along the coast and the upland fringes.	National	In most of the NCA recreation is centred on quite experiences of the landscape varying from visiting beaches and nature reserves to walking through the rural landscape. This is supplemented by themed experience such as the Hadrian's Wall cycle route, Coast to Coast Walk and England Coast Path National Trail linked to particular aspects of the historic or cultural landscape. With the strong natural, historic and industrial heritages of the area there is potential to increase this offer. The coastal fringe provides a wide range of recreational opportunities and destinations to attract residents and visitors. These are being linked by the England Coast Path National Trail which will seek to improve access to and along the coast within a framework which respects the local environment. New coastal access such as from Maryport to Whitehaven and the stretch southwards to Silecroft in development offers additional opportunities for recreational experience and a local boost to the economy. The provision of new access will however, need to be managed so as not to detract from the quality of the natural assets along the coast. The England Coast Path National Trail, will for the first time give people the right of access around all of England's open coast, including – where appropriate – 'spreading room' along the way where they can rest, relax or admire the view. The methodology for implementing the path includes provision to ensure there	Promote, maintain, manage and where possible sustainably extend public rights of way, recreational facilities and sites associated with cultural, historical and natural heritage as key attractions for visitors, providing suitable provision for all levels of ability. Develop new recreational facilities and experiences linked to the area's rich and diverse natural heritage. Develop the England Coast Path National Trail as an opportunity to raise the profile of the breadth of heritage in the coastal zone and develop best practice management. Plan and manage for a potential increase in visitors to coastal areas, so that increased visitor pressure does not result in damage to coastal habitats important for managing coastal flooding and for biodiversity. Promote informed, environmentally aware sustainable recreation, particularly in the coastal zone where pressure is high and many wildlife sites and habitats, are sensitive to disturbance. Promote the value of a high quality environment to increase awareness of its importance as an economic and health and well being asset.	**Recreation** **Biodiversity** **Sense of history** **Tranquillity** **Geodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation *Continued from previous page*				will be no impact on sensitive features found on and along the coast. It supports future work to protect, or increase, existing access to and from the coast that may provide links to the England Coast Path, and ensures that any landscape enhancement schemes take account of, and where possible incorporate, better public access provision. There may be opportunities to improve, link and extend existing cycleways and footpath networks away from the coast. Along the coastline marine litter is a significant issue with the area receiving both local and material washed ashore from the Irish Sea. In the area around Barrow other forms of coastal recreation including kite surfing are practised. These, alongside more widespread activities such as dog walking along the coastal margin, are popular but can cause disturbance to species such as waders and wildfowl using the shore and shallow waters for feeding, resting and nesting. There is scope for improved management of recreational access to the coastal zone to ensure recreation that complements other uses of the coastal margin for the benefit of both people and wildlife.	Support sustainable measures to enhance recreation while maintaining character identified in the Lake District National Park Management Plan. Improve interpretation of the landscape, with its strong geology and historic environment links to enhance quiet enjoyment and understanding for residents and visitors alike. Seek opportunities to enhance access to the local environment close to where people live and work, allowing local communities to enjoy their environment, take action to improve it, and to benefit from the health and social rewards it affords them.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity *Continued on next page*	Geology Open coastline and associated habitats including reefs, coastal sand dunes, coastal vegetated shingle, and maritime cliffs and slopes Rivers and streams Estuaries and their associated habitats including coastal sand dunes, mudflats and salt marshes Semi-natural terrestrial habitats: including woodlands (including ancient woodlands), wetlands such as fens, lowland raised bogs and rivers, and grasslands	International designations cover a range of coastal habitats including sand dune, shingle communities and salt marsh especially around Walney Island, the Duddon and Ravenglass estuaries. These habitats are particularly important for breeding sea birds such as gull and tern colonies, also wintering waders and wildfowl and the natterjack toad which is nationally rare and Cumbria supports 50 per cent of the UK population. Along the foreshore from Millom northwards are a series of glacial cobble skears supporting honey comb worm reef. The importance of these sites has recently been recognised in the designation of the Cumbria Coast Marine Conservation Zone, one of the first in England. Mussel reefs off Walney island are important feeding grounds for eider ducks, wintering waders and support a mussel fishery. Maritime cliff and slope in the form of low cliffs along most of the coast north of Millom and high sandstone cliffs at St Bees support a range of species with the St Bees cliffs particularly important for a suite of plant species and breeding seabirds not found elsewhere in the North West of England such as rock sea lavender, guillemot, puffin, razorbill and black guillemot. Sand dune and shingle communities around Walney Island, the Duddon Estuary, and the estuary at Ravenglass are internationally designated and support many specialist species including northern dune tiger beetle, oyster plant, Isle of Man cabbage and important colonies of gulls and terns, although some species such as roseate tern have been lost. On Walney island are a suite of saline Lagoons supporting specialist brackish water communities. Sand and mudflat communities bordering the NCA from the Duddon southwards are critical for many wintering birds and support rare eel-grass beds. Rivers in the NCA support many rare and specialist species including freshwater pearl mussels, river, sea and brook lampreys, and salmon.	National	The NCA hosts a highly varied number of sites of national importance representing a range of habitat types and associated species, including coastal and freshwater sites that are also internationally designated. 82 per cent of the SSSI are in favourable or unfavourable recovering condition, while 18 per cent is in unfavourable no change or declining condition with some areas part/ destroyed. Any decline in range of habitats and species both inside and outside the SSSI may indicate habitats being undermanaged and in sub-optimal condition. Coastal management including reduced dynamism and over stabilisation of dune systems is an issue in a number of areas. Diffuse pollution threatens the suite of freshwater sites; management of nutrients and soils on farmland is required so that they are not lost into watercourses. Continued monitoring and management of invasive species and new diseases is required. Both grey squirrel and signal crayfish threaten their native cousins through disease, and species such as Himalayan balsam, Japanese rose and Japanese knotweed threaten native vegetation. Plant diseases threaten species such as ash and elm, two of the dominant woodland trees. The spread of new diseases will need monitoring to manage impacts. Human modification of habitats remains a direct threat for many systems dependant on low nutrient conditions such as species-rich pastures and meadows, sand dunes, and drainage sensitive areas of wetland while	Protect, maintain, restore and enhance areas of semi-natural habitat of all types, but with particular reference to coastal habitats, lowland raised bogs, basin and valley mires, rivers and unimproved grasslands. Work with farmers, fishermen and developers to seek opportunities to secure positive management of the coastal environment that integrates shoreline management, development planning, access, fisheries and biodiversity. Work with farmers and landowners to secure positive management of modified habitats such as arable land and brownfield land to support specialist species through replanting of hedges, woodland and introduction of buffers, margins, while protecting and enhancing the historic aspects of the landscape. Work with farmers, landowners and water companies to manage agricultural land, remove artificial barriers in rivers to minimise pollution incidents and losses of nutrients and soils into watercourses to improve water quality to benefit biodiversity, recreation. Promote and encourage local woodfuel networks, to support active management of woodland enhance conditions for species such as red squirrel. Support the production and marketing of agricultural products that support the management of	**Biodiversity** **Climate regulation** **Food provision** **Regulation of water flow** **Regulating water quality** **Regulating coastal erosion and flooding** **Sense of place/ inspiration** **Sense of history** **Tranquillity** **Recreation** **Geodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity *Continued from previous page*	including purple moor-grass and rush pastures and lowland meadows National Nature Reserves, Local Nature Reserves and a country park European and national nature conservation designations including SAC, SPA, Ramsar, SSSI, NNR and MCZ sites	Though much reduced in extent the suite of surviving lowland raised mires, particularly around the Duddon, remain an important refuge for species such as large heath butterfly, and tree pipit. Through out the NCA from Drigg northwards are a series of basin and valley fens and kettle holes supporting a notable range of wetland communities and many specialists including small pearl-bordered fritillary, adder and a suite of wetland birds. The reedbeds at Siddick Pond are the most extensive in Cumbria and are an important wintering site for bittern. Purple moor-grass and rush pasture grading into lowland oceanic heath is an under recorded but widespread community, particularly in the Cumbria coalfields area east of Whitehaven. As well as notable plant communities there are populations of wintering hen harrier, marsh fritillary butterfly and breeding curlew. Other unimproved grassland communities are much rarer but include a number of hay meadows and patches of limestone grassland. Some of the most diverse unimproved grasslands are associated with brown field sites, particularly along the coast. Here they support rare plants such as purple broom rape and small blue butterfly in their only north of England populations. Although restricted mainly to the river corridors and to some coastal slopes, native woodland is an important feature. The woods are mixed including areas of ash, oak and riparian willow dominated communities. Coastal and flood plain grazing marsh is most extensive around the Duddon Estuary where although not notified it helps support the wintering wildfowl populations of the estuary. The NCA also holds important populations of farmland birds, in particular the arable landscape of the St Bees Peninsula, and to a lesser extent on the Cumbria coalfields where species such as tree sparrow, grey partridge, lapwing, and skylark though yellow wagtail have declined and may be locally extinct as is corn bunting.		successional change following modification is causing the continued decline of many areas of lowland raised bog. Climate change poses an ongoing risk to many habitats through changing the limits of environmental condition. Management of human disturbance around sensitive sites such as sand dunes, shingle and intertidal reefs is required. Native woodlands are at risk from over management, or abandonment of formerly managed woodlands, which would threaten species associated with established woodland cover or open woodland glades respectively. Brownfield including former industrial sites are at risk from development. Improved management of individual sites, with restoration, buffering and creation of new habitats will link existing areas improving connectivity and allow species to re-colonise and move between sites to adapt to the impacts of climate change. Where sites have been restored, but where component species are unlikely to re-colonise because of site isolation specific actions to restore populations will need to be identified and implemented. This may include steps to improve local habitat connectivity to enable re-colonisation or species reintroduction (such as has happened for marsh fritillary). In addition some key species in the NCA require, specific management interventions to maintain and restore populations for example breeding seabirds are disturbance sensitive, and some have been impacted by increasing populations of ground predators.	semi-natural habitats. Through increased uptake of agri-environment schemes. Promote interpretation to raise awareness and understanding of the biodiversity value of ecosystem services in the NCA at accessible nature conservation/ wildlife sites and promote the benefits to the wider environment of integrated management. Seek to minimise disturbance by visitors/recreation at sensitive sites. Plan and protect the area from invasive non-native species and their impacts. Seek opportunities to restore lost species through habitat management and where appropriate reestablishment. Ensure natural coastal processes can evolve through adoption of Shoreline Management Plans and support of Coastal Maritime zone. Support, encourage adoption and implement the Lake District National Park management plan. Use nature reserves and other local green spaces to encourage communities to become more involved in biodiversity 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.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity *Continued on next page*	Geology Soils Rivers and Streams Coast/sea Quarries	Four out of five geological SSSI are in favourable condition. Important surface exposures exist of many of the area's geological rock types, either in situ or exposed by quarrying or coastal processes, or in mine spoil heaps. Some geology is only exposed in sub-surface situations such as mine workings and is generally no longer visible as active mining has ceased in the area. The estuary systems of the NCA south of St Bees support active and visible geomorphologic processes, with the estuary complex at Ravenglass being particularly unmodified. Geomorpholgical process along the coast is also visible around Walney where there is extensive reworking of coastal sediments. Active geomorphological process on the peat bogs is generally impacted by past human activity.	National	The underlying geology and geomorphological processes have significantly determined the NCAs character, social and economic history through local mining and quarrying activity and use of local stone in vernacular architecture. The deep Coal Measures have been extensively worked since the Industrial Revolution. They are now uneconomic but extensive areas have been reworked through open-cast mining and together have provided many opportunities to study and record geological processes leaving a rich mining and cultural heritage. Mining of other mineral resources including iron ore, gypsum and alabaster has all now ceased in the NCA. Along the coast natural processes have resulted in glacial deposits and sediment reworking into estuarine and coastal landforms while peat formation has occurred in shallow waterlogged basins. Quarrying of limestone, sandstone and sand deposits continues to be important for local industries. Exploitation of these resources is likely to continue as long as resources allow and there is a market for the products quarried. Future energy developments such as the proposal for a nuclear waste repository facility are dependent on local geologies. Maintaining the visibility and accessibility of geological exposures is important to allow their study. Vegetation management on bare rock sites and the pumping of water from mines is critical to their condition, for example access to Florence Mine, ceased when water pumping was stopped. Glacial features include a number of soft cliff exposures, which are important as sediment sources for nearby coastal stretches and are at risk from actions taken to stabilise them. Reworking of materials from these cliffs and other deposits,	Continue to maintain and manage views of geological features and exposures through vegetation management, water pumping to allow monitoring and recording. Seek opportunities to improve access to exposures, cuttings and quarries, and improve interpretation to raise awareness and understanding of the NCAs geodiversity. Conserve, manage and enhance geological and mixed interest SSSI and Local Geological Sites. Seek opportunities to promote and increase people's understanding of the geological heritage and importance of coal-mining to social and economic history. Support opportunities to restore peatland function as a recorder of palaeo-ecological change. Seek opportunities to maintain and restore active geomorphological processes including those associated with coastal sand dunes, salt marshes and low land raised bogs.	**Geodiversity** **Biodiversity** **Sense of place/ inspiration** **Sense of history** **Regulating water quality** **Regulating coastal erosion and flooding** **Food production**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity *Continued from previous page*		In the intertidal zone the cobble skears that are the remains of glacial drumlins are an important feature as they form the substrate on which biogenic reefs of honeycomb worm and mussels establish. The former form the basis of the Marine Conservation Zone in the NCA and the latter are of particular significance supporting a traditional mussel fishery and are a key food resource for the wintering birds.		including the rocky skears that support coastal fisheries and reefs, is also important in supplying the materials for features such as the storm ridges of Walney. Maintaining active coastal geomorphological processes will be necessary to maintain storm ridges and active dune systems, and they role they play in coastal protection. Supporting the continued geomorphological function of salt marshes and sand dunes will also support their biodiversity and maintain their carbon sink function. The lowland raised bogs of the NCA make a notable contribution to the national and international resource of this peat forming habitat and offer future opportunities for carbon credit income streams as well as offering the opportunity to re-establish their geomorphological function as a recorder of palaeo-ecological change.	Seek opportunities to promote and raise awareness of the benefits that natural coastal processes can provide for flood protection, habitat creation and help to ameliorate impacts of climate change. Encourage maintenance of vernacular buildings, walls and stone-faced earthbank kests using sources of local stone/ materials to reinforce sense of history and place and for new build to strengthen character.	

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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.

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