





## Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper<sup>1</sup>, *Biodiversity 2020*<sup>2</sup> and the European Landscape Convention<sup>3</sup>, 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.

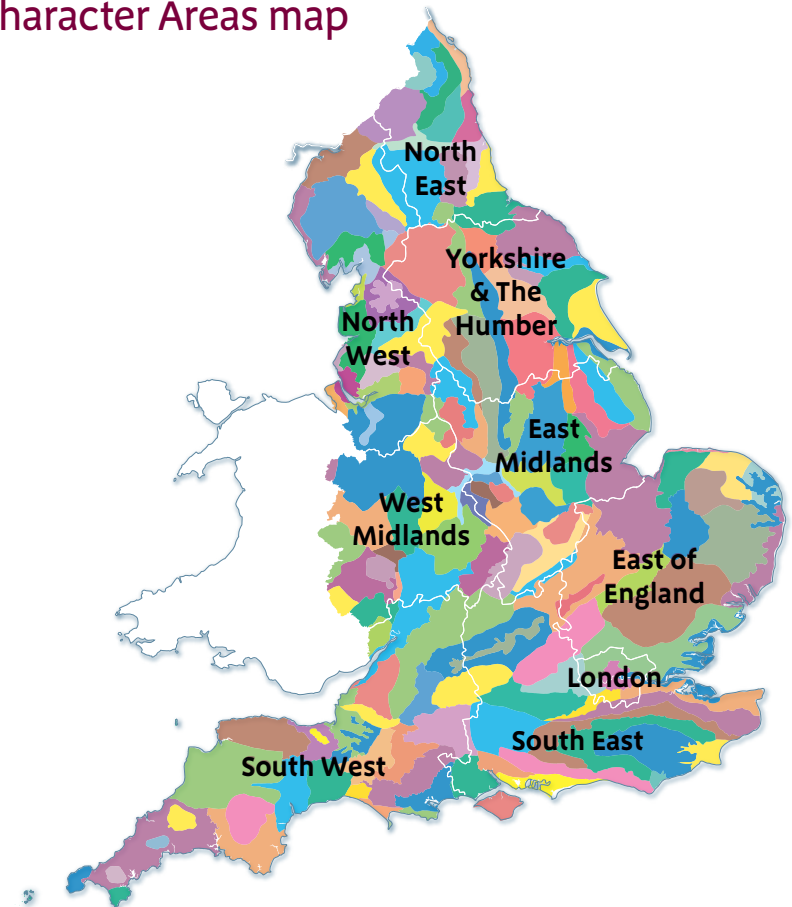
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

## National Character Areas map



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

## Summary

The South Cumbria Low Fells is an internationally recognised landscape, two-thirds of which is covered by the Lake District National Park designation. To the east the area extends to cover the River Lune valley. The area lies to the south and south-east of the central core of the Lake District (the Cumbria High Fells NCA), but the sudden change from the tough Ordovician Borrowdale Volcanics to the softer Silurian slates and mudstones provides a dramatic change in landscape: the rugged high fells give way to gentler, undulating hills, dissected by pastoral river valleys, woodland and linear lakes. Some 51 per cent (35,776 ha) of the area falls within the Lake District National Park, while 2 per cent (1,155 ha) falls within the Yorkshire Dales National Park, which borders the NCA to the east.

The area stretches from above the Duddon Estuary, in the west, through the wooded hills and valleys of Broughton in Furness, the River Crake and the Furness Fells, through Grizedale Forest to Coniston Water, Windermere and Whinell Forest, to more undulating farmland in the east. It is characterised by undulating low fells and ridges which, in the central section, are dissected by the two major lakes – Windermere and Coniston Water – and minor river valleys. Windermere is the largest lake in England and an iconic feature of the Lake District, heavily used for recreation and tourism. In the east – the area not covered by the National Park designation – the landscape is characterised by open, semi-improved pasture on a plateau between the rivers Kent and Lune, with a shallow relief of ridges and hollows.

The central area of the NCA, between Coniston Water and Windermere, is one of the most densely wooded areas in England, with extensive areas of broadleaved and conifer woodland and parkland. The higher ground supports a mosaic of upland heathland, interspersed with rocky outcrops, tarns, fast-flowing becks and stretches of bracken. Valleys support a working (principally

pastoral) landscape, with fields bounded by drystone walls reflecting the geology of the area. East of Kendal, and also in the far west, the landscape is more open and pastoral, with fewer trees. The South Cumbria Low Fells NCA contains several sites of international significance for their biodiversity, designated as Special Areas of Conservation (SAC). These include the mires at Subberthwaite, Blawith and Torver Common, the slopes and crags of Yewbarrow Woods (containing yew groves in association with old sessile oak woods), and the lowland raised bog complex of the Duddon Mosses.

Woodlands, wetlands and the peat topsoil of the fells are important carbon stores, and correct management will enable them to continue to sequester carbon. The NCA's catchments contribute to the north-west's water supply, as well as supporting the mosaic of habitats and associated species. The area's beauty has long been an inspiration for writers and artists, with Beatrix Potter and John Ruskin both having lived and worked here.

The area is a major tourism destination, with visitors attracted by the lakes, woodlands, upland landscape, semi-natural habitats, cultural and historic heritage, and the richness of recreational opportunities. There are 12 million visitor days spent in the Lake District per year, and Bowness-on-Windermere is the Lake District's most popular resort.

[Click map to enlarge; click again to reduce](#)

## Statements of Environmental Opportunity

- **SEO 1:** Manage and enhance the combination of open low fells, commons and valleys, with their mosaic of heathlands, species-rich meadows, wetlands and native woodlands among the matrix of pastures, to create a coherent and resilient ecological network and to strengthen the distinctive landscape character.
- **SEO 2:** Conserve the distinctive landscape character of the South Cumbria Low Fells, including the wealth of natural, geological and cultural heritage, and the internationally renowned Lake District National Park. Sustainably manage and improve opportunities for the enjoyment and understanding of this popular area.
- **SEO 3:** Safeguard and manage woodlands to retain them as important landscape features, and for their national and international biodiversity interest, along with their cultural and historical heritage. Seek ways to increase woodland cover in appropriate locations to mitigate the effects of climate change, address water quality and soil erosion, and supply timber products.
- **SEO 4:** Manage and enhance the wetlands, rivers, lakes, tarns, watercourses, raised bogs and mires for the benefit of water quality, biodiversity and recreation, and to mitigate flood risk and the effects of climate change.



Windermere has attracted visitors for centuries, and thriving towns, such as Bowness-on-Windermere, have developed as a result.

## Description

### Physical and functional links to other National Character Areas

The South Cumbria Low Fells border onto the Howgill Fells, Yorkshire Dales, Bowland Fringe, Morecambe Bay Limestones, West Cumbria Coastal Plain and Cumbria High Fells NCAs. The South Cumbria Low Fells have strong physical, ecological and cultural links with the Cumbria High Fells, and both are within the eroded dome of the Lake District massif.

The Cumbria High Fells form the dramatic backdrop to the South Cumbria Low Fells, rising abruptly from these gentler southern fells. From open, high land, there are panoramic views of the surrounding uplands and over the lowlands and estuaries of Morecambe Bay. To the west lie the Duddon Estuary and the west coast, and to the south lie the limestone ridges and valleys surrounding the broad expanse of Morecambe Bay, into which the NCA's rivers flow. To the east there are views of the extensive tract of upland landscape comprising the high, rounded hills of the Howgill Fells, the Yorkshire Dales and the Bowland Fells.

The low fells, ridges and valleys of the NCA radiate in a north–south orientation from the eroded central dome of the Cumbria High Fells, with the principal water source for the major lakes and rivers of the South Cumbria Low Fells originating from this high ground to the north. The major lakes of Coniston Water and Windermere dominate the glaciated valleys, along with numerous smaller lakes and tarns. The rivers flow south from the higher uplands

into Morecambe Bay. The River Lune originates in the Orton Fells NCA, at Ravenstonedale, and dominates the eastern extent of the South Cumbria Low Fells NCA as it flows south through the Lune gorge and broadens out into Lonsdale. The internationally designated River Kent and its tributaries, the Sprint and Mint, have their headwaters in the Cumbria High Fells NCA, from where they flow south, through Kendal, and enter Morecambe Bay in the Kent Estuary. The rivers Gilpin and Winster drain the low fell country between Kendal and Windermere, and pass through the Morecambe Bay Limestones before reaching Morecambe Bay. Rusland Pool flows south into Morecambe Bay, through Grizedale Forest, the Rusland Valley and into the River Leven.

The NCA provides many goods and services to areas beyond its boundaries: it provides timber and wood fuel from its extensive woodlands (including the large public forest estate holding in the area, as well as Grizedale Forest), agricultural products, drinking water, regulation of rainfall runoff and carbon sequestration.



The River Lune Valley



## Key characteristics

- Undulating, rugged low fells and ridges of Silurian slates and fissile mudstones radiate in a north–south orientation from the eroded central dome of the Cumbria High Fells, dissected by U-shaped valleys, which include the large lakes of Windermere and Coniston Water.
- Open fells, over 300 m in height, with craggy ridges, rocky knolls and infrequent woodland and tree cover.
- Mosaic of fell habitats, including upland heathland, valley and basin mires, springs and flushes, lakes, tarns, juniper scrub, upland calcareous grassland and lowland dry acid grassland, among fast-flowing rocky becks, rough pasture, bracken beds, and small broadleaved and coniferous woodlands.
- Extensive ancient, semi-natural woodlands, especially in the central area of South Cumbria Low Fells, extending from Coniston Water and the River Crake to the Winster Valley, and contiguous with large conifer plantations and mixed woodland in Grizedale and the surrounding area.
- Rivers and streams drain southwards from the uplands, and flow through the area in a distinctive north–south orientation to drain into the Duddon Estuary or Morecambe Bay.
- A pastoral landscape, consisting of small secluded and larger open valleys and fells, with generally small- to medium-scale enclosures that increase in size towards the east.
- Open, semi-improved pasture on a plateau between the rivers Kent and Lune, with a shallow relief of ridges and hollows.
- Well-managed land with a parkland character is associated with the edges of the principal lakes, valley bottom locations and large country house estates.
- Villages, hamlets, farmsteads, farm buildings, villas and large country houses, with local building materials varying from limestone and slate in the south, to sandstone and slate elsewhere. Some buildings are lime-rendered, giving them a characteristic white exterior.
- Historic field systems dating from medieval times, with well-maintained drystone walls forming strong patterns and boundaries. Sheepwalks, (areas of grassland where sheep can roam freely) established on the fells from the 13th century, are also historic landscape features.
- There is an intricate pattern of undulating and twisting minor roads that serve the scattered hamlets and farmsteads.
- This is a significant tourism and recreational area, with large numbers of visitors attracted by the natural beauty, the wildlife, the cultural connections, and the opportunities for walking, cycling, running, climbing and water-based activities, among other pursuits.

## South Cumbria Low Fells today

South Cumbria Low Fells is characterised by undulating low fells and ridges, which are dissected by the two major lakes of Windermere and Coniston Water in the central section, and by minor river valleys throughout. The small valley slopes and ridges are, in many places, covered with extensive stretches of coniferous and broadleaved woodland, in particular in the Grizedale area. The rivers are generally fast-flowing over rocky beds, and lined with trees. From these often confined valleys of enclosed pasture and woodland, there are glimpses of the backcloth of the higher Lakeland Fells to the north, and the surrounding limestone lowlands and Morecambe Bay to the south. To the east of Kendal, and the north and west of Ulverston, the landscape is more open, fields are medium to large in size, and they are bounded by well-maintained limestone walls. Woodland is less frequent in these areas, and vegetation is generally limited to small copses and belts of semi-natural trees and shrubs along watercourses. Weather and views are constantly changing, with the seasons marked by the bluebell woods in spring, the purple summer heather, the oranges of autumn trees and bracken, and the snow-clad fells in winter.

The area is underlain by the mudstones, siltstones and sandstones of the Windermere Group of Silurian age. While these are relatively hard rocks, they are less resistant to erosion than the Borrowdale Volcanic rocks to the north, and form a gentler, rolling landscape. The erosion by glaciers moving slowly southwards has created long, straight, U-shaped valleys, with craggy, knoll-like outcrops; large lakes, notably Windermere and Coniston Water, now occupy the ice-scoured valleys. Windermere has an indented shoreline, creating many attractive bays along the wood-lined banks. Esthwaite Water, designated as a Ramsar site, is a mesotrophic waterbody and is

one of the most productive lakes in the Lake District. The site supports a rich assemblage of pondweeds and the diverse aquatic invertebrate fauna includes a number of species with restricted distributions in Britain. The main rivers all rise in the higher land to the north, and flow south through the NCA to drain into the Duddon Estuary or Morecambe Bay. Rivers and streams are generally fast-flowing over rocky beds and lined with trees. The River Kent SAC flows from the Cumbria High Fells NCA through Kendal, and into the north-eastern part of the South Cumbria Low Fells NCA. The river is designated for its water crowfoot beds and important populations of white-clawed crayfish, bullhead and freshwater pearl mussel.



Rusland Valley: extensive semi-natural woodlands amongst a matrix of diverse habitats

Land above 300 m is more rugged in character: a diverse pattern of heathland and rough grassland is interspersed with rocky outcrops, small tarns and becks, and stretches of bracken. Woodland and trees are infrequent at these higher altitudes. The elevated open land on the tops of the ridges provides striking long-distance views northwards, towards the Lakeland Fells, and also to Morecambe Bay in the south. The undulating fields, often of species-rich grassland, are bounded by drystone walls with rocky outcrops. The fells and valleys contain extensive areas of semi-natural habitats of high visual and nature-conservation importance, including internationally important mires, raised bogs and ancient woodland, forming an intricate mosaic of habitats along with grass fell, heathland, fens and grazed pasture. The area incorporating Subberthwaite, Blawith and Torver Common, in the west of the NCA, is internationally designated as an SAC for its mires. With over 200 mires across the hilly plateau, this site contains some of the best examples in the UK. The Duddon Mosses, also in the west of the NCA, make up a complex of internationally important active and degraded raised bog, which crosses into the West Cumbria Coastal Plain NCA.

Woodland cover ranges from extensive conifer plantations and some mixed and broadleaved plantations, to several areas of semi-natural broadleaved woodland and copses on steep stream sides and knolls. Woodland is more extensive in the central and western parts of the area, with broadleaved and ancient semi-natural woodland concentrated in the area between Windermere and Coniston Water, along with the Forestry Commission-managed Grizedale Forest. Parkland is often associated with the shoreline estates of the main lakes, most of which developed from the late 18th century. The slopes and crags of the Yewbarrow Woods SAC contain internationally important yew groves in association with old sessile oak woods. In the east and far west of the NCA remnants of ancient semi-natural woodland do exist, but tree cover is generally limited to coniferous

shelterbelts. Oak is the dominant woodland tree species on deeper soils, with areas of ash and hazel dominating limestones. Alder is more local in 'flushed' ground and along stream sides, with birch occurring at higher altitudes. Juniper is also present in some areas. The ancient semi-natural woodlands are a potential stronghold for the hazel dormouse.

Farmland consisting of improved, undulating pasture with groups of mature trees and small woodlands located on the edges of the principal lakes, and several large country house estates all give a parkland character to some areas. The presence of historic field systems, bounded by drystone walls of locally sourced materials, reflects the area's importance as relatively productive pasture land in comparison with the thinner soils to the north. Land cover is principally undulating pasture for grazing and silage, within irregular and semi-regular fields that mostly pre-date the 18th century. More rectilinear fields (resulting from later enclosure and reorganisation) are a feature of the central and south-western areas, increasing in scale towards the east. The characteristic rocky knolls and slopes of the area mainly comprise unenclosed acid grassland and bracken cover, with patches of upland calcareous grassland along the narrow line of the Coniston Limestone in the west and around Kendal. The unenclosed rough grasslands of the fells are generally used for sheep grazing.



The elevated open land on the tops of the ridges provides striking long-distance views northwards towards the Lakeland Fells.



Population is relatively low, with villages and hamlets located in the valleys and on the lower slopes of the fells. Larger settlements developed at the towns of Windermere and Bowness in the 19th century, in response to demand for tourist facilities, and contain many Victorian buildings constructed from thinly-bedded Silurian slate walls and roofs, or rendered and then painted white. Kendal is a significant market town, granted a charter in the 12th century, and serving the many villages surrounding it. Hawkshead is a smaller settlement, which consists of a core of traditional 18th-century slate buildings and narrow streets, and a collection of Victorian additions.

Many smaller villages and hamlets in the area typically consist of a farm, workers' cottages, a pub and a church or chapel. Many of these settlements no longer consist of farming communities, rather their character is now considerably influenced by second homes, the presence of tourist facilities such as caravan sites and hotels, and bungalow developments. Local geology is reflected in the vernacular architecture of farmsteads, walls and older buildings, with slate, granite, sandstone and limestone all used as construction materials – depending on the bedrock. Roads form an intricate pattern, undulating and twisting through the landscape to serve the scattered villages and farmsteads. Often lined with hedges or scrubby vegetation, and individual mature trees including ash, oak and hazel, the lanes appear to be an integral part of the landscape.

The area is a major tourism destination, with visitors attracted by the lakes, woodlands, upland landscape, semi-natural habitats, cultural and historic heritage, and the richness of recreational opportunities such as lakeshore access at Windermere, which provides for sailing, canoeing, rowing and swimming. The numbers of seasonal visitors to the area, and particularly the visual impact of vehicular traffic and water-based recreational activity on

Windermere, have a significant effect on the way in which this landscape is perceived in the summer months.

The Lake District has been nominated as a prospective World Heritage Site for the influence that its natural environment and traditional farming have had on writers and artists, on the Picturesque, Romantic and conservation movements, and on the birth of the National Trust. John Ruskin and Beatrix Potter were particularly influential in the formation of the conservation movement in England, as well as living and working in the area. The open fells have retained a sense of tranquillity and remoteness.



**Brockhole National Park Visitor Centre: Originally built by a wealthy Manchester merchant to take in the view of Windermere. The house is now used as a visitor attraction.**

## The landscape through time

While the South Cumbria Low Fells create an immediate contrast with the rugged Lake District mountains to the north, the geology of the South Cumbria Low Fells and Cumbria High Fells are unified by their common origin as a deeply eroded dome of ancient rocks. Marine sedimentary grits and fissile mudstones of Silurian age underlie the South Cumbria Low Fells. The folded and fractured nature of these rocks provides evidence of earth movements and pressures in the crust between 400 and 300 million years ago. The varying hardness of the Silurian rocks, along with glacial, fluvio-glacial and periglacial processes, contribute to the complex topography of the area. The slow, southward movement of glaciers during the Quaternary period has created long, straight U-shaped valleys now occupied with large, deep lakes such as Windermere and Coniston Water. Glacial tills coat valley sides and slopes, with fluvio-glacial and recent deposits of sands and gravels on valley bottoms. To the south-east of the area there are significant drumlin fields, creating a 'basket-of-eggs' topography.

Because the soils of the area are relatively fertile in comparison with the thinner cover on the fells to the north, or over the limestones to the south, the land has supported farming – probably continuously – since Neolithic times. The presence of historic field systems, settlement patterns – some from medieval times – and evidence of several deer parks in the area, underline its importance as productive pasture land. By the 12th century, the influence of the church and monasticism had increased, and the monasteries of Furness Abbey and Cartmel Priory controlled much of the farmland in the area. They also made a useful contribution to the economic development of the region.

To the north-east of Dalton, in the Furness area, iron ore deposits were exploited by local monastic houses and an early foundry for the smelting of iron was established at Backbarrow near Newby Bridge, using coppice timber as a source of fuel. The steady development of the wool trade from the 13th century onwards resulted in extensive sheep grazing on the fells. In the later part of the 17th century, the prosperity of the farming community reached new heights due to the demand for wool and other textile products, and resulted in the construction of the large farmsteads and churches that are still located throughout the area.

By the 17th century industrial buildings had become a significant component of the landscape, especially bloomeries, bobbin mills and potash kilns around Grizedale and Furness Fells. Such industries were strongly dependent on woodland management techniques (timber production, coppicing and standards) and their associated charcoal burning, leading to woodlands becoming a significant feature across large areas of the central and western low fells. Iron ore deposits



Local geology is reflected in the building materials of farmsteads and walls, with historic field systems persisting in the close vicinity of villages.

have been mined in the area since medieval times, with industrial development continuing in the 17th and 18th centuries, with the smelting of copper ore.

Increased prosperity in farming (particularly cattle rearing) and the southern Lakeland industries (spinning and weaving) left a lasting imprint on buildings and the landscape: many scattered villages and isolated farmsteads were rebuilt in stone. Some of these date from the 16th century, but most relate to a period of rebuilding between 1650 and 1750. This was initially evident in houses and farmhouses, and then in the development (from the mid-18th century onwards) of overwintering buildings for cattle and the building of multifunctional barns that are characteristic of the area. Local rocks are seen in the vernacular architecture of the farmsteads: slate, granite, sandstone and limestone have all been used for walls, depending on the underlying bedrock.

Farm amalgamation between 1750 and 1820 coincided with the introduction of more hardy sheep breeds, and led to the development of characteristic yeoman farmhouses and larger farmsteads. The grazing of sheep and cattle on common land and in-bye land, and the co-operation within communities to do this across unenclosed fells, have created a distinctive and important local land management and cultural system that continues to evolve today. The increase in farm size is also reflected in the size and patterns of rectilinear field boundaries: small to medium in scale in the centre and south-west, and larger to the east – except in the close vicinity of villages, where older patterns persist. This is particularly notable along the rising ground east of the Lune, where surviving earthwork boundaries (associated with possible settlement remains at Holme and Killington) are believed to date from the medieval period.

Changes in agricultural practices have led to the loss, or poor management, of some of the NCA's characteristic habitats, such as species-rich grassland, lakes, rivers, wetlands and heathland. The high national demand for timber in the first half of the 20th century resulted in large areas (4 per cent of the area) being planted with conifers, such as at Grizedale, with many areas contiguous with native woodlands. After the Second World War farming techniques were intensified and the workforce declined. Patterns of grazing changed, with a decline in cattle and an increase in sheep on the fells leading to habitat deterioration. There has been a gradual reduction in sheep numbers since the introduction of agri-environment schemes and the reform of the Common Agricultural Policy, which linked payment to environmental enhancement.

Kendal has served as the principal market town since the 12th century, growing in size alongside other settlements in response to the demands of tourism since the mid-19th century. Significant economic and cultural changes occurred during the Victorian period, in response to the Romantic movement: people were influenced to seek quiet recreation and country air, famously popularised by William Wordsworth and John Ruskin. The development of the railways, particularly the spur from Kendal to Windermere in 1844, led to the towns of Windermere and Bowness rapidly increasing in size to accommodate tourism needs. The area has the most significant grouping of rural villas in Britain, many of which developed with parkland: these range from late-Georgian villas to Arts and Crafts houses of the early 20th century. The downturn in agricultural profitability in the late 20th century has led to a diversification into tourism activity and a rise in second homes. The availability of public and private transport has continued to influence an increase in visitor numbers.



## Ecosystem services

The South Cumbria Low Fells 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 South Cumbria Low Fells NCA is contained in the 'Analysis' section of this document (supporting document 3).

### Provisioning services (food, fibre and water supply)

- **Food provision:** Livestock production is principally lamb, with some beef and dairy. Some 95 per cent of the land on commercial holdings is given over to grassland systems and uncropped land. Grazing of the fells contributes to the distinctive landscape character and mosaic of habitats of the NCA. In 2009 there were 280,015 sheep (364,881 in 2000), 41,743 cattle (50,767 in 2000) and 1,115 pigs (3,814 in 2000).
- **Timber provision:** Woodland covers 18 per cent of the area, with small broadleaved and coniferous copses found on the rugged fells, and coniferous and broadleaved woodland on the small valley slopes and ridges. The valleys between Coniston Water and Windermere contain some of the most densely wooded areas of England. Timber is produced from the extensive conifer, mixed and broadleaved woodlands, and the market for wood fuel has expanded in recent years, helping to bring woodlands into management.

- **Water availability:** The public water supply abstraction from Windermere forms a significant part of regional water supply. Together with abstractions from lakes in the Cumbria High Fells NCA, water from this area supplies over 6.5 million people in north-west England. Lakes and rivers respond rapidly to both drought conditions and recharge.

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

- **Climate regulation:** The organic peat soils of Rusland Valley Mires, Duddon Valley Mires and the Winster Wetlands, and the peat surface horizons of upland heathland and rough grassland, all generally have a high carbon content. They have an important role to play in regulating climate change where the habitat is in good condition and where the impact of grazing management and drainage is minimal. Significant carbon storage and sequestration are provided by the NCA's extensive woodland habitat – both in the soil and in the above-ground biomass.
- **Regulating soil erosion:** The high rainfall levels can exacerbate soil erosion in this NCA. Grazing and visitor pressure, especially along watercourses and on the fells, further contribute to the problem. The extensive woodland cover and relatively gentle rolling fells of this NCA can act to protect its soils from erosion. Ensuring appropriate grazing levels and expanding the area of woodland would increase the value of this service.
- **Regulating soil quality:** The often shallow, impoverished soils and seasonally or locally impeded drainage have given rise to a pastoral landscape within this NCA. The extensive areas of semi-natural habitat can significantly contribute to the organic content and structure of soils, if land is under sustainable management.

- **Regulating water quality:** The ecological status of the NCA's rivers is mixed: many river reaches are of 'good' quality, although there are several of 'moderate' quality. The ecological status of area's lakes is also mixed – they are both moderate and good quality. Water quality can be enhanced through further changes in land use practices, habitat creation and management, addressing nutrient inputs, improvements to point-source discharges, and promoting phosphorous-free management practices to businesses and the tourism industry. Improving the water quality can provide benefits for areas downstream and outside this NCA, such as improving bathing waters around the Duddon Estuary.
- **Regulating water flow (flooding):** High rates of precipitation, thin soils and impermeable geology combine to produce extensive areas of saturated soils, with high rates of surface flow into a dense network of watercourses. This, in turn, can produce spatey watercourses liable to severe storm flows, such as the rivers Kent, Gilpin, Winster and Sprint, which drain the southern fells. The River Lune drains the far east of the NCA, and carries water from the Howgills, Yorkshire Dales and North Pennines. There is scope to reduce flood risk by retaining existing flood plains, restoring wetlands, and increasing surface roughness, water infiltration and retention.

### Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** The geology, extensively wooded landscape, fells and moorland, large lakes and picturesque villages (intimate in form and scale), as well as the distinctive use of stone in buildings, roofs and walling, all contribute to a strong sense of place. These factors have inspired artists and writers such as John Ruskin, William Wordsworth and Beatrix Potter for many generations. Feelings of inspiration and escapism are often associated with an extensively wooded landscape, fells and moorland, and large lakes.

Windermere is England's largest and longest lake, is an iconic part of the Lake District National Park, and has attracted visitors for centuries. Some of the most densely wooded areas of England are found in the fells and valleys between Windermere and Coniston Water.

- **Sense of history:** The history of this landscape is evident in the historic farmsteads, fields and settlement patterns – some dating from medieval times – and in the industrial remains that act as key landscape features, as well as providing evidence of the area's dependence on its woodlands. The area's history is further reinforced by the use of local stone in the older, traditional buildings: this gives settlements a distinctive character and builds on the strong cultural history reflected in the works of writers and artists such as Beatrix Potter and John Ruskin.



Path management is needed to prevent erosion caused by high visitor numbers.



Oak and alder woodland on the shore of Windermere.

- **Tranquillity:** The NCA has experienced a decline in tranquillity since the 1960s, however it is still important for the peacefulness that its open fells, wooded valleys and open water all provide. In 2007 the Campaign to Protect Rural England recorded 64 per cent of the area as ‘undisturbed’ in terms of noise and visual intrusion.
- **Recreation:** This area’s scenery, outdoor activities and cultural history attract large numbers of visitors. There is an extensive network of rights of way and open access areas, and Grizedale Forest provides popular outdoor recreational activities such as mountain biking routes, walking trails, sculpture trails and treetop adventure sport . The Lake District National Park receives 12 million visitors annually, with the busiest resorts located in this NCA – at the towns of Bowness and Windermere. Lakeshore access at Windermere, in particular, provides a range of recreational opportunities, including sailing and canoeing. There are three inland bathing waters at Windermere. The cultural heritage continues to attract high numbers of international visitors, who come to see Beatrix Potter’s first Lakeland property at Hill Top, John Ruskin’s residence at Brantwood and numerous National Trust properties.
- **Biodiversity:** Priority habitats cover 24 per cent of the NCA, 6 per cent is designated as Sites of Special Scientific Interest (SSSI), 3 per cent is designated an SAC or Special Protection Area (SPA), and Esthwaite Water is internationally important as a Ramsar site. The significant coverage of semi-natural habitats provides corridors and stepping stones between the protected sites of the NCA. The characteristic diverse habitat mosaic of the area provides a stronghold for species such as the dormouse, netted carpet moth, high brown fritillary and pearl-bordered fritillary butterflies in England. Windermere is one of the few lowland lakes to contain a substantial population of Arctic char, and nationally important populations of medicinal leeches are associated

with fell tarns. The Kent–Leven and Lune catchments support popular species such as otter, with the River Kent also supporting the native, vulnerable white-clawed crayfish, freshwater pearl mussel and bullhead.

- **Geodiversity:** The distinctive landscape character of this NCA is determined by the underlying geology, which is responsible for the undulating landscape of rocky ridges, valleys and fells. The NCA contains eight nationally important geological SSSI or mixed-interest SSSI, mainly in accessible sites, making it possible to study them. Local stone is used as a building material in the villages, towns and boundaries, significantly contributing to the sense of place and cultural heritage of the NCA.



Windermere in winter.



## Statements of Environmental Opportunity

**SEO 1: Manage and enhance the combination of open low fells, commons and valleys, with their mosaic of heathlands, species-rich meadows, wetlands and native woodlands among the matrix of pastures, to create a coherent and resilient ecological network and to strengthen the distinctive landscape character.**

### For example, by:

- Maintaining and protecting the open fell tops and extensive views across this NCA into adjacent areas, and the contrast between these and the enclosed valleys and densely wooded areas, to retain the sense of place and tranquillity.
- Maintaining, restoring and expanding semi-natural fell and valley habitats, while seeking opportunities to create an ecological mosaic connecting heathland, bracken, scrub, woodland, species-rich pastures, wetlands and tarns. Creating habitat corridors, buffers and stepping stones, within the existing matrix of improved pasture.
- Managing, restoring and expanding the area of upland heathland: extending existing areas, targeting the conversion of grasslands on poor soils, and ensuring that grazing and management through burning are in line with the nature conservation objectives for each site.
- Managing, restoring and buffering wetland valley habitats (including lowland raised bogs, valley mires and fens) through the sympathetic management of hydrology and through employing appropriate grazing regimes. This will increase the resilience of these habitats to climate change, as well as increasing their ability to store carbon.
- Retaining any appropriately-managed bracken stands that are of interest for breeding birds or butterfly populations, or where they retain elements of woodland flora.
- Ensuring that habitat networks address the requirements of key species, enabling the expansion of their range and ability to adapt to climate change, for example through the coppice management of suitable woodlands and bracken, and the sustainable management of deer populations.
- Maintaining the historic field patterns defined by networks of drystone walls, hedges and trees, retaining local differences in the style of boundary features and the materials used.
- Protecting and managing boundary hedgerows and trees, and avoiding replacing them with fencing.
- In the east of the area, seeking opportunities to expand the area of broadleaved woodland by buffering existing small woodlands, creating new woodlands on valley sides and in gills, and seeking ways of increasing the broadleaved component of shelterbelts and coniferous plantations.
- Seeking opportunities for increasing the length and area of natural riparian habitats along the rivers, to prevent damage to banks from stock grazing, to reduce sediment and nutrient runoff, and to create habitat corridors.
- Promoting the management of hay meadows and semi-improved pastures, to safeguard and enhance their botanical interest.

**SEO 2: Conserve the distinctive landscape character of the South Cumbria Low Fells, including the wealth of natural, geological and cultural heritage, and the internationally renowned Lake District National Park. Sustainably manage and improve opportunities for the enjoyment and understanding of this popular area.**

**For example, by:**

- Promoting the maintenance and restoration of traditional farm buildings, farmhouses and listed buildings, using local stone and building styles.
- Promoting the conservation of historic and designed landscapes (parkland), industrial archaeology, and locations associated with both the Romantic and Arts and Crafts movements.
- Promoting sustainable tourism practices that integrate the management of visitors with the enhancement of the area's natural and cultural attributes.
- Planning for the sustainable expansion of settlements, to deliver community needs, while protecting the nationally important natural and local cultural and historical features, and the contribution they make to local distinctiveness and the sense of place.
- Protecting the expansive views from the fells by sensitively planning urban development and expansion.
- Minimising light spill from both settlements and traffic to retain a sense of remoteness and tranquillity on fells and within valleys.
- Encouraging the delivery of a sustainable transport network with improved public transport.
- Seeking opportunities to minimise disturbance and loss of tranquillity within the M6 corridor.
- Raising awareness of, and encouraging community involvement in, planning and management decisions within the NCA.
- Conserving and interpreting archaeological earthworks and sub-surface archaeology, while recognising the potential for undiscovered remains.
- Managing and conserving the 18th- and 19th-century parkland landscapes and villas – especially those on the shores of Coniston Water and Windermere – to protect their historical and cultural heritage.
- Maintaining the panoramic views over the adjacent high fells, lowlands and estuaries of Morecambe Bay.
- Widening awareness of the value of the geology of the South Cumbria Low Fells, by maintaining and improving access to – and enabling the study of – important geological exposures.
- Conserving and enhancing geological sites, and providing opportunities to increase people's understanding of the geological heritage.
- Using local stone for both field boundaries and the restoration of farmsteads and other vernacular buildings, to reveal the links to the underlying geology.

**SEO 3: Safeguard and manage woodlands to retain them as important landscape features, and for their national and international biodiversity interest, along with their cultural and historical heritage. Seek ways to increase woodland cover in appropriate locations to mitigate the effects of climate change, address water quality and soil erosion, and supply timber products.**

**For example, by:**

- Promoting the establishment of a coherent and resilient network of treescapes (native woodland, wood pasture, parkland, coppice, scrub, field trees and hedgerows) through expanding and linking existing woodland with areas of new planting.
- Increasing the area of native broadleaved tree cover – in particular in the east of the area – in appropriate locations, and aiming to buffer, connect and improve the management of existing woodlands.
- Protecting the strong local cultural and historical heritage of woodlands in the central area of the NCA, through the promotion of traditional and sustainable management practices such as coppicing, hedgelaying and pollarding.
- Evaluating the biodiversity contribution of coniferous plantations. Seeking opportunities to increase the proportion of native species, or to restore them to open habitats, where such a change would bring significant improvements to biodiversity interest and the landscape.
- Sustainably managing and enhancing existing native woodland, while ensuring sufficient retention of deadwood for wildlife. Conserving the area's rich legacy of significant archaeological sites associated with woodland exploitation.
- Restoring plantations on ancient woodland sites to more natural communities of native species.
- Ensuring regeneration within existing native woodland, through the exclusion of deer and livestock where necessary.
- Promoting local, renewable energy generation using wood fuel from locally managed woodlands and by-products from timber production.
- Encouraging a low-impact rural industry based on woodland products, including supporting woodland owners in developing skills to actively manage their woodlands.
- Promoting the public understanding of woodlands: combining tourism and visitor activities with sustainable management that enhances natural and cultural attributes.
- Promoting the production and use of trees of local genetic provenance, free from disease, for stocking and re-planting.



## SEO 4: Manage and enhance the wetlands, rivers, lakes, tarns, watercourses, raised bogs and mires for the benefit of water quality, biodiversity and recreation, and to mitigate flood risk and the effects of climate change.

### For example by:

- Promoting a whole-catchment approach to enhancing the quality of the area's lakes, rivers and tarns, and strengthening their resilience to climate change.
  - Promoting phosphorus-free management practices to tourism businesses.
  - Working with the farming community to promote good nutrient management on in-bye land, and ensuring that farm practices reduce the rates of diffuse pollution generated in and around farmsteads. Targeting nutrient applications to maximise grass growth and to minimise runoff rates.
  - Promoting sustainable water use and conservation, as well as the benefits that this can provide for the Lake District's lakes and rivers.
  - Ensuring that all abstractions are sustainable in a catchment context.
  - Restoring and buffering lowland raised bogs, valley mires and fens by working with farmers, landowners and others to manage water levels in and adjacent to these sites. Implementing tree removal and managed grazing regimes where appropriate, to restore water-holding capacity, encourage active peat formation and protect peaty soils, and to increase resilience to climate change.
  - Enhancing, restoring and expanding aquatic habitats (fens and hydroseres) to conserve their unique assemblage of flora and fauna, ensuring that the transitional area between lake or tarn and surrounding land is maintained.
  - Seeking opportunities for sustainable river management that works with natural processes and allows space for rivers within connected flood plains to increase their resilience to extreme weather events,
- while enhancing water quality, biodiversity and recreational use, and managing the downstream flood risk.
- Promoting sustainable recreational opportunities on lakes and rivers, enabling quiet enjoyment, while continuing to protect existing undisturbed areas for wildlife.
  - Ensuring that any future local and regional development addresses water use, abstraction and demand, to minimise impacts on water quality, resources, flood risk and associated aquatic habitats, and to improve the ecology and resilience of lake and river systems.
  - Protecting populations of vulnerable key freshwater species, such as white-clawed crayfish, bullhead, freshwater pearl mussel and Arctic char.
  - Managing invasive freshwater species through awareness-raising and early warning detection.
  - Promoting sustainable tourism practices that integrate the management of visitors with the enhancement of the area's natural and cultural attributes.



Canoeists on Coniston Water: many visitors use the lakes for recreational activities.

## Supporting document 1: Key facts and data

Total area: 69,140 ha

### 1. Landscape and nature conservation designations

35,776 ha (51 per cent) of the area falls within the Lake District National Park, while 1,155 ha (2 per cent) falls within the Yorkshire Dales National Park.

Management Plans for the protected landscape(s) can be found at:

- [www.lakedistrict.gov.uk/](http://www.lakedistrict.gov.uk/)
- [www.yorkshiredales.org.uk/](http://www.yorkshiredales.org.uk/)

Source: Natural England (2011)

Please note: Part of this NCA is affected by Orders extending the Yorkshire Dales and Lake District National Parks. This will not take effect unless confirmed by the Secretary of State. Please see [www.naturalengland.org.uk/lakestodales](http://www.naturalengland.org.uk/lakestodales) for current status.



The NCA contains one of the high brown fritillary's UK strongholds and its most northerly population.

### 1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
<b>International</b>	Ramsar	Esthwaite Water; Morecambe Bay (part)	142	<1
<b>European</b>	Special Protection Area (SPA)	Morecambe Bay (part) SPA	3	<1
	Special Area of Conservation (SAC)	Subberthwaite, Blawith & Torver Low Commons SAC; Yewbarrow Woods SAC; Duddon Mosses (part) SAC; Roudsea Wood & Mosses (part) SAC; River Kent (part) SAC; Morecambe Bay Pavements (part) SAC; Morecambe Bay (part) SAC.	2,200	3
<b>National</b>	National Nature Reserve (NNR)	Roudsea Wood and Mosses (part) NNR; Rusland Moss NNR; Duddon Mosses (part) NNR; North Fen NNR; Blelham Bog NNR	82	<1
<b>National</b>	Site of Special Scientific Interest (SSSI)	A total of 29 sites wholly or partly within the NCA	4,125	6

Source: Natural England (2011)

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

All the SAC and SPA boundaries lie within the SSSI area. Small areas of NNR are not included within the relevant SSSI; SSSI boundaries often extend beyond the NNR boundaries.

There are 349 local sites in the South Cumbria Low Fells NCA covering 6,949 ha which is 10 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](http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp)
- Maps showing locations of Statutory sites can be found at: <http://magic.defra.gov.uk> – select ‘Designations/Land-Based Designations/Statutory’

## 1.2 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of SSSI in category condition
Unfavourable declining	121	3
Favourable	2,599	63
Unfavourable no change	184	4
Unfavourable recovering	1,205	29

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 ranges from sea level along the coast up to 494 m on Grayrigg Forest on the Whinfell ridge. The average elevation is 75 m above sea level.

Source: London Basin Natural Area Profile, Thames Valley Countryside Character Area description

### 2.2 Landform and process

The South Cumbria Low Fells together with the Cumbria High Fells comprise an eroded dome of ancient rocks. This NCA comprises the lower and gentler fells to the south of the rugged mountains of the central Lake District (Cumbria High Fells NCA). This reflects similar past glacial activity on the softer bedrock of this area. It is an undulating landscape of irregular and sometimes rocky hills, hollows and ridges dissected by a north-south orientated drainage pattern of tarns, the major lakes of Windermere and Coniston Water, rivers and streams contained within often sheltered valleys. The area to the east and south-east of Kendal is lower, less rocky and comprises a rolling landscape of drumlins.

Source: South Cumbria Low Fells Countryside Character Area

### 2.3 Bedrock geology

The area is underlain by marine sedimentary grits and fissile mudstones of Silurian age including many exposures of national importance. The varying hardness of these rocks contributes to the complex topography of the area.

Source: South Cumbria Low Fells Countryside Character Area



### 2.4 Superficial deposits

Glacial, fluvio-glacial and periglacial past processes together with the relatively soft underlying rocks have created the landform present today. Glacial tills coat valley sides and slopes with fluvio-glacial and recent deposits of sands and gravels on valley bottoms. There are significant drumlin fields on lower ground to the south-east of the area creating a basket-of-eggs topography. Local peat deposits present across the area are associated with valley basin mires, lowland raised mires and other wetlands.

Source: South Cumbria Low Fells Countryside Character Area

### 2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	7
National	Mixed interest SSSIs	1
Local	Local Geological Site	24

Source: Natural England 2011

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

### 2.6 Soils and Agricultural Land Classification

There are 6 main soilscape types in this NCA: freely draining slightly acid loamy soils, covering 46 per cent of the NCA; freely draining acid loamy soils over rock, 19 per cent; slowly permeable wet very acid upland soils with a peaty surface, 18 per cent; slowly permeable seasonally wet acid loamy and clayey soils, 7 per cent; very acid loamy upland soils with a wet peaty surface, 3 per cent; and raised bog peat soils, 1 per cent. Brown podzolic and humic gleyed soils predominate in the Low Fells, with gleyed soils also found

in valley bottoms. The often shallow impoverished soils and seasonally or locally impeded drainage give rise to a pastoral landscape. Higher areas have a peaty surface horizon and there are deeper areas of peats in basins and shallow valleys with more extensive deposits on some interfluves.

Source: South Cumbria Low Fells Countryside Character Area, National Soil Resources Institute Soilscape maps, Natural England (2010)

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

Agricultural Land Classification	Area	Percentage of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	4,797	7
Grade 4	35,092	51
Grade 5	19,850	29
Non-agricultural	8,496	12
Urban	925	1

Source: Natural England (2010)

The fells are Grade 5 agricultural land with Grade 4 throughout the surrounding lower ground and valley bottoms. Small areas of Grade 3 land are present along the Lune Valley, close to the northern edge of Kendal and along the southern fringes.

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

### 3. Key waterbodies and catchments

#### 3.1 Major rivers/canals

Lake Windermere and Coniston Water are the two main lakes of the area and are part of the series of valley lakes that radiate from the central dome of the Cumbria High Fells. The Cumbria High Fells, with the highest rainfall in England, is the primary source of the water for the major lakes and rivers within the South Cumbria Low Fells NCA.

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

Name	Length in NCA (km)
River Lune	31
River Kent	12
River Gilpin	7
River Winster	6
River Sprint	5

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.**

Rivers originating in the higher fells to the north of the NCA flow in a generally southerly direction into Morecambe Bay via the Lune, Kent and Leven estuaries. The River Lune drains the far east of the area as well as parts of the adjacent Howgills, Yorkshire Dales and North Pennines NCA before flowing through North Lancashire and reaching the sea close to Lancaster. The River Kent and its tributary the Sprint have their headwaters in the Cumbrian High Fells before flowing south through Kendal and entering Morecambe Bay in the Kent Estuary. The Rivers

Gilpin and Winster drain the low fell country between Kendal and Windermere.

#### 3.2 Water quality

The total area of Nitrate Vulnerable Zone is 134 ha which is <1% 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](http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e)

### 4. Trees and woodlands

#### 4.1 Total woodland cover

The NCA contains 12,524 ha of woodland. Woodland cover over the whole NCA is relatively high at 18 per cent. The area of ancient woodland (including plantations on ancient woodland sites) is 4,883 ha.

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

#### 4.2 Distribution and size of woodland and trees in the landscape

Of significant nature conservation importance are the areas of ancient semi-natural woodland located between Lake Windermere and Coniston Water which form one of the largest areas of interconnected woodland in England. These woodlands were associated with considerable industrial activity in the past providing timber for charcoal production for iron smelting and bobbins for the local weaving industry. The area includes the extensive Forestry Commission conifer plantations of Grizedale which are contiguous with the

native woodlands. Park woodland, with many large mature trees, occurs on the estates around Lake Windermere and Coniston Water. Woodland cover elsewhere is relatively low but there are significant areas of broadleaved woodland to the east of Lake Windermere and in the Winster Valley.

Source: Cumbria Fells and Dales Natural Area Profile

#### 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).

Type	Area (ha)	Percentage of NCA
Broadleaved	6,744	10
Coniferous	3,927	6
Mixed	658	1
Other	1,195	2

Source: Forestry Commission (2011)

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

Type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	3,091	4
Planted ancient woodland sites (PAWS)	1,792	3

Source: Natural England (2004)

## 5. Boundary features and patterns

### 5.1 Boundary features

Field boundaries are generally drystone walls made of local slates in the north or limestone in the south reflecting local geologies but with more hedges on lower ground to the south-east of the area. Top wiring of walls is common.

Source: South Cumbria Low Fells Countryside Character Area description;  
Countryside Quality Counts (2003)

### 5.2 Field patterns

The higher fells are unenclosed or with medium sized allotments, but drystone walls separate this open, often Common Land, from the rough and improved pasture fields on the lower sides and valley floors. There are patterns of irregular rectilinear fields, small to medium in scale in the centre and south-west but larger to the east. The latter are particularly notable along the rising ground east of the River Lune.

Source: South Cumbria Low Fells Countryside Character Area description;  
Countryside Quality Counts (2003)



## 6. Agriculture

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

### 6.1 Farm type

The majority of agricultural land is given over to grazing livestock in the Less Favoured Areas (398 farms out of a total of 706). In 2009 there were also 40 lowland livestock farms, 97 dairy farms and 12 horticultural holdings and 136 other holdings.

Source: Agricultural Census, Defra (2010)

### 6.2 Farm size

Farm sizes are fairly evenly spread over size classes: less than 5ha – 15 per cent of holdings; 5 to 20 ha – 19 per cent of holdings; 20 to 50 ha – 20 per cent of holdings; 50 to 100 ha – 23 per cent of holdings; greater than 100ha – 23 per cent of holdings. Trends show a reduction in the number of farms less than 100 ha with a 5 per cent increase in the area of farms above 100 ha (1,569 ha), which in 2009 accounted for 64 per cent of the farmed land (these figures do not include Common Land).

Source: Agricultural Census, Defra (2010)

### 6.3 Farm ownership

The number of farm holdings in 2009 was 706, down from 844 in 2000, a reduction of 16 per cent. The total farm area in 2009 was 50,311 ha, down from 51,500 ha in 2000, of which 28,643 ha was owner managed, down from 31,439 ha in 2000, and 21, 291 ha was tenanted, down from 21,500ha in 2000.

Source: Agricultural Census, Defra (2010)

### 6.4 Land use

This is a livestock farming NCA with 95 per cent of the land area, 48,047 ha, given over to grass and uncropped land, mostly sheep and beef with some dairy.

Source: Agricultural Census, Defra (2010)

### 6.5 Livestock numbers

Livestock numbers are high but show a reduction since 2000. In 2009 there were 41,700 cattle (50,800 in 2000), 280,000 sheep (364,900 in 2000) and 1,100 pigs (3,800 in 2000).

Source: Agricultural Census, Defra (2010)

### 6.6 Farm labour

Seventy-seven per cent of agricultural workers are principal farmers, 10 per cent part time workers, 6 per cent full time workers, 5 per cent casual/gang workers and 1 per cent salaried managers. Between 2000 and 2009 the number of people working in agriculture declined by 18 per cent.

Source: Agricultural Census, Defra (2010)

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

## 7. Key habitats and species

### 7.1 Habitat distribution/coverage

The South Cumbria Low Fells NCA support a range of upland and lowland habitats many of which are of international and national importance. The fells are the locations for upland fens, upland heathland and mesotrophic tarns with upland oak woodland and yew woodland, frequently with stands of juniper, clothing many steep valley sides. Mesotrophic lakes, rivers and lowland raised mires are found in the valley bottoms.

#### **Fens**

The South Cumbria Low Fells NCA supports areas of internationally and nationally important upland valley, basin and flush fens situated in shallow valleys among the irregular rocky hills and ridges that are characteristic of the area. These are complex systems often comprising expanses of acidic bog moss, sedge, white beak-sedge and cotton-grasses. with shallow streams and soakways of more lime-rich water meandering through them and supporting a contrasting vegetation that includes brown mosses, lesser bladderwort, marsh St. John's wort and few-flowered spike-rush. Areas of swamp vegetation and very wet quaking mires are also present among these fens. The mires are often made more complex by mans' past peat cutting activities superimposed on the more natural systems. These habitats support a rich invertebrate fauna including small pearl-bordered fritillary and keeled skimmer dragonfly. Base-rich and base-poor flushes are present across the area with the former including common butterwort and occasionally bird's-eye primrose.

#### **Upland heathland**

Upland heathland dominated by heather with cross-leaved heath and bilberry is present across many of the fells with some larger areas in the western side of the NCA. In places they include fen habitat, and stands of juniper mark the transition to upland oak woodland on adjacent valley slopes elsewhere.

#### **River Kent**

The River Kent and its tributaries is an internationally important river system for its beds of water crowfoot and the important populations of Atlantic white-clawed crayfish, bullhead and freshwater pearl mussel.

#### **Lakes and tarns**

The area has numerous tarns and lakes that are of international and national importance. Esthwaite Water is a mesotrophic water body and is the most productive of the larger lakes in the Lake District. It supports a rich assemblage of pondweeds. and has good examples of hydroseres along its shores including swamp and wet woodland. Elsewhere smaller tarns are found in the hilly country often associated with valley and basin fens. These have moderately base-poor water supporting a typical submerged flora including alternate water-milfoil, broad-leaved pondweed, small pondweed with water lobelia and shoreweed along the shoreline. Nationally important populations of medicinal leech are associated with some of these tarns. Lake Windermere is the largest lake in England and supports populations of the Arctic charr.

#### **Lowland raised bogs**

Internationally and nationally important lowland raised mires are found on the floors of the Rusland and Duddon valleys and are one part of the extensive resource of this habitat that extends south and east across the

adjacent Morecambe Bay Limestone NCA. These habitats are in various states of restoration. Expanses of bog moss, cotton-grasses, purple moor-grass with heather, cross-leaved heath, and round-leaved sundew characterise large areas of these bogs with birch and pine found elsewhere.

## Woodlands and scrub

Internationally and nationally important upland oak woodlands are found in the fells and valleys between Lake Windermere and Coniston Water. This includes some of the mostly densely wooded parts of England. These are mainly of sessile oak, downy birch and rowan with hazel on lower slopes and ash with some small-leaved lime along gills and alder in wetter areas. Some areas have extensive stands of yew and there are also important populations of juniper on upper slopes, often in transition to upland heathland. The woodlands support characteristic assemblages of birds including redstart, pied flycatcher and wood warbler. They are also a stronghold for the netted carpet moth in England.

## Other habitats

The rocky knolls and slopes that are so characteristic of the area mostly comprise acid grassland and bracken under extensive sheep and cattle grazing. These areas include lowland dry acid grasslands with pockets of heathland and there are locally some patches of upland calcareous grassland particularly along the narrow line of the Coniston limestone in the west. These areas together with habitats in the adjacent Morecambe Bay NCA are an England stronghold for the high brown fritillary and pearl-bordered fritillary butterflies.

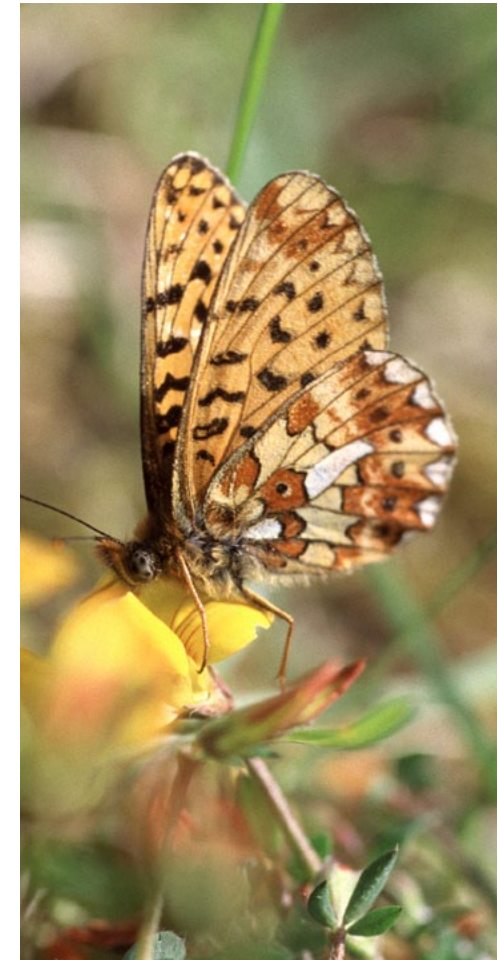
The lower ground and valley bottoms is largely given over to more intensive agriculture, but the many small fields in the area to the west of Kendal include

upland and lowland meadows and purple moor-grass and rush pastures.

Source: Cumbria Fells and Dales Natural  
Area Profile

## 7.2 Priority habitats

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



The mosaic habitats that are characteristic of the rocky knolls and slopes support important invertebrate populations such as the pearl bordered fritillary.



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

Priority habitat	Area (ha)	% of NCA
Broadleaved mixed & yew woodland (Broad Habitat)	4,399	6
Upland heathland	1,802	3
Coastal and flood plain grazing marsh	777	1
Blanket bog	527	1
Lowland raised bog	325	<1
Purple moor grass and rush pasture	124	<1
Lowland meadows	65	<1
Lowland dry acid grassland	22	<1
Reedbeds	12	<1
Lowland calcareous grassland	10	<1
Upland hay meadow	7	<1

Source: Natural England (2011)

- Maps showing locations of priority habitats are available at: <http://magic.defra.gov.uk> - Select 'Habitats and Species/Habitats'

### 7.3 Key species and assemblages of species

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

## 8. Settlement and development patterns

### 8.1 Settlement pattern

The NCA has a dispersed pattern of settlement, largely made up of small hamlets, villages and scattered farmsteads often tucked away in small valleys linked by a network of minor roads. There are a small number of larger towns of differing origins: Kendal around agricultural and the wool industry, Windermere from tourism and Ulverston and Dalton-in-Furness from agriculture and the local iron ore and slate industries which are largely centred in the adjacent West Cumbria Coastal Plain NCA and Cumbria High Fells NCA.

Source: South Cumbria Low Fells Countryside Character Area description; Countryside Quality Counts (2003)

### 8.2 Main settlements

The main town entirely within the NCA is Windermere. Large settlements such as Kendal, Kirkby Lonsdale, Ulverston and Broughton are around the periphery. The total estimated population for this NCA (derived from ONS 2001 census data) is: 51,723.

Source: South Cumbria Low Fells Countryside Character Area description; Countryside Quality Counts (2003)

### 8.3 Local vernacular and building materials

Older buildings are largely constructed of local materials with slate being used for both walls and roofs throughout the area while limestone walls and slated roofs are also found in the south. Rendered white-washed walled buildings are a common feature throughout the area. Rounded chimney stacks are distinctive additions to the buildings of this locality.

Source: South Cumbria Low Fells Countryside Character Area description; Countryside Quality Counts (2003)

## 9. Key historic sites and features

### 9.1 Origin of historic features

Settlement and farming date back, perhaps continuously, to the Neolithic period.

The influence of the monastic houses, notably Furness Abbey and Cartmel Priory, was central to the medieval development of the area, through their control of much of the farmland and fostering of industries including metal-ore mining and smelting, and wool production.

The period 1600 to 1750 made a lasting imprint on the buildings and landscape of the area. Increased prosperity both in farming and the southern Lakeland industries (spinning and weaving) spurred a wave of rebuilding in stone within the scattered villages and throughout the dispersed pattern of more isolated farmsteads.

Late medieval to 17th century industrial remains centred around the extensive woodlands are a significant component of landscape, especially bloomeries, bobbin mills and potash kilns around Grisedale and Furness Fells between Coniston Water and Windermere. Gunpowder industry developed from mid 18th century. Also bark peeling for tanning and hurdle making.

Kendal has served as the principal market town since the 12th century, growing in size alongside other settlements in response to the demands of tourism since the mid 19th century. Kirkby Lonsdale has served as a key market town at the meeting of major transport routes.

Traditional building materials are sandstone, slate and limestone (to south) walling, and local slate roofing. Most traditional buildings date from late 16th century, with increased numbers of buildings erected in the Windermere/Bowness area.

A parkland landscape has developed around Lake Windermere, Esthwaite Water and Coniston Water associated with larger estates and houses.

**Source: South Cumbria Low Fells Draft Historic Profile, Countryside Character Area description**

### 9.2 Designated historic assets

This NCA has the following historic designations:

- 4 Registered Parks and Gardens covering 78 ha.
- 0 Registered Battlefield/s covering 0 ha.
- 70 Scheduled Monuments.
- 1,330 Listed Buildings.

**Source: Natural England (2010)**

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

## 10. Recreation and access

### 10.1 Public access

- There are 1,170 km of public rights of way at a density of 1.7 km per km<sup>2</sup>.
- There are no National Trails within the NCA.
- Twenty-one per cent of the NCA, 14,358 ha, is classified as being publically accessible, which is very high in a national context, but low compared to the adjacent Cumbria High Fells (63 per cent accessible) and reflects the more agriculturally enclosed landscape and the smaller extent of common land in this NCA.

Sources: Natural England (2010)



One of the most densely wooded areas of England; woodland also provides recreation opportunities, such as here at Tarn Hows.

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

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	1,295	2
Common Land	4,613	7
Country Parks	7	<1
CROW Access Land (Section 4 and 16)	11,610	17
CROW Section 15	177	<1
Village Greens	11	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	1,390	2
Local Nature Reserves (LNR)	1	<1
Millennium Greens	<1	<1
Accessible National Nature Reserves (NNR)	42	<1
Agri-environment Scheme Access	7	<1
Woods for People	4,916	7

Sources: Natural England (2011)

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



## 11. Experiential qualities

### 11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) the areas of least tranquillity are around Kendal, Windermere and Ulverston, and along transport corridors in the eastern part of the NCA, particularly the M6 corridor. The highest scores for tranquillity are in the western parts of the NCA away from settlements and roads.

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

Tranquillity	Score
Highest	48
Lowest	-49
Mean	4.5

Sources: CPRE (2006)

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

### 11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows a similar pattern to the Tranquillity Map, with areas of disturbed land associated with the towns of Kendal, Windermere and Ulverston, as well as the major road corridors of the M6, A6, A591 and A594 and A684. Apart from the Lune Valley, intrusion since the 1960s into the eastern part of the NCA has been significant. A breakdown of intrusion values for this NCA is detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	8	31	35	27
Undisturbed	91	68.5	64	-26
Urban	<1	<1	<1	n/a

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the significant loss of undisturbed land, though the increase in urban land has hardly changed.

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



Swans on Windermere.

## 12. Data sources

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

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

## Supporting document 2: Landscape change

### Recent changes

#### Trees and woodlands

- By 2003 the area of woodland covered by England Woodland Grant Scheme management agreements was about 19 per cent of the eligible area. About 49 per cent of the woodland cover is on an ancient woodland site, and the proportion of these sites covered by a Woodland Grant Scheme agreement increased from 12 per cent in 1999 to 27 per cent in 2003.
- The implementation of forest design plans have enhanced existing plantations and integrate them more successfully into the landscape.
- Publicly owned woodlands have been developed to increase their recreational potential, for example mountain biking and hiking routes, treetop adventure sport, and a sculpture trail at Grizedale Forest.

#### Boundary features

- The condition of boundary features has improved with considerable restoration and maintenance of drystone walls under the Environmentally Sensitive Area and Countryside Stewardship schemes, continuing under Higher Level Stewardship – figures for 2011 reveal over 800,000 m of boundary features managed under such schemes.

#### Agriculture

- There have been significant reductions in grazing pressure in the past decade, following large increases in the second half of 20th century. This includes reductions due to foot and mouth disease in 2001, EU Common Agricultural Policy reform in 2005, decoupling payment from stock numbers and agri-environment schemes (particularly to achieve SSSI favourable condition target, 2010).
- From 2000 to 2009, sheep numbers decreased from 364,881 to 280,015, cattle decreased from 50,767 to 41,743 and the number of people working in agriculture declined by 18 per cent.
- A change in agri-environment schemes from Environmentally Sensitive Area to a two-tiered Environmental Stewardship (Higher and Upland Entry Level) scheme has provided a wider range of targeted objectives and options.
- The number of holdings under 100 ha (77 per cent of agricultural land in 2009) has reduced slightly from 2000 with a 5 per cent increase in the area of farms above 100 ha.
- There has been a significant restoration of farm buildings, particularly under the Environmentally Sensitive Area scheme.



## Settlement and development

- Over the past decade a number of wind farms have been constructed within and on the boundary of NCA (Lambrigg, Kirkby Moor, Harlock Hill and Askam).
- Some 87 per cent of visitors to the National Park arrive by motor vehicle, with 77 per cent continuing to use their own vehicle as the main method of transport, putting pressure on local traffic infrastructure.
- Since the 1960s, there has been a 26 per cent loss of undisturbed areas to disturbed areas associated with the towns of Kendal, Windermere, Ulverston and the main transport corridors of the M6, A6, A591 and A594.
- A reduction in noise disturbance and shoreline damage on Windermere has resulted from the introduction of a 10 mph speed limit in 2005.

## Semi-natural habitat

- Significant improvements in SSSI condition have been achieved, especially to heather moorland due to sustainable grazing regimes on the fells. Although much is now in appropriate management, these upland habitats have considerably longer recovery rates than lowland habitats.
- In 2011, 2,599 ha of SSSI were in favourable condition, 1,205 ha were in unfavourable recovering condition, 184 ha were in unfavourable no change condition, and 121 ha were in unfavourable declining condition.

## Historic features

- There have been a significant number of barn conversions in the area (over 100 since 1999). About 69 per cent of historic farm buildings remain unconverted and about 96 per cent are intact structurally.
- In 1918 about 2 per cent of the NCA was historic parkland. In terms of its share of the resource the NCA was ranked 98. By 1995 it is estimated that 47 per cent of the 1918 area had been lost. About 6 per cent of the remaining parkland is covered by an Historic Parkland Grant, and 35 per cent is included in an agri-environmental scheme.



Native cattle breeds, such as this Luing on moorland above Windermere, can be used to promote sustainable grazing and habitat improvement.

## Drivers of change

### Climate change

- Evidence from UK Climate Impacts Programme (UKCPO9) shows that over the coming century the Lake District climate is expected, on average to become warmer and wetter in winter and hotter and drier in summer.
- Under the medium emissions scenario by 2080: mean winter temperatures will increase by 2.6 degrees, mean summer temperatures will increase by 3.7 degrees, winter precipitation will increase by 16 per cent, summer precipitation will decrease by 22 per cent and there will be an increase frequency of extreme events (floods/droughts).
- Species tolerant of cold temperatures and winter drought may be out-competed (for example fish such as Arctic char). Species currently limited by winter cold may expand their ranges (for example bracken and introduced fish species).
- Peatlands may dry out during prolonged droughts, increasing the risks of soil erosion and wildfires, resulting in loss of habitat, stored carbon and archaeological pollen record.
- Freshwater habitats, water supplies and recreation may be affected by low flows, draw-down on lakes and reservoirs and increasing summer lake surface temperatures. Increasing water temperatures and low flows can also result in deterioration of water quality, including increasing concentrations of nutrients, blue-green algal blooms and lack of oxygen at depth. Deteriorations in water quality include increasing colour and sediment load in water abstracted for public supply.
- Extreme weather events are likely to increase rates of erosion of river banks and the wider catchment, with impacts on in-bye land, downstream flood risk and increased siltation of river and lake habitats.
- Farming practices may change with new climate conditions (for example a longer growing season) and changing demands on industry.



**Coniston Water. The erosion of glaciers moving slowly southwards has created long, straight U-shaped valleys with large lakes now occupying the ice-scoured valleys.**

## Other key drivers

- Reform of EU Common Agricultural Policy and Rural Development Programme for England in 2014 may affect the viability of upland farm businesses, as many benefit from agri-environment schemes.
- The risk of the spread of invasive species and plant and animal disease, such as ash die-back.
- Increasing demand for national food security and associated increases in food prices.
- Maintaining viable farm businesses balancing food production and delivery of other multiple benefits.
- Continuing diversification of farm businesses, particularly into tourism.
- Increasing pressure on water resources; the region's public water supply is dependent on internationally and nationally designated lakes and river systems.
- Development of renewable energy, including hydro-power, wind turbines and wood fuel.
- Visitor and transport pressures are likely to continue.
- Flood risk management requirements, including catchment management to reduce downstream flood-risk.
- Improved waste water treatment and management of other point source pollutants.
- Promotion of the management of peatlands to store and sequester carbon, reduce erosion and enhance downstream water quality.
- Habitat connectivity will be needed to address species movement and adaptation to climate change.
- Managing the area to make the habitat mosaics more resilient to climate change.
- Deer numbers can significantly impact upon natural regeneration in woodlands. A landscape scale approach to sustainable deer management is needed, addressing the impact of deer on natural regeneration in woodlands.
- Expansion of villages and hamlets with new housing that does not always reflect vernacular styles or utilise local materials particularly around Kendal and towards Dalton-in-Furness.
- Affordable housing may be needed to meet the needs of local communities.



## 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.



Boathouse on Coniston Water.



Statement of Environmental Opportunity	Ecosystem Service																		
	Food Provision	Timber Provision	Biomass Energy	Water Availability	Genetic Diversity	Regulating climate change	Regulating Soil Erosion	Regulating Soil Quality	Regulating Water Quality	Regulating Water Flow	Pollination	Pest Regulation	Regulating Coastal Erosion	Sense of Place / Inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
<b>SEO 1:</b> Manage and enhance the combination of open low fells, commons and valleys, with their mosaic of heathlands, species-rich meadows, wetlands and native woodlands among the matrix of pastures, to create a coherent and resilient ecological network and to strengthen the distinctive landscape character.	↔	↗	↗	↔	↗	↑	↗	↗	↗	↗	○	○	N/A	↑	↗	○	↔	↑	↔
<b>SEO 2:</b> Conserve the distinctive landscape character of the South Cumbria Low Fells, including the wealth of natural, geological and cultural heritage, and the internationally renowned Lake District National Park. Sustainably manage and improve opportunities for the enjoyment and understanding of this popular area.	↔	↔	↔	↔	↔	↗	↗	↔	↔	↔	○	○	N/A	↑	↑	↗	↗	↗	↗
<b>SEO 3:</b> Safeguard and manage woodlands to retain them as important landscape features, and for their national and international biodiversity interest, along with their cultural and historical heritage. Seek ways to increase woodland cover in appropriate locations to mitigate the effects of climate change, address water quality and soil erosion, and supply timber products.	↘	↑	↑	↔	↗	↑	↗	↗	↗	↗	○	○	N/A	↑	↗	↗	↔	↑	↔
<b>SEO 4:</b> Manage and enhance the wetlands, rivers, lakes, tarns, watercourses, raised bogs and mires for the benefit of water quality, biodiversity and recreation, and to mitigate flood risk and the effects of climate change.	↔	↗	↔	↔	↔	↗	↗	↑	↗	↗	○	○	N/A	↑	↔	○	↗	↗	↔

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

■ National Importance; ■ Regional Importance; ■ Local Importance

## Landscape attributes

Landscape attribute	Justification for selection
<b>The west is characterised by a landscape of low fells and craggy ridges with the central area dissected by the U-shaped valleys occupied by the two predominant lakes of the area, Windermere and Coniston Water with rivers running south into Morecambe Bay.</b>	<ul style="list-style-type: none"> <li>■ 51 per cent of area falls within the Lake District National Park.</li> <li>■ Elevation ranges from sea level to 494 m.</li> <li>■ Glacial erosion during the Quaternary Period formed long, straight U-shaped valleys with a north-south orientated drainage pattern of lakes, tarns and rivers.</li> <li>■ Views of the higher Lakeland Fells to the north and the surrounding limestone lowlands and Morecambe Bay to the south.</li> </ul>
<b>A gentler landscape, in contrast to the rugged, steep fells to the north, due to the area being underlain by Silurian mudstones, siltstones and sandstones of the Windermere Group.</b>	<ul style="list-style-type: none"> <li>■ The lower fells contrast with the rugged mountains to the north, and are the result of similar glacial activity occurring on the softer bedrock of this NCA.</li> <li>■ The varying hardness of the rocks of the area contributes to the complex topography, including many exposures of national importance.</li> <li>■ To the east of Kendal, large quantities of deposited glacial debris have formed a distinctive hummocky landscape of drumlins and open land.</li> <li>■ Local stone used extensively in the construction of buildings and stone walls.</li> <li>■ Iron ore deposits have been mined in the area since medieval times with industrial development continuing in the 17th and 18th century with the smelting of copper ore.</li> </ul>
<b>Large lakes, tarns, and fast moving rivers and streams flowing southwards over rocky beds from the higher land in the north into the Duddon Estuary or Morecambe Bay.</b>	<ul style="list-style-type: none"> <li>■ Esthwaite Water, a Ramsar site, is one of the most productive of the larger lakes in the Lake District and supports a rich assemblage of pondweeds.</li> <li>■ Windermere is the largest lake in England and supports populations of the freshwater fish, the Arctic charr.</li> <li>■ Small tarns are found throughout the hilly country, often associated with valley and basin fens, with nationally important populations of medicinal leech associated with some of these.</li> <li>■ The Special Area of Conservation (SAC) designated (for water crowfoot beds and important populations of white clawed crayfish, bullhead and freshwater pearl mussel). The River Kent flows from the Cumbria High Fells through Kendal and the north-east of this NCA.</li> </ul>

Landscape attribute	Justification for selection
<p><b>Woodland cover is extensive in the west, ranging from conifer plantations and some mixed and broadleaved plantations to areas of ancient semi-natural broadleaved woodland and copses on steep stream-sides and knolls.</b></p>	<ul style="list-style-type: none"> <li>■ Areas of ancient semi-natural woodland of significant nature conservation importance located between Windermere and Coniston Water forming one of the largest areas of interconnected woodland in England.</li> <li>■ Woodlands covering 12,524 ha (18 per cent of total area), 3,090 ha of ancient semi-natural woodland and 1,792 ha of ancient re-planted woodland.</li> <li>■ Extensive Forestry Commission conifer plantations of Grizedale Forest, now a recreational amenity.</li> <li>■ Woodlands support characteristic assemblages of birds including redstart, pied flycatcher and wood warbler and are the stronghold for the netted carpet moth in England. Conifer plantations provide habitat for species such as red kite.</li> <li>■ Important populations of juniper on upper slopes, often in transition to upland heathland.</li> </ul>
<p><b>Historic field systems dating from medieval times with well maintained drystone walls forming strong patterns and boundaries.</b></p>	<ul style="list-style-type: none"> <li>■ Drystone walls constructed from locally sourced sandstone, however, in some cases, slate is used in the north of the NCA and limestone in the south.</li> <li>■ Farm amalgamations in the 18th century is reflected in the size and pattern of rectilinear field boundaries, small to medium in scale in the centre and south-west, larger to the east.</li> <li>■ Older patterns persist close to villages and hamlets.</li> </ul>
<p><b>Agricultural land cover is principally undulating pasture, for grazing and silage. The unenclosed rough grasslands of the fells are generally used for sheep grazing.</b></p>	<ul style="list-style-type: none"> <li>■ Field pattern developed from the medieval period.</li> <li>■ Shallow, impoverished soils have given rise to the pastoral landscape.</li> <li>■ 95 per cent of the land area (48,047 ha) given over to grass and uncropped land.</li> <li>■ Conditions are suitable for livestock rearing, with relatively high rainfall, mild temperatures, and 80 per cent Grade 4 and 5 agricultural land.</li> </ul>
<p><b>An intricate mosaic of fell habitats including upland heathland, valley and basin mires, springs and flushes, lakes, tarns, juniper scrub, and upland calcareous grassland.</b></p>	<ul style="list-style-type: none"> <li>■ Areas of internationally and nationally important upland valley, basin and flush fens situated in shallow valleys amongst the rocky hills and ridges. These complex systems support a rich invertebrate fauna including small pearl-bordered fritillary and keeled skimmer dragonfly.</li> <li>■ The characteristic rocky knolls and slopes of the area mainly comprise of acid grassland and bracken cover, with patches of upland calcareous grassland along the narrow line of the Coniston Limestone in the west. These areas, along with habitats in the adjacent Morecambe Bay NCA, are an England stronghold for the high brown fritillary and pearl-bordered fritillary butterflies and one of the isolated northern sites for the Duke of Burgundy butterfly.</li> </ul>

Landscape attribute	Justification for selection
<p><b>An extensive network of semi-natural and coniferous woodland, especially in the central fells and valleys.</b></p>	<ul style="list-style-type: none"> <li>■ Some of the most densely-wooded areas of England are found in the fells and valleys between Windermere and Coniston Water.</li> <li>■ Yewbarrow Woods SAC contains internationally important yew groves in association with old sessile oak woods.</li> <li>■ The wet woodlands between Windermere and Coniston Water and in the Rusland Valley form the England stronghold for the netted carpet moth.</li> <li>■ Lakeland industries were strongly dependent on woodland management, such as coppicing, standards and charcoal burning leading to woodlands becoming a significant feature across large areas of the low fells, notably the central and western areas.</li> <li>■ Important populations of Juniper on upper slopes, often in transition with upland heathland.</li> <li>■ Publicly-owned conifer, broadleaved and mixed woodland plantations at Grizedale Forest providing timber and other wood products, as well as being a recreational, educational and tourism attraction, receiving 220,000 visitors a year.</li> <li>■ National Trust properties, such as Tarn How, are popular tourist attractions.</li> </ul>
<p><b>Internationally and nationally important wetland habitats amongst the irregular rocky hills and ridges to the west of the NCA.</b></p>	<ul style="list-style-type: none"> <li>■ Internationally and nationally important lowland raised mires are found in the Rusland and Duddon valleys and form part of this expansive habitat that extends south and east across the Morecambe Bay Limestone NCA.</li> <li>■ Subberthwaite, Blawith and Torver Common SAC contain some of the best examples of transition mires and quaking bogs in the UK.</li> <li>■ Wetland habitats support a rich invertebrate fauna including small pearl-bordered fritillary and keeled skimmer dragonfly.</li> </ul>
<p><b>Historic environment showing the development of settlement and farming since the Neolithic period.</b></p>	<ul style="list-style-type: none"> <li>■ Relatively fertile soils when compared to those of the north suggest the land has supported farming since Neolithic times.</li> <li>■ Historic field patterns from the medieval period and evidence of deer parks underline the area's importance as productive pasture land.</li> <li>■ Industrial buildings are a significant component of the landscape, especially bloomeries, bobbin mills and potash kilns around Grizedale and Furness Fells.</li> <li>■ Development of the wool trade from the 13th century onwards resulted in an expansion of sheep walks on the fells.</li> </ul>
<p><b>Cultural heritage linked to the Picturesque and Romantic movements and the birth of the conservation movement.</b></p>	<ul style="list-style-type: none"> <li>■ Contributing to the outstanding Universal Value of the World Heritage Site bid.</li> <li>■ Area of inspiration for John Ruskin, Beatrix Potter and the Arts and Crafts movement.</li> <li>■ 18th century picturesque villas and designed landscapes such as Belle Isle and Brockhole on Windermere, Belmont near Hawkshead and villas on the shores of Esthwaite Water and Coniston Water.</li> <li>■ 4 registered parks and gardens covering 78 ha.</li> </ul>



Landscape attribute	Justification for selection
<p><b>Settlement is mainly in small hamlets and villages built from local stone on the lower slopes and linked by a network of minor roads.</b></p>	<ul style="list-style-type: none"> <li>■ Traditional building materials are sandstone, slate and limestone walling, and local slate roofing.</li> <li>■ Rendered white-washed walled buildings and rounded chimney stacks are a common feature throughout the area.</li> <li>■ Roads lined with hedges, scrubby vegetation and individual mature trees appear to form an integral part of the landscape.</li> </ul>
<p><b>A major tourism destination with visitors attracted by the upland landscape, lakes, semi-natural habitats, cultural and historic heritage and recreational opportunities.</b></p>	<ul style="list-style-type: none"> <li>■ 12 million visitor days to the Lake District National Park per year.</li> <li>■ 1,170 km of public rights of way at a density of 1.7 km per km<sup>2</sup> and 21 per cent Open Access land with 51 per cent of tourists to the Lake District stating visiting the countryside and 39 per cent saying walking as the outdoor activities undertaken during their stay.</li> <li>■ Public rights of navigation of Windermere and Coniston Water.</li> <li>■ Windermere is England's largest and longest lake and an iconic part of the Lake District National Park.</li> <li>■ Many of the villas and mansions overlooking Windermere built during the 18th and 19th centuries have been developed into hotels and restaurants.</li> <li>■ A high number of National Trust properties and attractions including Beatrix Potter's first Lakeland property 'Hill Top', where she wrote a number of her books, and the Steamboat Gondola which disembarks at Brantwood, home of John Ruskin, and Blackwell, a superb example of Arts and Crafts movements architecture.</li> <li>■ Bowness-on-Windermere is the Lake District's most popular resort.</li> <li>■ A large number of outdoor activity centres and opportunities including mountain bike trails, watersports, treetop adventure sport, and hiking routes such as the Cumbria Way.</li> </ul>

## Landscape opportunities

- Conserve and protect the open fell tops and extensive views, and the contrast between these and the enclosed valleys and densely wooded areas to retain the sense of place and tranquillity.
- Protect and conserve Windermere and Coniston Water for their important landscape, cultural and biodiversity value.
- Protect and conserve the important sites and features linked to cultural and artistic heritage.
- Protect and conserve the pastoral farmed land alongside the many areas of semi-natural habitats, including open fells on the higher land.
- Protect and conserve evidence of industrial archaeology, historic designed landscapes, historic buildings and vernacular stone-built architecture.
- Protect and conserve the historic field pattern and network of drystone walls, hedgerows and boundary trees and scrub.
- Protect and improve the strong network of public rights of way and open access land.
- Protect, restore and manage the ancient woodland.
- Manage and promote sustainable recreational activity on Windermere and Coniston Water to maintain and enhance biodiversity and public enjoyment.
- Manage upland grazing systems to enhance existing fell habitat mosaics and soils, and strengthen adaptation and mitigation for climate change, providing multiple benefits.
- Manage and enhance existing native woodlands and trees in the coniferous plantations where conversion to broadleaved woodland could contribute to improved biodiversity, and to the east of Kendal targeting woodland creation in appropriate areas. Restore Plantations on Ancient Woodland Sites (PAWS).
- Manage and enhance existing species-rich pastures and meadows through protecting existing unimproved hay meadows and encouraging traditional management to improve visual diversity in the lowland farming landscape and improve biodiversity.
- Manage and enhance the restoration of rivers, lakes and tarns and their catchments, to enhance water quality and resource, make space for natural development of river courses and control invasive non-native species.
- Manage development pressures affecting the natural and cultural attributes through careful handling of the introduction of further urban elements such as overhead lines, wind farms and expansion of settlements.
- Manage tourism and development to avoid impacting on the sense of place, history and the area's tranquillity through encouraging the use of traditional building design, sensitive location of new developments and improved planning of traffic systems.

- Plan for a sustainable agricultural sector, balancing the provision of food alongside other multiple benefits to produce viable farm businesses which retain their important role within the rural economy.
- Plan for a connected, resilient habitat network with creation of habitat buffers, corridors and stepping stones, linking valley grasslands, wetlands, woodlands and the fells.
- Plan for the expansion and linkage of native broadleaved woodland and trees and an increase in the broadleaved component of conifer woodlands.
- Plan for the expansion of wetlands sites, including restoration and connection of lowland raised bogs, valley mires and fens.
- Plan for sustainable tourism, sustainable transport, and increased permissive access to create linked routes to existing open access areas and improve recreational opportunities for a wide range of users.
- Plan for the expansion in provision of wood fuel and wood-based products.



The Kendal Rough was traditionally kept within 20 miles of Kendal and now has a range across South Cumbria and beyond.

## Ecosystem service analysis

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

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

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Food provision</b>	Common grazing land Pasture Cattle and sheep rearing	Shallow, impoverished soils give rise to a pastoral landscape. Livestock farming is the main land use, with 95 per cent of the land given over to grassland systems and uncropped land.	Regional	<p>The fells are Grade 5 agricultural land (29 per cent) with Grade 4 (51 per cent) surrounding lower ground and valley bottoms. Small areas of Grade 3 (7 per cent) are present along the Lune Valley, the northern edge of Kendal and along the NCA's southern fringes.</p> <p>Livestock production of principally sheep (280,000 in 2009) with some beef and dairy (41,700 cattle in 2009) and pigs (1,100 in 2009). Livestock numbers have shown a reduction since 2000. In 2000 there were 364,881 sheep, 50,767 cattle and 3,814 pigs.</p> <p>Food security is likely to be increasingly important. Any increased food production needs to be managed in a sustainable way which does not impact upon other services.</p> <p>There may be scope for increasing production of venison through sustainable management of deer populations.</p>	<p>Appropriately graze fell and valley habitats to increase productivity while maintaining associated cultural landscapes and associated species.</p> <p>Promote use of hardy fell cattle over sheep grazing to improve diversity and resilience of open fell habitats while producing a viable food product.</p>	<p><b>Food provision</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Biodiversity</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p>
<b>Timber provision</b>	Coniferous woodland Broadleaved woodland	Woodland cover of 12,524 ha (18 per cent) with 6,744 ha of broadleaved woodland, 3,927 ha of coniferous and 658 ha of mixed woodland. Commercial forestry occurs at the extensive Forestry Commission plantations of Grizedale Forest.	Regional	<p>This NCA includes some of the most densely wooded parts of England in the fells and valleys between Windermere and Coniston Water. Woodland cover is relatively high in this NCA at 18 per cent; however, this is concentrated in these central areas and beyond this cover is low.</p> <p>Grizedale Forest (publicly owned) has been developed to maximise recreational and educational facilities.</p> <p>Woodlands of this NCA are associated with historical industrial activity providing timber for smelting, charcoal production and bobbins as well as increasing timber production post-war.</p> <p>Deer management may be necessary to ensure woodland regeneration.</p>	<p>Increase the area and connectivity of native woodland.</p> <p>Manage existing woodland, including reinstating the practice of coppicing, to produce wood fuel in appropriate locations for local use.</p> <p>Manage existing broadleaved wood where appropriate, including for the provision of high quality hard wood.</p>	<p><b>Timber provision</b></p> <p><b>Biomass energy</b></p> <p><b>Climate regulation</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p> <p><b>Regulating water flow</b></p> <p><b>Regulating water quality</b></p> <p><b>Recreation</b></p> <p><b>Biodiversity</b></p>



Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Water availability</b>	Lakes Rivers	<p>The public water supply abstraction from Windermere is a significant part of the regional network.</p> <p>The availability status of surface waters is 'water available' except for the River Leven / Windermere in the east of the NCA and the River Lune along the eastern border.</p> <p>The main river abstraction uses in the west of the NCA are for industry and hydroelectric energy generation while in the Lune catchment, public water supply is the main use. Abstraction points are scattered across a large number of locations.</p>	Regional	<p>Public water supply is heavily dependent on abstractions from lakes and river systems in the adjacent Cumbria High Fells NCA. Abstraction of water from Windermere acts as a top up to this supply and is an integral part of the strategic Lake District supply system, also comprising Haweswater and Thirlmere.</p> <p>Surface water abstractions from lakes and rivers can lead them to respond more rapidly to drought conditions, with increased draw-down, low flows and impacts on water quality, habitats and species. Droughts are unpredictable in terms of year and season of occurrence. A consensus of climate change predictions for the Lake District foresees more summer droughts.</p>	<p>Restore and enhance semi-natural habitats of open fells, native woodlands, wetland habitats and riparian corridors 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.</p> <p>Encourage promotion of sustainable water use by homes and businesses supplied from the catchment.</p> <p>Manage regional water use, demand and abstraction so impacts can be minimised and strengthen the resilience of SAC and SSSI lakes and rivers.</p> <p>Manage the visual and recreational impacts of draw-down on Windermere.</p> <p>Ensure that future development regionally addresses water resource planning and encompasses the highest standards for water efficiency.</p>	<p><b>Water availability</b></p> <p><b>Regulating water quality</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Recreation</b></p> <p><b>Biodiversity</b></p>
<b>Genetic diversity</b>	Rare sheep and cattle breeds Extensive areas of semi-natural habitats and associated species	<p>The Lake District National Park has the largest population of Herdwick sheep in the world.</p> <p>The Kendal Rough sheep was traditionally kept within 20 miles of Kendal, however now has a range across the south of the Lake District.</p> <p>There are a number of breeders of pedigree cattle breeds, such as belted Galloway, Highland and Beef Shorthorn who farm in the NCA.</p>	Regional	<p>Traditional cattle and sheep breeds are best adapted to thrive on the rugged fell habitats while also maintaining the semi-natural habitat mosaic.</p> <p>Nationally important populations of medicinal leeches are associated with the fell tarns.</p>	<p>Promote the use of traditional breeds to conserve not only the native genetic resource but also provide conservation grazing to restore and maintain semi-natural habitats.</p> <p>Support genetic diversity and distinct populations of priority species.</p> <p>Encourage the promotion and development of supply chains and markets for high quality local produce.</p>	<p><b>Genetic diversity</b></p> <p><b>Food provision</b></p> <p><b>Sense of history</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Biodiversity</b></p>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Biomass energy</b>	Coniferous woodland Broad leaved woodland	The existing woodland cover (18 per cent) offers moderate potential for the provision of biomass, both through bringing unmanaged woodland under management and as a by-product of commercial timber production.	Local	Supply chains and markets for local wood fuel are currently limited. Development of these is required to maximise the potential for wood fuel as a by-product of commercial forestry.  The NCA has high potential yield for short rotation coppice, with an area of medium potential in the north of the NCA; potential miscanthus yield is medium across the NCA with small areas of low potential yield in the north west. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables on the Natural England website at <a href="http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/default.aspx">http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/default.aspx</a>	Encourage the development of market and supply chain for local wood fuel as a by product of existing commercial forestry.  Manage existing woodland including coppice, for wood fuel.	<b>Biomass energy</b> <b>Climate regulation</b> <b>Regulating soil erosion</b> <b>Regulating soil quality</b> <b>Regulating water quality</b> <b>Regulating water flow</b> <b>Biodiversity</b>
<b>Climate regulation</b>	Soils and vegetation of the following habitats:  Trees, woodland and scrub  Lowland raised bogs, valley mires, fens and soils with peat horizons.  Fell habitat mosaic  Permanent grassland	Soils and vegetation growth on the extensive areas of semi-natural habitat store and sequester significant amounts of carbon for example the Duddon Mosses, Rusland Valley Mosses, Winster Wetlands and in the biomass of the extensive woodland cover of this NCA.	National / International	The soils of the NCA have a varied carbon content, being generally medium to high in upland areas such as the plateau between the Rivers Kent and Lune and the area between Coniston Water and Windermere with 10 to 50 per cent soil carbon content, reflecting the peaty nature of upland soils, but low (0 to 5 per cent) in other areas.  Higher carbon soils are also associated with the NCA's 12,524 ha of woodland (18 per cent of its area).  Past drainage of wetland habitats and subsequent grazing has resulted in the drying and erosion of the peat surface, with loss of existing carbon and reducing its ability to sequester carbon in the future.	Restore peatland and other wetland habitats by establishing appropriate hydrological regime so it can sequester carbon and increase species diversity, including bryophytes.  Ensure appropriate grazing of fell habitats to regulate soil erosion and establish vegetation cover.  Reduce net greenhouse gas emissions through increasing the area of native woodland and scrub and wetland restoration for carbon sequestration.  Promote opportunities for a low carbon economy.  Investigate opportunities for habitat-based payments for ecosystem services.	<b>Climate regulation</b> <b>Water availability</b> <b>Regulating soil erosion</b> <b>Regulating soil quality</b> <b>Regulating water quality</b> <b>Regulating water flow</b> <b>Timber provision</b> <b>Biodiversity</b>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating water quality</b>	<p>Lakes</p> <p>Rivers</p> <p>Surface water catchments</p> <p>Woodlands</p> <p>Wetlands</p> <p>Fell habitats</p> <p>Permanent grasslands</p>	<p>The ecological status of the NCA's rivers is mixed; many river reaches are of 'good' quality although there are several of 'moderate' quality and the ecological status of its lakes is also mixed between 'moderate' and 'good' quality. Surface waters of 'moderate' ecological quality include becks draining fells to the east of Coniston Water, becks draining Grizedale Forest, the River Sprint and Windermere.<sup>4</sup></p> <p>The chemical status of the NCA's rivers and lakes is generally not assessed although the rivers Kent and Leven have good chemical status. The chemical status of groundwater is good.</p>	National	<p>Public, private and agricultural water supplies, water-based recreation and biodiversity all require good water quality in the area's rivers, lakes and tarns. High nutrient levels can exacerbate blue green algal blooms, impacting on recreation, tourism, water supplies and wildlife.</p> <p>Water quality in Windermere has deteriorated over the last 10 – 15 years. Summer algal blooms have increased, concentrations of oxygen at depth have decreased and the numbers of the rare and protected fish including the Arctic charr have declined dramatically.</p> <p>Despite continued removal of phosphorus at the two adjacent wastewater treatment works this nutrient continues to enrich the lake due to inputs from fertiliser use, farm slurry, phosphates in cleaning agents and animal and human waste.</p> <p>The rivers Kent and Leven are priority catchments under the England Catchment Sensitive Farming Delivery Initiative and Defra support farm improvements within the catchments, which reduces dirty water generation by covering manure storage and stock gathering areas. It also supports the separation of clean and dirty water in yards and a reduction in rainwater entering slurry and silage stores.</p>	<p>Reduce nutrient inputs through improvements to public and private sewage treatment.</p> <p>Promote phosphorus-free management practices with tourism and other businesses.</p> <p>Ensure appropriate grazing of fell habitats and valley pastures for a well-vegetated sward to reduce runoff rates and erosion into river and lake catchments.</p> <p>Increase the area of native broadleaved woodland/scrub, targeted at areas of high risk of soil erosion.</p> <p>Expand and restore wetland habitats, particularly adjacent to lakes and rivers.</p> <p>Manage river banks, flood plains and lake shores for a robust cover of vegetation, including woodland and scrub in places.</p> <p>Ensure river engineering works are carried out in an ecologically sensitive manner, enhancing opportunities for conservation and habitat management.</p> <p>Work with the farming community to promote good nutrient management upon in-bye land and ensuring that farm infrastructure is able to reduce rates of diffuse pollution generated in and around the farmstead.</p> <p>Investigate opportunities for habitat-based payments for ecosystem services.</p>	<p><b>Regulating water quality</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p> <p><b>Regulating water flow</b></p> <p><b>Recreation</b></p> <p><b>Biodiversity</b></p>

<sup>4</sup> North West River Basin Management Plan, December 2009 (Environment Agency), accessed from [www.environment-agency.gov.uk/research/planning/33106.aspx](http://www.environment-agency.gov.uk/research/planning/33106.aspx)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating water flow</b>	Rivers Lakes Floodplains Wetlands Trees and scrub cover Other semi-natural habitats	<p>The rivers Kent, Leven and Crake drain the southern fells of the Lake District, and high rainfall, thin soils and impermeable geology combine to produce large amounts of runoff.</p> <p>There are approximately 1,500 properties across the Catchment Flood Management Plan area at risk from main river flooding. About 33 per cent of these properties are in Kendal, and a further 39 per cent in the rural villages of Grasmere, Ambleside, Windermere and Coniston. In the future, due to climate change it is predicted that the total number of properties at risk will rise to 2100.<sup>5</sup></p>	Regional	<p>The greater majority of the NCA falls within the Kent and Leven catchment for flood management purposes while its eastern border falls within the Lune catchment. These catchments have their headwaters in the Lake District and Howgill Fells which are steep and receive a great deal of rainfall. This combines with the impermeable underlying geology and waterlogged upland soils to rapid runoff rates allowing large volumes of water to discharge into water bodies very quickly.</p> <p>The Environment Agency's preferred approach to managing the flood risk described above includes restoring natural floodplains and associated habitats (with benefits for biodiversity and sediment/pollutant flows into the lakes), encouraging take-up of Environmental Stewardship to optimise land management for flood risk reduction through reduction in surface water runoff, avoiding inappropriate development in flood risk areas and minimising runoff from new development, such as through the inclusion of sustainable urban drainage systems.</p> <p>In Kendal, the River Kent has been modified to convey water more efficiently, by deepening, widening and constructing raised defences. Most of the flood plain around Kendal has been developed for industry.</p> <p>Woodland creation can help to reduce the supply of coarse sediment which can contribute to increased flood risk and damage farmland.</p>	<p>Ensure fell habitats and wetlands support a well-vegetated sward to improve infiltration and reduce evapotranspiration, and to slow flows due to increased surface roughness.</p> <p>Reduce flood risk through native woodland and scrub creation and carefully located tree planting in ghylls and along river corridors.</p> <p>Extend the areas of wetlands and restore former wetland zones such as flood plains to create greater water storage capacity and slow the flow during flooding events.</p> <p>Avoid inappropriate development in flood risk areas and minimise runoff from new development.</p>	<p><b>Regulating water flow</b></p> <p><b>Water availability</b></p> <p><b>Climate regulation</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p> <p><b>Regulating water</b></p> <p><b>Quality</b></p> <p><b>Biodiversity</b></p>

<sup>5</sup> Kent Leven Catchment Flood Management Plan, December 2009 (Environment Agency), accessed from <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/genw0309bpkv-e-e.pdf>



Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating soil quality</b>	Trees, woodland and scrub Lowland raised mires, valley mires and other wetland peat habitats Fell habitat mosaic Permanent grassland	Brown podzolic and humic gleyed soils predominate in the Low Fells, with gleyed soils also found in valley bottoms. Higher areas have peaty surface horizons and there are deeper areas of peats in basins and shallow valleys with more extensive deposits on some interfluvies. The poor agricultural quality soils of the NCA have led to livestock grazing being the dominant farming practice over arable production.	Local	The fells are Grade 5 agricultural land (29 per cent) with Grade 4 (51 per cent) found across the surrounding lower ground and valley bottoms. Small areas of Grade 3 (7 per cent) are present along the Lune Valley, the northern edge of Kendal and along the NCA's southern fringes. Vegetation growth, on the extensive areas of semi-natural habitat, can significantly contribute to soil organic content and structure, if sustainably managed. Over time, native woodland can develop deep humus soils. The slowly permeable wet and very acid upland soils with a peaty surface are at risk of loss of organic matter through climate change and soil erosion. Catchment Sensitive Farming promotes targeted management of nutrient applications following soil analysis of individual fields.	Ensure appropriate grazing of fell habitats and valley pastures for diverse vegetation which protects the integrity of the soil structure. Increase the area of native broadleaved woodland/scrub. Manage nutrients on improved pasture. Expand and restore wetland habitats. Investigate opportunities for habitat based payments for ecosystem services.	<b>Regulating soil quality</b> <b>Food provision</b> <b>Water availability</b> <b>Climate regulation</b> <b>Regulating soil erosion</b> <b>Regulating water quality</b> <b>Regulating water flow</b> <b>Biodiversity</b>
<b>Regulating soil erosion</b>	Trees, woodland and scrub Lowland raised mires and other peat habitats. Fell habitat Mosaic Permanent grassland	93 per cent of soils are susceptible to erosion. The catchments of the rivers Kent and Leven, which cover much of the NCA, are priority catchments under the England Catchment Sensitive Farming Delivery Initiative.	Regional	The slowly permeable wet and very acid upland soils with a peaty surface often found on the plateau tops are at risk of erosion and loss of particulate organic matter where surface vegetation is damaged or lost. The freely draining slightly acid loamy soils can erode easily on steep slopes, especially where vegetation is removed, soil is compacted or where organic matter levels are low after continuous cultivation. Erosion is equally prevalent on the very acid loamy upland soils with a wet peaty surface often found on steep slopes, where a combination of rapid runoff and easily damaged peat layers results in soil erosion. Soil erosion is also common on the freely draining acid loamy soils over rock often found on steep land over which rainfall flows.	Increase the cover of native broadleaved woodland and trees. Ensure appropriate grazing of fell habitats and valley pastures, wetlands and meadows for a robust cover of vegetation. Encourage measures that retain water in situ; ensure good vegetative cover; and avoid over-grazing/ trampling or damage by mechanised activities to reduce soil erosion and loss of soil structure. Manage the lakesides, river banks and flood plains for a robust cover of vegetation, including woodland/scrub and hydrosere creation. Investigate opportunities for habitat based payments for ecosystem services.	<b>Regulating soil erosion</b> <b>Water availability</b> <b>Climate regulation</b> <b>Regulating soil quality</b> <b>Regulating water quality</b> <b>Regulating water flow</b> <b>Biodiversity</b>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Pollination</b>	Extensive areas of semi-natural habitats	The upland and lowland heath, wetlands and grasslands of this NCA provide significant habitat for insect communities important for pollination and pest regulation.	Local	Of value largely to biodiversity rather than food production in this NCA.	Enhance fell, grassland and woodland habitats through appropriate grazing and management to increase the diversity of the habitat mosaic.  Create a network of habitats through creating and restoring buffers, corridors and stepping stones to link grassland, wetlands, woodlands and fells.	<b>Pollination</b> <b>Biodiversity</b>
<b>Pest regulation</b>	N/A					<b>Pest regulation</b>
<b>Sense of place/ inspiration</b>	Geology, landform and landscape views  Extensive semi-natural habitats of fells, freshwater and woodlands  Traditional hill farming systems  Pastoral valleys and field pattern  Historic environment and buildings  Cultural heritage  Tourism, access and recreation  Tranquillity	51 per cent falls within the Lake District National Park  Lake District National Park is currently undertaking a World Heritage Site bid for cultural and historic landscape and its influence on the inspiration of art, writing and ideas.	National/ International	Feelings of inspiration and escapism are often associated with the extensively wooded landscape, fells and moorland, large lakes and picturesque villages intimate in form and scale as well as the distinctive use of stone in buildings, roofs and walling. All these features contribute to a rich tapestry of textures, patterns and colours.  Dramatic long distance views across to the Lakeland Fells and Morecambe Bay to the south as well as seasonal changes in the landscape also generate a strong sense of inspiration which has been captured by many writers and artists not least John Ruskin and Beatrix Potter.	Protect the views, inwards and outwards, including the contrast between the rugged fells and the sheltered valleys.  Promote, protect and manage the historic and cultural heritage, including access to sites.  Promote traditional upland farming and forestry systems that maintain and restore the farmed landscape and full range of habitats.	<b>Sense of place/ inspiration</b> <b>Biodiversity</b> <b>Food provision</b> <b>Sense of history</b> <b>Recreation</b> <b>Tranquillity</b> <b>Regulating water quality</b> <b>Water availability</b> <b>Regulating soil erosion</b>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Sense of history</b>	<p>Farmed landscape and field pattern developed from the medieval period</p> <p>Extensive semi-natural habitats managed by traditional farming/forestry</p> <p>Picturesque villas/ designed landscapes</p> <p>Industrial remains form key landscape features</p>	<p>Numerous National Trust properties.</p> <p>4 registered parks and gardens covering 78 ha.</p> <p>70 scheduled ancient monuments.</p> <p>1,330 listed buildings</p>	National	<p>The history of this landscape is evident in its historic field systems and settlement patterns, some dating from medieval times as well as several deer parks all of which reflect its prosperity as productive pastureland.</p> <p>Prominent buildings include long low stone farmhouses, yeoman farmhouses, churches and fortified houses (including pele towers) particularly to the east.</p> <p>Popular cultural attractions including Beatrix Potter's first Lakeland property 'Hill Top', where she wrote a number of her books, Brantwood, home of John Ruskin, and Blackwell, a superb example of Arts and Crafts movements architecture.</p> <p>Industrial remains form key landscape features and include the bloomeries, bobbin mills and potash kilns around Grisedale and Furness Fells as well as lime kilns.</p> <p>The history of the landscape is further reinforced by the structure of the woodlands (primarily coppiced with standards) reflecting past traditional management practices ranging from gunpowder production, charcoal, potash and iron smelting and wood turning for the bobbin mills.</p> <p>Aspects of history that are particularly evident to the general public are the well known tourist destinations of Bowness, Windermere, Hawkshead, Coniston and Kendal, the large country houses with attractive grounds including Greythwaite, Newby Bridge, Holker Hall, Belle Isle, Brockhole and Blackwell (many of which are now hotels).</p>	<p>Promote, protect and manage the historic and cultural heritage, including access to industrial remains, restoration of drystone walls and their patterns, and management of coppiced woodlands.</p> <p>Promote traditional upland farming and forestry systems that maintain and restore the farmed landscape and the full range of habitats associated with these.</p> <p>Maintain and restore traditional farm buildings, listed/historic buildings and the network of drystone walls to preserve cultural heritage and sense of place.</p> <p>Ensure that new development is compatible with local landscape character.</p>	<p><b>Sense of history</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Food provision</b></p> <p><b>Biodiversity</b></p> <p><b>Regulating water quality</b></p>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Tranquillity</b>	Lakes and rivers Woodlands Open fells Enclosed valleys	Highest scores for tranquillity are in the western parts of the NCA away from settlements and roads. The least tranquil areas are around Kendal, Windermere and Ulverston, and along transport corridors in the eastern part of the NCA, particularly the M6 corridor. 26 per cent loss of undisturbed land between the 1960s and 2007. The increase in urban land has hardly changed.	National	The NCA has experienced a decline in tranquillity since the 1960s. Undisturbed areas have decreased from 91 per cent in the 1960s to just under 64 per cent in 2007 (CPRE Intrusion Map, 2007). The main areas of low tranquillity are concentrated around areas of development such as Kendal and Windermere and busy transport corridors, for example, the M6. Characteristics of the landscape that are particularly important in conveying a sense of tranquillity are the large lakes, pastureland, extensively wooded valleys and open fell tops set against the rugged fells.	Manage development pressure and access, by pedestrians, bikes and vehicles, to protect sense of remoteness, tranquillity and the night skies.  Deliver a sustainable integrated transport network, with improved public transport, quality services, car parking and linking of services.  Encourage quiet recreational activities that respect the special qualities of the area.	<b>Tranquillity</b> <b>Biodiversity</b>
<b>Recreation</b>	Lakes and rivers Public rights of navigation on Windermere and Coniston Water Woodlands and publically-owned forests Open fells Extensive rights of way and open access routes Cultural and historical heritage	The NCA offers an extensive network of rights of way totalling 1,170 km at a density of 1.7 km per km. 21 per cent of the NCA is classified as being publically accessible. This is high in a national context, but low compared to the adjacent Cumbria High Fells and reflects the more agriculturally enclosed landscape and smaller extent of common land in this NCA. 7 per cent of the NCA is in the Woods for People project. In addition, the NCA offers access to woodlands and forests, lakes and streams as well as having a network of lanes in lowland areas. Lakeshore access at Windermere in particular, provides a range of recreational opportunities including sailing, canoeing, rowing and swimming. Extensive public forest with recreational facilities. Numerous National Trust properties.	National	Access areas/routes, recreational facilities and sites associated with cultural and historical heritage require maintenance, promotion and management, as key attractions for visitors.  High visitor numbers mean inputs of phosphorous from detergents and cleaning agents to the lake catchment are high.  Recreation also dependent on maintenance and enhancement of habitats, for example traditional farmed landscape, semi-natural woodlands, expanses of open water and other attributes contributing to the sense of place.  Management also required of impacts of high visitor numbers such as traffic, loss of tranquillity, nutrient inputs to lake and river habitats and path erosion.	Manage and improve access and recreational opportunities to land and water for a wide range of users, ensuring the landscape attributes are maintained.  Promote sustainable tourism and recreational activities to minimise impact on the environment and local culture, while helping to generate income and employment.  Deliver a sustainable integrated transport network, with improved public transport, quality services, car parking and linking of services.  Seek opportunities for visitors to contribute to the protection and management of the NCA.	<b>Recreation</b> <b>Sense of place/ inspiration</b>



Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Biodiversity</b>	<p>Fell habitat mosaic</p> <p>Lakes, rivers and tarns</p> <p>Woodlands</p> <p>Wetlands</p> <p>Species-rich grasslands</p> <p>Peatlands</p>	<p>BAP priority habitats within the NCA cover 16,377 ha or 24 per cent of NCA area.</p> <p>6 per cent of the NCA is designated SSSI.</p> <p>349 local sites of biological importance.</p> <p>7 SAC</p> <p>1 SPA</p> <p>2 Ramsar sites</p> <p>England's stronghold for the high brown fritillary and pearl-bordered fritillary butterflies and one of the isolated northern sites for the Duke of Burgundy butterfly.</p> <p>Windermere is one of the few lowland lakes to contain a substantial population of Arctic charr freshwater fish.</p> <p>Nationally important populations of medicinal leeches are associated with the fell tarns.</p> <p>Catchment supports otters and native white-clawed crayfish.</p>	National and International	<p>63 per cent of SSSI are in favourable condition, 29 per cent unfavourable recovering, 4 per cent unfavourable no change and 3 per cent unfavourable declining. The main reasons for unfavourable, declining or no change SSSI condition are overgrazing, invasive freshwater species, forestry and woodland management, deer grazing and diffuse pollution.</p> <p>Significant progress from 2004-10 in securing SSSI restoration to unfavourable recovering condition, with a continuation of appropriate management required to achieve favourable condition.</p> <p>There is significant coverage of non-designated priority habitats, often providing corridors and stepping stones to protected sites, across the NCA.</p> <p>Extensive broad leaved mixed and yew woodland and upland heath is present across many of the fells with some larger areas in the west of the NCA. There are also important populations of Juniper on upper slopes, often in transition to upland heathland.</p> <p>The mosaic habitats of acid grassland, calcareous grassland, bracken and heathland that are characteristic of the rocky knolls and slopes support important invertebrate populations such as high brown fritillary and pearl-bordered fritillary butterflies.</p> <p>Woodlands support characteristic assemblages of birds including redstart, pied flycatcher and wood warbler and are the stronghold for the netted carpet moth in England.</p> <p>The ancient semi-natural woodlands are a potential stronghold for the hazel dormouse.</p> <p>Grizedale Forest is a site for red kite introduction.</p> <p>Esthwaite Water supports a rich assemblage of pondweeds and was the only known locality in England and Wales for slender naiad <i>Najas flexilis</i>. Although the species is locally extinct, re-propagation from source seed or reintroduction is being investigated.</p>	<p>Enhance fell habitats through employing appropriate grazing regimes, which increase the diversity of habitats.</p> <p>Increase native woodland and tree cover across the altitudinal range of woodland types. Where woodland cover is low in the east of the NCA, increase the area of broadleaved woodland targeting areas of low conservation interest.</p> <p>Convert coniferous plantations to native broadleaved woodland where such a change would make significant improvement to the biodiversity of those woodlands.</p> <p>Plan for creation of a connected habitat network, creating and restoring buffers, corridors and stepping stones to link valley grasslands, wetlands, woodlands and fells.</p> <p>Species-rich, well-managed hedgerows are vital in connecting woodland habitats for dormice and improvement of this connectivity could help the species move out from core populations such as at Roudsea Wood and Mosses NNR.</p> <p>Restore lakes, rivers and their catchments, to enhance water quality and resource, make space for natural development of rivers and the control invasive non-native species.</p> <p>Restore the natural hydrology of wetland habitats to improve condition of fens, mires and raised bogs.</p> <p>Enhance protected species populations through targeted habitat management and specific management measures, where needed.</p> <p>Integrate habitat restoration with actions to improve the state/supply of other key ecosystem services.</p> <p>Investigate opportunities for habitat-based payments for ecosystem</p>	<p><b>Biodiversity</b></p> <p><b>Water availability</b></p> <p><b>Climate regulation</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p> <p><b>Regulating water quality</b></p> <p><b>Regulating water flow</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Recreation</b></p>

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
<b>Geodiversity</b>	<p>Local stone used for building and walling</p> <p>Exposures in old quarries and lakeside</p> <p>Landscape contrast to surrounding NCAs</p>	<p>Geology reflected in the local building materials.</p> <p>7 geological SSSI and 1 geological and biological SSSI.</p> <p>24 local geological sites within the NCA.</p>	Regional	<p>The landscape character of this NCA is determined by the underlying Silurian slates, fissile mudstones and grits which contribute to the areas gentler, undulating character and form. The deformation of these sediments provides evidence of earth movements and pressures in the crust over the last 400 million years.</p> <p>In more recent geological time glacial erosion has formed long, straight U-shaped valleys with lakes.</p> <p>Geological SSSI and Local Geological Sites provide opportunities to reveal and interpret the area's geological heritage.</p> <p>Local geology is reflected in the building materials used in the historic walling patterns and older buildings. This and the juxtaposition between the low fells, rocky ridges, valleys and the dramatic high fells to the north provide the NCA with the special sense of place that has attracted visitors for centuries.</p>	<p>Continue to maintain views of geological features and exposures.</p> <p>Conserve and enhance geological SSSI and Local Geological Sites. There are opportunities to promote and increase people's understanding of the geological heritage.</p> <p>Improve access to exposures, cuttings and quarries, where appropriate, for the improved understanding of geodiversity.</p> <p>Support opportunities to restore peatlands to re-establish their geomorphological function as a recorder of palaeo-ecological change will also restore their biodiversity and carbon sequestration role.</p>	<p><b>Geodiversity</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Sense of history</b></p>

## Photo credits

Front cover: The NCA is characterised by undulating low fells and ridges supporting a diverse habitat mosaic and some of the most densely-wooded areas of England, contrasting with the High Fells to the north. © Natural England/Teresa Morris

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