National Character Area profile:

128. South Hampshire Lowlands

Supporting documents

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Introduction

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

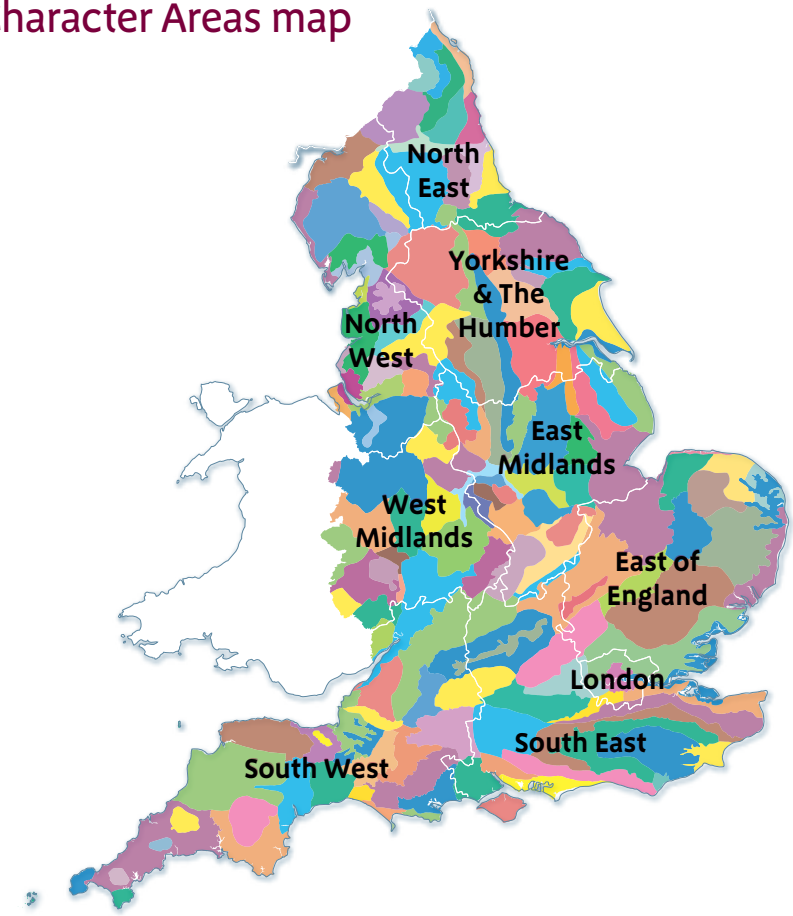
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



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

Summary

The South Hampshire Lowlands National Character Area (NCA) is a low-lying plain between the chalk hills of the Hampshire and South Downs and Southampton Water. Its highest point is an outlying chalk ridge – Portsdown Hill – but the bedrock geology is mostly open marine, estuarine and freshwater Tertiary deposits. The NCA is dominated by the city and port of Southampton and its adjoining towns and suburbs – 29 per cent of the area is urban. In the more rural areas, it is a mixture of farmland, particularly pasture, and woodland.

Some 18 per cent of the land cover of the NCA is woodland, of which almost half is designated ancient woodland, a legacy of the Forest of Bere, a Royal Hunting Forest that once covered the area. Today the most significant blocks of woodland are West Walk near Wickham, Botley Wood at Swanwick and Ampfield Wood near Romsey.

Although a high percentage of the area is urban, the NCA has considerable biodiversity interest. Southampton Water is internationally recognised for its importance for breeding and overwintering waterfowl and waders and for its wetland habitats such as mudflats and salt marshes. Three Natura 2000 designations cover parts of the area – Solent and Southampton Water Ramsar site, Solent and Southampton Water Special Protection Area and Solent Maritime Special Area of Conservation.

The NCA is drained by several rivers: the lower reaches of the Test and Itchen, the source and headwaters of the Hamble and the middle section of the Meon. These provide not only a refuge for species in decline elsewhere, such as otters, but also examples of unusual habitats such as the estuarine woodlands on the Hamble. Both the Test and Itchen are important sources of potable water.

The NCA however faces many challenges, particularly ongoing development. This will need to be implemented sensitively in order to safeguard not only the designated sites within the NCA but also the important adjacent sites such as the New Forest and South Downs National Parks.

Click map to enlarge; click again to reduce

Statements of Environmental Opportunities:

- **SEO 1:** Promote creative and effective sustainable development – including a well-connected network of high-quality greenspace in and around Southampton, Romsey, Eastleigh and Havant – which benefits local businesses and communities, protects local distinctiveness, encourages public understanding and enjoyment of the natural environment, and helps to mitigate the impacts of climate change.

- **SEO 2:** Conserve, manage and enhance the semi-natural habitats of the river valleys, their estuaries and intertidal areas along the coast, to maintain water availability and flow, reduce flooding downstream, improve water quality, and enhance their biodiversity and landscape benefits.

- **SEO 3:** Protect, manage and enhance the area's historic well-wooded character – including its ancient semi-natural woodlands, wood pasture and hedgerows – to increase biomass provision, link and strengthen habitats for wildlife, and improve recreational opportunities.

- **SEO 4:** Conserve, manage, link and enhance the traditional mosaic of semi-natural grassland habitats – including chalk grassland, watermeadows and unimproved grassland – for the benefits they provide in protecting and regulating soils and water, climate change adaptation as well as recreational opportunities and improved biodiversity.

Swans on the River Itchen at Highbridge.

Description

Physical and functional links to other National Character Areas

The area is drained by four main river valleys – the Test, Itchen, Hamble and Meon – flowing from their origins in the Hampshire Downs and South Downs National Character Areas (NCAs) to estuaries running into Southampton Water. They function as key wildlife corridors, for example for otter and Atlantic salmon. They also feed wetland and European or internationally designated wetlands, such as the Solent and Southampton Water Ramsar site and the Portsmouth Harbour Special Protection Area (SPA) (in the neighbouring South Coast Plain NCA), which are important for breeding and overwintering birds. Therefore, water quality and sediment load need to be carefully managed throughout the whole catchment.

There are wide views across Southampton Water from Southampton. However, the high-rise buildings and industrial areas of Southampton have an impact on the views from surrounding NCAs such as the New Forest and South Coast Plain. From Portsdown Hill, it is possible to see Portsmouth, the Solent and the Isle of Wight.

Southampton has several regionally and nationally important transport links, such as the M3 to London and the M27 along the south coast. A ferry service from the port connects the Isle of Wight to the mainland. Southampton Airport at Eastleigh on the outskirts of the city serves routes to the Channel Islands, European and international destinations.

Two National Parks, the New Forest and South Downs, in neighbouring NCAs are popular recreational destinations for people from the Southampton area and elsewhere within the NCA. Southampton and the coastal river valleys offer many water-based activities such as yachting and attract visitors from outside the NCA.

The view across Portsmouth Harbour from Portsdown Hill.

Key characteristics

- Low-lying, undulating plain abutting the chalk downs to the north and the coastal plain and Southampton Water to the south. An underlying geology of open marine, estuarine and freshwater Tertiary gravels. Soils over much of the area are heavy and clayey with localised pockets of more freely draining soils on higher land.
- Fast-flowing chalk rivers in wide, open valleys with watermeadows and riparian vegetation that provide valuable wildlife habitats for species such as breeding and overwintering birds, otter, water vole, Atlantic salmon, brown trout and the endangered, native white-clawed crayfish.
- Well-wooded farmed landscape (particularly to the east of Southampton), characterised by ancient woodland such as Botley Wood and West Walk, the remnants of the Royal Hunting Forest of Bere.
- Mixed agricultural landscape dominated by pasture with small pockets of horticulture and arable.
- An intimate and enclosed field pattern with many small and irregular fields generally bounded by mixed-species hedgerows or woodland.
- In parts, a very urban NCA dominated by the city and port of Southampton and other large towns such as Waterlooville and Havant. The more rural hinterland is characterised by small, loosely clustered or dispersed settlements, intermixed with isolated farmsteads.
- Fragmented by major transport links, including the M3 to London and the M27 to Portsmouth which cross the NCA.

The mudflats of the Solent and Southampton Water SPA support a wide assemblage of waders and waterbirds.

South Hampshire Lowlands today

The South Hampshire Lowlands National Character Area is a low-lying and gently undulating plain that lies between the chalk outcrops of the Hampshire and South Downs and Southampton Water. Wedge-shaped, to the west it melds with the New Forest NCA while to the east it tapers to a narrow point at Havant. The area is underlain by gently folded Tertiary sands, silts and clays in places overlain by more recent river-deposited sands and gravels. This has given rise to widespread, seasonally waterlogged, heavy, clay soils, with small areas of light, well-drained loams, for instance to the east of Romsey and the west of Chandler's Ford. Its highest feature, Portsdown Hill, is an outlying chalk ridge which forms a backdrop to Portsmouth and contrasts dramatically with the flatter countryside around it. It is the only area of chalk grassland within the NCA and supports a rich chalk grassland flora and diverse invertebrates such as the endemic early gentian, bee and fly orchids, and the chalkhill blue, small blue and brown argus butterflies.

The shoreline of the NCA is contained entirely within the inlet of Southampton Water and is heavily developed with the docks and city of Southampton. Despite being a busy waterway, Southampton Water is noteworthy for its international/European designations: the Solent and Southampton Water Ramsar site, Solent and Southampton Water SPA and the Solent Maritime Special Area of Conservation (SAC) for its wetland habitats and overwintering waders.

Several fast-flowing rivers are a significant feature of the landscape. The Test, Itchen, Hamble and Meon rivers drain the lowlands as they travel southwards from their origins in the Downs to their estuaries in Southampton Water. Their clear, spring water supports a rich aquatic flora and fauna and wildlife habitat that is now scarce elsewhere in England for species such as otter, Atlantic salmon, white-clawed crayfish, brook lamprey and southern damselfly. Dry fly fishing is thought to have originated on the River Test and the Test and Itchen are now managed for angling along most of their length.

Along the chalk rivers lie meadows of species-rich flood plain grassland. Beside the Test these undergo a transition from neutral grassland through to brackish grassland, reedbed, fen and salt marsh. These flood plain grasslands are important for breeding wading birds and wintering wildfowl and invertebrates, supporting many nationally rare and scarce species. Small pockets of fen and fen grassland, important for their distinctive flora such as marsh helleborine and marsh orchids, are associated with calcareous springs that rise at the foot of the Hampshire Downs, for example at The Moors, Bishop's Waltham Site of Special Scientific Interest (SSSI).

To the north and east of Southampton lie the remnants of the Royal Hunting Forest of Bere, now a mosaic of grassland, wood pasture and woodland, a high proportion of which is designated as ancient woodland. The area has a relatively high density of traditional farmsteads and historic houses set within 18th-century and earlier enclosed fields. Within broadleaved woodland, oak with a hazel understory is the prevalent woodland type but in some areas (such as Everett's and Mushes Copses and the upper reaches of the Hamble) there are stands of small-leaved lime with wych elm. Along the upper reaches of the Hamble are estuary edge woods, some of the botanically most diverse in the NCA, which show an unusual transition from woodland through brackish marsh to salt marsh. Conifer plantations introduced in the Forest of Bere provide small-scale commercial forestry operations.

Baddesley Common.

Isolated patches of agriculturally unimproved grassland are scattered across the NCA such as Moorgreen Meadows and Hook Heath Meadows SSSI. Despite their fragmented nature, they are valuable for their rich flora and invertebrate assemblages.

The farmed landscape is typically pastoral in character but some arable farming also takes place, especially cereals and oilseed rape. Around the Meon Valley, soils are lighter and there are some small but intensive pockets of market gardening/horticulture as well as nurseries and garden centres. The field pattern is varied with some small and medium irregular fields, resulting in some cases from medieval enclosure and typically bounded by a low oak hedgerow.

A significant proportion of the NCA, about 29 per cent, is urban. Southampton is by far the most important city but there are also several other significant, large towns including Eastleigh, Havant, Romsey, Totton and Waterlooville. The rural settlement pattern is more dispersed and less strongly nucleated with some often loosely clustered villages, hamlets, isolated small farms and cottages set within medieval and later enclosed fields and linked by a network of minor roads and narrow lanes. A few large houses and estates are dotted throughout the landscape.

The area benefits from good transport links including the M3 to London and Southampton Airport. However, these have a significant visual and environmental impact on the area, fragmenting farmland and semi-natural habitats. Only 7 per cent of the area, mostly within the Forest of Bere, is identified as remaining tranquil/undisturbed, with 65 per cent being described as disturbed in 2006.

The landscape through time

The NCA lies within the Hampshire Basin to the south of the South Downs ridge. Chalk, which forms the outlying ridge of Portsdown Hill, represents the oldest geology in the NCA. The Chalk was deposited in the Upper Cretaceous (between 100 and 66 million years ago) in an extensive shallow sea which covered much of northern Europe. Overlying the Chalk is a sequence of Tertiary sands, silts and clays which represent fluctuating marine, estuarine and freshwater environments which dominated southern England and the Hampshire Basin from approximately 66–34 million years ago. Towards the end of the Tertiary, the formation of the Alps (about 15 million years ago) led to folding of rocks in southern England resulting in the gently tilted and folded chalk ridges and Tertiary sediments. During the Quaternary ice ages, the NCA lay to the south of the maximum ice sheet advance in a tundra-like environment. There are extensive river terrace deposits (along the Test and Itchen, for example) which document the river response to fluctuating climatic conditions during the Quaternary.

Prehistoric occupation of the area seems to have been concentrated around the river valleys and Portsdown Hill where there are the remains of Neolithic and bronze-age barrows. A possible bronze-age jetty at Testwood Lakes suggests that even at this early period trading links were important for the area.

The first urban centres were established under Roman occupation as small market towns at Havant and Wickham. A Roman fort was constructed at Clausentum, possibly at modern-day Bitterne, a suburb of Southampton.[4] The remains of Roman villas as well as kilns have also been found across the NCA.[5]

In the 7th century, under the West Saxons, Hamwic, an important port and trading emporium, the forerunner of Southampton, was founded on the banks of the Itchen. By the 10th century, the threat of Danish raids prompted the inhabitants to rebuild it on the west bank of the Test where its proximity to the continent and the double tides of Southampton Water helped it to become a major port. Today, Southampton still retains parts of its original medieval walls and several fine examples of wealthy merchants' houses dating from the 12th century.

During this period, the Church also influenced the establishment of settlements such as at Bishop's Waltham, where the bishops of Winchester held an estate, and Netley and Romsey where abbeys were founded.

The modern Forest of Bere is a composite of the remnants of several Royal Hunting Forests – the forests of Melchet, Buckholt, Bere Ashley and the largest, the Forest of Bere Portchester. They were designated as Royal Hunting Forests by the Normans and were probably at their greatest extent during the 12th century. During the Middle Ages, the forests' value for hunting began to decline and the woodland began to be cleared for farmland. Timber from the forests was also in demand for ship-building at Southampton and later to fuel iron foundries for the construction of iron-clad ships.

[4] Hampshire County Integrated Character Assessment, Part 2 An Overview of the Hampshire Landscape, Hampshire County Council (draft March 2010)
[5] Hampshire County Integrated Character Assessment, Forest of Bere East, Hampshire County Council (May 2012)

From the 17th century onwards, watermeadows became a distinctive feature along the rivers Test, Itchen and Meon. Flooding the fields increased their fertility and prevented the ground from freezing, allowing livestock to be put out to graze earlier in the season The system was abandoned from the early 20th century and the valleys have now become more wooded. The fast-flowing waters of the rivers Itchen and Test were also harnessed to power mills, particularly paper and silk mills.

The proximity of the area to the continent and its coastal location has meant that, throughout its history, it has been at risk of invasion. In the 19th century, a series of forts were built along Portsdown Hill, known locally as Palmerston's Follies, to protect the naval base at Portsmouth.

The arrival of the railways in the 19th century connected the port of Southampton to London and spurred the development of Eastleigh as a railway town. It also gave local market gardening a new outlet as perishable produce such as strawberries could now be quickly transported to London.

During the 20th century, Southampton emerged as the major starting point for cruise ships and it remains a major port today for both freight and passenger traffic with the port authority being the largest employer in the city. In the post-war period, other urban centres within the NCA, such as Waterlooville and Havant, saw a rapid expansion to provide housing for an increasing population. Southampton City Council became a unitary authority in 1997.

A veteran oak tree at Creech wood.

Ecosystem services

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

Provisioning services (food, fibre and water supply)

- **Timber provision:** The area has been historically important for timber and today provides fencing, poles and some higher-quality firewood.

The River Test.

- **Water availability:** A large proportion of Hampshire and the Isle of Wight as well as areas of Sussex are dependent on the groundwater and surface waters of the rivers Test and Itchen. All the main rivers within the NCA also supply wetlands of international importance, for instance the Solent and Southampton Water Ramsar site within the NCA and the Portsmouth Harbour Ramsar site in the neighbouring South Coast Plain NCA.

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

- **Regulating water quality:** The chemical quality of the groundwater is good. However, the picture for the surface waters is more mixed. The Meon is judged to have both good ecological and chemical quality. The Lower Test is judged to be of moderate ecological quality between Timsbury and Romsey and poor between Romsey and its estuary. It is not assessed for chemical quality. The River Itchen is classed as ecologically poor for diatoms and chemically poor for the presence of tributyltin compounds.

- **Regulating water flow:** Some areas within the NCA – such as Romsey, parts of Southampton and Eastleigh – are prone to flooding. Improving the ability of flood plains to store water and restoring natural meanders to the rivers where possible could make a contribution to safeguarding properties.

Cultural services (inspiration, education and wellbeing)

- **Biodiversity:** The NCA has three SAC, one SPA and one Ramsar site, reflecting its importance for biodiversity. Nearly 3 per cent of the NCA is designated as SSSI.

Statements of Environmental Opportunity

SEO 1: Promote creative and effective sustainable development – including a well-connected network of high-quality greenspace in and around Southampton, Romsey, Eastleigh and Havant – which benefits local businesses and communities, protects local distinctiveness, encourages public understanding and enjoyment of the natural environment, and helps to mitigate the impacts of climate change.

For example, by:

- Working with local authorities, government agencies, local enterprise partnerships and other partners to ensure that economic growth in the South Hampshire Lowlands National Character Area (NCA) recognises and enhances where possible the qualities and ecosystem benefits of the natural environment.
- Promoting the benefits of the natural environment for local communities and visitors in terms of quality of life, health and recreation; and contributing to the mitigation and compensation for adverse impacts on the natural environment.
- Ensuring that development and its associated infrastructure (including light, noise and air pollution) does not damage or intrude on the special qualities of any of the designated sites and protected landscapes that lie within and adjacent to the NCA, for example the New Forest National Park, the Solent and Southampton Water Ramsar site, Solent and Southampton Water Special Protection Area (SPA), Solent Maritime Special Area of Conservation (SAC), River Itchen SAC, Isle of Wight Area of Outstanding Natural Beauty (AONB), South Downs National Park and Chichester Harbour AONB.
- Ensuring that all new development is informed by an understanding of local character and distinctiveness and conserves significant historic features.
- Encouraging the use of neighbourhood plans and historic landscape character assessments to inform planning decisions.
- Ensuring that all new development meets the highest standards for energy efficiency as set out in the Code for Sustainable Homes.[6]
- Making all development permeable to wildlife through the use of greenspace and green corridors that can function as ecological networks.
- Encouraging the provision of a strong, coherent green infrastructure network and ensuring that all development meets the Accessible Natural Greenspace Standard (ANGSt).
- Preserving and improving the tranquillity of the NCA, for instance ensuring that intrusion by development is minimised, providing new greenspace and improving the tranquillity of existing greenspace, buffering major roads with hedgerows or trees and encouraging the use of low-noise surfacing on roads.
- Seeking to encourage a softer transition between rural and urban landscapes through the planting of native trees around new development.
- Creating areas of well-managed broadleaved woodland to shield new development and major transport routes such as the M25 and provide corridors for sustainable links such as cycle ways and footpaths while also providing a potential wood fuel resource and buffering from traffic noise.
- Working with local planning authorities and public transport providers to ensure that viable public transport options are in place, particularly in areas of new development, to reduce the pressure of road traffic and reduce the impact of air pollution on European designated sites.

[6] Code for Sustainable Homes, Department for Communities and Local Government (2006)

SEO 2: Conserve, manage and enhance the semi-natural habitats of the river valleys, their estuaries and intertidal areas along the coast, to maintain water availability and flow, reduce flooding downstream, improve water quality, and enhance their biodiversity and landscape benefits.

For example, by:

- Working with partners, such as the Environment Agency and water companies, to ensure that the planned increase in population does not cause deterioration in water quality or water availability, to maintain supplies of potable water and protect the wildlife that depends on the rivers and wetlands.
- Working with the farming community under the Catchment Sensitive Farming Programme to ensure that agricultural run-off is reduced.
- Encouraging the use of wide buffer strips and planting of hedgerows to prevent or reduce run-off; and improving water quality by reducing the amount of nutrients and silts entering watercourses.
- Working with industries that use the rivers – such as mills, fish farms and watercress farms – to minimise pollution of the rivers Hamble, Itchen, Meon and Test.
- Promoting water efficiency among the wider public, industry, agriculture and users both within the NCA itself and within neighbouring catchment areas.
- Ensuring that any new development is built to the highest water efficiency standards as laid out in the Code for Sustainable Homes.
- Maintaining and managing the open character of the river valleys of the Itchen, Meon and Test to conserve and enhance the long views over the surrounding landscape.
- Promoting awareness among the wider public of the problems of invasive species, supporting local volunteers and working with landowners and partners to control invasive species such as mink, Himalayan balsam, Japanese knotweed and topmouth gudgeon which pose a serious threat to the biodiversity and economic viability of local rivers.
- Linking and extending lowland meadow habitats, where possible, along the rivers which will help to filter pollutants and increase flood water storage capacity as well as support biodiversity and increase habitat for pollinators and pest predators.
- Encouraging, where possible, the restoration of the traditional grazing of the historic watermeadows, particularly along the rivers Test and Itchen, to support biodiversity.
- Encouraging the planting and management of native vegetation and the removal of non-native vegetation alongside rivers to support wildlife such as Atlantic salmon and the southern damselfly.
- Working with landowners and partner bodies to ensure that a proportion of shade is present over key watercourses to prevent overheating during 'heat waves'.
- Working with the Environment Agency, angling groups and other partners to ensure that vegetation cover is managed for maximum biodiversity benefit while allowing access to the bank for recreational fishing.
- Removing weirs and helping fish to navigate impediments to migration, for instance by installing fish ladders.

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- Establishing new plantations in strategic locations to help manage water quality, water flow and soil quality.
- Restoring the natural morphology of rivers – especially along the Test and Itchen – to improve biodiversity and allow the river to channel excess water more efficiently and thus avoid flooding.
- Reconnecting rivers with their flood plains, protecting flood plains from development, and linking them, extending them and improving their condition so that they function effectively.
- Encouraging the careful siting of any development away from areas that are susceptible to fluvial, marine or groundwater flooding.
- Creating new wetland areas throughout both existing and approved new development as part of sustainable urban drainage systems that link into the heart of urban areas, significantly contributing to the alleviation of surface water flooding.
- Encouraging the use of permeable surfaces, green roofs and rain gardens in new development to reduce the risk of overland flows.
- Ensuring that the needs for high tide roost sites of birds and other needs on the Solent and Southampton Water SPA are taken into consideration when any development is planned.
- Encourage research within the Lower Test Valley Site of Special Scientific Interest (SSSI) to help better understand the changes that may be occurring due to sea level rise and how the SSSI may best be managed to adapt to them.
- Work with partners and stakeholders for the Lower Test Valley SSSI to agree climate change adaptation actions and manage intertidal habitat roll-back.

Weirs on the chalk rivers can act as barriers to fish passage.

SEO 3: Protect, manage and enhance the area's historic well-wooded character – including its ancient semi-natural woodlands, wood pasture and hedgerows – to increase biomass provision, link and strengthen habitats for wildlife, and improve recreational opportunities.

For example, by:

- Linking areas of woodland, in particular ancient woodland, to improve landscape character and resilience and to reduce fragmentation.
- Strengthening ecological networks by seeking opportunities to link areas of woodland, particularly ancient woodland, through hedgerows and new plantations of trees native to the area.
- Seeking the replacement of conifers on ancient woodland sites with broadleaved trees indigenous to the area, to enhance biodiversity and landscape while also aiding climate regulation and providing a local source of wood products.
- Restoring and maintaining areas of wood pasture for their biodiversity value such as lichen and bryophyte communities.
- Improving the recreational experience of the Forest of Bere so that it can offer an attractive alternative to the neighbouring national parks by providing adventure activities, such as wild camping, as well as ensuring that it provides areas for quiet recreation.
- Promoting a market within the NCA for biomass fuels from locally grown sustainable wood.
- Encouraging local landowners to actively manage broadleaved woodland for woodland products.
- Managing, restoring and replanting the network of hedgerows and field boundary trees to strengthen field boundary patterns.
- Preserving remnant historic field systems, such as medieval assart fields, where appropriate through agri-environment schemes.
- Promoting interest and understanding in the history and land use of the Forest of Bere among the wider public.
- Improving and encouraging access to the Forest of Bere through sustainable transport such as better cycle and pedestrian links from urban areas.
- Ensuring that the rural character of the Forest of Bere is maintained and enhanced, for instance by minimising 'street clutter' and, where possible, reducing light pollution and other intrusion.

SEO 4: Conserve, manage, link and enhance the traditional mosaic of semi-natural grassland habitats – including chalk grasslands, watermeadows and unimproved grassland – for the benefits they provide in protecting and regulating soils and water, climate change adaptation as well as recreational opportunities and improved biodiversity.

For example, by:

- Restoring a regular grazing regime to the chalk grassland at Portsdown Hill to maintain and improve its landscape and biodiversity interest.
- Encouraging, where possible, the reversion to grassland from arable across Portsdown Hill to restore and link the chalk habitat – particularly on the south escarpment – to safeguard important biodiversity interest, such as the early gentian (an endemic species) and assemblages of rare butterflies, as well as protect the shallow, chalky soils.
- Promoting the reversion of arable to grassland and scrub removal where current land cover threatens the integrity of historic features such as important earthworks and remains, including bronze-age barrows and Saxon burial grounds on Portsdown Hill and remnants of medieval field systems on the river valley sides and bottoms such as those along the Itchen.
- Improving recreational access to Portsdown Hill and encouraging sympathetic use by local residents.
- Creating awareness among the local population of Portsdown Hill's historical legacy.
- Promoting the 19th-century forts on Portsdown Hill more widely as venues for day trips.
- Linking and re-establishing, where possible, areas of lowland heathland particularly around Baddesley, Hamble, Netley, Shedfield and Wickham commons.
- Conserving and restoring remnant ancient/historic field systems, such as assart fields found in the Forest of Bere, through traditional hedgerow boundary management and replanting, by encouraging uptake of agri-environment schemes.
- Linking and extending the mosaic of semi-natural grassland within the Forest of Bere to reduce fragmentation; and encouraging reversion to grassland from arable, where possible.
- Exploring the possibility of developer funding for establishing suitable alternative natural greenspace (SANGS) to relieve visitor pressure on the coastal sites and minimise the disturbance to the birds.
- Restoring grassland where possible for green infrastructure.
- Encouraging the restoration and creation of new ponds through agri-environment schemes.
- Encouraging the introduction of arable field margins and buffer strips on arable land to support pollinators and pest predators and to increase biodiversity.

Supporting document 1: Key facts and data

South Hampshire Lowlands National Character Area (NCA): 38,635 ha

1. Landscape and nature conservation designations

16 ha of the New Forest National Park falls within the South Hampshire Lowlands NCA.

Management plans for the protected landscape can be found at:

- www.newforestnpa.gov.uk/

Source: Natural England (2011)

Please note: Part of this NCA is affected by an Order extending the Yorkshire Dales National Park. This will not take effect unless confirmed by the Secretary of State. Please see www.naturalengland.org.uk/lakestodales for current status.

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Designated site(s)	Area (ha)	% of NCA
International	Ramsar	Solent and Southampton Water	179	<1
European	Special Protection Area (SPA)	Solent and Southampton Water SPA	179	<1
	Special Area of Conservation (SAC)	River Itchen SAC, Solent Maritime SAC, Emer Bog SAC	310	1
National	National Nature Reserve (NNR)	n/a	0	0
National	Site of Special Scientific Interest (SSSI)	A total of 17 sites wholly or partly within the NCA	1,150	3

Source: Natural England (2011)

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

There are 683 local sites in the South Hampshire Lowlands covering 5,389 ha which is 14 per cent of the NCA.

Source: Natural England (2011)

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

1.1.1 Condition of designated sites

Condition category	Area (ha)	% of SSSI land in category condition
Unfavourable declining	90	8
Favourable	361	32
Unfavourable no change	65	6
Unfavourable recovering	613	54

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 South Hampshire Lowlands NCA occupies the low lying land between the Chalk outcrops of the South Downs and Hampshire Downs and Southampton Water. The highest point within the NCA is 123 m above sea level.

Source: South Coast Plain and Hampshire Lowlands Natural Area Profile, Natural England 2010

2.2 Landform and process

The gently undulating landscape is characterised by a diversity of features and land uses which reflects changing soil types and local variations of topography. Inland of the coastal plain, the landscape is strongly influenced by the underlying Tertiary sand and clay deposits.

Source: South Coast Plain and Hampshire Lowlands Natural Area Profile

2.3 Bedrock geology

The South Hampshire Lowlands form part of the Hampshire Basin with, to their north, the Chalk of the South Downs, which also forms Portsdown Hill. Above the Chalk here, there is a sequence of underlying and gently folded Palaeogene sands, silts and clays including the Lambeth, Thames and Bracklesham Groups demonstrating fluctuating marine, estuarine and freshwater environments ranging in age from 66 to 34 million years old. All of these were folded during the Alpine Orogeny (mountain-building episode) approximately 15 million years ago.

Source: South Coast Plain and Hampshire Lowlands Natural Area Profile

2.4 Superficial deposits

A sequence of up to 11 different river gravel terraces, chiefly associated with the rivers Itchen and Test, reflect changes in glacial/interglacial deposition rates and phases during the Pleistocene.

Source: South Coast Plain and Hampshire Lowlands Natural Area Profile

2.5 Designated geological sites

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

There are no Local Geological Sites within the NCA.

Source: Natural England 2011

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

2.6 Soils and Agricultural Land Classification

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

Agricultural Land Classification	Area (ha)	% of NCA
Grade 1	743	2
Grade 2	3,174	8
Grade 3	8,799	23
Grade 4	14,568	38
Grade 5	277	<1
Non-agricultural	3,553	9
Urban	7,459	19

Source: Natural England (2010)

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

3. Key water bodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
Test	14
Itchen	10
Meon	9
Hamble	7
Itchen Navigation	2

Source: Natural England (2010)

The chalk rivers of the Itchen and Test flow through the NCA and their flood plains contain some extensive areas of agriculturally unimproved grassland.

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

3.2 Water quality

The total area of nitrate vulnerable zone is 37,900 ha, 98 per cent of NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

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

The River Test.

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 7,004 ha of woodland (18 per cent of the total area), of which 3,280 ha is ancient woodland.

Source: Natural England (2010)

4.2 Distribution and size of woodland and trees in the landscape

Predominantly mixed farmland and woodland with good amount of semi-natural ancient woodland and ancient hedgerows. The oak trees prevalent within both woodland and hedgerows give the impression of a well-wooded landscape.

Source: Countryside Quality Counts, (2003), Natural England (2010).

4.3 Woodland types

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

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

Woodland type	Area (ha)	% of NCA
Broadleaved	5,219	14
Coniferous	1,258	3
Mixed	314	1
Other	213	1

Source: Forestry Commission (2011)

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

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	1,724	4
Ancient re-planted woodland (PAWS)	1,556	4

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Within the coastal plain, intensification of arable production has resulted in removal of hedges and hedgerow trees.

Source: South Hampshire Lowlands Countryside Character Area Description; Countryside Quality Counts (2003)

5.2 Field patterns

The patchwork of small, intimate and irregular fields is defined by ancient hedgerows.

Source: South Hampshire Lowlands 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

There were sharp decreases in the numbers of dairy, general crop and horticulture farms between 2000 and 2009, along with less dramatic falls in numbers of mixed and grazing farms, while pig and cereal farms showed a slight increase. Grazing livestock remained the most common form of farming, despite the decrease.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Apart from farms over 100 ha, which had increased between 2000 and 2009, all farms sizes have dropped in number.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 14,797 ha; owned land = 9,046 ha
2000: Total farm area = 15,686 ha; owned land = 9,224 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

This is a landscape dominated by mixed, well-managed farmland, ancient woodland and a few historic estates. The landscape is dominated by grazing land on heavy, clayey soils with small pockets of horticulture and some arable use on higher ground. Intensive market cropping, associated with garden centres, nurseries and smallholdings, is concentrated in the Meon Valley. Most of the NCA is grassland or uncropped and this increased slightly between 2000 and 2009. Most of the cultivated farmland is arable, mostly cereals but also other arable crops. Among other crops, only land used to grow oilseeds had increased, with everything else declining.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Livestock numbers remained fairly stable between 2000 and 2009 apart from a 10 per cent fall in the number of cattle. Despite this, cattle remain the most prevalent livestock type, accounting for 64 per cent of all livestock with sheep and pigs both at 18 per cent.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Overall, agricultural labour decreased by 22 per cent between 2000 and 2009 with the highest fall of 40 per cent being in part-time employees.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Former heathland or common, on pockets of acidic soils, are frequently used as paddocks or non-intensive grazing land. Wide, lush river valleys contain unimproved meadows and grazing marshes as well as numerous ponds.

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; **http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx**

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

Priority habitat	Area (ha)	% of NCA
Coastal and flood plain grazing marsh	806	2
Lowland meadows	354	1
Lowland dry acid grassland	86	<1
Purple moor-grass and rush pasture	51	<1
Lowland calcareous grassland	29	<1
Mudflats	8	<1
Fen	1	<1

Source: Natural England (2011)

Maps showing locations of priority habitats are available at

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

7.3 Key species and assemblages of species

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

8. Settlement and development patterns

8.1 Settlement pattern

Settlement in the area has a higher degree of dispersion than found on the adjacent chalk areas. In the parts of the west of the area the settlement pattern can be described as truly dispersed with no evident focus of settlement but scattered farmsteads. Elsewhere dispersed and relatively small nucleated settlements are intermixed. There is a high density of isolated farmsteads and hamlets, linked by a network of lanes with the farm building often being close to the road.

Source: South Hampshire Lowlands Countryside Character Area Description; Countryside Quality Counts (2003)

8.2 Main settlements

The main settlements within the NCA are Southampton, Eastleigh, Waterlooville and Havant. The total estimated population for this NCA (derived from ONS 2001 census data) is 505,822.

Source: South Hampshire Lowlands Countryside Character Area Description; Countryside Quality Counts (2003), Natural England (2012)

8.3 Local vernacular and building materials

Timber-framing was typical for most buildings up to the 17th century with brick becoming common thereafter, although timber was still employed in the construction of many farm buildings. Thatch and plain clay tiles were the typical roofing materials. The local clays were used for brick-making.

Source: South Hampshire Lowlands Countryside Character Area Description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

Wooded areas started to be cleared for the first farming about 3,000 years ago. Bronze-age barrows still exist and the Romans built a large fort (Clausentum – now part of Southampton) to protect the coast nearest to their administrative centre of Winchester. Domesday Book refers to the area as a county of rural settlements but the population rose in the 12th and 13th centuries during which time deer parks were created and more woodland cleared for farming. By the 17th century, the arable farming was thriving and water meadows became a notable feature of the landscape. Southampton became a major port under the Saxons, declining as a result of successive Viking raids but revived in the Medieval period. Evidence for the vulnerability of the area to invasion and attack remains in the form of coastal defences from medieval to Napoleonic periods. Some historic estates survive as testament to the prosperity of the area in the modern period. The 19th century saw improvements in roads and that, plus the coming of the railway, led to an increase in towns, including seaside resorts, built largely from bricks using local clay. Urban expansion, particularly around Southampton, Eastleigh and Havant and heavy traffic on roads, especially around the M27 and M3 impact on the rural character of the NCA.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 8 Registered Parks and Gardens covering 523 ha.
- 0 Registered Battlefields.
- 86 Scheduled Monuments.
- 1,249 Listed Buildings.

Source: Natural England (2010)

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

Early gentian.

10. Recreation and access

10.1 Public access

- 8 per cent of the NCA 3,057 ha is classified as being publically accessible.
- There are 427 km of public rights of way at a density of 1.1 km per km2.
- There are no National Trails within the NCA.

Source: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (accessible all year)	27	<1
Common Land	192	<1
Country Parks	496	1
CROW Access Land (OC and RCL)	332	1
CROW Section 15	240	<1
CROW Access Land (Section 16 Dedicated)	821	2
Village Greens	10	<1
Doorstep Greens	<1	<1
Forestry Commission Walkers Welcome Grants	801	2
Local Nature Reserves (LNR)	46	<1
Millennium Greens	2	<1
Accessible National Nature Reserves (NNR)	<1	<1
Agri-environment Scheme Access	5	<1
Woods for People	2,342	6

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) there are very few tranquil areas within this NCA, apart from a scattering of small patches in the north-east part where it meets the South Downs.

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

Category of tranquillity	Score
Highest	22
Lowest	-98
Mean	-26

Sources: CPRE (2006)

More information is available at the following address: **www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity**

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that that there is virtually no undisturbed land left within the NCA other than small patches north of Fareham between the M3, A3 and the A32. A breakdown of intrusion values for this NCA is detailed in the following table.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	43	59	65	22
Undisturbed	38	20	7	-31
Urban	19	21	29	10

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are that the amount of undisturbed land has dropped markedly since 1960 and the amount classed as 'urban' rising significantly.

- More information is available at the following address: **www.cpre.org.uk/campaigns/planning/intrusion/our-intrusion-map-explained**

Sunset on Solent harbour

12. Data sources

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

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

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- The proportion of established eligible National Inventory of Woodlands and Trees stock covered by a Woodland Grant Scheme management agreement increased from 16 per cent in 1999 to about 27 per cent in 2003. A large proportion (about 46 per cent) of the total woodland stock is designated ancient woodland. 53 per cent of this is on plantations on ancient woodland sites.

- The percentage of ancient woodland sites covered by a Woodland Grant Scheme has increased since 1999 from 22 per cent to 39 per cent.

Boundary features

- A varied field pattern with many small and irregular fields with hedgerows of mixed native species or remnant woodland boundaries is characteristic of the NCA. Hedgerows often have mature boundary trees particularly oak.

- Agricultural intensification and diversification to horse pasture may be driving a change to larger fields and abandonment of traditional boundary management. Figures from environmental stewardship schemes between 1999 and 2003 suggest that hedgerow management was not a popular option although more recent data from agri-environment schemes in 2011 seem to indicate that the situation may now have improved with over 100 km of hedgerow under agri-environment schemes.

Agriculture

- Farming within the NCA has seen some significant changes. According to the Defra agricultural census there has been a large reduction in cereal production, down by about 29 per cent and a small increase (of about 4 per cent) in the area under grass, perhaps reflecting the growing popularity of horse paddocks since 2000.

- The dominant land use of the farmed area remains grassland and uncropped land, accounting for 63 per cent of the total farmed area followed by cereals at 16 per cent.

- Livestock farming has also experienced decline in some areas with a 10 per cent decrease in the number of cattle, reflecting the national decline in the dairy industry. Sheep numbers have suffered a small drop of about 2 per cent while the number of pigs has remained steady.

- There have been dramatic changes in the numbers of small holdings (those under 5 ha), which have fallen by a third from 66 in 2000 to 44 in 2009.

Settlement and development

- The area has one of the highest rates of urbanisation in the country. In particular there has been housing, light industry and retail expansion into areas around Eastleigh and Swanwick and infill between Eastleigh and the A32.

- Roads and major routes in the area have also been upgraded and urban-fringe is increasingly intruding on rural farmland character and tranquillity. Currently, 29 per cent of the NCA is classified as urban according to the CPRE.

- Local Planning Authorities are promoting further considerable growth to maintain and increase economic prosperity and have set up a joint partnership, the Partnership for Urban South Hampshire (PUSH) to oversee this.

Semi-natural habitat

- Nearly a third (32 per cent) of the SSSI within the NCA is in favourable condition with a further 54 per cent in unfavourable but recovering condition, 6 per cent in unfavourable no change and 8 per cent judged to be unfavourable and declining.

- Cessation of grazing on Portsdown Hill and commons has resulted in the loss of some valuable chalk grassland habitats through incursion by scrub and secondary woodland.

- In some places, the intensification of agricultural practices has led to the conversion of unimproved grassland within the Forest of Bere, to arable land.

- The continuing spread and intensification of development along the M27/M3 corridors has destroyed some habitats but also left many in a fragmented and degraded state.

Historic features

- According to Countryside Quality Counts data about 60 per cent of historic farm buildings remain unconverted and most are still intact structurally.

- It is estimated that about 58 per cent of the historic parkland recorded in 1918 had been converted to other land uses by 1995. 44 per cent of the remaining parkland is covered by a Historic Parkland Grant but only 12 per cent is included in an agri-environment scheme.

- Several historic buildings within Southampton are recorded as being at risk on the English Heritage at Risk register as is Castle Hill in Chilworth, a possible iron-age monument, and Fort Southwick (a Palmerston Fort) on Portsdown Hill.

Coast and rivers

- Almost the entire length of the Southampton Water inlet has been developed, a considerable portion as docks. The North Solent Shoreline Management Plan has recommended a policy of 'hold the line' for the majority of Southampton Water with the exception of the Test Estuary where it lies within the Lower Test Valley SSSI. Here the proposal is for 'no active intervention'.

- The high purity of the groundwater has been maintained as has that of the River Meon. However the Lower Test and Itchen, which had been considered good, are now judged to be failing under the stricter requirements of the Water Framework Directive due to the presence of tributyltin compounds. The rise in the levels of nitrates and phosphates is also a cause for concern.

Drivers of change

Climate change

- Climate change is likely to bring changes in precipitation patterns such as an increase in winter rainfall and decrease in summer rainfall. Sudden flash flooding and increased storm flows may cause change within the chalk river systems possibly destabilising the river banks and altering the hydrology of the river through hydraulic scour.

- A change in flow cycle within rivers may impact on migrating fish hindering them from entering or leaving the river.

- Drier summers and increased demand for water due to higher temperatures will put pressure on the area's water resources possibly causing over-abstraction of water from the rivers. A rise in water temperature may adversely affect native fish species such as salmon and trout which prefer cold water while allowing invasive species to gain a foothold. If the water temperature remains above 22°C for seven days, brown trout can die.[7]

- Wet woodland is sensitive to summer drought and may undergo species change. Where they are close to estuaries, such as along the Hamble, woodlands may experience marine inundation which they may not be able to tolerate.

- Parkland and wood pasture may lose veteran tree cover through disease and wind throw. This could also leave rare associated species, such as the lichens found at West Walk, at risk.

- Drier warmer summers may leave mixed broadleaved and ancient semi-natural woodland at risk from new pests and diseases such as ash dieback, competition from non-native invasive species and fire.

- Ditches, such as those at Southampton Common SSSI, home to several species of amphibia, may experience reduced water levels leading to silting and vegetation succession.

- Salt marsh may retreat and undergo a change in species composition as it is exposed to increasing episodes of inundation. Any retreat in salt marsh may in turn cause the loss of roosting areas for wading birds.

Marsh helleborine.

[7] The case for change – current and future water availability, Environment Agency

Other key drivers

- Recent urban, industrial and retail development has already had a considerable detrimental impact on the landscape character of the area to the extent that the Countryside Quality Counts assessment considered it to be one of the fastest 'diverging' landscapes in England. Additional planned growth could put significant pressure on the landscape, biodiversity and ecosystem services of the NCA if not managed carefully as well as impact on the neighbouring National Parks. However, development, if sensitively implemented, also offers the prospect of increased provision for greenspace, creation of green infrastructure projects/corridors and improved recreational opportunities as well as the possibility of linking and strengthening fragmented semi-natural habitats.

- The surface water and groundwater of the rivers Test and Itchen are important as suppliers of potable water to the Isle of Wight as well as other areas in south-east England. The chalk rivers are nationally and internationally important habitats and a refuge for many species such as water vole, white-clawed crayfish and otter that are in decline elsewhere. It will be a challenge to preserve what are possibly the finest examples of chalk streams in the world, at the same time as meeting the needs of a growing population for potable water and the demands of recreation, in particular angling.

- Invasive non-native species such as signal crayfish, mink and Himalayan balsam are an increasing threat to the native species of the area, with the chalk rivers a particularly vulnerable habitat.

- There is likely to be increasing recreational pressure on the wider landscape, driven by a rising population and growing interest in health and wellbeing. For example, Southampton Water is popular for many different kinds of recreation, but the high and increasing numbers of visitors are thought to be causing disturbance to the internationally important population of wading birds.

- Inappropriate or lack of management is an issue for some woodlands in the area. While ancient woodlands have been damaged by the insensitive planting of conifers, other broadleaved ancient woodland sites have suffered from lack of management such as the abandonment of coppicing, with a resultant loss of biodiversity interest.

- Data from the agricultural census suggests that some significant changes may be taking place in the agricultural sector. Dairying was once quite an important sector of farming within the NCA but has now declined. In some areas, farmed land is being replaced by small-scale development and golf courses. In others, unimproved grassland has been lost due to agricultural intensification. The abandonment of traditional common grazing management, in places such as Portsdown Hill, has led to the scrubbing over of these areas.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis section focuses on a selection of the key provisioning, regulating and cultural ecosystem goods and services for this NCA. These are underpinned by supporting services such as photosynthesis, nutrient cycling, soil formation and evapo-transpiration. Supporting services perform an essential role in ensuring the availability of all ecosystem services.

Biodiversity and geodiversity are crucial in supporting the full range of ecosystem services provided by this landscape. Wildlife and geologically-rich landscapes are also of cultural value and are included in this section of the analysis. This analysis shows the projected impact of Statements of Environmental Opportunity on the value of nominated ecosystem services within this landscape.

The unusual estuarine habitat of the Upper Hamble Estuary SSSI may be vulnerable to increased marine innundation in the future.

Statement of Environmental Opportunity	Ecosystem Service																		
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place / Inspiration	Sense of history	Tranquillity	Recreation	Biodiversity	Geodiversity
SEO 1: Promote creative and effective sustainable development – including a well-connected network of high-quality greenspace in and around Southampton, Romsey, Eastleigh and Havant – which benefits local businesses and communities, protects local distinctiveness, encourages public understanding and enjoyment of the natural environment, and helps to mitigate the impacts of climate change.	↔ ***	↔ ***	↗ **	↔ ***	↔ **	↑ ***	↔ ***	↗ **	↔ ***	↔ ***	↗ **	↗ **	↔ ***	↑ ***	↔ ***	↑ ***	↑ ***	↗ ***	↔ ***
SEO 2: Conserve, manage and enhance the semi-natural habitats of the river valleys, their estuaries and intertidal areas along the coast, to maintain water availability and flow, reduce flooding downstream, improve water quality, and enhance their biodiversity and landscape benefits.	↔ ***	↔ ***	↑ ***	↔ ***	↔ ***	↗ **	↑ ***	↑ ***	↗ ***	↑ ***	↗ **	↗ **	↔ ***	↑ ***	↔ ***	↗ ***	↔ ***	↑ ***	↔ ***
SEO 3: Protect, manage and enhance the area's historic well-wooded character – including its ancient semi-natural woodlands, wood pasture and hedgerows – to increase biomass provision, link and strengthen habitats for wildlife, and improve recreational opportunities.	↔ ***	↔ *	↔ *	↔ ***	↑ ***	↗ ***	↗ **	↗ **	↗ **	↗ ***	↗ ***	↗ ***	↔ ***	↑ ***	↔ ***	↗ ***	↑ ***	↑ ***	↔ ***
SEO 4: Conserve, manage, link and enhance the traditional mosaic of semi-natural grassland habitats – including chalk grasslands, watermeadows and unimproved grassland – for the benefits they provide in protecting and regulating soils and water, climate change adaptation as well as recreational opportunities and improved biodiversity.	↔ ***	↔ ***	↗ **	↔ ***	↔ ***	↗ ***	↗ **	↗ **	↗ **	↗ **	↑ ***	↑ ***	↔ ***	↑ ***	↔ ***	↗ **	↔ ***	↑ ***	↔ ***

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
Portsdown Hill, a distinctive outlying spine-like chalk ridge.	■ Distinctive spine-like ridge which provides wide views across Southampton Water and a dramatic backdrop to Portsmouth to the north of the city. ■ Valuable unimproved chalk grassland, home to several rare chalk grassland species including the endemic early gentian. ■ Important resource locally for recreation.
Well-wooded landscape including extensive tracts of ancient semi-natural woodland.	■ 18 per cent of the land cover of the NCA is woodland of which 46 per cent is classed as ancient semi-natural woodland. ■ About three-quarters of the woodlands in the NCA are broadleaved. ■ Much of the woodland resource is the remnant of the historic Royal Hunting Forests of Melchet, Buckholt, Bere Ashley and Forest of Bere Portchester. ■ Woodlands along the Upper Hamble are notable for stands of small-leaved lime a species in decline elsewhere in Britain. ■ Estuary edge woodlands such as those found along the Hamble are significant riverine habitats and show an unusual type of succession, from woodland through brackish marsh to salt marsh.
A patchwork of small, intimate and irregular fields often bounded by hedges of mixed species, sometimes with mature oak hedgerow trees.	■ Historic pattern of field shape and size, a mixture of late enclosure, assarts and former commons on low-lying undulating farmland. ■ Intimacy and enclosure created by lush species-rich hedgerows with numerous field boundary trees, often oak. ■ Remnant assart fields reveal historic and more recent incursion into the Forest of Bere.
Well managed farmland including a mosaic of semi-natural habitats.	■ Mixed farmland and woodland dominated by pasture and livestock farming. ■ A wealth of nationally and internationally important habitats particularly diverse semi-natural grasslands including watermeadows, chalk grassland and wood pasture.
Chalk rivers flowing through wide lush river valleys to their estuaries in Southampton Water.	■ The Itchen and Test are considered to be among the finest examples of chalk rivers anywhere in the world. ■ The fast-flowing rivers support many rare or scarce species such as the southern damselfly, otter and the white-clawed crayfish. They also provide an important spawning ground for wild brown trout and salmon. ■ Wide river valley bottoms with watermeadows and riverine and estuarine vegetation that supports valuable national and international wildlife habitats. ■ Open views within the river valleys contrast with the surrounding more intimate enclosed undulating farmland landscape.
Rural character increasingly influenced by urbanisation and urban fringe.	■ Villages loosely clustered together and small farms and houses dispersed through the countryside. ■ Network of small roads and lanes link settlements and farms.

Landscape opportunities

- Plan for the sustainable development of Southampton and Portsmouth so that the economic benefits can be enjoyed while avoiding any impact on the designated sites within the NCA and the neighbouring New Forest and South Downs National Parks and Chichester Harbour AONB.
- Encourage and develop a strong green infrastructure network in and around urban and industrial developments to improve quality of life, increase access to recreational facilities and the natural environment for the local population, and to relieve pressure on sensitive sites within and adjacent to the NCA while making a positive contribution to local character.
- Manage development, encourage new tree planting and restore/maintain grassland within the historic Forest of Bere to halt further fragmentation of the woodland and farmland and strengthen its rural character and biodiversity interests.
- Extend and link areas of ancient woodland for benefits to biodiversity, recreation and sense of wellbeing.
- Encourage the replacement of conifers with tree species native to the area on ancient woodland sites where appropriate.
- Promote the restoration of traditional woodland management including a coppicing regime for broadleaved woodland.
- Manage, restore, link and replant hedgerows and hedgerow trees to maintain and strengthen field boundary patterns to contribute to the well-wooded character of the NCA.
- Maintain, manage and link areas of unimproved grassland, meadows and pastures, encourage rough woodland edges and the maintenance/construction of ponds within a woodland framework to strengthen pastoral character of farm land and increase wildlife habitats.
- Encourage the restoration, extension and linking of meadow and riparian habitat along the chalk rivers particularly in the Itchen and Test valleys to maintain and improve water quality and biodiversity. Where possible, encourage the traditional grazing of watermeadows.
- Encourage farmers and landowners to engage with the Catchment Sensitive Farming Programme to benefit/improve water quality and management.
- Protect and manage remaining areas of mudflats and other intertidal habitats along Southampton Water and the river estuaries.
- Promote tranquillity for wellbeing and prosperity through measures such as buffering major roads with native woodland and the provision of sustainable transport options.

Ecosystem service analysis

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Soils Livestock particularly cattle Cereals	54 per cent of agricultural land is classed as poor, Grades 4 and 5; 32 per cent is Grade 3; 2 per cent Grade 2; and 13 per cent Grade 1. The predominant farming type is pastoral accounting for about 63 per cent of farmed land use. The most important livestock type is cattle (accounting for about 64 per cent) followed by pigs and sheep both at about 18 per cent. Some arable farming, mainly cereals and oilseeds, takes place on sandier soils and the chalky slopes of Portsdown Hill. Within the Meon Valley where there are light, well-drained loams there are areas of intensive horticulture as well as garden centres and nurseries.[8]	Local	Agricultural practices are undergoing a profound change within the NCA. Horticultural businesses declined by 64 per cent and dairy farms by 44 per cent between 2000 and 2009. The fall in the number of dairy farms probably reflects the national downturn in dairy farming. Historically the rural hinterland supplied Southampton with dairy and meat products, but now only about 38 per cent of the area is farmed. There is limited scope for increasing food production so specialising or producing for niche markets may be more profitable. Grasslands are increasingly used for horse paddocks reflecting the difficulty of farming close to urban areas. Because the character of the farmed landscape is predominantly pastoral, it is important to ensure future changes in farming practices do not have detrimental implications for grassland management, for example the undergrazing of chalk grassland on Portsdown Hill allowing scrub development.	Encourage good agricultural practices, soil and land management to ensure the long-term viability of food production, protect soils and improve water quality. Encourage the development and promotion of supply chains and markets for local/regional produce especially within Southampton and Portsmouth, for example through Hampshire Fare. Encourage the uptake of specialist or niche crops. Support sustainable farming through agri-environment schemes and encourage the uptake of grassland and arable management options.	**Food provision** **Biodiversity** **Sense of place/ inspiration** **Regulating water quality** **Water availability**

[8] The Hampshire Landscape: A Strategy for the Future, Hampshire County Council

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Existing woodlands and conifer plantations	75 per cent of woodland cover is broadleaved and 18 per cent is coniferous. 46 per cent of the woodland resource is ancient semi-natural woodland. 47 per cent of this is on ancient woodland sites replanted with trees not native to the area. The Forestry Commission manages commercial timber production within the Forest of Bere. Their largest plantations are at Ampfield Wood, Creech Wood, Lords Wood and West Walk.	Regional	Historically timber from the Forest of Bere supplied the ship-building industries of Southampton and Portsmouth.[9] Today it is still quite a strong timber-producing area. The wood is used for fencing, poles and some higher-quality firewood. There is scope to increase production but this would need to be managed very sensitively. A high proportion of the woodlands within the NCA are designated as ancient semi-natural woodland and there is the potential to restore and strengthen this habitat. Any extension of timber production should avoid ancient woodland sites and prevent further fragmentation, for example by preventing the linking of ancient woodland sites with native trees or hedgerows. If well planned, new areas of timber production could provide new access opportunities.	Promote a market for local timber products. Ensure that timber production is managed to the best environmental standards to protect biodiversity, soil and water quality. Encourage and support active sustainable wood and soil management practices to increase the resilience of woods to climate change. Where possible replace coniferous plantations on ancient woodland sites with broadleaved trees native to the area. Avoid new plantations of non-native trees on ancient woodland sites. Avoid further fragmentation of ancient woodland sites. Encourage appropriate new tree/woodland planting for environmental benefit and recreational provision.	**Timber provision** **Biomass provision** **Biodiversity** **Climate regulation** **Sense of place/ inspiration** **Tranquillity**

[9] Hampshire County Integrated Character Assessment, Part 2 An Overview of the Hampshire Landscape, Hampshire County Council (Draft March 2010)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Rainfall Chalk rivers Groundwater	The region is drained by several rivers including the Hamble, Itchen, Meon, and Test which have their sources in the Hampshire Downs and South Downs to the north and flow through the NCA to Southampton Water. The River Hamble has water available for abstraction other than at low flows. The Meon and Test do not have water available other than at high flows. Abstraction on the Itchen is restricted even at high flows.[10], [11] The NCA also overlies several minor aquifers, Central Hants Bracklesham Group, Central Hants Lambeth Group, South East Hants Bracklesham Group, East Hants Lambeth Group and the South Hants Lambeth Group. All the aquifers apart from the East Hants Lambeth group aquifer have water available.[12] There is some abstraction by fish farms but these generally return the water after use so that there is no net consumption. Some water is also taken for agricultural use particularly by horticultural and nursery businesses within the Meon Valley. The headwaters of the rivers are fed by the principal chalk aquifers in the Hampshire Downs and South Downs NCAs. Some water for domestic consumption is abstracted at Testwood from the River Test and Gaters Mill from the River Itchen within the NCA. Water abstracted from the River Test is exported to the Isle of Wight to supplement its water supply.	National	The highly urban nature of the NCA means that there is a high demand for water mainly for domestic but also for commercial use. This is likely to grow as the population increases. To maintain supplies of potable water, increasing water demand will need to be managed carefully. This can probably best be done through increasing water efficiency such as metering. However, managing the landscape sensitively, for instance by improving and linking the river meadows so that they can absorb water more efficiently, can also help improve water infiltration. The Test, Itchen, Hamble and Meon all supply important internationally designated wetland sites for example the Solent and Southampton Water SPA. To maintain these wetlands in good ecological health it is important to maintain a sufficient water flow. Low flow levels in the rivers can also have consequences for the wildlife dependent on them including protected species such as Atlantic salmon and southern damselfly.	Promote and encourage the sustainable use and management of the area's water resources among all user groups both within and outside the NCA. Work with water authorities, local planning authorities and developers to ensure that any new development does not adversely impact on water resources. Encourage water efficiency for all new development among developers and local authority planners as laid out in the Code for Sustainable Homes.[13] Encourage the linking, extension and good management of the river meadows to aid water infiltration. Work with the Environment Agency and local water authorities to manage water abstraction from all the rivers so that low level flows do not adversely affect wildlife and wetland habitats.	**Water availability** **Biodiversity** **Food provision** **Regulating water quality** **Climate regulation** **Regulating soil erosion** **Regulating soil quality**

[10] East Hampshire Abstraction Licensing Strategy, Environment Agency (March 2013)
[11] Test and Itchen Abstraction Licensing Strategy, Environment Agency (March 2013)
[12] http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=wfd_rivers#x=456571&y=105897&lg=1,7,8,9,5,6,&scale=6 Accessed 12th March 2014
[13] Code for Sustainable Homes, Department for Communities and Local Government (2006)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	n/a	n/a	n/a	n/a	n/a	**n/a**
Biomass provision	Existing woodlands	The greatest potential for extending biomass provision within the NCA lies with provision of wood fuel.	Local	Soils are predominantly heavy clays making miscanthus and short rotation coppice (SRC) crops unsuitable for some parts of the NCA. Energy crops are best suited to the edge of urban areas and around new developments, both housing and industrial where they may bring landscape benefits by softening the interface between the rural and urban area. Well-designed plantations would benefit wildlife, landscape character as well as assist climate regulation. Woodland cover is quite high at 18 per cent, three-quarters of which is broadleaved, providing a good potential source of wood fuel. The re-introduction of traditional management techniques such as coppicing, where these have been abandoned, would assist the expansion of biomass provision while improving the biodiversity interest of the woodlands and contributing to sense of place.	Encourage and promote SRC/ miscanthus plantations at the edge of urban and industrial development to enhance the landscape and benefit wildlife. Encourage a local market for wood fuel especially within Southampton, Portsmouth and Winchester. Promote wood fuel production among owners and managers of broadleaved woodlands. Encourage and support the re-introduction of traditional woodland management techniques through uptake of agri-environment/woodland grant schemes.	**Biomass provision** **Biodiversity** **Climate regulation** **Sense of place/ inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Peaty riverine soils Woodland Hedgerows Best practice land management techniques	The permeable seasonally wet soils prevalent in the NCA have a low carbon content of 0–5 per cent. Woodland and hedgerows have the highest potential for carbon storage within the NCA.	Local	Most soils within the NCA have little capacity to store high levels of carbon. However, the rivers lay down beds of fen peat soils which have some potential for carbon sequestration. Improving, linking and extending the watermeadows/flood plains of the river valleys will increase their potential as a climate store. Well-managed woodland (especially broadleaved), hedgerows and trees lock up carbon and produce humus rich soils, which are a good carbon store. Linking areas of woodland would increase their ability to act as a carbon store. Changes in land management practices such as reduced tillage and reversion from arable to permanent grassland could benefit climate regulation through improved soil quality/structure and organic matter content. The ability of urban areas to contribute to climate change mitigation could be increased by encouraging the adoption of energy efficiency measures in existing buildings and all new development. The planting of new street trees, urban fringe woodlands and green roofs would also help climate regulation.	Extend, link and improve the condition of the river meadows along the chalk rivers to enhance their carbon absorption potential. Link, extend and improve the semi-natural grassland cover to enhance its ability to sequester carbon. Increase broadleaved woodland cover, link existing patches of woodland and restore the hedgerow network. Encourage and support the restoration of coppice management for broadleaved woodlands linked to a market for biomass fuel and wood products. Encourage the promotion and adoption of land management practices that maintain high levels of organic matter in soils and improve the soil structure to increase carbon storage through agri-environment schemes. Encourage the adoption of energy efficiency measures in all new housing and industrial development as laid out in the Code for Sustainable Homes. Promote the use of climate mitigation measures within Southampton and other urban areas such as the use of green roofs and street trees. Encourage local planning authorities to provide non-motorised or public transport alternatives for all new medium- and larger-scale developments to minimise additional use of car transport.	**Climate regulation** **Biodiversity** **Biomass energy** **Regulating soil quality** **Regulating soil erosion**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Aquifers and groundwater Rivers Semi-natural habitats such as watermeadows and grass pasture Trees, woodland and hedgerows Test and Itchen Catchment Sensitive Farming Scheme	The chemical quality of the groundwater is good. The Lower Test is classed as being of moderate potential ecological quality between Timsbury, in the north-west of the NCA and Romsey for low fish populations and poor between Romsey and Testwood for its diatom assemblage. Between Romsey and Testwood, it is judged to be failing in its chemical quality because of the presence of tributyltin compounds although in other respects the water quality is good. The River Itchen is classed as ecologically poor for its diatom assemblage and failing in its chemical quality for the presence of tributyltin compounds although otherwise the water quality is good. The Meon has both good ecological and chemically quality. The Hamble is not assessed for chemical water quality but its current ecological status is judged to be moderate because of high levels of phosphate.[14]	Regional	Phosphates and nitrates from effluent and agricultural run-off although at permissible levels are showing an upward trend. These can promote algal blooms not only in the rivers themselves but also in sensitive wetlands sites such as Southampton Water when they are washed downstream. Algal blooms can have a harmful effect on estuarine and riverine wildlife by lowering oxygen levels. Any new development should ensure that measures are taken to avoid this. Siltation of the rivers Test and Itchen particularly from agricultural run-off is also a matter for concern. When suspended in water sediment can affect the success of spawning in fish and has been linked to a recent decline in the numbers of salmon and brown trout. The Test and Itchen Catchment Sensitive Farming Scheme is working with farmers to address these problems. [15] Well-managed permanent grassland and meadows, buffer strips in arable, trees, woodland and hedgerows can help to filter and prevent run-off from agricultural land.	Work with partners, including the Environment Agency and water companies, to ensure that new development does not cause deterioration in water quality. Work with farmers, land managers and industry along the whole of the river catchments to monitor and limit sources of diffuse and industrial pollution to the chalk rivers and flood plains. Where appropriate, encourage the use of buffer strips to capture run-off. Promote and implement measures to reduce diffuse pollution through good land management practices especially encouraging the careful use of herbicides, pesticides and fertilisers on farmland. Extend, link and improve the quality of permanent grassland particularly flood meadows on arable land to absorb water pollution and reduce run-off. Consider new woodland plantations and restoration of the hedgerow network where appropriate to prevent run-off from agricultural land.	**Regulating water quality** **Water availability** **Regulating water flow** **Biodiversity** **Regulating soil quality** **Regulating soil erosion** **Food provision** **Sense of place/ inspiration**

[14] http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=357683.0&y=355134.0&scale=1&layerGroups=default&ep=map&textonly=off&lang=_e&topic=wfd_rivers#x=456571&y=105897&lg=1,7,8,9,5,6,&scale=6 Accessed 12th March 2014

[15] Rivers Test, Itchen and Alresford Pond Diffuse Water Plan (December 2012)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Semi-natural habitats particularly watermeadows, flood plain grassland and woodland Rivers Hedgerows	There are several flooding hotspots within the NCA around Romsey, Monks Brook, Eastleigh and Southampton.[16]	Regional	Any new development should be planned to minimise flooding risk and inappropriate development avoided on river flood plains. Even if not directly sited on a flood plain, development can reduce the capacity of the landscape to absorb water. To avoid increasing the flood risk, measures should be taken to prevent additional run-off, for instance by installing permeable pavements and sustainable urban drainage systems (SUDS). Restoring meanders to previously straightened rivers where appropriate could help to slow water flow. Existing semi-natural habitats such as grassland and the watermeadows of river flood plains provide some capacity to accommodate flooding. The grassland habitat is in many places is fragmented. Linking these and improving the management of river meadows will help their ability to moderate flood waters. Planting and extending woodland in strategic places could help to stem overland flows.	Protect the flood plains along the chalk rivers and their tributaries from inappropriate development. Encourage and promote the use of SUDS and green roofs, and create new flood storage areas within urban areas. Link, extend and improve the management of semi-natural habitats such as river meadows and wetland areas along the rivers so that they function more effectively as flood plains and provide areas of temporary water storage. Explore the potential for restoring straightened watercourses to their more natural meanders to help slow the flow of excess water. Encourage and support the adoption of good agricultural practices such as the good management of soils on farmland to aid infiltration. Explore whether new woodland plantations strategically placed might assist in stemming overland flow.	**Regulating water flow** **Regulating water quality** **Biodiversity** **Regulating soil quality** **Regulating soil erosion**

[16] Test and Itchen Catchment Flood Management Plan Summary Report, Environment Agency (December 2009)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soils Semi-natural habitats Woodlands and hedgerows	The soilscape for most of the NCA is slowly permeable seasonally wet slightly acid but base-rich loamy or clayey soils. This is interspersed with outcrops of sandstone which give rise to more acid sandy soils.	Local	Many of the clayey or loamy soils within the NCA are at risk of diffuse pollution, sediment run-off and flooding because of poor water infiltration. Their structure can be easily damaged when wet. The increased high rainfall events predicted due to climate change may exacerbate soil quality problems in future. Maintaining good structural condition through careful management of livestock to avoid poaching and adding organic matter where appropriate will aid water infiltration.	Improve infiltration by increasing the organic matter content of the soil where levels are low. Promote, encourage and adopt good sustainable land, soil and water management practices for livestock and arable production which minimise damage to soil structure such as sensitive grazing, careful timing of cultivations and, minimum tillage techniques. Encourage the use of winter stubbles, margins and the planting of more hedgerows and provision of permanent pasture.	**Regulating soil quality** **Regulating water flow** **Regulating soil erosion** **Climate regulation** **Food provision**
Regulating soil erosion	Soils Hedgerows Buffer strips Woodland and trees Semi-natural habitats – grassland cover Riparian habitats	Most soils in the NCA are not at high risk of erosion. However the heavier clayey soils are not very permeable and run-off after heavy rainfall may cause erosion of fine manures.	Local	Soil erosion is not a significant problem within the NCA, the exception being the slopes of Portsdown Hill where the chalky soils are shallower especially if under arable. Some silt is washed into the rivers through agricultural run-off in adjacent NCAs such as the Hampshire Downs. The Test and Itchen Catchment Sensitive Farming Scheme is working with local farmers to reduce the problems of sedimentation.	Prevent soil erosion by adopting good agricultural practices such as improving the hedgerow network, riparian habitat management and providing wide buffer strips in arable areas. Encourage and promote reversion from arable to grassland for cultivated land on Portsdown Hill where soil erosion is a problem.	**Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Regulating water flow** **Food provision** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural habitats Farmland Parks and gardens Hedgerows Watercourses	The semi-natural habitats, hedgerows and woodland together with the parks, gardens and greenspace within Southampton and other urban areas provide good habitat for pollinators.	Local	The nutritional value of pastureland can be improved by the addition of clovers which are bee pollinated. Around the Meon Valley, market gardening relies on pollinators particularly bees as do oilseed rape crops. The semi-natural habitats and ancient woodland of the NCA hosts a good assemblage of pollinators such as the hoverfly colonies at Hook Heath meadows and butterfly assemblage at Waltham Chase meadows. However, many semi-natural habitats within the NCA are highly fragmented. It is important that these habitats are extended and linked where possible to support pollinators and allow them easily to access crops. Dense urban areas such as Southampton can act as a barrier to pollinators. This could be mitigated by reinforcing and expanding the green infrastructure in and around towns such as making greenspace attractive for pollinators and installing green roofs. Transport routes can be used to help the movement of pollinators through the use of nectar-rich plants along road verges and edges.	Encourage the extension linking and better management of semi-natural habitats such as river meadows and ancient woodland as well as the restoration of hedgerows to support pollinators. Encourage greater sward diversity to attract a greater range of pollinators. Encourage the provision of flower-rich buffer strips in arable fields, good hedge bottom management and where appropriate reversion to grassland. Raise awareness of the importance of all pollinators with land managers, woodland managers and the wider public. Promote agri-environment schemes and good land management practices. Encourage wildlife gardening for pollinators in urban areas such as Southampton, Waterlooville and Havant. Promote the installation of green roofs in urban areas that will support pollinators. Encourage the planting and management of flower-rich strips along the major road networks such as M3 and M27.	**Pollination** **Biodiversity** **Food production** **Sense of place/ inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Hedgerows Woodland Parks and gardens Semi-natural habitats Farm land	The existing spread of semi-natural habitat within the NCA supports a range of pest predators. Some habitats are fragmented and this limits the extent to which predatory species are able to assist pest control on farmland.	Local	Strong linked networks of semi-natural habitats with good connectivity including woodland, hedgerows and buffer strips provide good habitat for pest predators. For instance, Trodds Copse SSSI has a notable hoverfly fauna. The fragmentation of farmland and increasing urban and industrial development can act as a barrier to biological/natural pest control. Better linked habitats would help allow the movement and spread of predators and support an increase in their numbers. An increase in biological/natural control of pests may allow a decrease in the use of chemicals and pesticides on farmland.	Promote good farming practices through the uptake of agri-environment schemes that support pest predators such as beetle banks and improvement of the hedgerow network. Encourage and promote the careful/reduced application of pesticides to limit their impact on pest predators. Encourage the linking, network development and improved management of semi-natural areas to allow the movement of pest predators and help them maintain or increase their numbers particularly where this is adjacent to areas of horticultural farming. Encourage local authorities to adopt more sensitive management and planting regimes in urban greenspace, for example grass cutting, planting of wild flower species to support more diverse invertebrates.	**Pest regulation** **Food production** **Biodiversity** **Pollination**
Regulating coastal erosion and flooding	Flood defences Intertidal mudflats and salt marsh North Solent Shoreline Management Plan	The shoreline of the Southampton Water is flat and would erode readily if not for major defences in place to protect Southampton.	Regional	The shoreline of Southampton Water within the NCA is heavily developed. Southampton docks stretch between the estuaries of the Test and the Itchen. The recommendation of the North Solent Shoreline management plan – coastal defence policy is to 'hold the line' across most of the NCA to protect the port and city of Southampton. The main exception is the Lower Test estuary. This is the least developed part of the Southampton Water shoreline within the NCA and incorporates the Lower Test Valley SSSI. Here it is recommended that no active intervention should take place. [15]	Carry out research within the Lower Test Valley SSSI to help better understand the changes that may occur due to sea level rise and how the SSSI may best be managed to adapt to them. Work with partners and stakeholders for the Lower Test Valley SSSI to agree climate change adaptation actions including managed intertidal habitat roll-back.	**Regulating coastal erosion and flooding** **Biodiversity** **Sense of place/ inspiration**

[17] New Forest District Council (2010), North Solent Shoreline Management Plan

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	River valleys and flood plains Patchwork of small irregular fields bounded by hedgerows Historic Forest of Bere Historic buildings of Southampton and Romsey Views such as across Southampton Water	The NCA is highly urban in parts but it has many features which provide an escape from the pressures of city living such as the fast-flowing clear waters of the rivers in wide lush valleys which cut across the undulating farmed and well-wooded landscape. The historic Forest of Bere is dominated by oaks and ancient woodland and the patches of woodland are distinctive and valued features. The river valleys in places offer open views to the surrounding countryside and Portsdown Hill affords magnificent views across Portsmouth Harbour to the Isle of Wight.	Local	The NCA has one of the highest rates of urbanisation within the country. Ensuring that sufficient greenspace is provided in any new development will help preserve the landscape character of the NCA and promote a sense of place. Preserving important views for instance within the river valleys and from Portsdown Hill. In recent years, there has been considerable small-scale development in particular on the edge of the Forest of Bere which is having a detrimental effect on the landscape character of the Forest. The NCA is close to several protected landscapes, the New Forest National Park, the South Downs National Park and Chichester Harbour AONB. The South Downs National Park runs along the NCA border from Otterbourne to Soberton Heath. Any development within the NCA should be carefully planned so that it does not have an impact on neighbouring protected landscapes, for instance through visual intrusion or light pollution.	Ensure that greenspace is provided within any new development to improve landscape character. Encourage the use of neighbourhood plans to maintain rural character and inform planning control. Encourage good design within development in Southampton so that it does not impinge on surrounding NCAs including visual disturbance such as views and light spill. Ensure that the views within the river valleys are taken into consideration in any planning application and protected where possible. Support and encourage the implementation of adjacent National Park management plans and consider effects on them of any development within the NCA.	**Sense of place/ inspiration** **Sense of history**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Forest of Bere Historic centre of Southampton Romsey Abbey Netley Abbey Palmerston Forts Scheduled Monuments Listed Buildings Historic field boundary patterns Archaeological features	There are 86 Scheduled Monuments. Some of the earliest evidence for human occupation of the area comes from Portsdown Hill where there are the remains of Neolithic and bronze-age barrows. Southampton has had a long history as an international port and has for many centuries exerted an influence on the surrounding landscape, for example trees from the New Forest and the Forest of Bere were harvested for use in the navy. It still retains important examples of early medieval domestic architecture and medieval walls.	Regional	Portsdown Hill could be more widely promoted as a tourist destination. This would need to be done in a sustainable way in order to preserve the monuments but could help to promote a sense of place locally and strengthen the local economy.	Ensure the preservation and upkeep of prehistoric and historic monuments on Portsdown Hill such as the Neolithic barrows. Promote awareness of the history of Portsdown Hill among local communities to promote a sense of place. Encourage sustainable tourism to Palmerston forts and Southampton.	**Sense of history** **Sense of place/ inspiration** **Recreation**
Tranquillity	Forest of Bere Chalk river valleys and estuaries Mixed farmland and well-wooded landscape Semi-natural habitats Parks and gardens	According to data from the CPRE most of the NCA (64 per cent) suffers disturbance and 29 per cent is urban. Only 7 per cent is now undisturbed. Remaining pockets of tranquillity are to be found within the woodland in the Forest of Bere, for instance Creech Wood and West Walk, west of Waterlooville.	Local	According to the CPRE map of tranquillity, the area within the NCA that can be considered undisturbed has declined from 38 per cent since the 1960s to 7 per cent. The NCA is adjacent to two National Parks, the New Forest and the South Downs and is close to the Chichester Harbour AONB. To preserve the tranquillity of the neighbouring protected landscapes their settings should also be considered in any development within the NCA.	Protect the remaining tranquil areas within the Forest of Bere and river valleys for their importance to sense of wellbeing through careful planning of any new development. Encourage new planting of trees, woodland and hedgerows, linking woodland to reinforce well-wooded character of farmland and buffer the fringes of Southampton/ urban areas and within the Forest of Bere to provide greater tranquillity. Manage the expansion of and consider buffering major transport routes through shelterbelts for instance through new woodland creation. Ensure that areas of greenspace especially within Southampton offer the maximum possible tranquillity.	**Tranquillity** **Biodiversity** **Sense of place/ inspiration** **Sense of history**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Public rights of way Forest of Bere and woodland Southampton Water Portsdown Hill River valleys Urban greenspace	The NCA has 427 km of public rights of way at a density of 1.11 km^2. Only 8 per cent is classified as being publically accessible, the majority of which is within woodland. Sites owned by the Forestry Commission, such as at Creech Wood and West Walk, are open for access by the public. Southampton acts as a base for many water sports on Southampton Water and the Solent. The Lower Hamble estuary is also a popular venue for sailing. The NCA incorporates one of Hampshire's largest country parks – Manor Farm Country Park. The Test Way long-distance route allows access to the Test river valley. The NCA has several Local Nature Reserves, the majority located in or close to Southampton.	Regional	There are several good opportunities for recreation within the NCA including a country park at Manor Park and woodlands managed by the Forestry Commission. There is a large and growing urban population both within the NCA itself and in the adjacent NCA South Coast Plain. Any new large-scale development should give consideration to providing good quality recreational opportunities. The NCA has several sensitive sites such as the Solent and Southampton Water SPA. Heavy recreational use at Southampton Water could cause bird disturbance if not managed carefully. In order to avoid impacting adversely on designated sites, plans for new development should include provision for good quality alternative greenspace. The Forestry Commission offer several opportunities for adventure activities within the woodland they manage such as natural play areas at West Walk and Creech Wood. There are also several private woodlands offering adventure play. These could potentially be expanded to offer an alternative to other more sensitive sites such as the Solent and Southampton SPA and the New Forest National Park while also supporting the local economy.	Promote understanding of the biodiversity importance of all the designated sites among all users. Encourage adventure play within the Forest of Bere to promote enjoyment and appreciation of the natural environment without adversely affecting the areas of high biodiversity, landscape quality or tranquillity.	**Recreation** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity *Continued on next page*	Internationally designated sites including Solent and Southampton Water SPA, Solent and Southampton Water Ramsar, Solent Maritime SAC, River Itchen SAC and Emer Bog SAC SSSI Priority semi-natural habitats such as ancient woodland, unimproved lowland grassland, chalk grassland, flood plain grazing marsh, arable field margins, hedgerows and ponds.	The complexity of the estuarine system within Southampton Water and the double tides has allowed a wide variety of estuarine habitats to develop including mudflats and reedbeds. These support an important assemblage of breeding birds particular gulls and terns such as the little tern and sandwich tern and overwintering birds including the dark-bellied Brent goose. The rivers Test and Itchen are internationally important examples of chalk river habitat. The Itchen has been notified as a SAC for its water-crowfoot vegetation and populations of southern damselfly and bullhead. Emer Bog SAC has been notified with the NCA, as an example of rare lowland bog habitat. It supports several species of bog plants and important invertebrates.	International	The hinterland of Southampton Water houses a large urban population. As a popular sailing and watersports venue it also attracts a wealth of visitors. Heavy recreational use of the area can lead to the disturbance of the birds for which the estuary has been notified. The provision of high quality alternative sites could help to reduce the pressure on the SPA. Waders and Brent geese use areas outside the SPA for roosting and feeding.[18] In order to minimise disturbance to the birds in these areas, this should be considered in relation to any new coastal development. Where appropriate more important roosting and feeding sites could be considered for Local Nature Reserve designation or other local site designation. The rivers support many species of international importance including salmon, southern damselfly, white-clawed crayfish, brook lamprey, bullhead, water vole and otter. However, they face several issues including that of eutrophication from rising levels of phosphates and nitrates levels and that of invasive species such as Himalayan balsam, mink, signal crayfish and topmouth gudgeon. Currently, both the rivers Itchen and Test as a whole are judged to be in an unfavourable but recovering condition. Abstraction for water use also has to be managed carefully as periods of reduced flow can have a serious impact on riverine wildlife for instance in hindering the development of fish fry. The drier summers predicted due to climate change may make balancing water flow and water abstraction all the more difficult.	Encourage research into use of the surrounding countryside by waders particularly Brent goose, for roosting and feeding. Ensure roosting and feeding sites by Brent geese are taken into consideration for any new proposed development. Where appropriate consider the designation of important Brent goose feeding sites as Local Nature Reserves. Seek to improve water quality through the Catchment Sensitive Farming scheme for the biodiversity of the chalk rivers and to prevent algal blooms in Southampton Water. Seek to manage and increase the areas of watermeadow alongside the rivers Test and Itchen to increase this habitat for pollinators and act as a buffer for the rivers from agricultural and industrial run-off. Encourage the re-introduction of traditional grazing on watermeadows where possible. Work with partners including the Environment Agency, angling groups, farmers and landowners to improve the riparian vegetation for fish and invertebrates and provide landscape and tranquillity benefits. Work with the Environment Agency to improve the hydrology of the chalk rivers to benefit wildlife such as Atlantic salmon and damselflies.	**Biodiversity** **Regulating water flow** **Regulating water quality** **Sense of place/ inspiration** **Biomass energy** **Tranquillity** **Timber provision**

[18] Solent Waders and Brent Goose Strategy, Solent Waders and Brent Goose Strategy Steering Group (November 2010)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity *Continued from previous page*		Almost 3 per cent of the NCA area is designated as SSSI. Of these, only 78 per cent are judged to be favourable, 54 per cent are unfavourable, recovering, 6 per cent are unfavourable, no change and 8 per cent are unfavourable, declining. The area has a high percentage (46 per cent) of ancient woodland cover. Other priority habitats include flood plain grazing marsh and watermeadows which are suffering from fragmentation. The farmed and well-wooded landscape with its small hedged fields also provides important wildlife habitats.		The area has a high proportion of ancient semi-ancient natural woodland which is predominantly oak with a hazel understory. The upper Hamble woodlands have examples of small-leaved lime and wych elm. They also show examples of succession from salt marsh on the edge of the estuary to full woodland. Botley Wood is nationally important for its butterfly species including purple emperor, silver washed fritillary and white admiral. The high coverage of semi-natural ancient woodland means that there is a high potential for the restoration of ancient woodland within the NCA through the replanting of ancient woodland with non-native trees, with trees native to the area and improved linkages to other ancient woodland sites through new tree or hedgerow planting. The flood plains of the main rivers have some important areas of species-rich flood plain grassland particularly in the Lower Test where there are examples of transition from neutral grassland through to brackish grassland, reedbed, fen and salt marsh. Portland Hill is a key area of chalk downland. It is home to a rich fauna and flora including the endemic early gentian and chalk hill blue butterfly. Scrub encroachment is an issue as there has been a movement away from traditional grazing management. Heathland at one time was probably a much more significant habitat within the Forest of Bere. Some areas of heathland have survived, for instance at Baddesley Common and Netley Common. There could be scope for restoring and extending heathland around these remaining fragments.	Work with partners to improve the permeability of rivers to migratory fishes such as salmon and brown trout through the installation of fish ladders and the removal of impediments to fish migration. Encourage the removal of conifers and other non-native species from ancient woodland sites where possible and replace with species native to the area. Encourage the re-introduction and restoration of appropriate management for broadleaved woodland such as rotational coppicing to improve biodiversity. Where possible seek to link areas of ancient woodland including through hedgerows and new plantations of native woodland to strengthen their resilience to climate change and enhance their biodiversity value. Encourage the restoration and maintenance of the hedgerow network to improve connectivity. Promote the importance of the chalk flora and fauna of Portsdown Hill among the wider population. Explore the possibility of restoring and enhancing heathland such as that at Baddesley Common.	

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Bedrock geology Soils Portsdown Hill	There are no nationally or locally designated geological sites. The NCA lies within the Hampshire Basin and the underlying bedrock is mostly Tertiary open marine, estuarine and freshwater sediments of sand and gravel. The oldest exposure is Portsdown Hill, which was laid down during the Upper Cretaceous 83–74 million years ago.	Local	There are currently no nationally or locally designated sites within the NCA. However, the area has a large population and a local geological site designated for educational purposes could be useful in explaining the evolution of the area.	Promote public awareness of local geology particularly at Portsdown Hill for instance through school visits, and interpretation boards. Explore the possibility of creating a local geological site for educational purposes to explain the geological evolution of Portsdown Hill and the creation of Southampton Water/ Solent.	**Geodiversity** **Sense of place/ inspiration** **Sense of history**

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