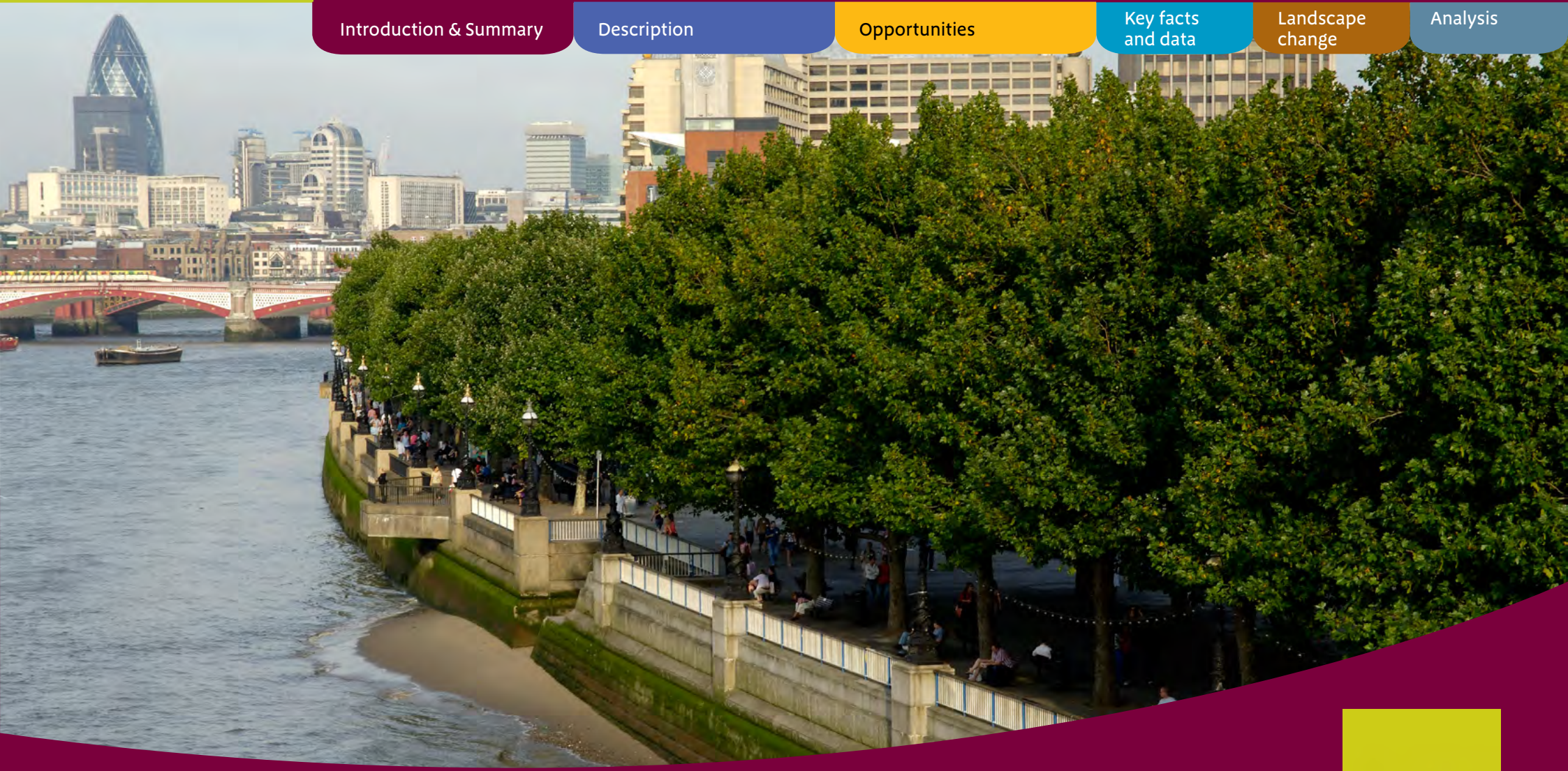
National Character Area profile:

112. Inner London



NATURAL ENGLAND

www.naturalengland.org.uk

Introduction

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

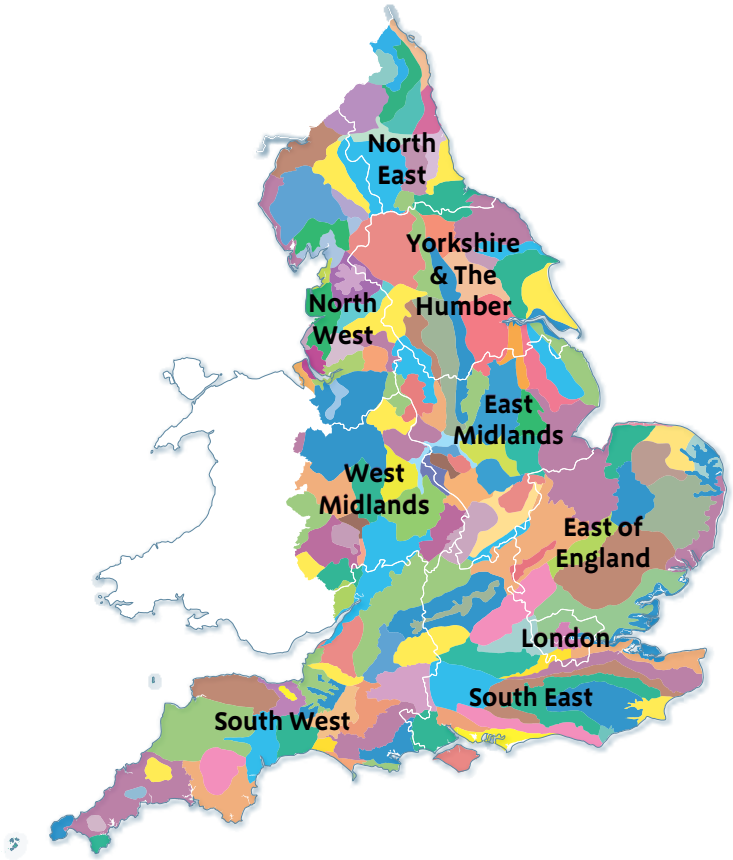
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



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

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

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

Summary

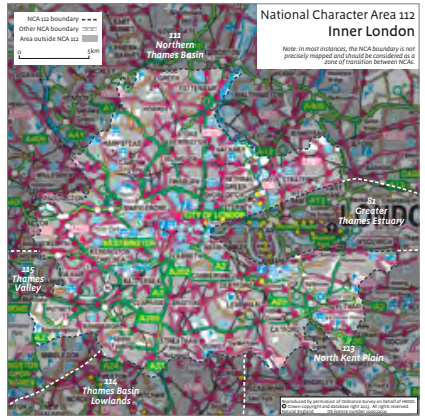
Predominantly urban, the Inner London National Character Area (NCA) lies at the centre of the Thames Basin on a broad flood plain which rises in gentle terraces, providing panoramic views of London's skyline from the clay plateaux and ridges in the north at the border with the Northern Thames Basin. The NCA is steeped in both historical and contemporary culture; it is the centre of UK Government and a major international hub for finance, business, tourism, transport and recreation. Owing to its urban nature, Inner London relies heavily on ecosystem services provided by the surrounding NCAs, such as flood alleviation, air temperature regulation and recreational services. For example, the Thames Barrier in the Greater Thames Estuary is a major tidal flood defence for London.

However, the extensive network of green infrastructure throughout the NCA, including Local Nature Reserves such as Camley Street, provides outdoor recreation and wildlife habitat close to people's homes and places of work. Reservoirs and wetlands such as the Lea Valley in the east provide opportunities for birding and fishing, as well as walking, cycling and boating. Water-based activities are provided along the Thames and its tributary rivers, the Grand Union Canal and Docklands. Parks and green spaces scattered among the built environment provide highly valued pockets of perceived tranquillity. Nevertheless, many communities in London suffer a shortage of green space close to where they live. The Thames Path National Trail also provides extensive walking opportunities following the river together with strategic walking routes such as the Capital Ring and the Jubilee Walkway.

The low, wooded ridges to the north and south form a low-key backdrop to the internationally significant buildings and cityscape in the wide valley bottom.

Some of the large central parks were previously Royal hunting grounds and have inspired many paintings and works of art. Other parts of London's natural landscape have literary connotations, such as the River Thames which is vividly portrayed in the novels of Charles Dickens. The capital city also contains several World Heritage Sites including the Tower of London as well as eight landscaped Royal Parks.

Inner London can be described as being one of the 'greenest' cities in the world. Its allotments, rivers, reservoirs, parks and gardens often support a varied range of wildlife such as sand martins and hedgehogs, and peregrine falcons can be found nesting in some inner-city locations. Climate change, population growth and development are just some of the pressures facing Inner London and it is important that urban greening methods are supported and enhanced, including through London's green infrastructure which comprises the natural and designed green spaces and vegetated surfaces across Inner London NCA.



Click map to enlarge; click again to reduce.

Statements of Environmental Opportunity

- **SEO 1**: Protect and enhance the landscape of the River Thames and its tributaries, and the extensive network of associated water environments, celebrating its rich industrial heritage, promoting sense of place, improving water quality and securing the long-term resilience of water resources, flood alleviation, biodiversity, geodiversity and recreation.

- **SEO 2**: Protect and enhance the network of Inner London's green spaces so that it provides services where people need them, promotes recreational and educational opportunities, supports biodiversity, reinforces local character and is resilient to future challenges such as climate change.

- **SEO 3**: Protect, manage and plan for expansion of the urban forest as part of the area's green infrastructure strategy to ensure that it meets future needs for climate regulation, supports biodiversity and recreation and strengthens local landscape character.

- **SEO 4**: Reconnect people with nature by providing opportunities and access to engage with nature close to where they live, work and play, reinforcing sense of place, improving recreation and providing benefits for biodiversity and climate regulation.

View towards Canary Wharf from Mudchute Park, Isle of Dogs.

Description

Physical and functional links to other National Character Areas

Entirely urban, Inner London relies heavily on ecosystem services provided by the surrounding National Character Areas (NCAs) – Northern Thames Basin, Greater Thames Estuary, North Kent Plain, North Downs, Thames Basin Lowlands and Thames Valley. Wetlands, woodlands and parklands in these NCAs provide flood alleviation and air temperature regulation. The Thames Barrier is a major tidal flood defence for London. These NCAs also provide a range of recreational services to Inner London. Similarly, Inner London has some high-quality green spaces such as the Royal Parks and a range of heritage sites including the Tower of London and Greenwich Park. Such attractions encourage millions of visitors each year to the capital locally, nationally and internationally, which provides key cultural services way beyond the Inner London NCA boundary.

The River Thames flows from headwaters in the Cotswolds through the Upper Thames Clay Vales and the Midvale Ridge, the Chilterns and the Thames Valley in the west, through the centre of Inner London and out to the Greater Thames Estuary in the east, transitioning from a freshwater channel to a marine estuary. London receives 60 per cent of its drinking water from the Thames and its tributaries; groundwater provides the remaining 40 per cent, with the Chalk which surrounds London forming the predominant aquifer.

Inner London lies at the centre of the Thames Basin on a broad flood plain which rises in gentle terraces, providing panoramic views of London's skyline from the clay plateaux and ridges in the north at the border with the Northern Thames Basin.

The NCA is steeped in both historical and contemporary culture; it is the centre of UK Government and a major international hub for finance, business, tourism and transport. People from the surrounding NCAs, the rest of the UK and Europe travel to Inner London every day for work and leisure.

Peregrine falcons, such as this one seen perching on the Houses of Parliament, have adapted to life in the inner city.

Key characteristics

- Varied geology and topography that have defined the growth of London. Inner London sits within a wide flood plain dominated by London Clay soils and gravel terraces; low hills to the north and shallow river valleys are almost entirely obscured by dense urban development. Hills to the north provide highly valued views across London's gentle terraces.
- The River Thames is the most immediately visible natural feature in the Inner London landscape. The Thames with its tributaries is an internationally important river system, the principal draining network for the Thames Basin, a major source of drinking water for London, and an important historic trade route. It provides wildlife habitat, iconic views and cultural inspiration in Inner London. The Port of London provides deepwater facilities for international marine traffic.
- An extensive network of parks and open spaces, providing outdoor recreation close to people's homes and places of work. This network, which is also a resource for wildlife, features large public parks such as Hyde Park in the west and Queen Elizabeth Olympic Park in the east; heaths and commons to the north and south; garden squares, churchyards, allotments and public open spaces; and the Thames Path National Trail.
- An extensive urban forest of small woodlands and trees in streets, parks, gardens and open spaces which bring nature into the heart of the city, provide shade and cooling, clean the air, communicate the seasons, support wildlife and provide a link to London's previous wooded landscape.
- A network of rivers, streams, canals, lakes, reservoirs and smaller waterbodies which, together with similar features in outer London, form a strategically important network which provides transport corridors, drainage and flood management, freshwater, diverse wildlife habitats, heritage value, recreational opportunities and important views.
- A unique mix of modern architecture and built heritage features. Many important historic buildings, features and designed landscapes provide evidence of a rich heritage. Roman remains, medieval churches, historic Royal palaces, former Royal hunting grounds and World Heritage Sites at Westminster Palace, the Tower of London and Maritime Greenwich sit alongside and among modern urban development and contemporary iconic features such as the Shard, the Gherkin and the London Eye, providing views across Inner London and to neighbouring NCAs. Architectural materials are very varied and reflect a wide range of sources, from locally made bricks to further afield within the UK, such as Portland Stone from Dorset.
- Remnant sites of former industry feature throughout Inner London, some of which are managed to support wildlife and/or provide recreational activities. These include former filter beds, brownfield sites awaiting development, railway sidings, canals, docks and quays.

Inner London today

Inner London lies on the banks of the Thames where the river valley widens out into a broad flood plain. Alluvial gravels overlie the heavy London Clay, and rise in gentle steps to form river terraces to the north and south. In places, the river terraces are overlain by sand and gravel glacial deposits to form more noticeable low hills, as at Hampstead. The gently terraced landform is almost completely obscured by the dense urban development.

The central area of London comprises broad formal streets, lined by stone and brick buildings, with narrow streets in the commercial centre and planned layouts of streets and squares in the West End. Surrounding the centre are extensive housing areas, lines of terraced houses, blocks of flats or estates of semi-detached dwellings, focused around local shopping centres, offices and small manufacturing works. Throughout, the dense urban structure is punctuated by a series of large parks and open spaces, in particular the Royal Parks – St James's Park, Hyde Park, Green Park and Regent's Park, near the centre. Elsewhere, small local parks, cemeteries (some extensive, such as Highgate Cemetery, and others very small) and areas of common such as Hampstead Heath and Clapham Common break up the extensive urban area and provide a changing scene of vegetation and open space. Street trees play an important part, in particular the mature planes in the streets and squares of the West End, and the lines of flowering cherries in some suburbs. Many of the houses in the suburbs have well-stocked gardens, which contribute to a feel of greenness.

The waterfront along the banks of the River Thames is particularly striking, with glass and steel office blocks juxtaposed with fine stone buildings from many periods, and the skyline is dramatically punctuated by features such as the dome of St Paul's Cathedral, the London Eye and office skyscrapers in the city.

Fortune Street Park, Islington.

Long views are also glimpsed of the new development at Canary Wharf and the O2 Arena (formerly known as the Millennium Dome). The Thames forms a connecting and unifying thread running through this historic capital city. Much of the character of the urban area arises from the mosaic of layouts and buildings from many different historic periods. The capital city contains the highest density of World Heritage Sites in England including Maritime Greenwich and its buffer zone, the Palace of Westminster, Westminster Abbey and St Margaret's Church, and the Tower of London.

The whole NCA is classified as dense urban settlement. The varied habitats in green spaces, gardens, cemeteries and allotments all provide important resources for wildlife including wild insect pollinators, bats, house sparrows, hedgehogs, sand martins and stag beetles. Breeding peregrines are well established in the capital. The Thames is important as a migratory corridor for both fish and birds. Aquatic species such as eel, smelt and salmon can be also found. The Thames is considerably narrower in Central London owing to a process of encroachment and reclamation, and this impacts on tidal range and tidal velocities and has a significant effect on ecology.

Street trees are an important feature of the London landscape.

The NCA has 9 km of public rights of way, which includes the Thames Path National Trail and sections of seven regionally strategic walking routes. Parks, green spaces, woodlands, rivers, and waterbodies provide recreational services to residents and visitors throughout the NCA. A small portion of Richmond Park National Nature Reserve falls within the NCA. Accessible green space, close to residential areas, is particularly valued for recreation and for physical and mental wellbeing. The extensive network of parks and green spaces throughout the NCA allows for active and passive outdoor recreation close to people's homes and places of work. Reservoirs and wetlands in the east provide opportunities for birdwatching and fishing, as well as walking, cycling and boating. Water-based activities are provided along the Thames and its tributary rivers, the Grand Union Canal and Docklands. Due to the predominant urban nature of the NCA, parks and green spaces scattered among the built environment provide highly valued pockets of perceived tranquillity. However, although London is well provided with green space, this does not necessarily lie close to where people live; for instance, Westminster has several Royal Parks including Hyde Park, St James's Park and Kensington Gardens, but many residential areas in the borough lack accessible green space[4].

[4] *City of Westminster Open Space Strategy,* Westminster City Council (February 2007)

The low, wooded ridges to the north and south form a low-key backdrop to the internationally significant buildings and cityscape in the wide valley bottom. Sense of identity is very strong across Inner London, particularly along the River Thames, in the designed landscapes of the Royal Parks, and in the streets and garden squares in the west. Some of the large central parks were previously Royal hunting grounds and have inspired many paintings and works of art. Other parts of London's natural landscape have literary connotations, such as the River Thames which is vividly portrayed in the novels of Charles Dickens.

Queen Elizabeth Olympic Park, home to the 2012 Olympic and Paralympic Games, and the Shard, which as of 2013, is the tallest building in Western Europe and transforms the London skyline, provide modern infrastructure in the capital.

The landscape through time

London is underlain by a diverse geology. The oldest bedrocks in the Thames region are Precambrian volcanic deposits overlain by shallow marine deposits (the London Platform). Subsequent uplift and erosion during the Early Cretaceous were followed by a marine transgression forming the Chalk which now functions as a major aquifer. This sequence can be viewed at Gilbert's Pit Site of Special Scientific Interest (SSSI) – a site that is still studied today. By 50 million years ago, intense sedimentation and subsidence formed the London Basin which was gradually infilled by various marine deposits including the fossiliferous London Clay which was deposited under semi-tropical conditions. Around 40 million years ago, falling sea levels resulted in the development of an ancestral Thames river system which, 2 million years ago, was a tributary to the ancestor of the modern Rhine. During this period, the Thames would have followed a course to the north of its current one through the Vale of St Albans, and also created a 'staircase' of river terraces owing to a combination of climate change, uplift and downcutting.

St Paul's Cathedral.

The earliest evidence of settlement alongside the River Thames dates from several thousand years ago. Before this time, the valley was densely wooded and people moved along the river banks creating open spaces for hunting and rearing cattle, with the river providing fish, plants and freshwater. Around 1,500 BC rising water levels drowned much of the Thames flood plain, and alder woodlands replaced the mixed forests of oak, lime and yew. On the drier gravel terraces farmsteads were established, and the best land was highly prized and exploited for clay and timber.

The origins of Roman London began at the point where the Thames could first be crossed, by Ludgate Hill and Cornhill in the City of London. Here the river and the alluvial flood plain narrow, and gravel islands on the south side produced a ford. The river comes closest to the edge of the gravel terrace on the north bank and so it is here, rather than on the south bank, that the City of London developed.

London had become the main city and commercial centre of England during the Anglo-Saxon period but Winchester remained the political capital, although Edward the Confessor built a palace by Westminster Abbey. Under the Normans, Westminster increased in importance and the magnificent 11th-century Westminster Hall still survives from their palace. Westminster also housed the Royal Courts of Justice and of the Exchequer. Later, Parliaments sat regularly in the Chapter House of the Abbey and then in St Stephen's Chapel at the palace.

From the Middle Ages, London grew as a port. Industrial development began in the east where land was unsuitable for building or agriculture. The wide flood plain of the Thames allowed the excavation of large docks and their progressive extension east along the river in line with the expansion in trade and shipping. Surrounding areas initially remained rural, providing food and timber for the capital. The large-scale development of London drew extensively from its own substructure, with bricks made from locally quarried brickearths.

Trade flourished in medieval London. The city's population was far greater than any rival in England. This led to London becoming a major centre for importing and distributing goods to elsewhere in the country. To improve their industries, trades and craftsmen of the city organised themselves into a complex system of guilds. These were a major influence in the Middle Ages. By the 15th century, cloth production was England's biggest industry and large amounts were being exported from London.

At the start of Henry VIII's reign, London was filled with splendid religious buildings. During the Dissolution of the Monasteries, vast numbers of these were destroyed or adapted to secular use. The core of the city was built around the lands seized from the church.

Prosperity increased during the Elizabethan period and the population of London grew accordingly. Restrictions in the city meant that secular entertainment was banished south of the river, particularly to the flourishing area of Southwark with its great theatres, such as the Globe, now associated with William Shakespeare.

The 1666 fire changed the medieval city of London forever. The Rebuilding Act of 1667 stated that houses must be built only of brick and stone. The new city gradually grew with wider streets and regular brick houses. Following the fire, the City became a more marked commercial centre under the Lord Mayor. The gentry chose to make their homes to the west, in Covent Garden and Lincoln's Inn Fields and further out over time.

During the 17th century the first green spaces, including St James's and Hyde Parks, were opened to the public. The Royal Parks were former Royal hunting grounds that had been located in areas of low agricultural value. These 'forests' had been managed to create good hunting conditions – a combination of woodland and open grassland. By the end of the 19th century, a further six Royal Parks had been made accessible and provided greatly valued breathing spaces.

London continued to expand through the Georgian and Regency periods, driven by its importance as a port at the centre of an expanding empire. During this

period the terraces and mansions of the West End were built and famous London squares such as those in Mayfair and Bloomsbury were laid out.

From the opening of London Bridge station in 1836, a rapid phase of expansion mirrored the spread of the railway as it became possible to live some distance from the workplace. The absorption of neighbouring towns and villages accelerated. Concerns for public health meant that these newly urban areas were often provided with a park. Additionally, some commons, such as Clapham, which had been used for grazing animals, survived to provide green oases within the city.

London lost many historic buildings during the Second World War bombing raids. The result is a mixture of old and new where a medieval church can sit in the centre of a modern urban office development. The post-war period saw considerable change in the built environment with tower blocks appearing for the first time.

Despite its role in defining the development of London, the natural landscape was not widely perceived as integral to London's character and has been valued more for its amenity. This has led to a gradual erosion of London's natural character through the culverting and canalising of rivers, felling of native woodlands and neglect of some remnant features which appear to have no amenity value. However, recent improvements are evident with supplementary planning guidance produced along with Mayoral and other funding programmes, which are helping to restore rivers, add to tree cover across London and increase the inclusion of urban greening measures in new developments.

The Greater London Authority has issued *All London Green Grid Supplementary Planning Guidance*, which aims to link the green spaces within London as well as to encourage the provision of further green infrastructure. As a legacy of the 2012 London Olympic and Paralympic Games, Queen Elizabeth Olympic Park, in the Lea Valley, has been designated Metropolitan Open Land.

Ecosystem services

The Inner London 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 Inner London NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Water availability:** With high population density and low rainfall, Inner London is under significant water pressure and has been assessed as either over-abstracted or having no availability for abstraction. Most of the area's water supply comes from the Thames with most licences being for public water supply. Water levels are maintained by groundwater flows from the Chalk in the Chilterns and the North Downs, and by artificial recharge when river flows are high[5].

- **Biomass energy:** Despite its urban character, Inner London's urban forest of pocket woodlands offers potential for the provision of some biomass energy by improved tree and woodland management.

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

- **Climate regulation:** The whole area suffers from the urban heat island effect. Heat is absorbed by the urban fabric during the day and released at night,

[5] Greater London Authority/ Environment Agency/ Natural England/ Forestry Commission (June 2011) *London's Environment Revealed: State of the Environment Report for London*

sometimes leaving Inner London considerably warmer than surrounding areas. This is particularly prominent during warm periods. Air pollution problems increase with warmer temperatures. The urban forest, specifically large canopy trees in streets and the public realm, are significant in regulating air temperature and filtering pollutants from the air. Pockets of green space are being created through urban greening measures in new developments such as green roofs, also contributing to climate regulation.

- **Regulating water quality:** Rivers in Inner London are highly modified with poor ecological potential unless restored. Urban run-off causes diffuse pollution, exacerbated by low river flows. Sewage overflows into the Thames at times of high rainfall when the combined sewer and drainage system becomes overwhelmed. River restoration projects throughout the area are helping to create semi-natural habitats such as reedbeds to help to slow and filter run-off from the urban environment.

- **Regulating water flow:** Inner London lies predominantly on the Thames flood plain but is currently well protected from tidal surges by flood defences. Rivers are highly modified and culverted in many places, increasing the risk of fluvial flooding at high river flows. River restoration projects are helping to alleviate and store fluvial flood waters. Surface flooding is a major issue as the land use is entirely urban and most surfaces are impermeable. Flood risk assessments are helping to plan and target green infrastructure interventions to help to alleviate surface flooding.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** Sense of place is very strong throughout the NCA, particularly along the River Thames, which is the most striking natural feature running through the centre of the NCA and has inspired the works of many celebrated artists, writers and musicians. The Thames, its tributaries and industrial heritage features support biodiversity, geodiversity and recreation and contribute to the sense of place. Local identity is reinforced by natural landscape features such as large Royal Parks, garden squares and avenues of large mature street trees in the west; and rivers and wetlands supporting remnant sites of former industry (docks, wharfs and creeks) in the east. The gently rising landform provides views of London landmarks from the high heaths, commons and woodlands at the perimeter of the NCA.

- **Sense of history**: The NCA supports a high density of heritage designations with 3 World Heritage Sites, 94 Registered Parks and Gardens, 79 Scheduled Monuments and 13,242 Listed Buildings attracting visitors from around the world. Sense of history is strong throughout the NCA as evidenced by these designated assets, settlement patterns and remnant industrial features, and in place and street names that echo past landscapes and land uses. Public access to heritage assets is widespread.

- **Recreation**: The NCA has 9 km of public rights of way, which includes the Thames Path National Trail and sections of seven regionally strategic walking routes. Part of Richmond Park National Nature Reserve falls within the NCA. Parks, green spaces, woodlands, rivers and waterbodies provide recreational services throughout the NCA. Accessible green space, close to residential areas, is particularly valued for recreation and for physical and mental wellbeing.

- **Biodiversity**: Priority habitat covers less than 1 per cent of the NCA (excluding Open Mosaic Habitats on Previously Developed Land which are currently unmapped). This includes 2,315 ha of woodland, 1 per cent of which is ancient woodland. The internationally (Ramsar) designated Lea Valley Special Protection Area lies on the eastern boundary, and the Wimbledon Common and Richmond Park Special Areas of Conservation lie on the south-west boundary. Six SSSI fall wholly or partly within the NCA. The River Thames is confined along its entire length through the NCA, but provides biodiversity interest on its foreshores particularly when wildfowl and wading birds take shelter at times of extreme weather. Tributary rivers support associated habitats and riverside walks. Overall, the biodiversity resource within the NCA is small and fragmented. Some areas are deficient in access to nature. Local Sites cover 5,219 ha (16 per cent of the NCA)[6] and are very important in providing access to nature close to places where people live, work and play and supporting priority species and other wildlife.

- **Geodiversity**: Inner London supports one geological SSSI. Gilbert's Pit provides one of the most complete sections through the Chalk and overlying fossiliferous deposits in the Greater London area. It forms a key site for stratigraphic studies and is particularly important for a palaeogeographic reconstruction of the Woolwich and Reading Beds. Eleven sites are proposed within the London plan as sites of regional or local geological importance, and London is home to internationally important geology collections in museums. The underlying geology and topography of Inner London have influenced settlement patterns and the growth of the capital city from its original site on the banks of the Thames. The geodiversity of building stone in London reflects the hard rock geology of Britain. For example, St Paul's Cathedral and the British Museum are made from Portland Stone.

Cliff face at Gilberts Pit SSSI.

[6] Greenspace Information for Greater London (GiGL) (2013) *Greenspace Information for Greater London (GiGL) is the capital's environmental records centre – they collate, manage and make available detailed information on London's wildlife, parks, nature reserves, gardens and other open spaces. The information they collect is used by a range of organisations and individuals to inform their areas of work, including planning, conservation and research.*

Statements of Environmental Opportunity

SEO 1: Protect and enhance the landscape of the River Thames and its tributaries, and the extensive network of associated water environments, celebrating its rich industrial heritage, promoting sense of place, improving water quality and securing the long-term resilience of water resources, flood alleviation, biodiversity, geodiversity and recreation.

For example, by:

- Maximising opportunities, through development and regeneration, to open up culverts, re-naturalise rivers, restore functional flood plains and design in links to river-based industrial heritage where appropriate.
- Reducing habitat fragmentation by removal of barriers and installation of fish passes.
- Restoring and enhancing the non-tidal freshwater tributary rivers by implementing projects identified in the London Rivers Action Plan, restoring stretches of rivers and their flood plains to a more natural form.
- Promoting wider awareness of the value of green space in improving water quality.
- Providing more opportunities for people to access and enjoy good-quality waterways and the wildlife that they support.
- Building capacity of local groups to identify, develop and deliver river restoration projects and to manage and monitor improvements.
- Restoring ecological networks along river corridors from the Inner London NCA to the countryside in neighbouring NCAs, and co-ordinating landscape-scale ecological restoration in the Lea and Wandle valleys, restoring fragmented riparian habitats, along with other landscape aspirations.
- Enhancing the biodiversity and recreational value of the reservoirs in the Lea Valley and restoring the fragmented marshland habitats, building on the regeneration presented by the 2012 Olympic and Paralympic Games and their legacy.
- Conserving river-related habitats, such as the mudflats at Deptford Creek, and promoting greater understanding and access.
- Working with partners to support the Thames Tideway Tunnel Project, which will help to address the problems caused by pollution from effluent.
- Reclaiming, where possible, the 'lost' rivers currently buried under London, or, where this is not possible, using urban design and land management to evoke the underlying natural signature and reinforce the connection and sense of place.
- Building and maintaining networks of stakeholders across catchments (Lea, Thames, Ravensbourne and Wandle) and developing catchment plans to address water quality, water resource efficiency, flood management and ecological potential.
- Promoting water resource efficiency in homes, offices and industry.

Continued on next page...

Statements of Environmental Opportunity

SEO 1: Protect and enhance the landscape of the River Thames and its tributaries, and the extensive network of associated water environments, celebrating its rich industrial heritage, promoting sense of place, improving water quality and securing the long-term resilience of water resources, flood alleviation, biodiversity, geodiversity and recreation.

... continued from previous page

- Promoting sustainable urban drainage to assist water regulation and control of urban diffuse pollution.
- Conserving and promoting the industrial heritage of the Thames including the docks, wharfs, creeks, canals and reservoirs; and incorporating remnant sites into London's green infrastructure network, and promoting education and awareness.
- Developing and promoting connected walking and cycling routes and heritage trails along waterways (including the Thames Path National Trail), improving links to extend and widen access.
- Working with partners such as the London Invasive Species Initiative to manage invasive non-native species such as floating pennywort which has become a significant problem in recent years.
- Managing weed cover to prevent the restriction of flow that can lead to flood risk issues.
- Raising awareness about the importance and significance of river terrace deposits for geoconservation and archaeology, as well as underpinning the topography and character of this NCA.

SEO 2: Protect and enhance the network of Inner London's green spaces so that it provides services where people need them, promotes recreational and educational opportunities, supports biodiversity, reinforces local character and is resilient to future challenges such as climate change.

For example, by:

- Developing strong cross-boundary partnerships, encouraging the implementation of the All London Green Grid and delivering strategic and local capital projects to improve the function, use and performance of London's green infrastructure network.
- Protecting and promoting multifunctional green infrastructure through borough strategies and local development plans.
- Ensuring that development and regeneration demonstrate long-term funding for the creation, improvement and management of London's green infrastructure network.
- Making maximum use of existing evidence, for example data on areas of deficiency in access to nature, the London Surface Water Flood Risk Map, the London Heat Map, air pollution pathways data and biological records, to inform where green infrastructure intervention measures can be best implemented and functions integrated.
- Developing and promoting innovative solutions to the provision of green space within the centre of the NCA, for example accessible green roofs, rain gardens and pocket and linear parks, promoting sensitive design to fit with local character and biodiversity.
- Working in partnership with Business Improvement Districts to explore the greening of business areas, for example retrofitting green roofs, and providing bee-friendly habitat, rain gardens and soft landscaping.
- Building capacity within local communities for protection and enhancement of local green spaces through neighbourhood planning and community ownership and management.
- Conserving, enhancing, restoring and creating features of wildlife value in parks and green spaces such as ponds, woodland blocks, hedgerows, ancient trees, acid grassland and lowland meadows.
- Improving the management of green spaces to increase the quality and range of services such as recreation, wildlife value, climate regulation and flood alleviation.
- Improving the management of green spaces, taking account of remnant natural features, to increase the value to local character.
- Conserving, maintaining and restoring registered historic parks.
- Creating places for water storage within green spaces, such as ponds to alleviate flood risk, and to make water available for green space management during times of drought.
- Conserving, managing and planning for extension of local sites of importance for nature conservation to help to restore ecological networks across London.
- Extending the areas of acid grassland on commons, maintaining a balance with woodland and other habitats of wildlife value, and promoting wider access and understanding of the commons.

Continued on next page...

SEO 2: Protect and enhance the network of Inner London's green spaces so that it provides services where people need them, promotes recreational and educational opportunities, supports biodiversity, reinforces local character and is resilient to future challenges such as climate change.

... continued from previous page

- Conserving, maintaining and extending the remnant industrial sites that are established as valued wildlife habitats and/or public open space.
- Conserving, maintaining and enhancing the railway cuttings, embankments and sidings that form valuable wildlife habitats, potential geodiversity sites and green corridors.
- Conserving the wildlife value of industrial brownfield sites, through the planning system, encouraging their educational use and promoting wider understanding and active engagement.
- Promoting the use of the London's Natural Signatures report to inform the design of new landscapes associated with redevelopment.

SEO 3: Protect, manage and plan for expansion of the urban forest as part of the area's green infrastructure strategy to ensure that it meets future needs for climate regulation, supports biodiversity and recreation and strengthens local landscape character.

For example, by:

- Establishing and evaluating the state and value of London's urban forest and using the information to stimulate investment in planning, planting and management.
- Planning to increase overall canopy cover across London, and targeting tree planting for cooling, shade and surface water flood alleviation.
- Increasing the resilience of the urban forest through the adoption of the Right Tree, Right Place principles and by managing for a varied species composition to provide disease resilience.
- Protecting the woodland, particularly the ancient woodlands on the ridges to the north and south, and managing them appropriately along with the archaeological and geological features that they contain.
- Conserving and promoting understanding of the historical interest and archaeological features of the woodlands, including their roles in productive landscapes, recreation and industry.
- Conserving and maintaining blocks of ancient woodland and veteran trees, and promoting understanding of their value for biodiversity.
- Enhancing woodlands in parks and open spaces through management to increase biodiversity value and widen access where possible.
- Restoring a culture of woodland management in London and increasing understanding of how street trees and woodlands are managed.
- Developing local demand for small-scale markets for charcoal, fencing and other woodland products and increasing skills and training for appropriate tree and woodland management for biodiversity.
- Encouraging the development of borough tree strategies and local implementation plans and developing, updating and promoting the use of the Right Trees for a Changing Climate tool in support of the Mayor's London Tree and Woodland Framework approach for planting trees in London, which promotes appropriate tree planting in London.
- Encouraging partnership working across organisations working to increase tree cover and maintenance across London, such as the RE:LEAF partnership.
- Building capacity within local communities for planning, planting and maintenance of trees and woodlands, for example by volunteer tree wardens.

SEO 4: Reconnect people with nature by providing opportunities and access to engage with nature close to where they live, work and play, reinforcing sense of place, improving recreation and providing benefits for biodiversity and climate regulation.

For example, by:

- Improving access to nature by enhancing the nature value of accessible sites, opening access to restricted sites and, where feasible, creating new sites within which to experience nature.
- Building capacity and supporting local communities to develop and deliver projects for the enhancement of local landscapes and provision of habitat such as river restoration, tree planting, growing food and green space improvement.
- Building capacity and support for local communities to recognise the value of natural landscape features in neighbourhood planning and exploring opportunities for managing local green spaces.
- Promoting the use of green infrastructure to benefit health and wellbeing, for example through health walks.
- Developing and supporting volunteering for biological recording, conservation, green space management and monitoring and control of invasive species.
- Building capacity within local communities for protection and enhancement of local green spaces through neighbourhood planning and community ownership and management.
- Conserving and promoting the industrial heritage of the Thames including the docks, wharfs, creeks, canals and reservoirs; and incorporating remnant sites into London's green infrastructure network, and promoting education and awareness.
- Developing and promoting connected walking and cycling routes and heritage trails along waterways (including the Thames Path National Trail), improving links to extend and widen access.
- Building capacity of local groups to identify, develop and deliver river restoration projects and to manage and monitor improvements.
- Designing, planning and managing the green space network to provide a wide range of high- quality recreational services where people want and need them, for example for food growing and natural play.
- Promoting the natural landscape as an outdoor classroom for learning and education as well as the value of natural landscape for play; and integrating natural play into the green space network where appropriate, and encouraging play opportunities.
- Restoring rivers close to where people live, work and play; and improving access to and engagement with restored rivers so that people can experience seasonal changes in river patterns.

Additional opportunity

1. Protect and manage key geological and geomorphological features that have helped to shape the landscape and the iconic buildings of Inner London.

For example, by:

- Maintaining and enhancing protected and proposed sites, preserving access and ensuring responsible recreation.
- Promoting the educational value of the geological resource, including building stones, by encouraging interpretation through, for example, walking trails.
- Encouraging links between geological and archaeological communities that work in Inner London.

Supporting document 1: Key facts and data

Area of Inner London National Character Area (NCA): 33,012 ha

1. Landscape and nature conservation designations

The Inner London NCA contains the highest density of World Heritage Sites in England. In total this includes: Maritime Greenwich Buffer Zone (156 ha); Maritime Greenwich (100 ha); The Palace of Westminster, Westminster Abbey and St Margaret's Church (10 ha) and The Tower of London (8 ha).

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	% of NCA
International	Ramsar	Lee Valley	35	<1
European	Special Protection Area (SPA)	Lee Valley SPA	35	<1
	Special Area of Conservation (SAC)	Wimbledon Common SAC Richmond Park SAC	114	<1
National	National Nature Reserve (NNR)	Richmond Park	10	<1
	Site of Special Scientific Interest (SSSI)	A total of 6 sites wholly or partly within the NCA	241	1

Source: Natural England (2011)

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

Wimbledon Common and Richmond Park are designated as both SCA and SSSI. The latter is also an NNR. Only part of these sites lay within this NCA.

There are 509 local sites within Inner London covering 4,683 ha, 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

SSSI condition category	Area (ha)	Percentage of NCA SSSI resource
Unfavourable declining	1	1
Favourable	73	30
Unfavourable no change	5	2
Unfavourable recovering	161	67

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 maximum elevation is 132 m, the minimum is -0.2 m; the range of elevation is 132 m.

Source: Natural England (2010)

2.2 Landform and process

Inner London lies on the banks of the River Thames where the river valley widens out into a broad flood plain. It is a largely level, broad valley landscape which rises to low hills to the north and south. The NCA has a gently terraced landform resulting from glacial and fluvial deposits. The landform is almost completely obscured by the dense urban development.

Source: London Basin Natural Area Profile

2.3 Bedrock geology

The London basin is a syncline – a concave fold with the oldest sediments at its periphery – which formed 20 to 40 millennia ago as a result of the Alpine Orogeny (mountain-building). The region became dry land during this time. The oldest rock here is chalk, which was laid down in warm shallow seas during the Cretaceous period (95-65 Ma). The Chalk, which is the main aquifer for London, is overlain by Palaeogene and Neogene sands and mudstones, laid down in the Tertiary period 64 to 2 Ma. Following a marine transgression some 55 Ma, the London Clay, comprising shallow marine sediments, was laid down. Overlying the London Clay are the Bagshot, Barton and Bracklesham Beds; these sands and clays were deposited on a large coastal plain.

Source: London Basin Natural Area Profile

2.4 Superficial deposits

Important Quaternary sediments are present, recording the changing temperatures during this period and the sequential presence and absence of ice-sheets. The Anglian ice sheet advanced as far south as the northern rim of the London Basin and forced the young River Thames to change its course to its current one. Fluvial sediments deposited by the Thames river system before the Anglian Ice Age, occur predominantly along the northern edge of the London Basin parallel with the axis of the syncline. Sediments deposited after the Anglian Ice Age are found along the flood plains of the current rivers. These latter deposits are found at lower altitudes than their predecessors. The youngest sediments are sands and gravels deposited by the Thames in its current location since the last ice age.

Source: London Basin Natural Area Profile

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	1
National	Mixed Interest SSSI	0
Local	Local Geological Sites	0

There are currently no Local Geological Sites within the NCA, however the Draft London Plan Policy on London's Geodiversity – London's Foundations – proposes 28 Regionally Important Geological Sites (RIGs) and 15 Local Important Geological Sites (LIGs) across Greater London, some of which fall within the NCA.

Source: Natural England (2011) Greater London Authority (2012)

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

2.6 Soils and Agricultural Land Classification

The NCA is entirely urban.

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

Grade	Area (ha)	% of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	0	0
Grade 4	0	0
Grade 5	0	0
Non-agricultural	1,686	5
Urban	31,289	95

Source: Natural England (2010)

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

3. Key water bodies and catchments

3.1 Major rivers/canals

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

- River Thames 22 km
- Grand Union Canal 22 km
- River Lea (or Lee) 18 km

Source: Natural England (2010)

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

The rivers and canals drain into the Thames which in turn drains eastwards into the North Sea.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 2,477 ha, or 8 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

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

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

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 2,315 ha of woodland, predominantly broadleaved (7 per cent of the total area), of which 228 ha (10 per cent) is ancient woodland.

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

4.2 Distribution and size of woodland and trees in the landscape

The NCA contains many individual trees especially street trees, garden trees and trees in parks. Mature plane trees line the streets and squares of the West End, while flowering cherries are prominent in the suburbs.

Source: Natural Area Profile

4.3 Woodland types

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

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

Woodland type	Area (ha)	% of NCA
Broadleaved	2,280	7
Coniferous	14	0
Mixed	17	0
Other	4	0

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	217	1
Planted Ancient Woodland (PAWS)	11	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

There are no significant boundary features within the NCA. There are small remnants of Roman defensive walls in the City of London.

5.2 Field patterns

There are no 'fields' within the NCA.

6. Agriculture

6.1 Farm type

The NCA is entirely urban with no significant agriculture. There are several city farms in the area but these are mainly educational.

6.2 Farm size

The NCA is entirely urban with no significant agriculture.

6.3 Farm ownership

The NCA is entirely urban with no significant agriculture.

6.4 Land use

The NCA is entirely urban with no significant agriculture.

6.5 Livestock numbers

The NCA is entirely urban with no significant agriculture.

6.6 Farm labour

The NCA is entirely urban with no significant agriculture.

7. Key habitats and species

7.1 Habitat distribution/coverage

The key biodiversity habitats are around the outer edge of the NCA such as lowland heathland at Hampstead Heath.

Source: London Basin 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
Broadleaved mixed and yew woodland (broad habitat)	633	2
Lowland meadows	34	<1
Lowland dry acid grassland	18	<1
Mudflats	11	<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

The whole of the area is dense urban settlement.

Source: Inner London Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

The whole of the area is urban settlement by definition, including the City of London and the City of Westminster. The total estimated population for this NCA (derived from ONS 2001 census data) is: 3,087,273.

Source: Inner London Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

Central London is comprised of broad formal streets, lined by stone and brick buildings, with narrow streets in the commercial centre and planned layouts of streets and squares in the West End. Surrounding the centre are extensive areas of residential housing with lines of terrace houses, blocks of flats or estates of semi-detached dwellings, focused around local shopping centres, offices and small manufacturing. The waterfront along the banks of the River Thames has new glass and steel office blocks, juxtaposed against fine stone buildings from many different periods. The River Thames forms a connecting and unifying thread running through the city.

Source: Inner London Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

There is evidence of settlement alongside the river from several thousand years ago. The first permanent bridge across the Thames was constructed by the Romans in 63 AD at what was then the extremity of the tidal reach. Today, place names still reveal the locations of the gates into the City, such as Newgate, Aldgate. There is a lot of evidence of the Roman settlement, for example Roman Voernor's palace, Roman amphitheatre, Guidhall Yard, and the Benedictine nunnery of St Mary, Clerkewell. Numerous small sections of the London Wall survive including remains of the original Roman wall for example, a section at The Old Bailey. There is a mound which is reputed to be Boudicca's Grave, south of Highgate Ponds. Much of the medieval City of London was destroyed by the Great Fire of 1666, or cleared afterwards during Wren's remodelling. London also lost many historic buildings during the Second World War bombing raids. The result is a mixture of old and new where, for example, a medieval church can sit in the centre of a modern urban office development.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 94 Registered Parks and Gardens covering 1,697 ha
- 0 Registered Battlefields
- 79 Scheduled Monuments
- 13,242 Listed Buildings

Source: Natural England (2010)

- More information is available at the following address:
  http://www.english-heritage.org.uk/caring/heritage-at-risk/

  http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

10. Recreation and access

10.1 Public access

- Eight per cent of the NCA, 33,012 ha, is classified as being publically accessible.
- There are 9 km of public rights of way at a density of 0.1 km per km^2.
- The Thames Path National Trail passes through the NCA.

Sources: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	0	0
Common Land	816	2
Country Parks	14	<1
CROW Access Land (Section 4 and 16)	<1	<1
CROW Section 15	797	2
Village Greens	9	<1
Doorstep Greens	3	<1
Forestry Commission Walkers Welcome Grants	156	<1
Local Nature Reserves (LNRs)	365	1
Millennium Greens	1	<1
Accessible National Nature Reserves (NNRs)	10	<1
Agri-environment Scheme Access	0	0
Woods for People	495	2

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) no part of the NCA can be considered as tranquil, although there are many pockets of what people consider valuable, tranquil spaces scattered among the dense urban development such as pocket parks and churchyards; as well as parts of the larger public and Royal Parks.

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

Category of tranquillity	Score
Highest value within NCA	-50
Lowest value within NCA	-140
Mean value within NCA	-92

Sources: CPRE (2006)

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

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that the whole of the NCA is disturbed by visual and auditory intrusion. A breakdown of intrusion values for this NCA is detailed in the table below.

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	% change (1960s-2007)
Disturbed	2	2	0	-2
Undisturbed	0	0	0	0
Urban	98	98	100	2

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are that the NCA has become entirely urban.

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

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%.
The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes

Trees and woodlands

- The London Tree and Woodland Framework produced a joint strategic overview produced in 2005 by the Forestry Commission and the Mayor of London has set objectives for improving the care and provision of London's urban forest.
- More than 500,000 new trees have been planted across Greater London in the last 10 years, mainly through community and street tree projects funded by grant schemes such as Forestry Commission/RE:LEAF Community Grant Scheme, Mayor of London's Street Tree Fund, and The Big Tree Plant. This has significantly increased the woodland cover in Inner London.
- Non-native invasive pests and diseases are an increasing threat to London's trees and woodlands. Recent outbreaks of particular concern are oak processionary moth, ash die back and Massaria fungal disease of London Plane trees.
- Research is underway to better understand the economic value of London's urban forest.
- London Plan Supplementary Planning Guidance on the development of borough tree strategies guides local authorities on the audit, protection, planting and management of trees and woodlands.
- The RE:LEAF partnership set up by the Mayor of London, brings together organisations working for trees and woodland in London, to create opportunities for business and local communities to help protect London's trees and increase tree cover[7].

Boundary features

- There are no significant boundary features within the NCA other than small remnants of Roman defensive walls in the City of London.

Agriculture

- There is no commercial agriculture present in Inner London. There has recently however, been a significant rise in local food growing, community orchards and beekeeping in parks, allotments, gardens and community spaces. This has been supported by Mayoral schemes such as Capital Growth. While mostly driven by social drivers, some communities of growers and producers have developed commercial markets such as box schemes, for example Growing Communities in Hackney.

Settlement and development

- Inner London experiences a constant programme of re-development, particularly at the centre of the NCA. In recent years, planning policy guidance has encouraged urban greening measures such as green roofs, green walls and trees and levies from development have facilitated improvements to local parks and green space provision.

[7] *London Tree and Woodland Framework*, Greater London Authority (2005)

- Large infrastructure projects have included the Jubilee Line extension, new river crossings, Cross Rail and the Thames Tideway Tunnel.

- The former industrial landscape of the lower Lea Valley has been transformed by the creation of the Queen Elizabeth Olympic Park.

- Rivers and streams are being restored, and in places this has stimulated prime residential development to replace former industrial infrastructure such as on the rivers Wandle and Lea.

Semi-natural habitat

- Semi-natural habitat in Inner London is increasing limited in its extent and is fragmented by dense urban development. Patches of habitat occur and are created within parks and green spaces. Larger and higher quality habitat features such as woodlands, wetlands and grasslands are at the edges of the NCA.

- Stepping stones for wildlife have increased in number over recent years through planning and development, incorporation of biodiversity features into the design of new developments and building and considerate design of urban greening features such as sustainable urban drainage schemes.

- Across Greater London, there has been a net increase in the coverage of Sites of Importance for Nature Conservation, but this is not broken down for Inner London and may contain losses at specific sites. Also, figures do not represent quality of habitat, or the degree of positive conservation management.

- There are currently no environmental stewardship agreements in place in Inner London, as the scheme is not designed for dispersed environmental resources as occur in dense urban areas.

- Fish populations in the tidal Thames have greatly improved since the early 19th century, and now it supports a diverse range of wildlife and provides key fish nurseries for species such as sole, herring and bass which supports North Sea fish stocks. Smelt, eel and salmon have also returned to the river.

Historic features

- The majority of the Registered Parks and Gardens, which are classified as Royal Parks and owned by Inner London Boroughs and private owners have ensured appropriate resources to maintain them because of their inherent value and as tourist destinations for visitors from across the world.

- Key sites on the Register at Risk are the Victorian cemeteries at the margins of the NCA, namely Nunhead, Abney Park and Kensal Green, where there are insufficient resources to keep tree growth from degrading the original layout and built structures of the cemeteries.

Coast and rivers

- The London Rivers Action Plan was published in 2009, identifying river restoration projects on all London's rivers to deliver aspirations for biodiversity, flood risk management and access and recreation. Since 2000, approx 40 km of river habitat has been enhanced and 18 km restored in Greater London (figure not broken down for Inner London).

- In 2010 the Thames won the Theiss International River Prize in recognition of achievements in river management and restoration.

- Invasive non-native species are an increasing threat to London's rivers. Floating pennywort has become a significant problem in recent years. In places it may completely cover the river channel, leading to a decline in native plant species and oxygen levels, killing aquatic life. Weed cover can also restrict flow and cause flood risk issues. The London Invasive Species Initiative has been established to co-ordinate London wide measures to tackle the problem.

- The creation of Queen Elizabeth Olympic Park in east London has significantly improved lower reaches of the River Lea and its backwaters, and there is an opportunity through the Olympic legacy to extend this along the River Lea.

- Fish populations in the tidal Thames have greatly improved since the early 19th century, and it now supports a diverse range of wildlife and provides key fish nurseries for species such as sole, herring and bass which supports North Sea fish stocks.

- Fish populations in the freshwater tributaries are impeded by the high degree of modification such as flood defence structures which impede fish passage. Populations are limited to the remaining pockets of natural channel. River restoration projects over the last ten years have improved fish passage and increased the area of habitat to support populations.

Minerals

- London has a high demand for minerals for construction and some of this does come from dredging[8].

Drivers of change

Climate change

- The three main threats to London from a changing climate are overheating, flooding and drought cause by hotter, drier summers; warmer, wetter winters; and more frequent incidences of extreme weather.

- Direct effects of climate change on biodiversity in Inner London are likely to be mixed with some species gaining space and others losing out. Lack of connectivity is a barrier to species dispersal and may hasten species decline and limit colonisation by new species.

- Amenity grassland, in parks, green spaces and on the commons, is susceptible to drought and may be more difficult to maintain without adequate irrigation from locally stored rainwater. This may provide opportunities for ecological enhancement using drought tolerant native plant species.

- Woodlands at the edge of the NCA may experience changes in species composition, with shallow-rooted species such as beech at a disadvantage.

- Water habitats are likely to experience reduced water availability, high temperatures, low oxygen levels and increased pollution. Increased flash flooding could lead to scouring of habitat features within rivers and streams.

- Historic features and geodiversity interest may suffer the impacts of more frequent cycles of wetting and drying, and increased vegetation encroachment.

[8] http://www.london.gov.uk/thelondonplan/climate/minerals.jsp

- Indirect impacts of climate change on natural landscape features include more intensive use of places by people during hot weather; thermal pollution of water habitats from heat exchange technology (where water is used to cool buildings then returned to the environment); tree planting to provide shade and cooling, may impact on biodiversity (such as species-rich grasslands) or historic character, if not carefully planned.
- The impacts of climate change may also provide opportunities to improve the natural environment through adaptation measures, for example:
  - Protecting existing green spaces and creating new ones to help manage the urban heat island.
  - Creating new and enhancing existing flood storage capacity within parks and green spaces.
  - Urban greening measures such as sustainable urban drainage schemes.
  - Restoring rivers to provide increased floodwater storage and alleviation.
- Population growth in London is likely to further increase emissions contributing to climate change[9].

[9] Adapting to Climate Change, Creating Natural Resilience, London Climate Change Partnership (2009)

Other key drivers

- Regeneration and development. As well as ongoing commercial and housing development pressure, Inner London will be affected by major infrastructure projects such as the Thames Tideway Tunnel and Cross Rail. Changes to the London skyline and iconic views will be affected by new building developments in the centre.
- The legacy of the 2012 Olympic Games presents opportunities to extend the regeneration of the Lea valley beyond the Olympic Park. The All London Green Grid provides opportunities to strengthen the green space network through planning and development and provides a Green Infrastructure framework that encourages increased wildlife habitat and ecological connectivity alongside other green infrastructure functions such as climate change adaptation.
- Increased pollution brought on by further expansion could impact on human health, wildlife habitats and views across the capital and water quality.
- Outbreaks of non-native invasive species and diseases are an increasing threat to London's natural landscape features.
- Managing water quality and quantity including flood risk mitigation will become increasingly important in a changing climate with potential increased extreme events such as intense rainfall and periods of drought.
- Data from London Boroughs suggests that the number of allotment sites has increased recently following a long period of many allotment sites being

sold for development. Local allotments and food production improves the state of the environment by increasing the area of green space, creating wildlife havens and reducing urban emissions in relation to transporting food. The Capital Growth scheme launched in 2008 to turn 2012 land areas into thriving food growing spaces. By May 2012, there were over 1,700 Capital Growth spaces including land in schools, hospitals, housing estates, utility companies and parks.

- Urban greening methods offer numerous benefits to the environment such as increased biodiversity, health and wellbeing and reducing CO2 emissions and air quality improvements and are encouraged through the London Plan. Green roofs are important components of urban greening and provide energy saving benefits, water management and biodiversity enhancement. It was estimated that London had approximately 5,000,000 m2 of green roof cover at the end of 2008. This area has increased significantly since 2004.

- Development on brownfield land has reduced pressure on London's green spaces and brings the land back into beneficial use. Development can also help to remediate contaminated land, improve landscape quality and manage habitat loss through new greenspace provision. However, some brownfield land is of high biodiversity value and losses via development and inappropriate greening have a negative environmental impact, reducing space for invertebrates, reptiles and other wildlife. The total area of brownfield land in London has increased by 200 ha since 2000 and 97 per cent of new properties were built on brownfield land in 2008, well above the England average of 77 per cent[10].

[10] *London's Environment Revealed: State of the environment report for London, November 2012,* Greater London Authority (2012)

Green roof at Barclays Tower, Canary Wharf.

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.

London's veteran trees provide a good habitat for stag beetles.

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	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Protect and enhance the landscape of the River Thames and its tributaries, and the extensive network of associated water environments, celebrating its rich industrial heritage, promoting sense of place, improving water quality and securing the long-term resilience of water resources, flood alleviation, biodiversity, geodiversity and recreation.	↔ ***	↔ **	↑ **	N/A	↔ **	↗ **	↑ **	↑ **	O **	O **	O **	N/A	N/A	↑ **	↑ **	↗ **	↑ **	↑ **	O **
SEO 2: Protect and enhance the network of Inner London's green spaces so that it provides services where people need them, promotes recreational and educational opportunities, supports biodiversity, reinforces local character and is resilient to future challenges such as climate change.	↗ *	O **	O **	N/A	O *	↑ **	↑ **	↑ **	O **	O **	↗ **	N/A	N/A	↑ **	↗ **	↗ **	↑ **	↑ **	↗ **

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

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

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	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 3: Protect, manage and plan for expansion of the urban forest as part of the area's green infrastructure strategy to ensure that it meets future needs for climate regulation, supports biodiversity and recreation and strengthens local landscape character.	O **	↗ **	↗ **	N/A	↗ **	↑ **	↑ **	↑ **	O **	O **	O **	N/A	N/A	↑ **	↑ **	↗ **	↑ **	↑ **	↗ **
SEO 4: Reconnect people with nature by providing opportunities and access to engage with nature close to where they live, work and play, reinforcing sense of place, improving recreation and providing benefits for biodiversity and climate regulation.	↗ *	O **	O **	N/A	↗ *	O **	O **	O **	O **	O **	↗ *	N/A	N/A	↗ *	↗ *	↔ **	↑ **	↗ *	↗ *

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

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

Landscape attribute	Justification for selection
Floodplain geology with a gently terraced landform.	■ Inner London sits within a wide floodplain dominated by London clay soils and gravel terraces. ■ Gently terraced landform resulting from glacial and fluvial deposits. ■ The origins of Roman London began at the point where the Thames could first be crossed by Ludgate Hill and Cornhill and early development patterns followed the gravel terraces which have good drainage. Later development spread onto clay soils. ■ The suburbs on the edge, spreading and rising into the surrounding NCAs, were designed to retain a sense of topography. ■ The landform is now almost entirely obscured by dense urban development. ■ Low hills to the north provide highly valued views across London. ■ Inner London hosts one Geological SSSI at Gilbert's Pit. ■ There are 11 sites in the NCA, recommended for designation as Regionally Important Geological Sites (RIGS) or Locally Important Geological Sites (LIGS).
The River Thames and its tributaries.	■ An important historic trade route, tributary rivers and creeks were industrial cargo routes into and out of the City from the Thames. The Port of London still provides deepwater facilities for international marine traffic. ■ The origins of Roman London began at the point where the Thames could first be crossed by Ludgate Hill and Cornhill. ■ Vertical flood defences restrict the natural extent of the Thames river channel throughout the NCA, however intertidal muds are exposed at low tide providing important habitat fish and invertebrates. ■ The Thames with its tributaries is a nationally important corridor for migrant birds. The River Lea supports the Lea Valley SPA and Ramsar site, part of which falls within the NCA, providing wetland habitats for breeding and overwintering birds. ■ Strongly tidal, the river displays twice-daily contrast. ■ The banks of the Thames support the Thames Path National Trail, major areas of open space, internationally important heritage sites, and seats of Government. ■ The river flows into the Thames Estuary Nature Improvement Area in the east. ■ The Thames provides cultural inspiration and highly valued views from its many bridges. The Thames foreshore in Inner London preserves extensive and important archaeological deposits. ■ Many tributary rivers have been lost or forgotten from the landscape, by filling in or culverting to allow for building development. However, restoration projects in the rivers Lea, Wandle and Ravensbourne are bringing riverside walks, wildlife habitat and river recreation back into the heart of the city.

Landscape attribute	Justification for selection
Large public parks, including the Royal Parks (St James', Regents, Hyde, Green, Greenwich and part of Richmond Park), part of the Lea Valley Regional Park and the Queen Elizabeth Olympic Park.	■ Designed purposefully as a continuation of the built environment often belonging to large private estates. ■ Some were former Royal hunting grounds featuring 'forests' or wood pasture managed to create good hunting conditions. ■ All are now freely accessible and formally managed as amenity grassland and many contain assets such as ponds, woodlands and veteran trees. ■ Created for the 2012 London Olympic Games, the Queen Elizabeth Park is London's newest park and has significantly changed the previous industrial landscape in the east to a large vibrant park which will support 45 ha priority habitat. ■ Richmond Park, part of which sits within the NCA, is an SAC, a National Nature Reserve and a SSSI. ■ The ensemble of buildings at Greenwich and their landscape setting including the Royal Park, Greenwich Park, is a World Heritage Site.
Heaths and commons.	■ Associated with the original 'villages' of London where people had the right to use the land for grazing animals and other activities. ■ Historic commons lie across the sand and gravels in the south. ■ Support important areas of acid grassland and remnant heathland, but mainly managed as amenity grassland. ■ Provide and echo London's rural past and historic rural character. ■ Provide access to wide open skies, and views across London. ■ Wimbledon Common, part of which lies within the NCA is an SAC and SSSI. ■ 816 ha of common land.

Landscape attribute	Justification for selection
A network of smaller, but highly valued green spaces that includes small public parks and greens, residential open spaces, private gardens, garden squares, churchyards and cemeteries and allotments and pocket parks.	■ Public parks were created in the 19th and 20th century to provide light, air and recreation amongst the expanding development. ■ Local parks contribute significantly to local identity. ■ Garden squares in the west are characteristic of 18th and 19th century development of great estates, and feature dense horticultural planting and large trees. ■ Private gardens feature constantly changing trends, ownership and management, and are an important resource for people and wildlife in the city. In 2006-2008 3,000 ha of gardens were lost from Greater London, given over to hard surfacing or development. ■ Cemeteries were built in the 1850s because of competition for burial space in churchyards. Many are now Local Nature Reserves, for example Tower Hamlets, Highgate, and often contain historic follies, veteran trees and bat roosts.
An extensive urban forest of pocket woodlands, and trees in streets, parks and gardens.	■ 690 ha of broadleaved native woodland mainly characterised by small stand of woodland in parks or linear woodlands along rail sides. ■ Includes approximately 230 ha of ancient woodland (Oxleas Wood, Highgate Woods) which provide significant cultural heritage and supports important archaeological features of past management. ■ Provided important resources to enable the growth of London - timber for establishing Roman Londinium, fuel for pottery kilns, charcoal for metalworking, oak bark for tanning and timber for ship building. ■ Trees in streets and open spaces have significant visual amenity and play a key role in local identity, they provide links to historic character and seasonal displays. ■ The urban forest is important in providing significant regulatory services to Inner London, such as air temperature and quality regulation and carbon sequestration.
A vibrant cultural history - displayed in street and settlement patterns, historic buildings, monuments and designed landscapes.	■ Many features that can chart the historic development of London. ■ Inner London features the highest density of World Heritage Sites in England - Maritime Greenwich, Palace of Westminster, Westminster Abbey and St Margaret's Church, and the Tower of London. ■ 94 registered historic parks and gardens covering 1,697 ha. ■ 79 scheduled monuments. ■ 13,242 listed buildings. ■ Architecture that draws on building stone from across the country such as Portland Stone from Dorset.

Landscape attribute	Justification for selection
Green roofs, green walls and rain gardens.	■ An increasing feature of new developments in the commercial centre. ■ Occasionally retrofitted into existing developments. ■ Often as a form of adaptation to climate change impacts such as surface water flooding. ■ May be designed to provide other additional services such as habitat for wildlife (especially invertebrates, birds and bats) or recreation.
Historic and protected views and landmarks.	■ Recognised by regional government for their significant contribution to London's character at a strategic level. ■ Composition and character of strategic views are protected by London Plan policy. ■ All but two of London's 27 designated views have both viewpoint and view within Inner London. The other two begin in neighbouring NCAs, with a view of Inner London. ■ Designated views feature 6 London Panoramas, 3 Linear Views, 13 River Prospects and 5 Townscape Views, within which are 13 protected vistas of 3 strategically important landmarks (St Paul's Cathedral, the Palace of Westminster and the Tower of London.
Remnant sites of former industry and development including canals, filter beds, railway sidings, reservoirs, brownfield sites, docks, wharfs and creeks.	■ Development of the built environment is a constant feature of Inner London. ■ Remnant features are scattered amongst modern development, providing links to London's rich industrial heritage. ■ Sites of former industry and inter-development sites may support priority open mosaic habitats such as flower-rich grasslands and pioneer communities. ■ Some features such as canals, reservoirs and docks are now used primarily for recreational activities such as watersports, fishing or birdwatching. ■ Some sites are managed for nature conservation.
An extensive network of locally designated Sites of Importance for Nature Conservation – supporting pockets of BAP and non-BAP habitat.	■ 509 local sites covering 5,219 ha (16 per cent of the NCA). ■ Support a wide variety of wildlife habitats of varying quality, including grassland, woodland and wetland habitats. ■ High-quality sites designated as important at a metropolitan (regional) level. ■ Local nature sites are particularly important in providing access to nature within Inner London.

Landscape opportunities

- Manage the urban forest, ensuring that overall canopy cover is enhanced to meet increasing demand on regulatory services. Plan for the retention and inclusion of large species trees into new and re-development. Restore the woodlands, particularly the ancient woodlands on the ridges to the north and south and manage them and the archaeological features that they contain.
- Conserve and enhance the landscape of the River Thames and its tributaries with its riverside walks, open spaces and important wildlife habitats. Restore where possible, the natural profile and geomorphology of tributary rivers, Manage the wetland and riparian habitats along the rivers Lea, Wandle and Ravensbourne.
- Manage London's green infrastructure network of local nature reserves, parks, squares, allotments, cemeteries and residential green spaces. Strengthen the network so that it provides services where people need them.
- Safeguard the historic commons that lie across the sands and gravels of south London from Wandsworth to Plumstead.
- Safeguard the views and vistas of townscapes, river prospects and London panoramas.
- Strengthen links with London's cultural heritage by protecting remnant sites of former industry that spread throughout the NCA and incorporating them into London's green infrastructure network.
- Restore ecological networks, make space for nature and facilitate adaptation to future challenges by appropriate design and management of new and existing wildlife sites throughout the NCA, especially along the river valleys - connecting the city with the countryside in surrounding NCAs.
- Plan for the creation of new urban landscapes associated with redevelopment, major infrastructure projects and urban greening.
- Restore, through urban design and land management, the remnant natural features of landscape areas within Inner London.

Ecosystem service analysis

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

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

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Local food grown in allotments and private gardens	Over recent decades there has been a reduction in allotment sites in London, with many being sold for development. However data from London boroughs suggests that this trend has been reversed with numbers of allotment sites increasing more recently. Local allotments and food production improves the state of the environment by increasing the area of greenspace, creating wildlife havens and reducing urban emissions in relation to transporting food. The Capital Growth scheme was **Continued on next page...**	Local	Food production is limited in the area, with very little land area given to agriculture. There is a high proportion of "other" holding types, which is likely to be indicative of a range of other urban fringe land uses. Urban farms could be a useful educational resource for people to learn about farming, food and the environment. The urban location enables a large number of people to experience farming. With the high proportion of urban land use and significant pressure on land, the potential for expanding farming and food production is very limited. Allotments, including community allotments, urban gardens and green roofs provide small-scale opportunities for people to grow food locally. Work is underway to assess the potential for a Chinese mitten crab fishery.	Work with the local communities to seek opportunities and consider how food production can be managed sustainably in urban fringe and marginal areas. Seek opportunities to expand the provision of allotments, amenity space and roofs within housing areas and community gardens to enable urban communities to grow food locally.	**Food provision** **Regulating soil quality** **Regulating soil erosion** **Timber provision**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision cont		**... continued from previous page** launched in 2008 to turn2012 land areas into thriving food growing spaces. By May 2012, there were over 1,700 Capital Growth spaces including land in schools, hospitals, housing estates, utility companies and parks.				
Timber provision	Woodland	Opportunities for expanding timber provision are limited in Inner London. Woodland cover is 7 per cent of the area of which 2,280 ha is broadleaf woodland, 1,750 ha is mixed, and 4 ha is other woodland.	Local	The majority of the NCA is urban so there are very limited opportunities for large-scale woodland creation. However, increasing woodland coverage is limited to suitable locations and improving management of existing woodlands could provide opportunities for small scale timber provision for wood products and provide other benefits.	Encourage the appropriate management of existing trees and woodland and explore opportunities for creating new woodland and tree planting where appropriate for multi-purpose use for including small-scale wood product provision and enhancement of landscape, biodiversity and recreation interests.	**Timber provision** **Biomass energy** **Climate regulation** **Regulating water quality** **Regulating soil erosion** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Reservoirs River Thames and tributaries London chalk aquifer Chilterns chalk aquifer North Downs chalk aquifer	The annual rainfall in the NCA is lower than the national average (690 mm compared to 897 mm) (EA, 2006). Inner London's potable water supply comes from a range of sources both surface water, primarily from the Thames and the Lea and also groundwater particularly from the underlying chalk aquifer. Reservoirs on the edge of the NCA in Hackney and just outside in Waltham Forest and Brent provide winter storage of fresh water. The chalk aquifer under London in most places is confined by overlying clays which are impermeable and prevent rainwater from replenishing the groundwater levels. It is recharged by water from the Chilterns and the North Downs. **Continued on next page...**	Regional	The NCA has four main rivers, the Lea, Ravensbourne, Thames and Wandle. The rivers have sources that interact with the Chalk groundwater, and predominantly flow on clay in the NCA area. Rain falling onto areas outside London penetrates the soils recharging the Chalk aquifer. The rising groundwater table forms the headwaters of these watercourses. The groundwater flow within this water body is drawn towards central London and recharges the confined Chalk underneath London, which is designated as a principal aquifer. The Wandle is heavily restricted for licensing and abstractions will only be allowed at times of higher flow with a flow constraint that will protect the river environment. Similarly, the resource availability of the Ravensbourne is 'restricted water available for licensing'. The Lower Lea is heavily controlled and modified. This section of the catchment is underlain by impermeable London Clay that completely confines the chalk below. Abstractions in the Lower Lea catchment will be considered only at times of very high flows.	Explore the possibilities for the increased use of rising groundwater, canals and water transfers, and water recycling to reduce pressure on river ecosystems. Prioritise resource efficiency measures and alternative sources for abstraction in the lower and middle reaches of the River Lea. Encourage the incorporation of measures to improve water efficiency in new buildings such as the use of grey water systems. Encourage the continued improvement of infrastructure to reduce loss by leakage Manage increasing demands to secure a sustainable water supply for Inner London by encouraging water use efficiency in homes, offices and industry.	**Water availability** **Regulating water quality** **Biodiversity** **Sense of place / inspiration** **Recreation** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont.		**... continued from previous page** London's water demand poses considerable constraints and challenges for the ecology, landscape and people of these NCAs. With high population density and low rainfall, Inner London is under serious water stress. 95 per cent of water abstracted is for public supply. 50 per cent of this is for household use, 25 per cent for commerce /industry, and the remaining 25 per cent is lost through leakage from the distribution system. This is a major concern for the region and is most significant in Inner London where the supply network is over 100 years old and vulnerable to vibrations from road traffic and construction.		An availability assessment was not possible for the tidal Thames because the methodology was not designed for tidal systems. As the water in the Thames Estuary is brackish /saline, water may be available without seasonal restrictions, due to tidal movements replenishing abstracted water. Abstractions, and possible restrictions, from the tideway will be determined case by case[11]. Groundwater levels under London are managed carefully to ensure that they are kept low enough to prevent flooding of the underground infrastructure, and high enough to prevent unsustainable abstraction. Natural replenishment is supplemented by artificial recharge where water is pumped into the aquifer at times of high river flow. Levels were at their lowest in the 1960s, but as heavy industry moved out of London they started to recover. Today levels fluctuate between 35–45 m below sea level. Drawdown for public water supply has increased in certain areas. **Continued on next page...**		

[11] Environment Agency 2013

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont.				**... continued from previous page** Water availability within the Confined Chalk aquifer underneath the London CAMS area is subject to the London Licensing Policy, and is generally either unavailable for abstraction or heavily restricted[12]. The average leakage per property per day in Greater London is 167 litres. This is a 37 per cent improvement since 2003, mainly due to large investments from water companies to replace and repair the Victorian distribution system. However, leakage in London is still 32 per cent higher than the average for England and Wales. Domestic water use in London is approx. 164 l per household per person per day (l/h/d) which is 20 l/h/d higher than E&W England and Wales average, and 26 per cent higher than the aspiration set out in Defra's Future Water Strategy for 130l/h/d by 2030. Only 28 per cent of homes in London currently have water meters installed compared to England and Wales average of 41 per cent. As an emergency measure, at times of high drought, low river flows and high demand, the Beckton desalination, just outside the NCA can provide additional supply to over 1 million people in London, but this is not a long term solution[13].		

[12] Environment Agency 2013

[13] *The London Catchment Abstraction Management Strategy*, Environment Agency (2006)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	N/A					**Genetic diversity**
Biomass energy	Woodland Trees	Inner London's urban forest of pocket woodlands and individual trees offers potential for the provision of biomass energy by improved tree and woodland management.	Regional	Inner London's woodland resource consists of small stands or linear woodlands along rail sides. These occur mainly in the south on higher ground at the edge of the NCA. Most of these woodlands have never had traditional management. Opportunities for increasing biomass provision lie in the improved appropriate management of existing tree and woodland resource rather than new plantings. Trees in streets, parks and open spaces are in public ownership and managed under borough policies. Woodland and arboricultural arisings from Inner London's urban forest offer significant potential for biomass, but this is currently limited by supply chain processes and local demand for woodfuel. The Forestry Commission and partners are working to promote supply chains and develop woodfuel processing hubs, two of which have already been established just outside the NCA in north and south London[14, 15].	Promote and distribute the Forestry Commission Woodfuel Supplier Toolkit Explore the potential for developing local, small scale markets for added value products (such as fencing, charcoal, sustainable /local branded products), with associated infrastructure and skills training.	**Biomass energy** **Biodiversity** **Climate regulation** **Recreation** **Sense of place / inspiration**

[14] Connecting Londoners with Trees and Woodlands – A Tree and Woodland Framework for London, Greater London Authority (2005)
[15] Forestry Commission (2010) Morris JK Woodland Archaeology in London

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Urban forest (trees and woodlands) Wetlands Waterbodies Greenspace network including large public parks, heaths and commons Green infrastructure	Trees in streets and public open spaces throughout the NCA provide shading to buildings and people. Trees, woodlands, and some vegetated green spaces regulate air temperature through evapotranspiration. This can impact on public health, particularly in periods of high temperature. Waterbodies, including reservoirs, canals, rivers and ponds perform a similar function through direct evaporation. Together these help to mitigate the urban heat island effect, as do the wetlands, woodlands and parklands in surrounding NCAs which supply cool air to Inner London. Trees also remove pollutants from the air, improving air quality and capture carbon. **Continued on next page...**	Regional	A 10 per cent increase in green infrastructure (particularly tree canopy cover) in urban areas can reduce ambient temperatures by up to 4oC which is the predicted increase for London under medium to high emission scenarios[16]. Temperature regulation is a particular challenge for Inner London which suffers the urban heat island effect, where the urban fabric absorbs and retains heat during the day and releases it at night, preventing the city and its inhabitants from cooling down. This can result in Inner London being considerably hotter than surrounding areas, exacerbated in areas significantly lacking in trees and green spaces. Trees only perform this function when they have established large mature canopies, which are much more effective than large groups of smaller canopied trees.	Promote the use of the 'right tree, right place principle' for tree planting to take account of future climate change. Promote and update The 'right trees for a changing climate' tool http://www.righttrees4cc.org.uk/ should be used, promoted, and updated as new research and evidence becomes available, and local airflows and pollutant concentrations should also be taken into account. Develop and support local volunteering through new and existing schemes such as the Tree Council's volunteer tree wardens. Identify areas within the urban realm that can help offset the urban heat island effect.	**Climate regulation** **Sense of place / inspiration** **Regulating water flow** **Regulating water quality** **Recreation** **Biodiversity**

[16] UK Climate Projections (UKCP09) 2013 http://ukclimateprojections.defra.gov.uk

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation cont.		**... continued from previous page** High temperatures increase some pollutants such as ground-level ozone, and so the urban forest performs cumulative functions. The wetlands in the east, and the urban forest throughout the NCA, also sequester carbon.		There may be a deficiency in ecosystem service delivery in future years due to smaller species being planted, and a delay in succession due to trees being either old or young, with fewer planted in intervening years. Grant schemes such as the London Tree and Woodland Grant Scheme, Mayors Street Trees Fund, The Big Tree Plant and NGO programmes have funded much of the recent plantings, some of which have been targeted in areas of poor air quality. Challenges and costs of retrofitting trees into the built environment can prevent trees being planted where climate regulatory services are needed most. Woodlands and trees in public realm deliver multiple services, but are usually managed for amenity, rather than climate regulation, under borough open space strategies (although some **Continued on next page...**		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation cont.				**...continued from previous page** local authorities are now producing separate tree strategies). The recent London Plan Supplementary Planning Guidance for development of borough tree strategies guides Local Authorities on the audit, protection, planting and management of trees and woodlands. The health of trees is important to their functioning in terms of climate regulation. In some places communities are actively engaged in local tree planting and maintenance. Deculverting and naturalisation of concrete river channels can also assist in locally reducing temperatures [17, 18, 19].		

[17] Adapting to Climate Change: Creating natural resilience, London Climate Change Partnership (2009)
[18] Managing Risks and Increasing Resilience – The Mayor's Climate Change Adaptation Strategy, Mayor of London (2011)
[19] RE:LEAF Prospectus: More trees for a greener London, Greater London Authority

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Wetlands Rivers and streams Green spaces Urban greening	Inner London's rivers are classified as heavily modified and, at Water Framework Directive baseline (2009) assessment, have either moderate or poor ecological potential. 57 combined sewer overflows enter the tidal Thames discharging 39 million cubic metres of untreated sewage per year. Diffuse pollution from urban run-off is exacerbated by low flows and volumes in rivers. Inner London has little semi-natural habitat and rivers are highly modified, although habitat creation and river restoration projects are being delivered to improve water quality functioning in places.		The rivers within the Inner London NCA flow over clay which prevents interaction of surface waters with the chalk groundwater. Rainfall cannot penetrate due to dense urban fabric and underlying clay soils, so runs quickly into rivers. Low flows and volumes concentrate pollutants from run-off, which is likely to increase with predicted increases in droughts and storms. Water quality in the Thames is influenced by discharges from sewage works, upstream diffuse agricultural run-off, urban runoff and incidents of pollution. Great efforts have been made in recent years to improve the water quality of the Thames itself, largely through improvements in the quality of effluent from sewage treatment works. However, under the conditions of the Water Framework Directive the Thames is judged to be failing because of the presence of some hazardous compounds derived from road runoff, pesticides), herbicide from agriculture, and biocides. The water quality of the Lea and Ravensbourne suffers from phosphate and dissolved oxygen issues, the Ravensbourne also having high Ammonia. The Wandle suffers from high phosphate content[20]. **Continued on next page...**	Promote urban greening measures in new and existing development designed to slow and filter run-off, for example, rain gardens, green roofs. Identify opportunities through the All London Green Grid, the London Rivers Action Plan and other projects and programmes, to target and design green infrastructure and river restoration for water quality functions. Explore and support water quality objectives in Catchment Plans for the Tidal Thames, and rivers Lea, Wandle and Ravensbourne.	**Regulating water quality** **Regulating water flow** **Biodiversity** **Recreation**

[20] Environment Agency 2013

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality cont				**... continued from previous page** London's combined sewer overflows (CSOs) were built in the 1800s to improve river quality by preventing disposal of sewage directly into the river. Surface water drainage and sewage is dealt with in a combined system, overflowing into the Thames when sewers reach capacity. Increasing population and development puts system under pressure, and it is now overwhelmed by as little as 2 mm of rainfall. The Thames Tideway Tunnel, due for completion in 2020, will intercept flows from 34 unsatisfactory CSOs via a 32 km tunnel under the Thames. The Lea Tunnel, due to be completed in 2014, will prevent storm sewage overflow into the River Lea. Misconnections and containment failures also contribute to pollution problems. However, serious incidents (category 1 and 2) are low in London. The NCA has little semi-natural habitat. Natural wetland habitats now exist only at the eastern boundary of the NCA in the Lea and Ingrebourne valleys. Manmade reedbeds have been created in gravel workings and reservoirs. Small reedbeds (often under 0.5 ha) have been created as part of river restoration or habitat creation projects on the margins of lakes or rivers usually within parks. Small stands of semi-natural habitat within the urban fabric, represents an important resource in filtering pollutants from urban run-off, and in addition provide stepping stones for associated wildlife.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Greenspaces Urban greening Rivers and streams Reservoirs and waterbodies Wetlands	London is vulnerable to tidal, fluvial and surface water flooding. Wetlands and woodland at the edge of the NCA, and in neighbouring NCAs help to regulate flood risk. Inner London's network of green spaces, rivers and streams also helps to alleviate flooding.	Regional	A large proportion of Inner London lies on the Thames floodplain. Flood risk is principally managed by a complex system of flood defences (walls, gates, and the Thames Barrier) and drainage networks. Tidal flood defences provide a sufficiently high standard of protection for predicted increases in tidal surges in the medium term, up to 2070 (Thames Estuary 2100). Fluvial food risk will increase with a projected increase of 20 per cent in peak river flows (Thames CFMP 36). Rivers in Inner London are culverted or canalised for much of their length increasing the risk of flooding at high flows. Greatest risks are from surface water flooding which is managed to some extent by a network of drains, rivers and green spaces. The dense urban fabric throughout the whole of the NCA and surrounding areas, coupled with underlying clay soils, prevents infiltration of rainfall. Water collects causing surface floods, or runs off into rivers carrying pollutants from the urban environment. Some elements of green infrastructure can help slow flows and reduce the amount of rainwater entering the drainage system. The use of sustainable drainage systems such as ponds and reed beds can also help slow flow. **Continued on next page...**	Where possible restore or enhance rivers to slow fluvial flows and create flood storage and encourage the use of sports pitches as temporary flood storage areas. Promote urban greening measures such as rain gardens and green roofs for all new developments and encourage retrofitting to existing development where surface water flooding is identified as a significant risk. Promote the better management of existing greenspaces to improve rates of absorbance of surface waters. Encourage the design of green infrastructure for regulating water flow can that will also support the delivery of multiple services including biodiversity, recreation, climate regulation, and sense of place. Encourage the installation of sustainable urban drainage systems where appropriate.	**Regulating water flow** **Regulating water quality** **Biodiversity** **Sense of place / inspiration** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow cont				**... continued from previous page** However, most green spaces are managed for amenity and soils are compacted compromising their potential to regulate surface water flows. The probability of all forms of flooding is projected to increase as sea levels rise and heavy rainfall events become more frequent and intense; and the consequences will also increase as London's population grows, more infrastructure is located in areas of flood risk and more gardens are converted into impermeable surfaces. 3,000 ha of vegetated garden land have been lost to hard paving since 1998, an area equivalent to 21 times the size of Hyde Park (London: Garden City). The Mayor's Drain London Forum provides a mechanism for collaboration between boroughs on strategic flood risk management[21].		

[21] *The London Rivers Action Plan*, The River Restoration Centre (2009)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soils particularly on London Clay	This NCA consists of several soil types including slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, freely draining slightly acid loamy soils, loamy soils with naturally high groundwater and loamy and clayey soils of coastal flats with naturally high groundwater. Much of the soilscape within the NCA has been heavily disturbed but small pockets of the "natural" soilscape survive in the area's parks and commons such as Greenwich Park and Wimbledon Common.	Local	Although little of the NCA is now farmed, soil quality is still important for gardeners, allotment holders and greenspace managers. Both public and private gardens within London can have a negative impact on other NCAs in particular through their demand for peat. Soil compaction as a result of high visitor numbers is a problem for some popular sites such as Hampstead Heath. Some areas of London suffer soil contamination, ranging from physical contamination with rubble and glass to chemical contamination from industrial processes or road run-off. In the worst cases, soil may have to be washed mechanically to remove the pollutant or removed altogether from site.	Promote awareness amongst the public and those managing parks and gardens of the need to use sustainable sources of soil improvement. Encourage home composting where possible. Where possible and appropriate, manage visitor access to open spaces with soil compaction problems.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Soils London Clay	The majority of the soils in this NCA have a low risk of soil erosion. However, freely draining slightly acid loamy soils have an enhanced risk of soil erosion.	Local	Soil erosion is not a major problem in this NCA because of its urban nature. Inner London has many green spaces but these are often grassed reducing the risk of soil movement. Building sites possibly present the greatest potential for soil erosion.	Promote awareness amongst developers of the Defra code of best practice set out in the "Construction Code of Practice for the Sustainable Use of Soils on Construction Sites". Where erosion is a problem in larger open spaces, such as parks, encourage the planting of hedging to prevent overland flows.	**Regulating soil erosion** **Climate regulation** **Regulating water quality**
Pollination	Gardens Urban greenspace Green Infrastructure	Private gardens, allotments and more natural areas within greenspace supporting pollinating insects and contributing to local food production.	Local	Road verges, the sides of railway and overground tube tracks, river and canal corridors, brownfield sites and other suitable locations could all be managed to provide improved nectar sources. The sheltered, milder climates of urban habitats can provide havens for pollinators. However habitat fragmentation can restrict dispersal of some species and makes pollinators more vulnerable to climate change[22]. Open mosaic habitat brownfield sites, and to a lesser extent biodiverse green roofs, can support notable invertebrate communities including rare and scarce pollinating insects.	Seek opportunities to introduce species-rich grassland, pollen and nectar strips, margins along motorway and road verges, railways, on brownfield sites and alongside watercourses such as the river valleys and canals, to encourage and support pollinating insects. Promote the management of small greens and parks for the benefit of pollinators; in particular encourage the planting of wildflowers following the example of the Olympic Park.	**Pollination** **Biodiversity** **Food provision**

[22] *Making B Lines. A report on the practicalities of making a B Lines network, P Evans (2012)*

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Remnant natural landscape features Historic buildings The River Thames, its tributaries and associated industrial heritage Large parklands with designed landscapes, and regional parks World Heritage Sites Woodlands and associated archaeology Famous writers and artists River terraces and associated geodiversity and Palaeolithic archaeology	Sense of place is very strong throughout the NCA particularly along the River Thames. Local identity is reinforced by parks and gardens, green spaces, trees and woodlands, rivers, and remnant sites of former industry such as canals and the docks, wharfs and creeks in east London. Inner London is constructed from a wide variety of building materials ranging from locally made bricks to stone imported from elsewhere within the UK or from abroad. The low wooded ridges to the north and south form a low key backdrop to the internationally significant buildings and cityscape in the wide valley bottom. The views from Greenwich Park and Hampstead Heath down over the city have been important for many centuries.	International	Sense of place is very strong across Inner London particularly along the River Thames, in the designed landscapes of the Royal Parks, and in the streets and garden squares in the west. Some of the large central parks were previously royal hunting grounds and have inspired many paintings and works of art. Other parts of London's natural landscape have literary connotations such as the River Thames which is vividly portrayed in the novels of Charles Dickens. Parks, green spaces and trees within and around the built environment also inform the sense of a place and visual identity.	Reinforce the sense of place evoked by natural landscape features in new public realm developments, restoration projects and by the appropriate management of existing areas. Encourage the conservation and promotion of industrial heritage associated with the Thames and its tributaries within landscape-scale projects and strategies which integrate multiple landscape objectives. Ensure the conservation and management of the highly valued parks and open spaces particularly those with heritage value and World Heritage Site status, such as Greenwich Park.	**Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Historic buildings The River Thames, its tributaries and associated Industrial heritage Large parklands with designed landscapes, and regional parks World Heritage Sites Registered parks and gardens Woodlands and associated archaeology	The NCA supports a high density of heritage designations with 3 world heritage sites, 94 registered parks and gardens, 79 Scheduled Monuments and 13,242 listed buildings attracting visitors from around the world. Sense of history is strong throughout the NCA evidenced by these designated assets, settlement patterns, remnant industrial features, and in place and street names that echo past landscapes and land uses. Public access to heritage assets is widespread.	International	The London Landscape Framework identifies the "Natural Signatures" – the unique natural identity - of landscape areas, derived from an analysis of remnant natural landscape features and underlying geology. London's deep and vibrant history is integral to its importance as an international visitor destination. Whilst heritage assets are many, widespread and accessible; focus for conservation is on those assets that have amenity value. This has led to a gradual erosion of historic natural character where features are perceived to have no amenity value, for example by the culverting and canalising of rivers, felling of native woodlands at the edge of the NCA and neglect of some remnant natural features such as that appear to have no amenity value. **Continued on next page**	Promote 'Natural Signatures' as described in the London Landscape Framework[23] in new public realm developments, restoration projects and appropriate management of existing areas, using the analysis and design clues in the London Landscape Framework. Explore opportunities to conserve and promote the industrial heritage of the rivers in the Lea Valley and Wandle Valley through landscape-scale projects which integrate multiple landscape objectives. Raise awareness of woodland archaeology, and ensure appropriate woodland management to protect heritage features. Appropriate woodland management draws on traditional techniques and delivers additional benefits biodiversity, biomass production and carbon storage.	**Sense of history** **Recreation** **Biodiversity** **Sense of place / inspiration**

[23] *London's Natural Signatures: The London Landscape Framework, Natural England (2011)*

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history cont				**... continued from previous page** This is despite the role of the natural landscape in defining the development of London. Nonetheless London does offer considerable opportunities for recreation and possibilities to get away from the hubbub of the busy city. Visitor pressures need to be managed to avoid negative impacts on historic features.		
Tranquillity	Parks Woodlands Rivers Wetlands Green infrastructure / urban greening – pocket parks Local Nature Reserves	The whole NCA has low (negative) tranquillity scores. However, parks and green spaces scattered amongst the built environment provide highly valued pockets of perceived tranquillity.	Regional	No part of the NCA is considered to be undisturbed or tranquil because of its predominant urban nature. However, landscape features such as parks and woodlands, commons, riverside walks, local nature reserves and churchyards provide important pockets of locally valued tranquillity. Wetlands and reservoirs in the Lea Valley provide access to wide open skies and refuge from road and street traffic. A predicted increase in warmer drier summers may increase visitor pressure and compromise tranquillity.	Improve perceptions of tranquillity, and create more tranquil spaces, within existing and new development through planning and urban design, and through management of parks and green spaces. Encourage measures to reduce light pollution such as through providing passive lighting and low lux lighting.	**Tranquillity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Parks and greenspaces Rivers and waterbodies Thames Path National Trail	There are 9 km of public rights of way, which includes the Thames Path National Trail and six other regionally strategic walking routes cross the NCA including the Capital Ring, the Green Chain, the Jubilee Greenway, the Jubilee Walkway, the Lea Valley Walk and the London Loop. Part of Richmond Park National Nature Reserve falls within the NCA. Parks, green spaces, woodlands, rivers, and waterbodies provide recreational services to residents and visitors throughout the NCA. Accessible green space, close to residential areas, is particularly valued for recreation and for physical and mental wellbeing.	National	The extensive network of parks and green spaces, throughout the NCA allow for active and passive outdoor recreation close to people homes and places of work. The UK National Ecosystem Assessment highlighted the importance of local green spaces to human wellbeing for physical and psychological health reducing the heart rate and stress as well as providing an encouragement to leading a healthy lifestyle[24]. The All London Green Grid provides a framework for strengthening the green space network and the services it delivers; priority for enhancements should be aimed at areas of deficiency. Reservoirs and wetlands in the east provide opportunities for birding and fishing, as well as walking, cycling and boating. Water-based activities are provided along the Thames and tributary rivers, Grand Union Canal and Docklands. Parts of the Lea Valley Regional Park and the proposed Wandle Valley Regional Park both fall within the NCA and provide recreational opportunities across large areas and out into the countryside. **Continued on next page...**	Develop opportunities for volunteers and local communities to contribute to the management and maintenance of recreational assets. Seek opportunities to deliver local green space strategies and site-specific management plans to raise the quality and accessibility of public green spaces across the NCA. Raise awareness of the value of social housing greenspace for health, biodiversity and social cohesion amongst the public and social housing providers. Encourage improvements to existing social housing green space where appropriate so that it provides a good quality experience and a wide range of benefits including biodiversity and for health and well being.	**Recreation** **Sense of place / inspiration**

[24] *The UK National Ecosystem Assessment Technical Report, UK National Ecosystem Assessment (2011)*

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation cont				**... continued from previous page** Levels of access to nature and greenspace vary across London with significant areas of deficiency existing within parts of Inner London. In some areas social housing greenspace is thought to be greater than the amount owned and managed by the local authority. Greenspace quality is similarly variable across the NCA, and equally important in terms of access to recreation and health benefits. The Queen Elizabeth Olympic Park is a new high quality recreational resource in an area of deficiency. Pressure on the network is likely to increase with London's increasing and aging population, and with the predicted increase in warmer drier summers [25, 26, 27].		

[25] *Green Infrastructure and Open Environments: The All London Green Grid (supplementary planning guidance),* Mayor of London (2012)
[26] *London Plan Chapter 7: London's Living Place and Spaces,* Mayor of London (2012)
[27] Greater London Authority/ Environment Agency/ Natural England/ Forestry Commission (June 2011) *London's Environment Revealed: State of the Environment Report for London*

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Woodlands Parks and green spaces Rivers and streams Urban Greening Local wildlife sites Geomorphology Gardens	Overall the biodiversity resource is fragmented. Large parts of the NCA are deficient in access to nature. Part of the Lea Valley wetlands SPA and part of the Wimbledon Common/Richmond Park Special Area of Conservation falls into Inner London, but cover less than 1 per cent of the area. 241 ha of land is designated SSSI, dominated by broadleaved woodland. 1 per cent of overall woodland cover is ancient. Heaths and commons are primarily managed for amenity value. The River Thames is confined along its entire length through the NCA, but may provide biodiversity interest on its foreshores and walls and provides an important corridor for migrating birds and fish. Tributary rivers support associated habitats and riverside walks. Local sites of importance for nature conservation cover 5,219 ha, 16 per cent of the NCA. The city's gardens also provide an increasingly important resource for wildlife.	Local	High quality priority habitat is limited to wetlands and woodlands at the edge of the NCA. However, locally designated sites represent an important resource for communities, providing access to nature within the heart of the city close to where people live and work. They include some public parks, cemeteries and remnant sites of former industry. The sites are generally small in size, of variable quality, and are usually managed by local authorities, London Wildlife Trust, community groups, or other voluntary organisations. Banks of rivers and streams are being naturalised in places, and associated riparian habitats created or restored. With only a small percentage of land considered being of biodiversity value (local, national or international designation), the resource is under considerable pressure **Continued on next page...**	Support the restoration of ecological networks across landscapes that span Inner London and adjoining NCAs. Encourage better and more appropriate management of SINCs to help create core sites from which ecological networks can develop. Encourage the appropriate management of non-designated greenspace among local authorities to increase the habitat resource and increase resilience. Raise awareness of the contribution of private gardens through promoting wildlife gardening. Encourage urban greening in business districts, housing estates and streets to soften the matrix of the built environment and provide stepping stones for wildlife. Promote engagement with nature sites for education, health and business value. Develop opportunities to engage people in nature through encouraging involvement in the management of local sites.	**Biodiversity** **Recreation** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity				**... continued from previous page** from an increasing population, and large areas are still deficient in access to nature. The Queen Elizabeth Olympic Park in the east will provide 45 ha of priority habitat, primarily species-rich grassland and reedbed, representing an important new resource both in terms of biodiversity and access to nature. The Lea Catchment Nature Improvement Area aims to restore ecological functioning across the Lea Valley, linking the new resource at the Olympic Park with the River Thames, the SPA wetlands and wildlife sites associated with the chalk streams and headwaters in the Thames Basin Lowlands. Elsewhere, opportunities to restore ecological networks may be developed through landscape scale frameworks such as the All London Green Grid ALGG, London Rivers Action Plan, and Environment Agency Catchment Plans.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geological SSSI Museum collections Building stone Sand and gravels dredged from the Thames – see geodiversity comments in sections above. Geomorphology Evidence of past environments: climates and landscapes Palaeolithic archaeology	Inner London supports 1 geological SSSI, museum collections, geo-conservation and public engagement activities such as walks and talks, which promote the value of geology and landform to the development of London. In addition, 11 sites comprising 221 ha have been proposed for designation as regional and local geological sites[28]. London provides examples of a wide variety of building stone from across the UK and across the world. Geodiversity is still exploited and utilised within this NCA The river terraces that underpin much of this NCA preserve fossils and sedimentary evidence of past environments and climates. These range from times (Last interglacial, 125,000 years ago) when temperatures were warmer than today and a fauna that included lions, hippos and extinct species of elephant to glacial episodes when much of the NCA was a tundra landscape, and during one of these episodes (the Anglian glaciations **Continued on next page...**	National	There is one geological SSSI at Gilbert's Pit in Greenwich and 221 ha that are proposed for designation for their regional and local geological importance. Sites mainly within or alongside public parks are fully accessible. The NCA is home to the nationally and internationally important collections at the Geological Society and the Natural History Museum. Local museums, such as Museum of London and The Horniman, celebrate the importance of the Thames and associated geology to the development of London. Landforms shaped by geology and geomorphologic processes provide views across London, for example from the river terraces in the north. London's deposits provide a valuable geological resource for education. Building stone resources from London, and stone imported from all around the globe, are evident in buildings throughout the NCA and building stone trails and geo-walks provide public engagement opportunities.	Continual development provides ongoing opportunities to view and understand the geology under London and identify the influence of natural processes. Permanent and temporary exposures could be created with interpretation for public access, and/or for sampling and collecting to further research and understanding. Support the designation of regionally and locally important sites (RIGS and LIGS) as recommended in the London Geodiversity Action Plan, to afford these sites protection (RIGS) and consideration (LIGS) in borough development strategies. Seek opportunities to provide educational access and interpretation of the NCAs geodiversity assets.	**Geodiversity** **Recreation** **Sense of place / inspiration**

[28] Greenspace Information for Greater London (GiGL) (2013)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity		**... continued from previous page** 450,000 years ago), a large ice sheet sat on the outskirts of London. This palaeoenvironmental evidence may also potentially provide insights into the impacts of future climate change. The earliest evidence we have for a human presence in the NCA is in the form of stone tools dating from around 400,000 years ago [29, 30].				

[29] London Geodiversity Action Partnership (February 2010) London Geodiversity Action Plan 2009 -2013

[30] Greater London Authority (March 2012) Green Infrastructures and open environments: London's Foundation: Protecting the geodiversity of the Capital, Supplementary Planning Guidance, London Plan 2011 Implementation Framework

Photo credits

Front cover: London Embankment and the River Thames. © Environment Agency
Pages 4, 7: © Peabody Trust
Page 5: © D Morrison
Page 8: © Trees for Cities
Page 9: © Natural England\Rob Fraser
Pages 13, 34: © EAST
Page 35: © London Wildlife Trust

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

Catalogue Code: NE476 ISBN 978-1-78367-033-8

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

www.naturalengland.org.uk