National Character Area profile:

154. Hensbarrow

Supporting documents

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Introduction

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

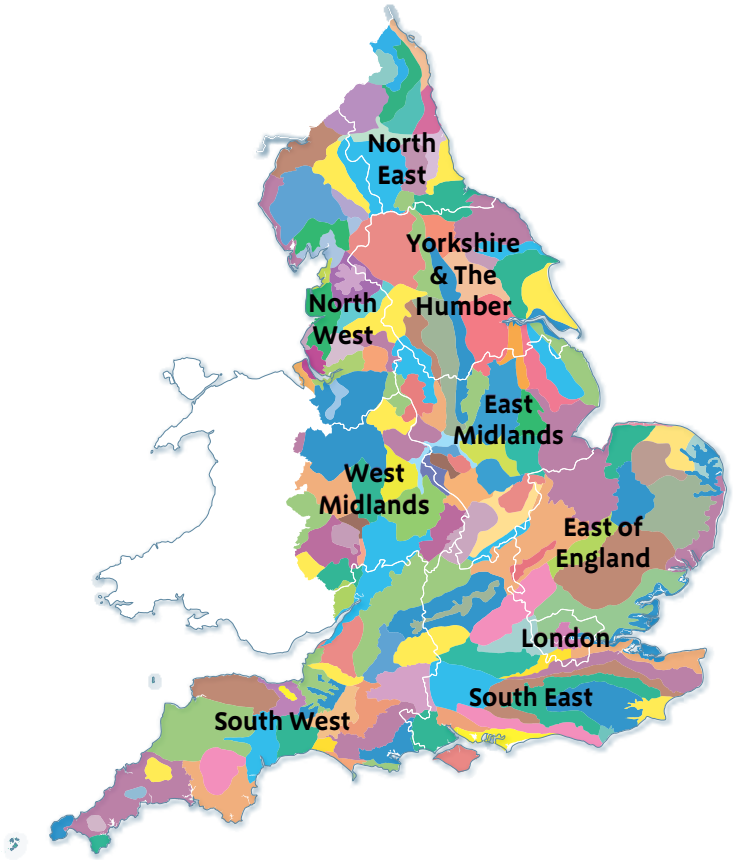
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



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

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

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

Summary

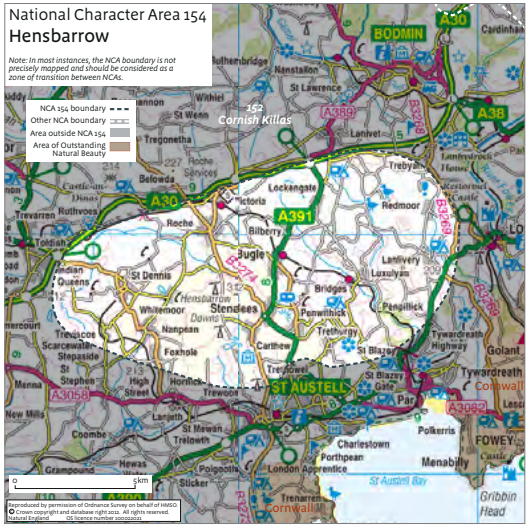
Hensbarrow is an interesting and varied landscape. The National Character Area (NCA) is named after Hensbarrow Downs, the granite hills which are the focus of the china clay industry. The world-famous Eden Project is located in an old china clay pit in the Hensbarrow Downs area. To the north, Goss Moor forms an open and wild landscape that is not untouched by human infrastructure such as roads and electricity pylons and historical tin extraction. The eastern side of the NCA is an area of contrast between the wild and open granite tors, the biodiverse heath and willow carr and an idyllic pattern of fields bounded by Cornish hedges and woodlands. Settlements are fairly small and the local vernacular is of granite or cob and granite buildings, roofed with slate and sometimes with hanging slate; the locally produced concrete blocks are also a distinctive feature.

The ecology of the landscape is recognised with national and international designations. There are two Special Areas of Conservation which cover 6 per cent of the NCA. Some 341 ha of Goss Moor is designated as a National Nature Reserve and there are a total of nine Sites of Special Scientific Interest (SSSI) either wholly or partially within the NCA. Areas of heath have a particularly rich diversity of wildlife with rare butterflies such as the marsh fritillary, plants such as the royal fern and acid-loving sundews, and birds such as the yellowhammer.

The geology is dominated by granite and its associated tors and mineral deposits. Moorstone litters the eastern slopes and china clay has had a huge impact on the Hensbarrow Downs area. There are five geological SSSI in the NCA and 1.5 per cent of the area is in the Luxulyan and Charlestown section of the Cornwall and West Devon Mining Landscape World Heritage Site.

The rich history of the NCA is easy to see and visitors are drawn to the relics of mining heritage that scatter the landscape, both from rock mining and china clay extraction. The most popular visitor destination is the Eden Project but there are also 93 km of public rights of way at a density of 0.78 km per km^2 and 10 per cent of the NCA (1,218 ha) is classified as being publicly accessible. This allows for other recreational activities such as walking, cycling and horse riding.

The Hensbarrow area has long been a landscape of dynamic change and this pattern continues as new solar farms are constructed and as china clay continues to be extracted from the landscape.



Click map to enlarge; click again to reduce.

Statements of Environmental Opportunity

- **SEO 1**: Protect the ancient and distinctive field patterns of the Hensbarrow landscape and historic boundary features of Cornish hedges. Protect and appropriately manage the area's cultural resources so that the special landscape character and sense of history of the area are conserved.

- **SEO 2**: Manage, restore and enhance the mosaic of semi-natural habitats, as well as the subtle landscape features which contrast sharply with the 'lunar' landscape of china clay extraction, working to actively improve the biodiversity as well as regulating water flow across the NCA.

- **SEO 3**: Plan for the restoration and future use of redundant china clay workings in order to benefit biodiversity, tourism, water flow and sense of place.

China clay waste heap being developed adjacent to agricultural land.

Description

Physical and functional links to other National Character Areas

Hensbarrow is a landscape with roots of granite. Granite is exposed as moorstone and tors and where it has decayed the granite forms pockets of china clay. Extraction of china clay and metal ores has shaped the landscape which has a long industrial heritage.

Hensbarrow is inextricably linked to the surrounding areas as the source for the rivers Fal and St Austell which flow the short distance from the moors and bogs down through the industrialised valleys. Agriculture is a major factor in the area and there are agricultural links between Hensbarrow and the nearest National Character Areas (NCAs) – Bodmin Moor and the Cornish Killas.

The area is completely surrounded by the Cornish Killas NCA which reinforces the underlying granite exposure that forms the Hensbarrow landscape. The area is visible from many areas of Cornwall owing to the landscape that has been created by china clay extraction, a landscape of steep slopes and pointed peaks which contrasts with the rolling farmland, pockets of valley woodland, heath and moorland of the rest of the area. The farmland is mostly formed of irregular fields of pasture bounded by Cornish hedges.

Cornwall's main transport links (the A30 and the main rail line) skirt the periphery, meaning that the area is highly visible and encountered by many, albeit fleetingly.

Links to the surrounding countryside are also emphasised through the settlement pattern of farmsteads connected to the areas of lowland moor by trackways, enabling grazing of livestock in the summer on the moor and in the winter on the lower valley pastures.

Typical view of Hensbarrow NCA from the A30.

Key characteristics

- China clay spoil tips dominate this landscape with both conical and terraced heaps. They are often vegetated but the tops of conical heaps can remain bare of vegetation.
- Buildings associated with the china clay industry including chimneys, drying kilns and mica dams.
- Active china clay works are obvious as distinctive white terraces in the landscape.
- A dispersed settlement pattern of hamlets and farmsteads with many villages being associated with the china clay industry. The local vernacular is granite and slate buildings which form the centre of the towns. Much later development represents a shift in the vernacular towards locally produced concrete blocks and sheet metal associated with industrial sites.
- Mineral extraction industry, such as tin mining and china clay extraction, is prominent in the landscape. The china clay deposits are thought to be the largest in the world.
- There are many abandoned mine buildings as well as larger structures such as the viaduct at Luxulyan. Many of these are of historical significance and add character to the area.
- Pylons and wind turbines are a notable feature of the western landscape and new solar farms near Luxulyan stand out from the green fields that surround them.
- Sheltered, wooded valleys with willow scrub and fast-flowing streams cut north to south through the area heading to the sea.
- Key habitats associated with the area include lowland heathland, purple moor grass and rush pasture and fens, all of these being of European importance.
- The mosaic of habitats is home to many rare and iconic species, for example the spider *Araneus triangulus*, marsh fritillary, gold-ringed dragonfly, early purple orchids growing on roadside Cornish hedges, and birds such as buzzard and yellowhammer.
- The eastern area is dominated by irregular small fields, fringed with Cornish hedges and supporting small farmsteads and hamlets.
- The granite geology of the area is showcased by striking tors such as Helman Tor, Roche Rock and huge granite boulders known as moorstone.

Hensbarrow today

The Hensbarrow NCA is a relatively small area of many different characters. Broadly speaking it can be split into three main areas: the western side, where the china clay workings dominate the landscape; the Goss Moor area to the north; and the eastern area where the scars of tin working have healed to form a landscape of rural tranquillity threaded through with tree-filled valleys and wilder heathland, topped by airy tors. The lowest point in the NCA is 130 m below sea level, in the open cast quarry areas, but the hills rise to a maximum height of 307 m.

Roche Rock.

Goonbarrow, Hensbarrow, Carloggas Downs, Greensplat, Burngullow, Nanpean, Treviscoe and Fraddon Downs are the core areas of china clay extraction, where a lunar landscape of flat-topped and older conical waste heaps and flooded pits dominates, all linked by large white haul roads crossing areas of heathland. These features all create an impression of surreal and other-worldly grandeur, enhanced by occasional glimpses of the turquoise or green waters of flooded clay pits and settling ponds.

Below the high ground, such as Hensbarrow Downs, irregular fields, enclosed by largely treeless Cornish hedges, lie in complex patterns. These reflect piecemeal enclosure of the moorland since the medieval period and the mixed farming and mining economy that persisted for centuries. Pasture for livestock rearing is dominant and arable is found on only the most favoured sites.

The isolated farmsteads, loose clusters of miners' cottages, terraces and small hamlets are linked by narrow, winding, commonly sunken lanes. Most of the villages, such as St Dennis and Roche, are associated with the mining industry and contain welfare facilities such as band rooms and recreation grounds. At the edges of the moors, the farms and hamlets occupy the most sheltered sites so that the land can appear to be very sparsely populated.

Older buildings are almost universally built of granite or a cob and granite mix with slate roofs and some have hanging slates for protection against driving rain. The granite occurs throughout the landscape in walls, clapper bridges, crosses, standing stones, stone stiles and rock exposures. Settlements are linked by narrow, winding lanes, sunken in the lower ground, but forming open, unenclosed tracks across the moors.

On the more sheltered sites and better agricultural land, to the east of the area, modern farm buildings tend to dominate the older dwellings. The farming pattern is overlaid by groups of miners' cottages and small villages, some of which have become rather shapeless through recent development, others of medieval origin with buildings clustered around the square-towered granite churches. Within the mining areas, Methodist chapels are also prominent. The traditionally dispersed settlement pattern has been augmented by roadside development and the enlargement of hamlets and small villages.

Settlements in the east are strongly influenced by the industrial nature of the area. While at their core they tend to consist of a few older granite, cob and slate built houses, the rest is made up of post-war houses which do not match the local vernacular.

Cornish hedges form an integral part of the character of the area and their variations of style create a feeling for each local area. The hedges on the lower lands are normally topped by flailed hedges but higher up the hedgerows mostly disappear and the Cornish hedges have their stone facing showing. In the east and south many of the Cornish hedges are topped by mature trees which can meet over the road to form tunnels of dappled light. Some of the eastern hedges can be very ancient and made up of huge granite boulders. The area around St Dennis church has very distinctive stone walls that create a unique landscape pattern.

Since the 1990s the area has been developing as a visitor destination owing to the development of Wheal Martyn, Luxulyan Valley and the Eden Project in a disused clay pit. Eden attracts over 1 million visitors a year. This, combined with a more holistic approach to the management of redundant mine workings, has led to the development of cycle ways and recreation routes. The visitors who are initially drawn in by the Eden Project often go on to visit other attractions such as the China Clay Museum at Wheal Martyn. Regeneration of the area can also be seen in examples such as the conversion of china clay 'dries' to self-catering cottages at Carbis Wharf. These developments have injected significant income and generated respect for a historically poor and deprived area.

The Eden Project - located in a redundant china clay pit.

The landscape through time

The NCA is underpinned and influenced by granite geology. The underlying granite is one of a series of granite intrusions which are linked at depth as the Cornubian Batholith, a pluton of magma which was intruded after the Carboniferous Variscan Orogeny (mountain-building episode). This granite is known as the St Austell Granite. This links the NCA with a chain of intrusions that are seen in the Isles of Scilly, West Penwith and Carnmenellis to the west and Dartmoor to the east. The granite defines the area, forming the tors, clitter slopes and thin moorland soils. It hosts mineral veins of copper and tin and large deposits of china clay which were formed by alteration and weathering of the granite.

Although there are many prehistoric field systems, most of the area was open grazing land and the history of the landscape since the later prehistoric times has been one of piecemeal enclosure and mineral extraction. The Neolithic enclosure on top of Helman Tor evidences a long habitation of the NCA by humans.

The landscape was cleared of woodland prior to the discovery of china clay in 1750; since then the open grazing pattern has complemented the piecemeal enclosure and exploitation of the mineral resource. The irregular field patterns with scattered hamlets and farmsteads represent the range of ages of enclosure. It is possible to see the evidence of medieval ridge and furrow on areas of permanent pasture and moorland. This area is agriculturally poor and the china clay industry brought about a beneficial change.

Unlike mining activity in other parts of Cornwall (tin and copper), the china clay area has provided jobs for local people and this has created a 'clay culture' and tradition that is still obvious today. All aspects of the area, including its settlement pattern, land use and prosperity, have been driven by mineral extraction. It has shaped the prominent landscape features – most spectacular are the tips of china clay waste, with traditional ones having a smoothly symmetrical conical form with their sharp points pointing skywards. From the late 1960s, changing technology and safety measures have brought about the vast terraces, steps and flat tops that envelop the villages and farmland.

The deposits are the largest in the world. Around 120 million tonnes of china clay have been produced since William Cookworthy's first discovery at Tregonning Hill in 1746, but reserves are sufficient for at least another hundred years. The area has developed the necessary associated infrastructure including engine houses, leats, pan kilns, settlement pools and the large haul routes that carve through the area and are used by massive (300 tonnes plus) dump trucks slowly moving around. The china clay has always been extracted by open cast mining methods but from the early 20th century huge water cannons have been used to wash it out. It goes through machinery to settling tanks in order to help to separate out the mica and then it is transported through underground pipes for further purification. Much of the water that is used is recycled.

The rise of the china clay industry was reflected in a decline in agriculture. Pockets of productive land to the east of Luxulyan still feature small beef and milk enterprises, with smaller horticulture and arable farms right on the border with the Cornish Killas NCA. This has also led to small pockets of unaltered farmland among the main clay pits, where investment has not been made to modernise and intensify. These areas have high potential from a historic, landscape and biodiversity perspective.

The stark landscape has both inspired and depressed artists, poets and writers, including Daphne du Maurier and Jack Clemo, the former of whom wrote: "A stranger set down upon this spot today, or closer still amongst the slag and shale, white hills either side of him, would think himself thousands of miles from Cornwall in the canyons of Colorado, perhaps or the volcanic craters on the moon."

Since the year 2000, when the Eden Project opened to the public while still under construction, it has been a major visitor attraction in the NCA and it has also led to the creation of the Clay Trails which allow walkers, horse riders and cyclists to enjoy the unusual landscape of the Hensbarrow area. The China Clay Museum is another popular visitor attraction which is located in the centre of the area and is a hub for multi-use trails.

Around Luxulyan and Helman Tor, there is a similar history of change from rural to industrial and then back again. Although the granite is less affected by china clay extraction, the loose granite boulders scattering the surface of the valley and its surroundings, known as moorstone, were used for building. By about 1840 quarrying of the granite began. Around the top of the valley were Luxulyan, Cairns, Carbeans and Colcerrow quarries, while in the valley were Rock Mill and Orchard quarries. The last stone came out from Carbeans in 1933. Some 1.5 per cent of the NCA forms the Luxulyan and Charlestown section of the Cornwall and West Devon Mining Landscape World Heritage Site, which was designated in 2006.

In the 1800s and 1900s, the method for tin and copper extraction changed to include more sub-surface mining and many new shafts were dug. By the end of the 20th century, all of the tin and copper mines in the NCA had closed.

Breney Common and Red Moor now form part of a nature reserve and much of their area is made up of wet willow carr which is dotted by pools and areas of heath. Cattle and ponies are used to graze the nature reserves. The area has not always been so peaceful for the dips and pools were created over hundreds of years by open tin workings dating from prehistory to the early part of the 20th century. The area is now popular with local residents for walking and horse riding.

The A30 road once ran through the middle of Goss Moor but single lane sections caused a major bottleneck in the county. In late 2004 it was re-routed and widened, the dual carriageway running around Goss Moor being opened in 2007. Much of the previous road has now been converted to a cycle lane which opened in 2008.

Walkers on the line of the old A30 across Goss Moor National Nature Reserve.

Ecosystem services

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

Provisioning services (food, fibre and water supply)

- **Food provision:** Beef and sheep rearing dominate agricultural production. Dairying is the major farm type in the NCA. Pasture is widespread but there are a few mixed farms with arable crops on the richest soils.

- **Water availability:** There are no reservoirs in the NCA but, owing to the granite bedrock, there is an underground water supply of aquifers that some people access through boreholes to gain a private water supply. A large amount of water is used by the china clay extraction industry to dissolve the clay as a way of extracting it from the large open cast pits. Much of this water is recycled so it does not adversely affect the water supply for the rest of the NCA.

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

- **Climate regulation:** Carbon storage in the normal soils of Hensbarrow is low, ranging from nought to ten per cent. Areas of permanent pasture and woodland protect organic matter with higher carbon content and contribute to carbon sequestration. The peaty soils of Goss Moor and Red Moor, as well as any other small areas of moor, are far more efficient as carbon stores as long as they are not allowed to dry out.

- **Regulating water quality:** The history of mining across the area has resulted in moderate water quality owing to high metal levels caused by disused mines. Soil washed off roads can also be an issue.

- **Regulating water flow:** Most of the watercourses in the NCA are fast flowing and have a flashy nature. Heath and moorland act as a sponge, retaining water and regulating discharge in the upper reaches. Woodlands and Cornish hedges help to regulate the speed at which surface water reaches watercourses. High water flow in the NCA's watercourses can lead to flooding in neighbouring areas such as the town of St Austell.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** The Hensbarrow landscape is very diverse and yet retains a strong sense of place. This is in part owing to the fact that it is possible to see the distinctive outline of the St Austell waste clay tips from much of Cornwall and Devon. The mining communities have developed a strong sense of local identity and traditions, many of which are now experiencing a revival. The areas of moorland and heath can feel wild and timeless, as can the broadleaved woods which in the west are strewn with huge moss-covered granite boulders. The agricultural land, with its small-to-medium fields bounded by Cornish hedges, is a large part of the landscape. In recent years the area has become synonymous with the Eden Project.

- **Sense of history:** The industrial history of the area is clear to see because of the wealth of remains, primarily from the china clay industry, but also from hard rock mining, extensive tin streaming, quarries and mills. The settlement pattern reflects this dominance, along with the shifting roads and ghost settlements such as Retew and Greensplat, swallowed into huge open pits but still alive in local memories. The area also contains many individual older features, including the biggest bronze-age barrow

in Cornwall crowning Hensbarrow Downs, the nationally rare Neolithic enclosure on Helman Tor and the iconic Roche Rock hermit's chapel. The remnants of the farming landscape add to this time depth of human activity.

- **Recreation**: The NCA has fairly good public access through rights of way and nature reserves. The Goss Moor trail is a popular circular route passing right through the middle of the Special Area of Conservation (SAC) and along the medieval lanes around Tregoss. The Clay Trails link settlements and attractions such as Wheal Martyn and Eden, and are popular with cyclists, horse riders and walkers. The world-famous Eden Project is the main visitor attraction within the area. Its two huge biomes are impressive from the outside and inside hold spectacular collections of tropical and warm temperate plants.

- **Biodiversity**: The NCA is quite biodiverse. It includes three SAC, Goss Moor which is a National Nature Reserve and a total of nine Sites of Special Scientific Interest (SSSI) either wholly or partly within the NCA. Iconic heathland species include marsh fritillary, royal fern and sundew. The woodlands of the area are often rich with lichens and mosses.

- **Geodiversity**: Geodiversity has been the main driving factor in the shaping of the area by humans. It includes the granite tors and moorstone, quarries and china clay area as well as rich veins of copper and tin which were mined intensively. Interesting geological exposures include Roche Rock which is a striking area of granite exposure and the Luxulyan Quarry which is part of the Cornwall and West Devon Mining Landscape World Heritage Site. There are five geological SSSI including Roche Rock and Luxulyan Quarry.

Important grassland habitat on Goss Moor National Nature Reserve.

Statements of Environmental Opportunity

SEO 1: Protect the ancient and distinctive field patterns of the Hensbarrow landscape and historic boundary features of Cornish hedges. Protect and appropriately manage the area's cultural resources so that the special landscape character and sense of history of the area are conserved.

For example, by:

- Maintaining and restoring Cornish hedges, stone walls, hedgerows and other boundary features while respecting the varying pattern of ancient field systems and reflecting local variations in style and composition through careful research, using locally sourced granite.
- Replacing lost Cornish hedges, stone walls and hedgerows where they can help to impede cross-land flows within the main river valleys, and to prevent soil erosion and agricultural run-off.
- Protecting against insensitive development/alterations impacting on rural character, ensuring that buildings reflect traditional materials and styles (including local granite and slate).
- Protecting and appropriately managing evidence of ridge and furrow, buried archaeology and other historic earthworks.
- Protecting built features and areas containing extensive mining heritage particularly in the Luxulyan Valley and its setting as part of the Cornwall and West Devon Mining Landscape World Heritage Site and in the Tregargus Valley with its extensive range of china stone mills.
- Identifying the key historical remains of the china clay industry, including the iconic sky tips and the social infrastructure such as local chapels, and finding a sustainable long-term future for these features.
- Protecting, managing and interpreting the important geology and geomorphology of the area and using this to explain the links to the formation of the landscape.
- Protecting historic features which act as local landmarks (such as Roche Rock and Lanlivery church) and their settings from adverse development.
- Maintaining and restoring estates and parkland landscapes, especially around the Luxulyan Valley, avoiding loss of grassland, retaining views into the parks and protecting veteran trees especially where these are vulnerable to changes in agricultural practices and are important for lichens, invertebrates and fungi.
- Providing information and interpretation to visitors accessing the area via open access and public rights of way to help them to understand and value the archaeological features and unique biodiversity of the area.
- Continuing to encourage links between the Eden Project and other cultural assets such as the China Clay Museum.

SEO 2: Manage, restore and enhance the mosaic of semi-natural habitats, as well as the subtle landscape features which contrast sharply with the 'lunar' landscape of china clay extraction, working to actively improve biodiversity as well as regulating water flow across the NCA.

For example, by:

- Consolidating, expanding and re-linking fragmented areas of moorland and wet and dry heath where appropriate (particularly Goss and Red moors and areas of former china clay workings), preventing further loss to scrub invasion and where appropriate encouraging less intensive agriculture in these areas.
- Enlarging and interlinking grassy marshes, managing in favourable condition through appropriate grazing regimes and water management techniques to aid the storage of floodwaters.
- Maintaining and protecting areas of permanent and rough grassland in enclosed farmland (particularly on higher pastures and fringe farmland), encouraging less intensive agriculture, enhancing wildlife value and protecting archaeological features.
- Enhancing wildlife features on mixed farmland to further arrest the decline in farmland birds, arable plants and other wildlife.
- Managing and restoring broadleaved woodlands, particularly areas of ancient semi-natural woodland such as within the Luxulyan Valley.
- Managing existing carr woodlands, particularly in the Luxulyan Valley, Goss Moor and Red Moor areas, to improve biodiversity and aid water infiltration and storage.
- Allowing the natural regeneration of willow and scrub along the steep sides and upper slopes of the main river valleys and tributaries (including the Fal and Par) to stabilise the soil and filter water to improve river quality.
- Guiding locations for new woodlands to filter views of development including pylons, electricity lines and industrial works, reduce noise levels, support biodiversity and adaptation to climate change, enhance climate regulation, aid strategic flood management and improve recreational opportunities close to where people live.
- Maintaining the distinctive granite landscape features of Cornish hedges, walls, clapper bridges, crosses, standing stones and stone stiles.
- Retaining expansive open views from both within and out of the NCA, and views of prominent church towers and mining features typical of this area.
- Reducing the visual impact of pylons, electricity lines and obtrusive industrial features, and preventing further visually intrusive skyline development.
- Managing the impact of visitor numbers at key destinations such as Helman Tor, Luxulyan Valley and the Eden Project as well as controlling the growth of golf courses, riding stables and caravan sites which result in congestion on minor roads and a loss of rural character.
- Creating permissive access links to the Cornish Way, the Saints Way, the National Cycle Network and the South West Coast Path.
- Using extensive management of semi-natural habitats, making use of appropriate grazing species.

SEO 3: Plan for the restoration and future use of redundant china clay workings in order to benefit biodiversity, tourism, water flow and sense of place.

For example, by:

- Where appropriate maintaining the artificial landforms and waterbodies to retain links to the area's mining past, particularly the sky tips and their adjacent pools.
- Creating opportunities to integrate former workings within the wider landscape by linking new landscape proposals with existing hedgerow patterns, woodland and copse planting using appropriate native species.
- Providing opportunities for innovative uses of redundant workings to support biodiversity and adaptation to climate change and improvements in water storage, and generate recreational and educational opportunities.
- Restoring some sites to heathland and grassland to consolidate the existing resource.
- Generating new opportunities for recreation at key sites through permissive access agreements linking sites with adjacent settlements.

Carthew Clay Pit.

Additional opportunity

1. Plan and develop opportunities to allow access to, and movement through the area on a network of trails and paths which connect visitor attractions within the area such as the World Heritage Site, Goss Moor and other visitor attractions.

For example, by:

- Enhancing the many recreational opportunities offered through active management and provision of quality infrastructure such as multi-user paths, clear signposting and better interpretation to improve understanding, appreciation and enjoyment of the natural and built environment.
- Exploring opportunities to work with partners and organisations supporting volunteering in the natural environment, to both maintain, enhance and promote biodiversity and increase people's knowledge of it.

Supporting document 1: Key facts and data

Area of Hensbarrow
National Character Area (NCA): 11,949 ha

1. Landscape and nature conservation designations

There are no National Parks or Areas of Outstanding Natural Beauty in this NCA. 1.5 per cent of the NCA forms the Luxulyan and Charlestown section of the Cornwall and West Devon Mining World Heritage Site.

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	N/A	N/A	0	0
European	Special Protection Area (SPA)	N/A	0	0
	Special Area of Conservation (SAC)	Breney Common and Goss Moor and Tregoss Moor SAC; St Austell Clay Pits SAC	736	6
National	National Nature Reserve (NNR)	Goss Moor NNR	430	4

Tier	Designation	Name	Area (ha)	% of NCA
National	Site of Special Scientific Interest (SSSI)	A total of 9 sites wholly or partly within the NCA	2,031	17

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.

The land covered by international and European nature conservation designations totals 736 ha (6 per cent of the total land area); national designations cover 2,031 ha, (17 per cent). Breney Common and Goss and Tregoss Moors SAC and Goss Moor NNR lie within the SSSI designated area. St Austell Clay Pits SAC is also nationally designated.

There are 17 Local sites in Hensbarrow covering 1,095 ha which is 9 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	18	2
Favourable	91	10
Unfavourable no change	0	0
Unfavourable recovering	768	88

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 lowest point in the NCA 130 m below sea level (in the opencast quarry areas) but rises to a maximum height of 307 m. The mean height is 163 m.

Source: Natural England (2010)

2.2 Landform and process

The presence of the underlying granite has been the dominant control on the form of this undulating landscape which has been shaped not only by natural processes but also by industrial processes. China clay quarries are a dominant feature of the landscape.

Source: Hensbarrow Countryside Character Area Description, Cornish Killas and Granites Natural Character Area Profile

2.3 Bedrock geology

The granite rock of Hensbarrow is part of the Cornubian Batholith, a pluton of magma which was intruded after the Carboniferous Variscan Orogeny (mountain-building episode). The granite was broken down over time to form fine, white china clay, composed mainly of the clay mineral kaolin. The rocks, mainly slate, surrounding the granite were less resistant to erosion and this led to the eventual 'unroofing' of the granite. This in turn led to the development of the china clay industry locally.

Source: Hensbarrow Countryside Character Area description, Cornish Killas and Granites Natural Area Profile, British Geological Survey maps

2.4 Superficial deposits

Some alluvium and river terrace deposits exist in small quantities.

Source: Hensbarrow Countryside Character Area description, Cornish Killas and Granites Natural Area Profile, British Geological Survey maps

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	5
National	Mixed Interest SSSI	0
Local	Local Geological Sites	6

Source: Natural England (2011)

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

2.6 Soils and Agricultural Land Classification

The acidic soils are predominantly gravelly and peaty but with patches of brown earths capable of cultivation in the lower-lying areas.

Source: Hensbarrow Countryside Character Area Description, Cornish Killas and Granites Natural Area Profile

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	4,707	39
Grade 4	3,078	26
Grade 5	2,563	21
Non-agricultural	1,600	13
Urban	0	0

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 Fal 11 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 River Fal rises in the heart of the NCA and cuts through a steep valley on its short journey to the sea.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 3,783 ha, 32 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 1,709 ha of woodland (14 per cent of the total area), of which 64 ha is ancient woodland.

Source: Natural England (2010)

4.2 Distribution and size of woodland and trees in the landscape

The landscape was cleared of most woodland cover at an early date. In the higher more exposed areas trees are scarce, but they become more common on the lower and more sheltered ground and they have been planted as clumps and shelterbelts around farmsteads. More recently there have been programmes of tree planting on the edge of the spoil heaps to enhance the value of the area.

Source: Hensbarrow Countryside Character Area Description, Cornish Killas and Granites 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	1,583	13
Coniferous	51	<1
Mixed	11	<1
Other	64	<1

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

Area and proportion of ancient woodland and planted ancient woodland within the NCA.

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	19	<1
Planted Ancient Woodland (PAWS)	45	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Boundary features are a combination of stone faced hedge banks (Cornish hedges) with vegetation on top and also fencing associated with the protection of the extensive mining operations.

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

5.2 Field patterns

Off the high ground, irregular fields, enclosed by Cornish hedges, stone walls and hedgerows, lie in complex patterns. In places, old field systems have been enlarged, and are more regular in shape. Although there are many prehistoric field systems, most of the higher area was open grazing land and the history of the landscape since the later prehistoric times has been one of piecemeal enclosure which has been significantly altered by the mining activity in the area.

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

6. Agriculture

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

6.1 Farm type

The predominant farm type is grazing livestock LFA (mainly cattle) with 58 holdings (42 per cent). The NCA is mainly pastoral and does not have a wide range of farm types but those in any significant numbers are: 36 'other' (26 per cent); 19 dairy (14 per cent); 7 mixed (5 per cent); 5 grazing livestock (lowland) (4 per cent); and 5 specialist poultry (4 per cent). Since 2000 grazing livestock (lowland) has declined (by 22 holdings, 81 per cent) as has dairy (by 10 holdings, 34 per cent) and horticulture. Grazing livestock LFA showed an increase (by 9 holdings, 18 per cent) as did other (by 4 holdings, 13 per cent) and specialist poultry. Mixed farms remained stable at 7 holdings.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farms between 5 and 20 ha are the most common at 55 holdings (40 per cent), followed by farms sized between 20 and 50 ha (20 per cent). Between 2000 and 2009 farms sized between 20 and 50 ha decreased by 13 holdings or 32 per cent as did those under 5 ha by 7 holdings or 33 per cent and those between 50 and 100 ha by 1 holding or 4 per cent. Farms over 100 ha increased by 5 holdings or 38 per cent.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Owned land makes up 61 per cent of the total farm area, while the remainder is tenanted. There has been an increase in owned land of 5 per cent over the 2000 to 2009 period and an even larger increase in tenanted land of 32 per cent. Total farm area has increased by 817 ha since 2000.
2009: Total farm area = 6,572 ha; owned land = 4,004 ha.
2000: Total farm area = 5,755 ha; owned land = 3,807 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

By far the most important land use coverage by hectarage is grass and uncropped land at 5,913 ha, 90 per cent of the farmed area. The other land uses of any significance are cereals at 269 ha, 4 per cent of the farmed area and other arable crops at 126 ha or 2 per cent of the farmed area.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Cattle are the most numerous livestock (10,200), followed by sheep (4,700) then pigs (1,600).The numbers of sheep have fallen quite considerably by 3,200 or 40 per cent. Cattle have also seen a slight decrease in their numbers, decreasing by 3 per cent.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The vast majority of holdings are managed by owner farmers (205). The workforce is reasonably evenly split between part time workers (23) and full time workers (22) with 15 casual/ gang workers. Trends from 2000 to 2009 show a decrease in the number of owner farmers (down by 41). The number of full –time workers has decreased by 5 and casual/ gang workers by 4 in contrast to the number of part-time workers which has increased by 7.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

The dominant habitats within the NCA are the vast expanses of lowland heath and purple moor grass and rush pasture associated with the Goss Moor area. These areas are of European importance for the population of Marsh Fritillary butterfly providing all the habitat niches for a thriving and expanding population. Small areas of similar habitat are peppered through though the NCA north of the clay working and through a recent series of projects attempts are being made to enhance the old spoil heaps to act as links between these important habitats.

Source: Cornish Killas & Granites 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 woodlands (Broad habitat)	1,310	10
Lowland heathland	412	3
Purple moor grass and rush pasture	299	3
Upland heathland	1	<1

Source: Natural England (2011)

- Maps showing locations of priority habitats are available at: **http://magic.Defra.gov.uk/website/magic/** select 'Habitat Inventories'

7.3 Key species and assemblages of species

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

8. Settlement and development patterns

8.1 Settlement pattern

The underlying settlement pattern is one of dispersed hamlets and farmsteads. Scattered cottages are a reminder of the small-holdings that grew up with the mining industries. At the edges of the moors, the farms and hamlets occupy the most sheltered sites so that the land can appear to be very sparsely populated.

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

8.2 Main settlements

The main settlements in the NCA are: Roche, St Dennis and Bugle. The total estimated population for this NCA (derived from ONS 2001 census data) is: 17,742.

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

8.3 Local vernacular and building materials

Older buildings are almost universally built of granite with slate roofs and some have slate hanging. The granite occurs throughout the landscape in walls, clapper bridges, crosses, standing stones, stone stiles and rock exposures.

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

9. Key historic sites and features

9.1 Origin of historic features

Industrial activity has shaped the prominent landscape features that give the area its particular and very individual character. Most spectacular are the tips of china clay waste. The traditional ones have a smoothly symmetrical conical form with their sharp summits pointing skywards, providing dramatic landmarks, 'The Cornish Alps'. Changing technology and increased safety measures have brought change in the landscape and more recent waste tips are quite different. Vast terraces, steps and platforms loom on the skyline, covering large areas and dominating the villages and farmland around them. Even when abandoned or reclaimed there is a contrast between the old and the new. It was in the 1750s that William Cookworthy, a Quaker from Plymouth, found china clay on the Hensbarrow Downs and so began the process that was to create this dramatic landscape. Before that, this had been an area of poor farming, on smallholdings reclaimed from the unenclosed moor, of small-scale mining for tin, and of quarrying. The extraction of china clay grew from small beginnings to become one of the most significant industries in Cornwall with Cornish china clay being of very high quality and this was sent around the world.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 0 Registered Parks and Gardens
- 0 Registered Battlefields
- 27 Scheduled Monuments
- 164 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

- 10 per cent of the NCA, 1,218 ha is classified as being publically accessible.
- There are 93 km of public rights of way at a density of 0.8 km per km^2.
- There are 0 National Trails within the NCA

Sources: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	0	0
Common Land	611	5
Country Parks	0	0
CROW Access Land (Section 4 and 16)	945	8
CROW Section 15	121	1
Village Greens	<1	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	16	<1
Local Nature Reserves (LNRs)	0	0
Millennium Greens	0	0
Accessible National Nature Reserves (NNRs)	442	4
Agri-environment Scheme Access	14	<1
Woods for People	367	3

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of Tranquillity (2006) the most tranquil areas of the NCA are within the heart of the extraction areas due to their inaccessibility, however the industrial process within the area mean that these areas are also adjacent to some very disturbed spaces.

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

Category of tranquillity	Score
Highest value within NCA	31
Lowest value within NCA	46
Mean value within NCA	<1

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.

A breakdown of intrusion values for this NCA is detailed in the table below.

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	% change (1960s-2007)
Disturbed	53	70	54	1
Undisturbed	47	30	45	2
Urban	0	0	0	0

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are that the intrusion in the areas was impacted on significantly during the 1980's and 90's. This coincides with the highest period of extraction of china clay. Since the late 90's production has reduced and the techniques for extraction have altered reducing the impact on the surrounding area.

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

Typical village of Stenalees nestled under the clay tips.

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

- Woodland cover accounts for 12 per cent of the NCA with less than 3 ha being approved for new planting under Woodland Grant Schemes since 1999. However restoration plans are being developed and implemented for many of china clay workings with woodland and heathland making a significant contribution to this work. Tree planting should be carefully located so as not to impede the views of some of the iconic features of the area such as the sky tips.

Boundary features

- Only about 2 per cent of the typical Cornish hedges are protected by agreements between 1999 and 2003. With expansion of mineral workings continuing boundary features are often lost although within restoration plans some of these original boundaries are being reinstated. Many tall bushy hedges where significantly impacted on by Dutch elm disease which is still found within the area.

Agriculture

- Only about 50 per cent of the NCA is used for agriculture and this has not changed over recent years. The farming is still dominated by cattle (a population of approximately 10,200) and sheep (population approximately 4,700) grazing on permanent pasture. The number of sheep within the NCA has fallen by 40 per cent since 2000. The number of holdings has increased slightly due to the inclusion of lower thresholds and part time farms within the statistics.

Nowadays, there is quite a strong horse culture in the area and there are several riding stable as well as private horse owners.

Settlement and development

- Although the number of new buildings outside urban areas remains below the national average, development is having an impact on the landscape character of the area with the amalgamation of villages in the small valleys into long ribbon developments. Significant development (20 per cent more homes) potential was identified in the area in recent planning documents focused on the development of a number of Eco Towns which will further impact if developed.

Semi-natural habitat

- While designated areas (SSSI, SAC) only make up 17 per cent of the NCA, 60 per cent of BAP priority habitats within designated sites are currently in a favourable condition. The NCA is important for purple moor grass and rush pasture and lowland heath, all priority habitats and significant enhancements are being made to the area as a result of the work carried out through the recent 'Tomorrow's Heathland Heritage Project'. Many areas previously suffered from overgrazing but have now been brought under tighter management.

Further work regarding management techniques is in an early stage of development focusing on Goss Moor National Nature Reserve and forming a sound ecological network for the area. Farms and especially Cornish hedges, link up the habitats by forming wildlife corridors. Since the changes in farming of the 20th century, semi natural habitats have become even more significant for native wildlife. Marsh fritillaries and horseshoe bats are only two of the notable species found in the NCA.

Historic features

- The area shows signs of early human occupation, such as Neolithic enclosures and ancient field systems, around the higher points such as Helman Tor and the development of a largely pastoral landscape until the mid 18th century. Following the discovery of china clay in Hensbarrow downs in the 1750s extensive industrial development occurred which peaked in the late 1800s. All of this development has left a wide variety of historic features such as the viaduct at Luxulyan, engine houses, Cornish hedges and Methodist chapels, with some associated with the Luxulyan Valley section of the Cornwall and West Devon Mining Landscape World Heritage Site. The Eden Project was developed in one of the historic china clay pits, giving a new lease of life to the area.

Rivers

- Two of the main rivers within the area (upper Fal and upper Par) are currently in moderate condition for ecological status with the St Austell River and Gwindra stream showing good ecological status. The lower Fal is designated as a Special Area of Conservation (SAC) so the moderate water quality of the upper reaches of the river may be of concern.

  All of these rivers demonstrate some potential flood risk in times of heavy rainfall with significant risk to areas of St Austell and the Luxulyan Valley. In recent years there have been some significant flood events in St Austell. In 2010 the flooding was so bad that floodwater poured into houses. After heavy rainfall the water courses running off the china clay tips and surrounding area, pick up sediment, becoming discoloured.

Minerals

- The china clay spoil tips, in particular, form highly distinctive landmarks in the Cornish skyline and the abandoned engine houses that dot the landscape are highly evocative and often seen in local artworks. The clay tips were previously allowed to re-vegetate naturally but that often lead to rhododendron dominance so now they are replanted with trees and heather. This sits alongside the redundant tin and copper streaming operations which are hidden under the natural vegetation of the Goss Moor and Red Moor area of the NCA.

Drivers of change

Climate change

- Increased storminess that has been noted in recent years and is likely to continue, makes the rivers even more flashy, increasing flooding risk in neighbouring towns such as St Austell.

- Prolonged periods of drought are likely to have adverse affects on peat soils and habitats, making soils more prone to exposure, desiccation and subsequent wind and water erosion, and habitats prone to wildfire events with significant changes in flora and fauna resulting. Marshy grassland and rush-pasture may similarly be affected by prolonged periods of drought.

- The ability of soils on the moorland parts of Goss Moor and Red Moor to retain and slow the flow of water, providing reduced flood risk in surrounding towns and villages, may be impaired as a result of desiccation following drought.

- A change in climate may lead to the development and use of novel/unusual crops such as olives and vineyards.

Other key drivers

- Encouraging tourism while managing visitors in such a way that people can enjoy the area without causing damage to any of the more sensitive habitats.
- The shortage of affordable housing in Cornwall may lead to a call for new homes. New housing developments should be matched to the local vernacular of granite and slate to help to maintain sense of history and sense of place.
- The drive for more sustainable energy sources might well lead to pressure to erect wind farms or further solar farms. There will be an ongoing need to continue to conserve and enhance the character and special qualities of the designated landscapes and the species they support.
- Maintaining an agricultural economy to sustain a labour force sufficient to manage the farmed landscape remains a challenge, and continuing to provide food locally and regionally.
- Restoring and enhancing the natural beauty of the area through appropriate extensive habitat management, paying special attention to delicate heath and moorland habitats which may suffer due to changes in climate.
- As the mining heritage continues to age, the decision will have to be made whether to actively conserve many of the old buildings or allow them to naturally decay.

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.

Heathland alongside china clay tips.

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 the ancient and distinctive field patterns of the Hensbarrow landscape and historic boundary features of Cornish hedges. Protect and appropriately manage the area's cultural resources so that the special landscape character and sense of history of the area are conserved.	↔ ***	↔ ***	↔ ***	N/A	↔ ***	↔ ***	↗ **	↗ ***	↗ *	↗ ***	↗ **	N/A	N/A	↑ **	↑ ***	↔ **	↗ ***	↗ ***	↗ ***
SEO 2: Manage, restore and enhance the mosaic of semi-natural habitats, as well as the subtle landscape features which contrast sharply with the 'lunar' landscape of china clay extraction, working to actively improve the biodiversity as well as regulating water flow across the NCA.	↘ **	↔ **	↔ **	N/A	↗ **	↗ ***	↗ **	↗ **	↗ **	↗ ***	↑ **	N/A	N/A	↔ ***	↑ ***	↗ ***	↗ ***	↑ ***	↑ ***
SEO 3: Plan for the restoration and future use of redundant china clay workings, in order to benefit biodiversity, tourism, water flow and sense of place.	↔ ***	↔ ***	↔ ***	N/A	↔ ***	↗ **	↗ **	↗ **	↗ **	↗ **	↑ **	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
The landscape of the 'Cornish Alps' in the china clay extraction area.	■ The old china clay waste tips are conical in shape and add a great deal of flavour to the area, as well as adding to the sense of human history. ■ A disused china clay quarry was used to house the Eden Project. ■ Newer china clay workings show an example of modern industry and include huge, terraced spoil tips. ■ The strangely coloured, turquoise, blue or green pools of the flooded clay pits add to the almost alien feel of the area.
Species-rich heath and moorland and associated willow carr.	■ Cattle and ponies are traditionally a feature of the grazed moorland although sheep are dominant in number, with hardy breeds being favoured due to their ability to survive in this harsh environment. ■ These open habitats support populations of marsh fritillary butterflies and other invertebrates such as the spider Araneus triangulus. ■ Heathland in particular is an excellent habitat for pollinating insects because of the many flowers, which last late into the year.
A network of small streams and rivers.	■ The upper reaches of the River Fal and the River Par; formed by several fast flowing streams, cut through this NCA draining into the English Channel at Falmouth and Par respectively.
A distinct and varied pattern of fields, enclosures and settlements reflecting a long and ongoing history of agricultural activity and dispersed settlement.	■ The unenclosed common land of many of the highest hilltops and the network of small to medium irregular fields creates a rural atmosphere and tells a tale of long human occupation of the area. ■ The dispersed pattern of settlement that has at its core, old buildings of granite, cob and granite mixes or rendered granite and slate roofs. ■ Cornish hedges are a distinctive feature contributing to the sense of place, as well as being important historical features and wildlife corridors allowing species movement and migration.

Landscape attribute	Justification for selection
A long history of human occupation is evident in the numerous heritage assets to be found across the landscape.	■ The story of early human occupation is told by archaeology such as the remains of a Neolithic enclosure on Helman Tor. Unfortunately many of the signs of early human occupation have been lost to quarrying. ■ Much of the NCA is scattered with the remains of the tin and copper mining industry. ■ The dips and pools of the east and of Goss and Tregoss moors are evidence of tin streaming. ■ Part of the Luxulyan and Charlestown section of the Cornwall and West Devon Mining Landscape World Heritage Site is in the western half of the NCA.
Areas of broadleaved woodland in the valleys and willow carr, contrast with the more open hilltops.	■ Scattered broadleaved woods amongst the farmland, lend to the sense of rural idyll. ■ The small but impenetrable areas of willow carr add further contrast to the landscape and add a feeling of wilderness.
A diverse landscape of hills often contrasting dramatically from surrounding lowlands.	■ The distinctive granite tors rise dramatically above the rolling green hills and woodland-filled valleys. ■ The man-made hills of the china clay spoil heaps, form distinctive landmarks.

Landscape opportunities

- Restoration of sites affected by the industrial past will provide opportunities to enhance biodiversity and recreation, while ensuring that the legacy of the industrial heritage remains.
- Development pressures around the town of St Austell combined with the expansion of the tourism offer to the area will provide opportunities to further enhance the areas recreation and biodiversity potential.
- The development of Eco Towns within the heart of the area provides opportunities for master planning of the complete area to ensure maximum multi use of the area occurs and using this to develop novel techniques to sustainably manage enhancements to the environments.

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	Grazing livestock Milk and meat	The predominant farm type within the NCA is grazing livestock. Cattle are most numerous, followed by sheep with around 14,927 grazing animals in total. Dairy farming is very common in the area. There are also a few mixed farms and some specialist poultry farms. By far the most important land use coverage by hectarage is grass and uncropped land at 5,913 ha, 90 per cent of the farmed area. The other land uses of any significance are cereals at 269 ha, 4 per cent of the farmed area and other arable crops at 126 ha or 2 per cent of the farmed area.	Regional	The wet and warm Atlantic climate is conducive to a long growing season which is reflected in the stock husbandry regime of animals being 'out' for a much greater proportion of the year. A relatively small farm size and mixed livestock systems (beef, dairy and sheep) means that margins are very low and expansion is difficult. Food production, based on a rough pastoral farming landscape, is a key service in this area. Extensive, slow-reared beef and sheep dominate quality food products. Between the years 2000 and 2009, the number of pigs farmed in the area sharply increased from 266 to 1224.	Working with the local farmers to develop appropriate opportunities and markets for local cattle ensuring the links to the area's sense of place are maximised. Continue to encourage and expand good grazing management of rough common land such as the found on Goss Moor, thus encouraging good soil management and maintaining or improving the moorland and heathland ecosystems.	**Food provision** **Biodiversity** **Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Sense of place / inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	51 ha coniferous woodland 1,583 ha of existing small broadleaved woodland	13 per cent of the NCA is covered by broadleaved woodland and only approximately 1 per cent is taken up by coniferous woodland felled land/ land prepared for planting. The small area of coniferous woodland is the main source of timber production.	Local	There is very little timber production in the NCA. The small areas of conifer plantation are remnants of attempts to produce timber during the post-war period. The quality of timber produced within these plantations is low due to the wet nature of the ground the harsh climatic conditions and the nutrient-poor soils. Many of the locations chosen for planting were in the poorest locations. These areas are often poorly served by the road network. These areas were often previously rich in biodiversity. Pockets of habitats may still survive within plantations and show potential for restoration.	Clearance of conifer plantation at maturity provides opportunities for the restoration of semi-natural habitats; the enhancement of landscape character; Consideration should be made within these schemes of appropriate species to be planted. Increased habitat connectivity can be provided by woodland creation linking with existing semi-natural habitats which will provide benefits for species such as the marsh fritillary butterfly. Increased and enhanced management of the deciduous woodlands would release small volumes of timber suitable for local use (predominantly as wood fuel), improve habitats, help to regulate water flow and increase the stability and quality of soils.	**Timber provision** **Regulating water flow** **Regulating soil erosion** **Regulating soil quality** **Climate regulation** **Sense of place/ inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Streams and rivers Water available for abstraction Mine adits Relatively high levels of precipitation Pools and mires formed in old mine workings	There are no reservoirs in the NCA. The mains water supply comes from Coliford Lake up on Bodmin Moor. There are many small rivers and streams in the region but the River Fal is the only river of any size. It rises in the heart of the NCA and cuts through a steep valley on its short journey to the sea. The entire area overlies an impermeable basement rock of granite so water is available for abstraction. This is accessed by some people using private bore holes. Long abandoned mine adits are also sometimes used to provide private water supplies. Pits left over from mining and china clay workings have filled with water forming various wet habitats.	Local	The pastoral nature of the agricultural land does not require that large quantities of water be abstracted from rivers or boreholes. With the increasing prices of mains supply water, using boreholes to gain a private water supply is becoming more popular and might eventually have an effect on the groundwater level. The china clay industry uses a lot of water for their water cannon and settling tanks; however, much of the water that they use, they recycle.	Seek opportunities to realise the energy producing potential of fast-flowing streams and rivers, particularly where this coincides with the restoration and maintenance of historic structures, features and management practices. The location of these will need to be carefully considered due to the designation of some rivers and the species reliance on river flows. Encourage good environmental management of wetland habitats, especially mires, increasing the capacity of habitats to retain water.	**Water availability** **Regulating water quality** **Biodiversity** **Climate regulation** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	N/A	N/A	N/A	N/A	N/A	N/A
Biomass energy	Secondary woodland and areas of scrub and gorse	There is little standing, accessible biomass in the area with woodland restricted to mainly steep slopes. There are opportunities for small-scale wood fuel production.	Local	Opportunity for specific energy crops is small within the NCA but local wood fuel may be available in the form of small section wood from hedgerow and woodland management and the arisings from scrub and management associated with good agricultural practice and habitat enhancements. Clearance of areas of scrub and secondary woodland to expose high quality grassland and heathland habitats and the management of hedgerows may generate some material suitable for local wood fuel, and would enhance the ecological network and connectivity. Yield maps indicate that the majority of the NCA has the potential for a medium yield of miscanthus and a low yield of short rotation coppice. In terms of landscape, opportunities for biomass planting are restricted to lower areas in the south where planting can be integrated within existing mixed crops or link existing woodland, landform or higher hedges creating areas of enclosure.	Ensure that opportunities are pursued which enhance the biodiversity of the area through appropriate management of scrub and that arisings from this are considered as an economic resource in the form of wood fuel. Consideration should be given to the impact of extraction on the soil and buried archaeology within any area. Management of vegetated Cornish hedgerows can supply a small amount of wood for local use while enhancing the longevity of these key features in the landscape.	**Biomass energy** **Biodiversity** **Sense of place/ inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Carbon rich peaty soils 1,709 ha of predominantly deciduous woodland Areas of permanent pasture	Carbon storage in the soils of Hensbarrow is low, ranging from 0 to 10 per cent, although there are small pockets with a higher carbon content scattered throughout the area under areas of heathland and moor. Historically grazing and burning have released carbon dioxide from the area. Valleys contain many pockets of permanent woodland and wet grassland habitat. These features contribute to the regulation of climate through both carbon storage and carbon sequestration.	Regional	Peat rich soils play an important role in storing carbon. Wet peat is particularly effective as a carbon store but releases the carbon if the peat dries out. Areas of permanent grassland and woodland maintain higher levels of carbon storage than regularly cultivated soils. Where permanent grassland occurs, appropriate application of organic matter will result in higher levels of carbon storage and improved soil condition. The use of nitrogen fertilisers on poorly structured soils is likely to result in the release nitrous oxide gases. The secondary and ancient woodlands also support soils with higher carbon levels and contribute to the storage and sequestration of carbon.	Continue to manage moor and heath via grazing and blocking of drainage ditches where needed, thus helping to fortify them against drought. Careful management of existing habitats and development of new habitats that can both provide links to the ecological network and play a role in climate regulation should be considered and implemented. These changes may also provide economic benefits resulting from reduced inputs of inorganic fertiliser. Maintain areas of secondary woodland and ancient semi-natural woodland through positive, traditional management keeping disturbance of soils to a minimum.	**Climate regulation** **Regulating soil quality** **Regulating soil erosion** **Regulating water flow** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Pasture, especially permanent pasture Wet heath and moorland	The total area of Nitrate Vulnerable Zone is 3,783.5 ha, 32 per cent of NCA. The River Fal has high levels of metals due to increased levels of copper, zinc and cadmium in its catchment. Under high rainfall conditions sediment from the China clay working sis washed into local watercourses, causing discolouration.	Regional	Water quality is important to this area in support of much of the heath and moorland biodiversity. Careful management of livestock, particularly controlling access to watercourses and waste management, is essential to maintaining good water quality. The large percentage of agricultural land given over to pasture is less likely to be fertilised often with artificial phosphates which is good for water quality. Moorland burning increases levels of dissolved organic carbon (DOC), acidity and water dis-colouration.	Seek opportunities to establish extensively managed permanent grassland, and areas of scrub and woodland along coombes, steep valley sides and near watercourses. Increase the amount of farmland managed under principles established by the Catchment Sensitive Farming initiative. Fencing watercourses, where appropriate will reduce sedimentation and nutrient loading.	**Regulating water quality** **Water availability** **Regulating soil quality** **Regulating soil erosion** **Biodiversity** **Food provision**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Woodland Heath and moor Network of Cornish hedges	Most of the water courses in the NCA are fast flowing and have a flashy nature. The valley woodlands catch and slow precipitation before it becomes surface water. The extensive network of Cornish hedges slow the rate at which surface water reaches rivers and streams. Heath and moorland act as natural sponges, holding precipitation and reducing the quantity that reaches the area's watercourses.	Regional	Heavy rainfall causes many watercourses to flow very fast which causes erosion of their banks. This is particularly apparent in the china clay area where there is often little vegetation on the spoil heaps, to slow the surface water. The network of Cornish hedges remains fairly intact as they are seldom removed or replaced by fencing. The area of heath and moor is less now than in the past but in recent years efforts have been made to restore such habitats. For example the blocking of drainage ditches on Goss Moor to re-wet some areas.	Continue to manage heath and moorland to allow slow percolation of water through the peaty soils. Where feasible create new semi-natural habitats. Increase amount of farmland managed under principles established by the Catchment Sensitive Farming Initiative. Protect Cornish hedges and build new hedges where they can slow crossflow.	**Regulating water flow** **Regulating water quality** **Biodiversity** **Sense of place/ inspiration** **Food provision** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Slowly permeable wet, acidic, peaty soils Free- and poor-draining soils, affected by high rainfall Permanent pasture Semi-natural habitats	The acidic soils are predominantly gravelly and peaty but with patches of brownearths capable of cultivation in the lower-lying areas.	Local	Peaty soils have low strength when wet and are easily damaged by unsustainable burning practices, overgrazing, compaction and loss of vegetation. Most of the peat is under heath which is well managed. Management of the freely draining acid loamy soils over rock is difficult on what is steep, often very stony land. There is generally low risk of poaching, but organic topsoil can poach when wet. The freely draining slightly acid loamy soils have potential for increased organic matter levels through management interventions Organic matter may be being lost through tillage across more intensively farmed areas away from the open moorland. Lack of organic matter makes soils more susceptible to compaction and erosion. Improving soil quality through increasing organic matter will have potential benefits in regulating soil erosion by making it more stable and able to withstand heavy rainfall. It may also contribute towards climate change regulation, storing more CO2, though the capacity of these soils to make a significant contribution is limited.	Re-wetting of areas of degraded peat soils can improve structure and stability of the soils, particularly when combined with careful and appropriate stock management. Exposed and bare areas of peat soil would be improved through re-vegetation. Ensure levels of organic matter are maintained in all soils, minimising tillage operations where possible. Identify and apply grazing regimes that increase sward diversity and increase levels of organic matter. Manage with extensive, and where appropriate, mixed grazing regimes to reduce stocking densities and avoid soil compaction.	**Regulating soil quality** **Regulating water quality** **Climate regulation** **Regulating water flow** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Woodlands Pasture Cornish hedges Heath and moor	All soils across the area are prone to some degree of erosion or have historically suffered degrees of erosion. Soil erosion occurs principally locally in association with livestock regimes such as overwintering stock and fodder production. The loose sandy soils of the china clay tips erode very easily until they get a good covering of vegetation.	Local	The freely draining slightly acid loamy soils have an enhanced risk of soil erosion on moderately or steeply sloping land where cultivated or bare soil is exposed. This is exacerbated where organic matter levels are low after continuous arable cultivation or where soils are compacted. There is also the potential for wind erosion on some coarse-textured cultivated variants. The slowly permeable wet very acid soils with a peaty surface are at risk of gullying/hagging (and loss of particulate organic matter) from rapid run-off and/or where surface vegetation is damaged or lost. They are vulnerable to occasional mass flow events and can be affected by wind erosion where the soil is bare. The intensive management of stock (dairy and beef) leads to soil compaction which provides a higher risk of soil erosion.	Reverse or remove drainage in appropriate areas to re-wet peaty soils making them less prone to desiccation, oxidation and subsequent wind and water erosion. Increase sward diversity to increase laying down of organic matter on improved grasslands and a wider variety of species to help knit together substrate. Manage grazing regimes to reduce or minimise soil compaction and poaching. Retain and enhance the network of Cornish hedges and give careful consideration to the relocation of gateways to ensure soil is not lost from fields into watercourses. Promote good management of top soils and employ minimum tillage techniques in locations where it may help to maintain good soil structure. Introduce, where appropriate buffer strips across fields to help reduce soil migration on slopes. Where organic matter is low, increase organic matter inputs to improve soil structure. Measures will be beneficial that retain water in situ, ensure good vegetative cover, and avoid overgrazing/trampling or damage by mechanised activities.	**Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Regulating water flow**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Heathland and moorland Species-rich grassland Cornish hedges	The patchwork of semi-natural habitats provides a food source for pollinating insects. However due to the lack of horticulture in the NCA the main benefactor is biodiversity rather than food supply. Cornish hedges are often flower-rich and provide movement corridors between habitats.	Local	A range of habitats support a significant number and variety of important plants, providing an important and widespread base for pollination. Heathland is particularly good due to the late flowering heathers and gorse. Pollination opportunities can be enhanced through increasing the diversity of vegetation and habitats.	Increase area of land covered by semi-natural habitats, to increase the diversity and number of flowering plants and increase the area and range of habitat mosaics where different habitats lie in close proximity.	**Pollination** **Biodiversity** **Food provision**
Pest regulation	N/A	N/A	N/A	N/A	N/A	N/A
Regulating coastal erosion	N/A	N/A	N/A	N/A	N/A	N/A

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Granite tors and slopes scattered with moorstone Cornish hedges Moorland and heath Fast-flowing streams and rivers falling through shallow, steep-sided wooded valleys Open and expansive area of undeveloped, farmed land punctuated with simple settlements The 'Cornish Alps' of the china clay area	The exposed granite in the east of the area helps to add a dramatic, wild and ancient feel to the land. Cornish hedges vary greatly in the area from being stony to being high and grassy to being covered by trees which form tunnels over the roads. They greatly add to the character of each different part of the landscape. Lively streams and rivers help to add touches of interest. Heath and moor create patches of wilderness amongst the agricultural and industrial land. The Cornish Alps are visible from much of the NCA. The turquoise-blue flooded pits add to the strangeness of the landscape. The woodlands and farmland of the east create a rural idyll.	Regional	Hensbarrow has a strong sense of place, dominated by its granite mass evidenced in Cornish hedges, walls, clapper bridges, crosses, standing stones and stone stiles and china clay extraction resulting in an almost lunar landscape of waste heaps and flooded pits. Recent solar farms near Luxulyan have made a very obvious mark on the rural part of the landscape. Settlement pattern is of dispersed hamlets, isolated farmsteads and clustered miners cottages with traditional building materials of local granite, cob, slate roofs and slate hangwalls linked by enclosed, narrow winding roads on lower ground and open unenclosed, tracks across the moors, overlain by a pattern of towns and larger villages associated with the mining industry. Industry, both past and present has a strong influence on the culture of the mining towns. There is an independent culture in the area of china clay extraction where the workers were known as 'china men'.	Ensure that the important aspects and features that make up the unique character of the place are conserved and enhanced, while maintaining vibrant, viable future uses and occupation of the landscape. Identifying, protecting and reinforcing the distinctive elements and features of the landscape are essential to maintaining the distinctiveness and inspirational character of the area. Encourage any new building development to fit in with the settlement pattern and local vernacular of granite and slate.	**Sense of place / inspiration** **Biodiversity** **Sense of history** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Mining heritage Prehistoric and medieval earthworks and structures Ancient Cornish hedges 27 Scheduled Monuments, 164 listed buildings 1.5 per cent of the NCA forms the Luxulyan and Charlestown section of the Cornwall and West Devon Mining Landscape World Heritage Site	The industrial history dominates due to the vast tips and pits associated with china clay extraction, many abandoned mine buildings that scatter much of the NCA and the china clay extraction. There are other relics of industry including water wheels and the stunning viaduct in the wooded valley at Luxulyan which is in part of a Cornwall and West Devon Mining Landscape World Heritage Site. In the east of the NCA the age of some of the Cornish hedges is apparent because they include huge granite boulders in their form. Many of the farmsteads contain a good survival of unaltered traditional agricultural buildings.	International	World Heritage Site status conferred on the mining heritage and landscapes of the area seeks to enhance the conservation, access and interpretation of the surviving assets. The heritage assets of the area contribute to tourism in the NCA, with a focus on Wheal Martyn Museum and the Clay trails Continued protection and enhanced interpretation of the wealth of heritage present is essential.	Continuing to conserve and enhance both the physical remains and access and interpretation of the internationally important historic environment will further complement and contribute to the diversification of business opportunities across the area. It provides opportunities for increased access and recreation, learning and research and, appropriately managed, enhanced biodiversity interest. Using traditional, locally sourced materials and vernacular design to inform new development will reinforce the character and locally distinctive nature of the area.	**Sense of history** **Sense of place/ inspiration** **Recreation** **Biodiversity** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Areas of semi-natural habitat which feel remote and undisturbed Dark night skies	The highest tranquillity score for the NCA is 31 and the lowest is -46.5. On average the tranquillity level of the NCA is not very good. The area has small havens such as Breney common and the Luxulyan Valley which are quite free of modern infrastructure. Other areas are less tranquil due to obvious pylons, power stations, solar farms and roads such as the old A30. Although the centre of Goss Moor, away from the power lines has a very tranquil feel.	Local	The most tranquil areas of the NCA are within the heart of the extraction areas due to their inaccessibility, however the industrial process within the area mean that these areas are also adjacent to some very disturbed spaces. The eastern side of the NCA is generally a tranquil area but some road noise can normally still be heard. The north and west of the NCA have obvious intrusion from power lines and roads. The towns and villages of the area often have signs of urban decline.	In the remaining tranquil areas ensure that the sense of tranquillity is maintained by encouraging only appropriate levels of development.	**Tranquillity** **Sense of place / inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Open access land Public rights of way Cycle paths Eden Project Horse riding Wheal Martyn China Clay Museum	10 per cent of the NCA (1,218 ha) is classified as being publically accessible and there are 93 km of public rights of way at a density of 0.78 per km^2. The world-famous Eden Project is the main visitor attraction within the area. There are various cycle paths associated with the Eden Project and Goss Moor.	National	The vast range of experiences is available to visitors and residents (such as walking, mountain biking, cycling, and birdwatching) allow for a dispersal of activities across much of the area. The impact of these activities on the protection of soils should always be considered. The Eden Project and the associated areas do, however, receive a far higher proportion of the NCA's visitors. Many of the visitors will be national or even international. The west and northern areas tend to attract more local visitors.	Maintain and improve the quality of recreational assets and other quiet recreational routes by supporting opportunities to connect and link with new multi-user routes, and sustainable transport schemes, particularly in areas close to where people live such as St Dennis and Roche, to give more opportunities to more people to access the environment. Encourage links between the Eden Project and other local attractions and facilities to continue economic regeneration of the NCA as a whole. Look to build upon the strong sense of place and history of the area to widen local recreational and regeneration opportunities of the area, while building sustainable businesses.	**Recreation** **Sense of place / inspiration** **Sense of history** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Internationally and nationally designated sites and habitats Range and wealth of species including marsh fritillary and royal fern	The NCA includes 3 Special Areas of Conservation (SAC), Goss Moor which is a National nature Reserve and a total of 9 Sites of Special Scientific Interest (SSSI) either wholly or partly within the NCA. 2,022 ha of the NCA are designated as priority habitat. Many of the designated areas are woodland, moorland or heathland.	International	88 per cent of the SSSI area is deemed to be in unfavourable recovering condition. There have been problems with over or undergrazing of many heath and moorland areas but recent years have shown a determined effort to bring them back under tighter management. Areas of priority habitats without designation are often degraded due to past attempts to improve the area for agricultural production such as the installation of drainage and improvement through fertilisers.	Explore opportunities to improve the condition of all important sites and habitats. Further action should be taken to increase the area of important habitats where possible, increase the connectivity of sites and habitats, and create more habitat where appropriate.	**Biodiversity** **Sense of place / inspiration** **Regulating water quality** **Regulating water flow** **Climate regulation** **Pollination**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Nationally designated sites Historic, localised tin and copper mining China clay extraction Quarrying Tin and copper mining Local stone often used in vernacular buildings Cornwall and West Devon Mining Landscape World Heritage Site	The predominantly granite geology underpins all aspects of the landscape of this area. It contributes significantly to the sense of place, history, recreation and is a major attraction for visitors to the area. The geology is expressed in the tors and moorstone and through its use as a building material. The weathered granite has given rise to large deposits of china clay which is mined on an industrial scale. There are five geological SSSI including Roche Rock and Luxulyan Quarry. The Luxulyn area is included in the Cornwall and West Devon Mining Landscape World Heritage Site.	International	The range and variety of geology and geodiversity across the area has been widely studied and continues to allow for the study and interpretation of earth sciences. The area provides examples of how mineral deposits have been won (streaming, mining and open cast) and their impact globally, now recognised as a Cornwall and West Devon World Heritage Site. The Hensbarrow Downs area is an example of modern china clay industry.	Identify and realise opportunities for enhanced access to, study and increased understanding of the Internationally important geodiversity across the area to allow further information to be gained. Opportunities should be explored to continue to use local stone in building development.	**Geodiversity** **Biodiversity** **Regulating soil quality** **Sense of place / inspiration** **Sense of history**

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Catalogue Code: NE486 ISBN 978-1-78367-043-7

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