



BRIGHTON & HOVE AND LEWES
DOWNS BIOSPHERE PARTNERSHIP

Biosphere Management Strategy



FOR A
WORLD-CLASS
ENVIRONMENT

2014 - 2019

OVERVIEW

LINKAGES

RURAL

URBAN

COASTAL

KNOWLEDGE

Foreword

The Brighton & Hove and Lewes Downs Partnership is a cross-sector partnership that has come together for the area between the River Adur and the River Ouse to become a Biosphere Reserve under UNESCO (the United Nations Educational, Scientific and Cultural Organisation).

A decision from UNESCO on Biosphere status is expected in summer 2014. This Management Strategy will then come into effect for a five-year period until 2019.

Despite their name, Biosphere Reserves are not restrictive protected areas. Rather, they are places where, by working together, people can create a better life for themselves and the other living things who share the space.

Being a Biosphere Reserve will lead to international recognition for the good work already being carried out in the area in protecting and enhancing the environment. It will also improve partnership working, particularly across local authority boundaries, raise standards and help tackle wider issues across the whole area. It should help to better integrate the three Biosphere objectives of nature conservation, sustainable socio-economic development, and knowledge, learning and awareness, through a more holistic approach.

Our Partnership continues to grow and broaden its representation of different organisations. We are also committed to engaging with local people, building on the 1,500 "Friends of the Biosphere" signed up so far, so that everyone can play a part in our shared aspirations to become a "world-class environment".

This Management Strategy is one small step in the right direction, but its success will depend on both our partners and the wider public being inspired to work towards its aims. If we achieve this then we will have made significant progress towards a more sustainable and healthy future. I hope you will join us on this journey.



Chris Todd

Chair – Brighton & Hove and Lewes Downs Biosphere Partnership
September 2013



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Chapter 1 OVERVIEW

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CHAPTER 1 – Overview

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An Introduction to Biosphere Reserves

What is a UNESCO Biosphere Reserve?

Biosphere Reserves are areas internationally recognised under the 'Man and the Biosphere' Programme of UNESCO as "sites of excellence" to balance conservation and socioeconomic development between nature and people, and to explore and demonstrate innovative approaches as learning sites for sustainable development.

The 621 sites across 117 countries bestowed with this global accreditation collectively form the World Network of Biosphere Reserves. The UK presently has five sites, three of which - North Devon (England), Dyfi (Wales), and Galloway & Southern Ayrshire (Scotland) – are modern Biosphere areas that lead the way in linking the conservation of their local environment to sustainable socio-economic development opportunities.

Despite their name, Biosphere Reserves are not statutory designations nor restrictive areas that preserve nature in splendid isolation (and certainly are not artificial glass domes!), but instead are living, working places for people and the rest of nature.

How do Biosphere Reserves work?

Biosphere Reserves have three functions:

- Conservation – of landscapes, ecosystems, species and genetic variation (biodiversity)
- Development – of society and the economy in ecologically and culturally sustainable ways
- Knowledge – facilitation of public awareness, environmental education, collaboration, academic research and monitoring to develop innovative approaches to conservation and development

Biosphere Reserves are split into three zones to deliver these functions:

- Core Area – statutory nature conservation sites (international and national designations) whose effective protection and management is the overriding focus
- Buffer Zone – land and sea that surrounds, links up and shields the Core Area(s) with sensitive management that is compatible with nature conservation
- Transition Area – areas of more intensive urban/rural land use, as well as the open sea, where sustainable management and lifestyles are promoted and pursued

What are the potential benefits of being a Biosphere Reserve?

- Improved quality of life by creating a healthier environment – helping nature to help ourselves
- Strengthening the economy by making the area a more attractive place to visit
- Heightened profile of a world-class accolade, enabling increased marketing and funding opportunities
- Opportunities to attract and create new enterprises and jobs in environmental and low-carbon industries
- Improved partnership working, helping to break down barriers and raise environmental quality
- Provide an integrated framework for conservation and development policy and practice, linking up initiatives across different sectors and locations, and driving best practice in environmental management, development planning and stakeholder participation

- Attract longer-term funding for effective short-term projects, which are delivering Biosphere objectives but risk being lost
- Foster a stronger sense of community awareness, identity and pride in the local environment through public engagement and environmental education
- Enable applied research and monitoring by local academic institutions to address conservation and development challenges
- Promote collaboration and knowledge transfer through the international Biosphere network

How could the Biosphere make a real difference to local people's lives?

- Improve drinking water quality, by managing the land so that polluting chemicals do not contaminate the chalk aquifer. This would remove the need for expensive artificial “end-of-pipe” treatments which increase our water bills
- Clothe more buildings with living green walls and roofs which help to insulate them, sustain wildlife and capture storm water to reduce flash flooding linked to climate change
- Increase the number of warmer and more efficient homes, lowering climate change impacts and fuel bills in an era of ever-increasing energy costs
- Add to the colour and diversity of urban green spaces by encouraging wild flowers to grow, thereby sustaining pollinating insects and other wildlife
- Bring the countryside into the heart of urban areas, through creating and restoring diverse chalk grasslands that are connected to the wider downland and are grazed by sheep that provide a local food source
- Increase awareness of natural spaces close to homes for healthy exercise, family time and relaxation
- Encourage more people to become active outdoors – through walking, cycling, and swimming – and take part in “green gyms”, improving mental and physical health and well-being, helping to fight obesity, and reducing costly NHS treatment later in life
- Rediscover past cultural connections to the downland and coast, which were based on the area's natural assets
- Open up publicly-owned downland to greater environmental and social benefits, through more targeted conservation measures and managed access
- Support farmers with appropriate rural diversification schemes, to boost their income and promote more recreational opportunities such as campsites for visitors
- Create new job opportunities by increasing the desirability of living in, working in and visiting our towns and cities, through a healthier urban environment with more trees and wildlife; this would in turn encourage more (eco-)tourists to spend longer here and in the surrounding downs and coast
- Support local sustainable fisheries which boost the local economy, reduce food miles and help to improve the marine environment and sea life
- Support initiatives which help connect local food producers with their markets and which develop the infrastructure to support this
- Reduce pollution from homes, gardens and urban areas which negatively impacts the cleanliness and quality of sea water
- Use less water individually so that there is enough for our needs and for the natural environment, especially with increasing drought impacts from climate change
- Add value to local produce from the Biosphere area as a desirable and sustainable source of goods and services

The Brighton & Hove and Lewes Downs Biosphere Partnership

The Brighton & Hove and Lewes Downs Biosphere Partnership consists of almost 40 public (national statutory and local authorities), educational, community, voluntary and private sector bodies, including all five local authorities and local town and parish councils, the South Downs National Park Authority (SDNPA) and the Sussex Inshore Fisheries and Conservation Authority (IFCA).

The Partnership has engaged with a wide range of stakeholders in 2012-13 to inform the Biosphere proposal and management strategy, through around 150 public events and meetings and dedicated topic working groups and local workshops. This culminated in a major formal consultation exercise that attracted almost 1,800 individual responses, 94% of which supported the Biosphere proposal and 95% its objectives.

Our Aim & Objectives

Our aim is:

To create a world-class environment, that is economically successful and enjoyed by all – forever.

Our three objectives are:

1. Nature Conservation

Improve important local wildlife habitats and species (biodiversity), and precious environmental resources such as water, through better downland and floodplain management, enhanced landscapes and urban spaces, and new marine conservation initiatives.



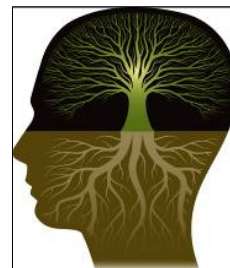
2. Sustainable Socio-Economic Development

Take positive action to reduce energy and water use, and waste generation; encourage sustainable transport and local food production; and develop new social and economic opportunities such as outdoor health, eco-tourism and low carbon industries.



3. Knowledge, Learning and Awareness

Increase awareness and knowledge of our environment and culture by working with local universities, schools and colleges, and the public to actively engage people in the use, appreciation, conservation and management of their local area.



The more technical project objective, which cuts across and seeks to integrate the three objectives as well as our three environments, is:

“To promote international Biosphere status as a unified approach to town, country and sea which adds value; improves policy and practice; supports healthy ecosystem services; and better connects people to their environment.”

The Brighton & Hove and Lewes Downs Biosphere area

The proposed Biosphere Reserve (see map below) covers 389 square kilometres or 150 square miles (38,921 hectares / 96,175 acres), an area a little larger than the nearby Isle of Wight. Three-quarters of this area is land and one-quarter is sea. It comprises three distinct but inter-related environments:

- Rural environment of the South Downs National Park block that lies between the River Adur in the west and the River Ouse in the east
- Urban environments of the city of Brighton & Hove, and towns of Shoreham, Lewes, Newhaven, Peacehaven, Telscombe, Southwick and Shoreham Beach
- Coastal and marine environment of the English Channel, running from Shoreham Harbour in the west to Newhaven Harbour in the east, and extending out to 2 nautical miles in near-shore waters to include sub-tidal chalk outcrops



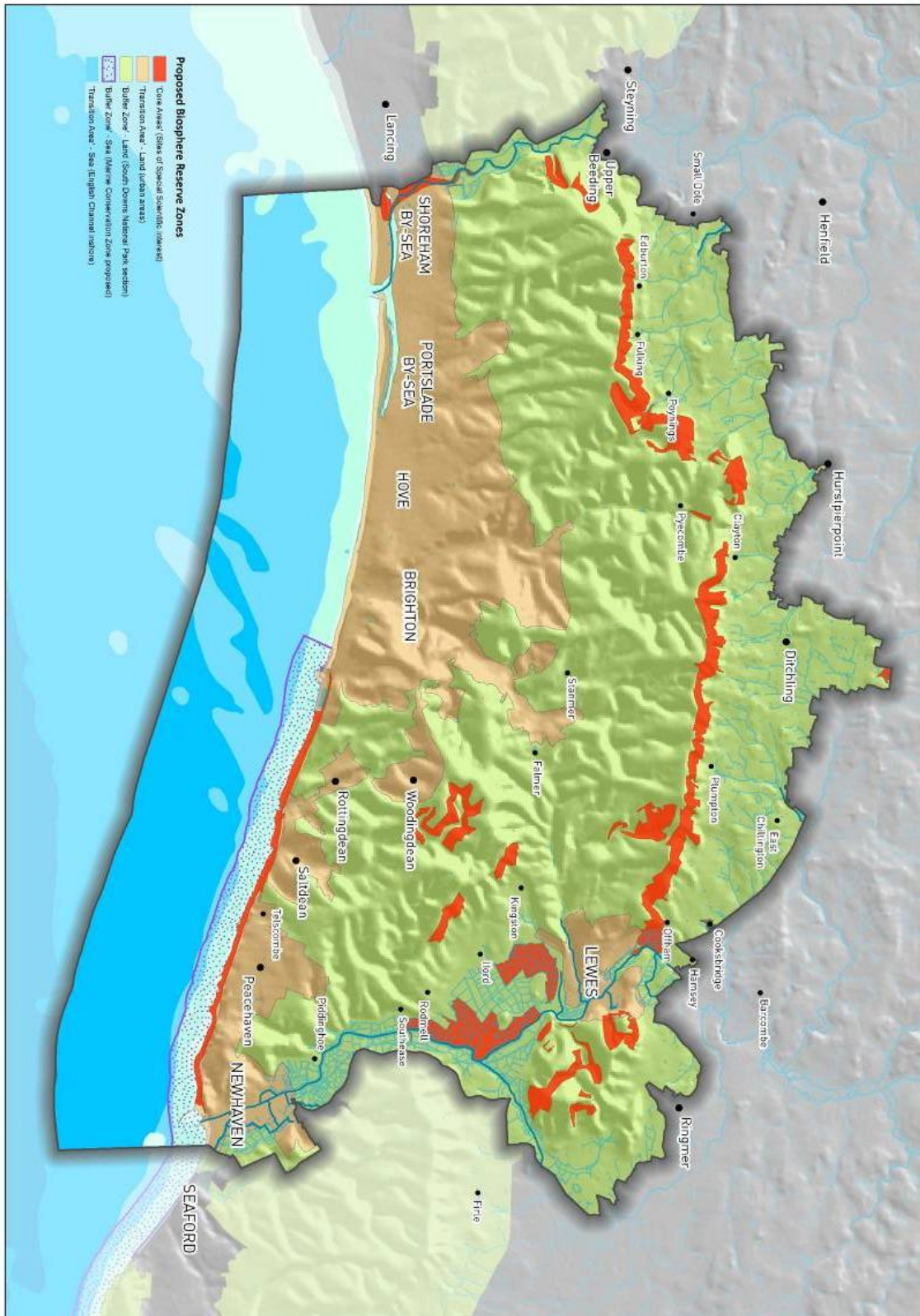
These rural, urban and coastal/marine environments sustain many of the daily needs of the 371,500 people who live here (as well as around 12 million visitors annually), and those of thousands of species of wildlife too. They provide us with clean water, local food, open space for relaxation and inspiration, and a desirable environment for tourists to spend time and money.

The area has an approximate economic value of £7 billion, with a local economy that is fairly resilient although income levels are below average in the South East. While there are large employers, both public and private, including the two universities, there is a strong independent sector mainly made up of small and medium sized business.

Many important and rare wildlife habitats occur here – from chalk grassland on the South Downs to wetlands in the river valleys and estuaries, and from the networks of urban greenspace to the vegetated shingle beaches, chalk cliffs and coastal reefs. These in turn support over 200 species on international conservation lists, over 300 national priorities, and more than 1000 that are locally rare.

In the more managed environment on land, food is produced both in the rural and urban environments, mainly meat, grains, fruit and vegetables and honey, although the latter are less commercial and tend to be produced individually in gardens and allotments for personal use. The sea is also a source of food in the form of fish and other creatures, although these are not farmed as such, purely harvested.

The connections of "green networks" for wildlife and people between town, country and coast are important. The area has a rich heritage and contemporary culture, which has developed from nationally significant early Neolithic settlements right through to the Regency period and modern times as a centre for the arts and culture, digital media and environmental industries.



Our Biosphere Zones

- Core Areas:

The 14 internationally/nationally protected nature conservation sites, found almost entirely within the South Downs National Park, form the 'Core Areas' of the Biosphere where conservation is the priority, and cover around 1,700 ha, or 5% of the total area. They are distributed as a "string of pearls" in an arc along the northern chalk scarp slope and eastern downland areas, and descend down the river valleys and meet the coastal strip in the east. They comprise all of the nationally designated Sites of Special Scientific Interest (SSSIs) on and around the Brighton and Lewes chalk blocks, including ten biological sites. Two of these are European Special Areas of Conservation (SACs), three are mainly geological sites and one is a mixed (coastal) site. The eleven sites with biological interest are dominated by chalk grassland sites (6), with two freshwater, one acid grassland, one coastal and one estuarine site.

- Buffer Zones:

The 'Buffer Zone' is made up the remainder of the South Downs National Park (not including Lewes town) and the adjacent western end of the recommended Marine Conservation Zone (MCZ) of 'Beachy Head West' (to be confirmed by 2014). This is where human activities that are compatible with nature conservation, such as sensitive agriculture and recreation, are promoted. The South Downs National Park is predominantly a landscape designation, where there are stricter planning controls and where sustainable land management is promoted. Similarly a Marine Conservation Zone should lead to more favourable marine management.

- Transition Areas:

Finally, the 'Transition Area' is formed of two parts: the urban settlements of Brighton & Hove, Lewes, Newhaven, Peacehaven, Telscombe, Southwick, Shoreham and Shoreham Beach which lie outside the South Downs National Park (except for Lewes town); and the near-shore English Channel, out to the sub-tidal chalk ledge which lies up to two nautical miles offshore, but excluding the recommended Marine Conservation Zone. These areas are environments used more intensively by people in which active participation in more sustainable management and lifestyles are encouraged. Examples of such activities include local food-growing, renewable energy use and sustainable sea fisheries.

A Biosphere Reserve can add to the existing South Downs National Park designation by integrating the large urban coastal settlements and the neighbouring sea into one area.

The Biosphere Management Strategy

This Management Strategy sets out the characteristics of the proposed Biosphere area, the work that is already taking place or is planned or possible, and how a Biosphere Reserve is intended to work for us.

Each element within is described in terms of its nature, information resources, and current policy and practice. Proposals for future Biosphere focus are identified which will reduce deficiencies, address gaps and enable new opportunities to be realised.

The connections that bring together the different environments of town and country, and land and sea, are the focus of *Linkages* (Chapter 2).

Each of the three environments of *Rural* (Chapter 3), *Urban* (Chapter 4) and *Coastal & Marine* (Chapter 5) *Environments* is individually considered, with the two main Biosphere functions of nature conservation and sustainable socio-economic development addressed in each area.

The cross-cutting topic of *Knowledge, Learning & Awareness* (the third and final Biosphere function) is the subject of Chapter 6.

A Summary Table that details each of the main elements and issues covered by this Management Strategy follows, structured according to the three Biosphere objectives as well as overall "Linkages". This sets out general principles for improvement, as well as the proposed focus for the Biosphere Partnership to "add value" to such efforts.

Management Strategy Summary Table

ELEMENTS / ISSUES (Chapter / page reference)		PRINCIPLES	BIOSPHERE FOCUS
<i>What is important here?</i>		<i>What is needed?</i>	<i>What will we do?</i>
1. Nature Conservation		Improved status of key habitats and species under the Local Biodiversity Action Plan (LBAP)	Support implementation of LBAPs for the most valuable and distinctive wildlife elements of the Biosphere
Key Habitats		Bigger - Better - More - Joined-up semi-natural habitats for wildlife	Help to implement the national 'Lawton recommendations' through sensitive habitat management, restoration and creation works
Rural: Chalk Grassland, Farmland, Woodland, Freshwater (C3 / p44)		Better management for nature, integrated with productive land uses	Support Nature Improvement Area (NIA) chalk downland measures, targeted agri-environment farming approaches, sustainable (wood)land management, and more natural wetland features (floodplains and downs)
Urban: green spaces (e.g. parks) & features (e.g. street trees) (C4 / p71)		Increased natural value for wildlife, linked to benefits for town-dwellers (e.g. "wild play", mental health)	Encourage more eco-friendly urban green elements (including gardens and buildings) understanding and adoption by people (e.g. plants for pollinators)
Coastal & Marine: vegetated shingle beaches, chalk cliffs & reefs (C5 / p123)		Sensitive management combined with effective conservation and recovery of marine habitat condition	Support seabed mapping and new marine conservation approaches (marine protected areas - rMCZ and marine SNCIs) - and marine plans through stakeholder dialogue
Key Species Groups: Birds, Butterflies/Bees, Plants, Others (C3 / p50; C4 / p88; C5 / p124)		Effective conservation of healthy local populations of key species for conservation and ecosystem services	Support targeted sympathetic management for selected individual groups/species, including farmland birds, downland butterflies, bees (pollinators) and Elm trees
Geology: chalk downs and cliffs (principally) (C3 / p53; C5 / p125)		Continued conservation, and heightened public understanding and appreciation	Support public interpretation of the geology of the area on specific sites (SSSIs / Local Geological Sites) and the general landscape

ELEMENTS / ISSUES (Chapter / page reference)	PRINCIPLES	BIOSPHERE FOCUS
<i>What is important here?</i>	<i>What is needed?</i>	<i>What will we do?</i>
2. Sustainable Socio-Economic Development	Reduce the “ecological footprint” of our lifestyles through positive behavioural change	Encourage organisations (incl. Biosphere Partners) and individuals to take positive action (across all elements)
1. Carbon / Energy (C4 / p92)	Make buildings more energy-efficient and generate more renewable energy	Promote energy conservation measures to public to reduce their fuel bills and climate change impacts Promote renewable energy generation opportunities
2. Waste / Sustainable Materials (C4 / p94 & 100)	Reduce waste, reuse as possible, recycle and recover (energy); use sustainable products (with low embodied energy)	Work with community bodies and public to reduce waste generation, increase recycling rates and compost waste
3. Sustainable Transport (urban & rural) (C4 / p97; C3 / p56)	Reduce the need to travel and encourage low carbon modes of transport to reduce emissions; improve sustainable access to the countryside	Promote active and low carbon travel to urban populations for its multiple benefits; work to better link sustainable access to countryside
4. Local and Sustainable Food (rural, urban & marine) (C3 / p55; C4 / p102; C5 / p126)	Choose more low-impact diets; reduce food waste; connect rural producers to markets; ensure marine fisheries are sustainable	Integrate and promote healthy local growing and eating; support rural infrastructure/product-branding; support work to achieve Marine Stewardship Council (MSC) fisheries certification and encourage local consumption
5. Sustainable Water (urban demand focus) (C4 / p104)	Use water more efficiently in buildings and in the products we buy	Work with the public and water companies to seek to balance water demand with locally available supply
6. Culture and Community (incl. Heritage) (urban, rural & marine) (C4 / p105; C3 / p57; C5 / p132)	Nurture a culture of sustainability, community and a sense of place which builds on the local heritage	Encourage a natural sense of place and identity by working with organisations (heritage and arts) and the public to connect with their local environment
7. Local Economy (incl. Ecotourism) (urban, rural & marine) (C4 / p107; C3 / p58; C5 / p128)	More sustainable economic development, better linked to our local environment and communities	Develop ‘eco-tourism’ opportunities for people to sustainably appreciate the natural environment; support appropriate rural diversification; support new development which is sustainable, and fair trade
8. Health and Wellbeing (incl. Recreation) (urban, rural & marine) (C4 / p111; C3 / p60; C5 / p131)	Active balanced lifestyles to promote good health and well being	Promote sustainable outdoor recreation that provides physical and mental health and other benefits through greater contact with nature

ELEMENTS / ISSUES (Chapter / page reference)		PRINCIPLES	BIOSPHERE FOCUS
<i>What is important here?</i>		<i>What is needed?</i>	<i>What will we do?</i>
3. Knowledge, Learning & Awareness		Greater applied understanding of the local environment and “environmental literacy” of citizens	Work with local research and education bodies to generate new knowledge, interest and engagement
Research & Monitoring			
Research (in Physical, Living, and Socio-economic Environments) (C6 / p139)		Sufficient focused research information on the local area that can directly inform and support its sustainable management, use and enhancement	Develop a Research Plan with local higher education bodies and others to identify the key applied questions to support local environmental management through new research projects, linked to wider areas as possible
Monitoring (Environmental) (C6 / p144)		Adequate baseline information and targeted monitoring to be able to interpret and as possible attribute changes occurring over time	Develop a Research Plan that sets out the baseline situation and facilitates more comprehensive and standardised monitoring approaches in the local area
Environmental Education			
Schools (C6 / p146)		Children and young people to develop a natural passion to be active, explore and appreciate their local environment	Support formal environmental education provision in schools (including use of school grounds and local green spaces) through various local initiatives (e.g. BHee programme, Eco-Schools, Forest Schools, Wild Beach)
Universities & Colleges (C6 / p149 & 148)		Maintenance and development of courses which include a local environmental focus; integration of sustainability within mainstream curriculum	Support development of local environment elements of courses with local Higher and Further Education bodies
Environmental Education Centres (C6 / p149)		Good local facilities for informal environmental learning for all to interpret and engage with the local environment	Work with existing and develop new environmental education facilities (incl. Linklater, Woods Mill, and proposed Big Nature Centre) and programmes that focus on the local environment
Public Awareness & Engagement		Broad public understanding, enjoyment, support and engagement to re-connect people with their local environment, and incentivise more environmentally-friendly lifestyles of residents and visitors	Facilitate a progressive “learning journey” approach, from awareness and knowledge to “bio-empathy” and active engagement
Nature conservation (C6 / p153)		Public understanding and appreciation of the natural environment, its needs and links to our lives	Engage people to understand and responsibly use their local natural environment through access, interpretation, events, education, volunteering and a stake in local management decisions
Environmental sustainability (C6 / p155)		Public understanding of the environmental impacts of our lifestyles and how we can make a positive difference to our world	Engage people to understand and improve the environmental impacts of our lifestyles, through interpretation, events, education, volunteering and a stake in local management decisions
Professional Training (vocational) (in environment-related topics) (C6 / p159)		A strong local skills base for the future to study, teach, manage and communicate about the environment	Work with and promote local vocational training providers on their course provision, curriculum content and potential students

ELEMENTS / ISSUES (Chapter / page reference)		PRINCIPLES	BIOSPHERE FOCUS
<i>What is important here?</i>		<i>What is needed?</i>	<i>What will we do?</i>
4. An interconnected Natural Environment		Integrated approaches to sustainably manage the downs, towns and coast environments	Work through a shared vision of environmental improvements to benefit nature and people
Town & Country			
Landscape Connections (C2 / p14)	Improved connections for people and wildlife to move between rural areas and urban green spaces	Develop and improve green networks of ecological corridors	
Water Resources - Ground Water (C2 / p16)	Improved groundwater aquifers (quality and quantity) for drinking water supply	Help to deliver improvement objectives for the Adur and Ouse catchment by working with rural and urban land managers and householders	
Water Resources - Surface Water (C2 / p19)	Better water quality in the Adur and Ouse rivers and estuaries by reduced pollution run-off from the land	Work with rural and urban land managers and householders to reduce "diffuse" pollution sources	
Freshwater Flood Risk Management (C2 / p22)	Sustainable, more natural measures to reduce flood risk (which is increasing with climate change)	Promote development of Sustainable Drainage Systems (SuDS) in urban areas, and rivers reconnected to their floodplains	
Land & Sea			
(Bathing) Water Quality (C2 / p25)	Sustained improved quality along local beaches for people and nature (to meet the new EU standards)	Help to inform and engage the public about coastal water quality and their role in improving it	
Coastal Flood & Erosion Risk Management (C2 / p26)	Protect urban areas and built infrastructure through as many natural processes as possible	Promote integration of benefits for the natural environment and sustainability in Flood and Coastal Erosion Risk Management strategies and schemes	
Overall Approaches			
"Ecosystem Services" (C2 / p28)	An optimised balance of benefits for nature and people provided by healthy environments	Assess the services provided by local ecosystems and promote their integration in decision-makers' policy, sustainable rural land management (including new incentives e.g. PES), and public understanding	
Climate Change – adaptation (C2 / p31)	Increased resilience of our environment and communities to unavoidable impacts	Support practical adaptation measures and preparedness to cope with extremes of drought and flooding, temperature, weather events, and rising sea levels	
Climate Change – mitigation (C2 / p31)	Reduced emissions of greenhouse gases from energy use and land use impacts	Work with organisations and individuals to reduce energy consumption, source more sustainable energy, and avoid damaging emissions from (wet)land	
"Green Infrastructure" (C2 / p33)	Multiple use and benefits to nature and society from well-functioning green networks	Encourage a multi-functional approach to landscape policy, design and management (especially in urban greenspace and new developments)	

Chapter 2 LINKAGES

2



CHAPTER 2 – Linkages

Summary

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SUMMARY

The three distinct environments of town, country and coast in the Biosphere area are closely connected. For example, town and country are connected by green corridors for wildlife and recreation by people. The land and sea are linked through runoff of nutrients and disposal of sewage, and through flooding and erosion of the coastline. It is important to consider and manage our local natural environment as an interconnected entity, rather than solely focus on its individual areas or elements in isolation. A range of tools are available to address these issues, including:

- Landscape ecology: a scientific approach which includes a focus on the spatial connectivity of wildlife habitats and species populations
- Ecosystem Services: a framework to value all the benefits that people obtain from the natural environment, such as water, recreation, water quality and flooding control, and nutrients/food
- Green Infrastructure: an approach to actively plan and manage greenspace to deliver a wide range of environmental and socio-economic benefits
- Water Framework Directive: an integrated approach to water management to achieve good ecological status across surface water rivers, groundwater aquifers and inshore coastal waters by addressing both water quality and quantity issues
- Climate Change mitigation and adaptation: reducing greenhouse gas emissions and preparing local environments and communities for unavoidable climate impacts

A major objective of the Biosphere Project is to re-connect urban-dwellers with the natural environment. Working through the 'South Downs Way Ahead' Nature Improvement Area project and Brighton & Hove Green Network especially, the aim is to boost the ecological connectivity, of chalk grassland in particular, by bringing the countryside into the heart of our towns. This will be done along road corridors, parks and housing grounds, through enhanced habitat networks and more natural management of greenspace, including sheep grazing. Through education and recreation this will increase local people's understanding of their local "ecosystem services" and connections to the environment.

A key element is water, as a resource for life and as a flooding risk. The Adur & Ouse Partnership is working with the Biosphere Project to implement the Water Framework Directive (WFD) locally. This will address the significant issues of declining water quality (mainly from nitrate pollution), from both urban and rural sources, and the increasing demand for water, placing increasing pressure on groundwater supplies and the wider environment. There is also a focus on the surface water rivers and wetlands of the Adur and Ouse valleys to tackle water quality and ecological quality issues through a catchment management approach to both rural and urban sources of pollution. The related issue of freshwater flooding comes from the rivers, particularly the River Ouse, and surface water runoff. The aim is to reconnect rivers with their floodplains where possible to deliver greater flood storage capacity and wetland habitats. In urban areas, the focus will be to develop more "green infrastructure" such as green roofs or rainwater storage to reduce flood risk by slowing or preventing water entering urban drainage networks. At the coastal margin, a strategy is being developed to address both flood and coastal erosion risk to sustainably hold the existing line of defence.

One of the key issues for the marine environment resulting from inputs from the land is nutrient enrichment (mainly nitrogen and phosphorus from wastewater effluents and agriculture), causing poor water quality. The modern wastewater treatment works at Peacehaven is now addressing bathing water quality to meet the demanding requirements of the revised Bathing Water Directive, and help to achieve 'blue flag' status. The "diffuse pollution", meanwhile, from rural and urban sources is a focus for the Biosphere Project, to influence land use through agri-environment schemes, for example, and householders' behaviour through public education and outreach.

2.1 Introduction to Linkages

A key benefit of the Biosphere approach is that it promotes greater integration of how we think about and manage our environment, rather than assessing each of the elements and environments (rural, urban and coastal/marine) in isolation. The Biosphere approach is built around how the natural environment really works, based upon the fundamental processes which link the individual elements together.

Imagine, for example, being a resident of a council block on the edge of town who: enjoys the panoramic views; grows healthy, cheap food on a nearby allotment; walks the dog each day on the local downland nature reserve (with its colourful wild flowers and butterflies) and keeps an eye on the grazing sheep; and spends the evening sea-fishing for a catch of local in-season mackerel for supper. These are ways we can better connect with the diversity of our local environment.

Or perhaps consider where our water comes from. Water is evaporated from the land and sea before falling as rain upon the rolling hills of the South Downs, where it can then spend many years passing down through the natural cleansing filter of chalk to the groundwater aquifer. Over time this historic rainfall is pumped up to the surface and generally receives limited treatment only (given its natural purity) to be supplied as drinking water to households and businesses. Eventually it will then be passed out to sea via the sewer system.

Not all connections are “on the ground” between different environments. Our associations may be less tangible. For example, the established link between an attractive healthy environment and thriving local businesses and neighbourhoods in urban areas, or the health and wellbeing benefits of outdoor recreation in local accessible green spaces.

This chapter of the Biosphere management strategy addresses how urban and rural areas are connected and could be improved. The same is also done for land and sea. Finally it sets out the key approaches to a more joined-up way of looking after the natural environment, so that it is able to provide the ecosystem services upon which the area depends, and adapt to the growing impacts of global climate change.

2.2 Town & Country

A. Introduction

The chalk hills of the surrounding South Downs National Park are essential to the health of our urban areas – Brighton & Hove, Shoreham, Lewes, Newhaven and Peacehaven – given their fundamental role in providing clean water from the groundwater aquifer; local food; fresh sea air; contact with wildlife; and outdoor spaces for exercise, recreation and relaxation. Urban and rural environments physically come together at the urban fringes (much of which is designated within the National Park). They are linked through green corridors that lead from chalk downland to the heart of our settlements and the coast.

The importance of the Downs to the vitality of our towns has long been recognised by local people. From the late 1800s to the early 1900s, the Brighton Corporation (precursor of the local council) purchased downland areas to protect groundwater supplies and prevent uncontrolled development. However, much of this earlier public understanding has largely been forgotten. Re-establishing this awareness is a key focus for the Biosphere Project.

B. Landscape Connectivity

The science of landscape ecology has experienced a great upsurge in interest in recent years among nature conservationists and other sectors keen to take a spatial approach to managing the natural environment in an integrated way with other rural and urban land use. The concept of “green networks”, including ecological corridors for movement of wildlife species and people, has increasingly been a focus for planning and action, culminating in the national ‘Making Space for Nature’ Lawton report (2010). This promotes four essential principles for future nature conservation in the UK: bigger, better, more, and joined-up. The last principle of “spatial connectivity” is our particular focus here.

Current Policy & Practice –

A number of different programmes are being pursued to advance ecological connectivity at a landscape scale, a concept advocated under The Wildlife Trusts’ ‘Living Landscapes’ and RSPB’s ‘Futurescapes’ initiatives for example.

The Sussex Biodiversity Partnership has identified a countywide network of Biodiversity Opportunity Areas (BOAs) that represent significant local landscapes with existing nature interest. These are recommended as areas to target for further enhancement and better interconnectivity. Building on this approach, an urban Green Network for Brighton & Hove was modelled in 2009 based upon accessibility of natural green space to people, and the potential movement of wildlife, including links to rural chalk grassland habitats. The resulting network seeks to link existing designated wildlife sites and other semi-natural greenspace through a suite of potential core areas, green buffers and connection zones.

The South Downs National Park Authority (SDNPA) has commissioned ecological connectivity modelling studies of a range of habitats and key species by Forest Research using their nationally adopted approach.

The Brighton & Hove green network forms an integral part of the ‘South Downs Way Ahead’ Nature Improvement Area (NIA) project for the Brighton & Hove and Lewes focal area. The NIA is a DEFRA-funded partnership pilot project (2012-15) to promote functioning ecological connectivity (of chalk grassland especially) and people’s connections to the South Downs landscape under its ‘Town to Down’ theme.

These landscape conservation approaches, based upon ecological connectivity, are now being incorporated into local spatial planning policies. These include Brighton & Hove City Council’s (BHCC) draft City Plan for city-wide policies and special area policies on, for example, Biodiversity and the Urban Fringe respectively.

Beyond policy, practical work on improving green networks has already started. In Brighton & Hove the central reservation of the Lewes Road, one of the main roads into the city, has been converted into a wildflower corridor, and park planting schemes have increasingly focused on nectar-rich perennial plants. These approaches are now being extended through the NIA project and Higher Level Stewardship (HLS) grazing schemes to bring the countryside into the city. Such local chalk grassland habitat creation and restoration projects aim to bolster the functioning of the wider ecological network.

Future Focus –

Planned:

- Delivery of habitat networks that connect the urban and rural environments for nature and people, based upon modelling studies and using the NIA framework to co-ordinate rural and urban enhancements (by SDNPA and BHCC respectively) that deliver more and better connected chalk grassland areas
- Butterfly/Bee banks habitat creation under the Nature Improvement Area (NIA) project
- The emerging Adur Local Plan, and Joint Area Action Plan for Shoreham Harbour, are to contain policies that recognise the need to enhance green corridors and improve ecological connectivity

Potential:

- Incorporation of the Brighton & Hove Green Network objectives in major civic improvement projects, such as the Lewes Road sustainable transport project and the proposed Valley Gardens project to improve and re-connect urban greenspace
- Improved access to the South Downs, particularly for pedestrians and cyclists (especially on busy road crossings such as the A27)



In recent years, BHCC Cityparks has been experimenting with recreating accessible chalk grassland in council parks and housing land. Downland wildflowers have been introduced by planting 'plug plants' and sowing wildflower seed.

C. Water Resources

Water is a precious natural resource that is vital to the health of the environment, human wellbeing and the economy. The water contained in the Rivers Adur and Ouse may be the only obvious freshwater resource present in the Biosphere area, but it is the water stored underground in the South Downs' chalk aquifers that supplies most of our drinking water.

Demand for clean water is growing as a result of an increasing population, and higher modern day living standards and expectations. Resources are finely balanced between meeting the demands of existing abstractions and the need to protect river flows and the groundwater aquifer to meet environmental and other in-stream requirements. Water abstraction from both surface and ground water sources in the Adur and Ouse catchments is managed by the Catchment Abstraction Management Strategy (CAMS) www.publications.environment-agency.gov.uk/pdf/GESO0305BVIG-E-E.pdf, which is led by the Environment Agency in consultation with local stakeholders. CAMS investigate and assess the availability of water resources and the sustainability of current abstraction, with the aim of restoring a healthy balance between the needs of people and the environment.

The modern driver for sustainable water management is the European Community (EC) Water Framework Directive (WFD) www.environmentagency.gov.uk/research/planning/135096.aspx, which requires all inland and coastal waters to meet “good ecological and good chemical status” (or “potential”) by 2015 and not deteriorate from their present status either. The WFD also addresses aquatic pollutants, freshwater nature conservation, and mitigation of the effects of floods and droughts. An important feature of the Directive is the integration of water quality and water quantity issues for both surface rivers and groundwater aquifers to form a holistic approach to water management.

The WFD has introduced statutory strategic River Basin Management Plans (RBMPs) to each of the nine River Basin Districts in England and Wales. These set out how the objectives for all water bodies are to be achieved. The South East region RBMP www.environment-agency.gov.uk/research/planning/124978.aspx estimates that 35% of the surface waters are meeting good ecological status. This is targeted to increase to 47% by 2015 through tackling point source pollution from sewage treatment works, historic physical modifications of rivers, diffuse pollution from agriculture and urban sources, and water abstraction. Implementation is led by, but not the sole responsibility of, the Environment Agency as the national regulatory body for the water environment.

A catchment-based approach to shared local WFD implementation is being promoted under the Adur & Ouse Partnership pilot project locally, which covers all of the Biosphere area as well as the upstream river catchment areas and all of the Sussex coast (a total area of 980 square kilometres). Established in October 2011, this broad partnership is producing a Catchment Plan with proposed objectives, targets and actions to improve all of the different water bodies present: surface water rivers, groundwater, and coastal and estuarine waters (a unique combination). The Biosphere Project is supporting the development and future implementation of the Catchment Plan particularly through engagement with local urban communities.

Please note that demand management measures are covered under the ‘Sustainable Water’ principle of the *Urban* chapter, while public awareness actions needed are contained in the *Knowledge, Learning & Awareness* chapter.

i. Ground Water

- Quantity:

The Brighton Chalk aquifer is the source of drinking water for Brighton & Hove and neighbouring towns on the south coast. Within the Adur & Ouse catchment, approximately 98% of licensed groundwater abstraction is for Public Water Supply (PWS), with the remaining 2% used for industrial and agricultural purposes. The vast majority of water abstracted by Southern Water Services (SWS) from the Brighton Chalk aquifer is provided to the coastal urban area, with a strong seasonal increase in the summer months to meet the additional demands from tourists and residents. The groundwater body is classified as poor status under the WFD, based on it

failing two of the four tests (in the 2006-9 assessment), namely excess demand over supply balance and low surface water flows. However, modelling of climate change impacts on the aquifer has shown that it can be a resilient source of water if it is managed sustainably.

Current Policy & Practice –

The Environment Agency has a national groundwater protection policy and practice statement ('GP3') which sets out its aims and approaches for groundwater. It produces a national water resources strategy that forecasts the likely pressures on all water resources over the next 20 years and the ways to satisfy future demand. Catchment Abstraction Management Strategies (CAMS) are used to provide a framework for managing abstraction licences based upon the regular assessment of (ground) water resources. Future 'foresight scenarios' of the Department of Trade and Industry (DTI) are used to look at the impact of climate change, together with changes in agriculture, industry and domestic water use.

Future Focus –

The Adur & Ouse Partnership (Groundwater group) has the following objectives and targets:

- Groundwater quantity within the catchment will be at sustainable levels, balancing both availability and demand (within the context of an integrated supply network)
- Target: Inform the water companies' upcoming 'Periodic Review' for 2014 ('PR14') with regard to groundwater quantity (and successive Period Reviews thereafter)
- Target: Reduce household and business demand in the water resource zones supplied by the Adur & Ouse sources to Defra's aspirational target of 130 litres per head per day (linked to the Urban chapter's 'Sustainable Water' section)
- Target: Update the Adur & Ouse Catchment Abstraction Management Strategy (CAMS) in 2013 to ensure the sustainable management of water resources within the catchment
- Target: Deliver the Restoring Sustainable Abstraction Programme (RSA) – solving abstraction related problems with abstraction licence holders
- Target: Water companies to deliver Asset Management Plan (AMP) 6 schemes (including 'Natural Environment Programme' schemes) with regard to water resources
- The two Water Companies are also implementing household metering programmes

- Quality:

Groundwater quality protection is important because the majority of water abstractions in our area are taken from aquifers. If these groundwater sources are affected by pollution then alternative sources have to be used either in the short or long term, with knock-on effects elsewhere. Whilst groundwater in the chalk aquifer is naturally of very high quality, increasing nitrate levels are considered to put this water body "at risk" of WFD failure and are being closely monitored. Pollution is the result of a combination of both rural and urban contamination, and includes some pesticides (glyphosate and now-banned substances) as well as hydrocarbons and solvents. The pollution comes principally from arable agriculture in the rural environment; a mix of oil and salt storage, sewers and septic tanks; and spraying highways and railways in the urban environment. Levels of contamination are expected to continue to rise due to the long potential lag time (around 30-60 years) for such inputs to reach the aquifer below. Chemical treatment by water companies of contaminated ground water (which tends to peak in the winter months) that exceeds legal safety limits for nitrates and pesticides is both expensive and energy-intensive to install and operate.

Current Policy & Practice –

The Environment Agency's national groundwater protection policy is designed to afford the highest protection to the recharge areas around chalk public water supply sources through the designation of Source Protection Zones. 'Safeguard Zones' are identified "at risk" areas where further investigation is required. Preventing pollution is by far the most sustainable and cost-effective way of maintaining good groundwater quality, as supported by various EC Directives including the Groundwater and Nitrates Directives. The Environment Agency operates a permits system for intentional discharges and disposals to groundwater, and controls other potentially

polluting activities by measures such as Notices and Codes of Good Practice. They have identified Nitrate Vulnerable Zones (NVZs) where action plans are used to limit inputs by farmers. The use of substances such as pesticides and herbicides is subject to environmental assessment.

The draft BHCC City Plan (Part 1) sets out policies which include reducing chemicals application to avoid urban groundwater contamination. BHCC's 'City Downland Estate Management' policy (formerly called the 'Downland Initiative') is developing a new focus on protecting groundwater quality (not an element of the original 2005 policy).

Successful Environment Agency campaigns have identified potentially polluting activities and advice has been targeted in these vulnerable areas. A groundwater catchment management pilot project has been run by the EA with BHCC on their city downland estate tenanted farmland. This focussed on reducing nitrate inputs and other potential chemical contaminants from agriculture through the provision of whole farm advice and support for capital improvement works. In practice the use of chemicals by BHCC has reduced substantially over the years. For example, BHCC City Parks greatly reduced herbicide applications in the period up to 2008. Southern Water is carrying out a 'restoring sustainable abstraction' scheme on the Winterbourne Stream that flows into Lewes. The South Downs NIA is now focusing on groundwater improvements under its 'Surface to Groundwater' theme.

Future Focus –

The Adur & Ouse Partnership (Groundwater group) has the following objectives and targets:

- More sustainable urban and rural land management will significantly reduce pollutants reaching groundwater such that pollution does not contribute to further deterioration of groundwater quality. In the long term, such land management will be linked to improvements in groundwater quality
- Target: Land use with an emphasis on practices that enhance multiple ecosystem services (with regard to groundwater quality) will be the leading practice of downland and headwater areas
- Target: Urban pollution does not contribute to deterioration of groundwater quality
- Target: Inform the water companies' upcoming 'Periodic Review' for 2014 ('PR14') with regard to groundwater quality (and successive Periodic Reviews thereafter)
- Identify and communicate all risks to groundwater quality and quantity using the 'ecosystem approach' through sharing of evidence with all relevant stakeholders, leading to a good understanding of the functioning of the aquifers and ecosystem services - water capture, water purification and water regulation in particular – that influence this
- Target: Construct a robust evidence base by drawing together current research and monitoring data from a wide range of sources, and relaying that evidence base back to relevant sources/stakeholders

South Downs NIA ('Surface to Groundwater' theme):

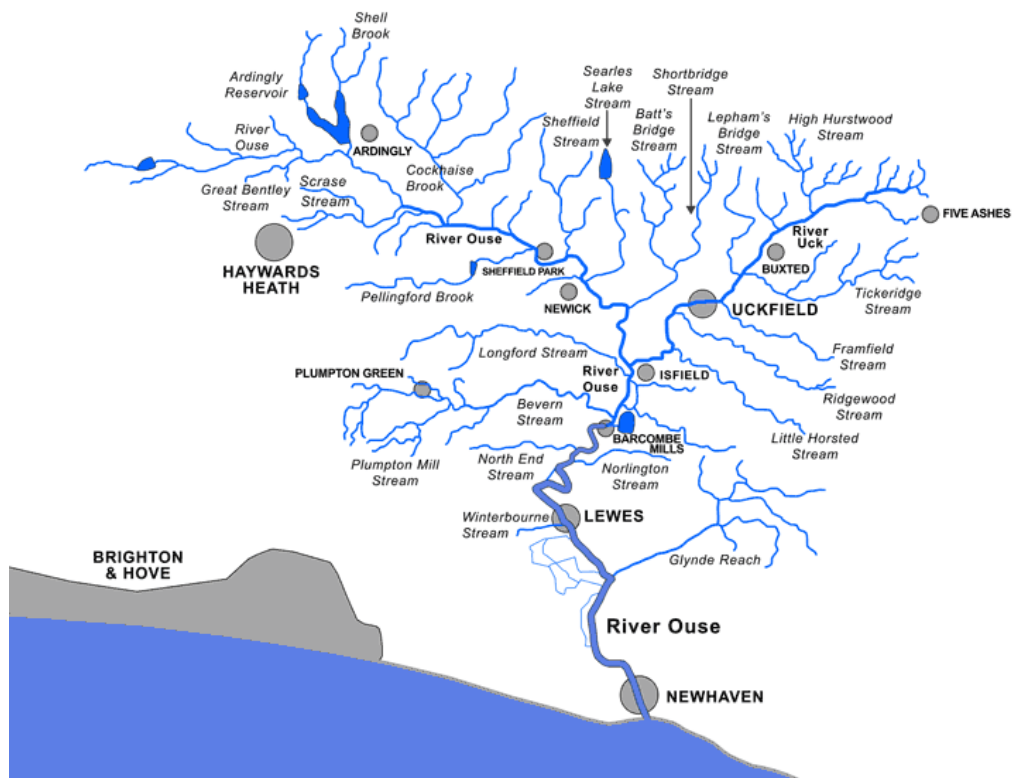
- Devise and deliver a land management programme and link to 'Periodic Review' 2014 ('PR14') to develop a levy including the Brighton Chalk Block (on completion of hydrological modelling)

ii. Surface Water



River Adur catchment map © Environment Agency

Note: the Biosphere area covers the lower tidal river only, from Upper Beeding (near Steyning) to Shoreham Harbour



River Ouse catchment map © Environment Agency

Note: the Biosphere area covers the lower tidal river only, from Lewes to Newhaven

- Quantity:

The River Adur and River Ouse support a diverse range of habitats and surface water abstractions for public water supply, agriculture and industry. The River Adur responds quickly to rainfall events and has low summer flows. It flows largely over impermeable Weald Clay but is also fed by perennial springs from the scarp slope of the Brighton Chalk which provide a limited baseflow to some of its tributaries. Its catchment covers an area of 600 km² and is home to some 550,000 people. The River Ouse has the second largest catchment area of 605 km² in Sussex and is home to around 165,000 people. It rises on the Tunbridge Wells Sands in the High Weald before flowing largely over Weald Clay down to the sea. The river is prone to winter flooding, as dramatically experienced in Lewes in 2000, but also has low summer flows making water abstraction unreliable. The River Ouse system is dominated by a large strategic public water supply abstraction operated by South East Water just above the river's tidal limit at Barcombe Mills (which lies outside of the Biosphere area). This is augmented by releases from Ardingly reservoir at the top of the catchment which keep summer flows well above natural levels. Approximately 94% of the licensed surface water abstraction in the Adur & Ouse catchment is for public water supply, with around 4.4% for aquaculture (fish farming and watercress beds), 1.5% for agricultural purposes and just 0.1% for industry.

Only a small proportion of the water abstracted in the catchment (from both surface and ground water sources) is returned to rivers and streams. This amounts to around a third of the estimated 135 mega litres of treated effluent discharged daily, with the remaining two-thirds discharged directly by Southern Water to the English Channel via Long Sea Outfalls at Shoreham, Peacehaven and Newhaven. As a result, there is a large loss of water from the catchment. The waste water that is discharged to rivers is dominated by the discharge at Goddards Green Waste Water Treatment Works (WWTW) in the Adur catchment, whilst there are six significant discharges into the Ouse catchment, with the largest at Scaynes Hill WWTW. Both sites account for about 30% of all the discharges back to their rivers, impacting the rivers' hydrology.

Current Policy & Practice –

As with groundwater, Catchment Abstraction Management Strategies (CAMS), led by the Environment Agency, provide the framework for managing abstraction licences.

Future Focus –

No elements have been identified.

- Quality:

The Environment Agency oversees a network of 50 sampling points covering approximately 250 km of classified river in the area to assess surface water quality, which is generally classed as good. The ecological water quality of the River Adur and its main tributaries is variable. The river's ecology is highly sensitive to changes in flow upstream and in all of the smaller tributaries including notable chalk streams flowing from the Brighton Chalk scarp slope. In the lower reaches and tidal stretches it is generally less sensitive to freshwater flows. The ecology in the Upper Ouse and its tributaries is also highly sensitive to changes in flow with sensitivity declining in the middle and lower reaches.

Current Policy & Practice –

Meeting future surface water quality objectives and making improvements relies on sufficient flows being available in the rivers and streams. The Environment Agency carries out regular field sampling of surface water quality across a network of monitoring stations. Environment Agency-led river enhancement projects, working with others, include:

- OUT – Ouse Upstream Thinking - cleaning up the headwaters of the River Ouse by exploring ways to reduce levels of suspended solids, faecal pollution, fertiliser and pesticide-related chemicals entering the River Ouse upstream of South East Water's water treatment works. The headwaters of the Ouse will receive less pollution and sediment loading, so the water environment will improve, helping to meet WFD targets. Other benefits include reduced water treatment costs for South East Water and lower land management costs for local farmers and landowners. The project in partnership with South East Water and the University of Brighton will look at ways to

help fund good farming and land management practices, and build this work into the water company's long-term price plans

- MORPH – Middle Ouse Restoration of Physical Habitats - restoring the River Ouse and its floodplain to a more natural state to reduce flooding downstream of the Middle Ouse and improve wildlife habitats both in and beside the river. Fifteen sites have been chosen for improvements to include floodplain storage, habitat creation and restoration, and removal and adaptation of in-river structures such as weirs to improve flows and allow better fish passage
- ARPHA – Adur Restoration of Physical Habitat Action plan - improving habitats in and beside the River Adur and its tributaries and so reduce flooding. Up to 12 sites will be improved with works ranging from the removal or modification of in-river structures, reinstating old meanders and allowing the river to flood the floodplain

These initiatives all focus on the river catchments upstream of the Biosphere area but are intended to also have a beneficial impact downstream.

Future Focus –

The Adur & Ouse Partnership (Surface Water Quality group) has developed the following objectives/targets:

- Tackle pollution in the Adur and Ouse from both urban and rural sources
- Target: Understand and address the issues of surface water pollution from roads and highways drainage
- Target: Develop a strategy to address those pollutants which pose the most serious threat to water quality in the catchment
- Target: Phosphate pollution will no longer contribute to WFD failures in the Adur and Ouse by 2027
- Encourage urban and rural populations, land and watercourse managers to play a positive role in sustainable water management
- Target: Demonstrate methods of improving surface water quality through agricultural best practice and pioneering techniques
- Target: Help and support the work of South East Water and Southern Water in preparing and implementing catchment management plans over the next 20 years
- Target: Highlight the issues of domestic cleaning solutions and garden herbicides which contribute to the pollution of our surface waters
- Research and investigate the current status of surface water quality in the Adur and Ouse, and establish and maintain a reliable evidence base to underpin this work
- Target: Demonstrate a thorough understanding of WFD failures in the Adur and Ouse
- Target: Establish and maintain a reliable evidence base that can be used to identify key areas of concern and where resources should be deployed



D. Freshwater Flood Risk Management

Threats to built infrastructure from freshwater flooding in the Biosphere area come from varied sources, including surface water (land runoff), groundwater, urban drainage and river floodplains.

The Flood and Water Management Act (2010) provides a new framework for the management of flood risk. County Councils (ESCC and WSCC in the Biosphere area) and Unitary Authorities (BHCC) are now the Lead Local Flood Authority with a responsibility for flooding from local sources - surface water flooding, groundwater flooding and ordinary watercourse flooding – whereas flooding from main rivers, the sea and large reservoirs remains the responsibility of the Environment Agency.

The Environment Agency is responsible for overseeing Catchment Flood Management Plans (CFMPs) www.environment-agency.gov.uk/research/planning/127387.aspx which address all types of inland flooding from rivers, groundwater, surface water and tidal flooding. EA's role is to deliver flood risk management policies which will deliver sustainable long-term flood risk management. They also aim to develop measures that will improve the ecological status of rivers under the Water Framework Directive. For example, management regimes should reflect the ecological needs of the catchment using Flood Risk Management solutions to create wetlands (with a focus on Biodiversity Action Plan habitats creation). The Biosphere area is covered by two CFMPs for the Adur and River Ouse catchments.

Future flood risk will be influenced by changes in land use (including built development) and management as well as climate change. Predictions for future change are based upon our existing understanding of the catchment, an extrapolation of long-term trends and assessment of likely future change. In these catchments, urban development and changes to land use and land management are expected to have little impact on flood risk, whereas climate change could increase peak flood flows by up to 20%.

i. Non-fluvial flooding

There are no rivers within the Brighton and Hove sub-area (including Peacehaven and Telscombe), the most densely populated part of the whole Adur and Ouse CFMP study areas. The main flood risk issues are from groundwater, surface water and urban drainage system flooding, especially from the steep hills of the South Downs, enabling rapid run-off of water from intense rain storms which can cause 'muddy' flooding. Wet weather conditions in 2000/2001 gave rise to flooding at a number of locations throughout Brighton & Hove (especially in Patcham and Bevendean) as well as in Lewes, creating numerous problems and clear-up costs (which amounted to >£0.5 million for BHCC) and impacting upon soil retention and crop growth.

Current Policy & Practice –

A Brighton & Hove Strategic Flood Risk Assessment (SFRA) was conducted in 2012 to assess the nature and extent of current and future flood risk. Its aim was to manage and reduce flood risk in relation to the location of new development. The SFRA identifies the risks from different forms of flooding across the city, taking into account climate change and likely associated rises in sea levels. A Surface Water Management Plan (SWMP) is being developed by BHCC and others to set out the most cost-effective way of managing surface water flood risk for the long-term, with a detailed risk assessment by BHCC underway in 2013.

Through the draft BHCC City Plan policy on 'Managing Flood Risk' (CP11) the Council will seek to manage and reduce flood risk and any potential adverse effects on people and property, in accordance with the findings of the Strategic Flood Risk Assessment (SFRA). In addition, the 'SA4' Urban Fringe policy includes a focus on protecting sensitive groundwater source protection zones from pollution and encouraging land management practices that reduce rapid surface water runoff and soil erosion.

LDC has an Integrated Urban Drainage Study which brings together East Sussex County Council, the Environment Agency and Southern Water Services to try and deliver a more sustainable approach to the issue of urban flooding and drainage. The study seeks to

integrate the need to manage the risk of flooding, prevent pollution of water courses (having regard to the WFD) and where possible replenish groundwater aquifers and deliver improved habitats.

ADC has produced a SFRA to assess the risk of flooding across the District and to help inform policies in the emerging Local Plan. WSCC is also producing a SWMP to tackle existing flooding issues, particularly to the west of the River Adur.

Across the Biosphere area the key focus is on developing 'green infrastructure' (see later section) in urban areas. Local measures are being taken by BHCC CityParks, including opening up hard surfaces around street trees (allowing better surface drainage) and filling up park ponds with surface water drainage inputs only.

Future Focus –
Overall Principles:

- Reduce flood risk to homes vulnerable to surface water flooding
- Reduce flood risk to sites at risk from groundwater flooding
- Slow water entering the drainage network to reduce flooding

Planned:

- EA to review the CFMP Policy when further information is available concerning surface water and groundwater flood risk
- EA to strengthen development control advice through Local Development Framework policies which promote no increase in run-off from new developments
- EA to investigate groundwater flooding and develop a flood warning system
- ESCC, WSCC and BHCC to develop Local Flood Risk Strategies to effectively manage localised flood risk
- BHCC implementation of relevant measures (including emergency response plans) identified in the Local Climate Impact Profile report
- BHCC City Plan 'CP11' - appropriate mitigation measures in vulnerable new developments which will also require site-specific flood risk assessments to identify how flood risk will be mitigated and minimised
- ADC emerging Local Plan to include policies that seek to manage and reduce flood risk

ii. Fluvial flooding

The main risk from flooding in both the River Adur and River Ouse CFMP areas is from rivers, although tidal conditions also influence the lower reaches of both rivers and other forms of flooding can occur. Serious flooding does not occur on the Adur very often and extreme flooding is very rare, although with climate change the number of properties at risk to the 1% annual flood probability event will increase from 156 to 2178 properties by 2100, principally in Shoreham and the Adur Estuary. In contrast, the River Ouse has experienced a number of major flooding events over the last century (1960, 1979, 1987, 1993, 2000) affecting urban areas including Lewes, with Newhaven being a potentially flood prone area. The tidal influence of the River Ouse can further exacerbate river flooding particularly in Lewes and Newhaven. Flooding of designated floodplain sites with wetland habitats is generally positive to their wildlife interest.

Current Policy & Practice –

Flood risk management in this catchment has historically relied on embankments to defend areas at risk.

EA activity is prioritised on a risk basis according to flood risk mapping. It includes the maintenance of existing and the construction of new or replacement flood defences and structures, providing vulnerable properties with flood forecasting and warnings, and influencing development control to appropriately locate and/or mitigate new developments. Increased flood protection measures could potentially damage freshwater habitats or increase such habitats through creation of new flood storage areas.

East Sussex County Council seeks in its Environment Strategy (2011) to effectively manage flood risk (and coastal erosion), ensuring that new developments are appropriately located and that people and property are better prepared and protected. It is preparing a draft Local Flood Risk Management Strategy for the county.

EA work on the River Ouse is focussed upon the raised embankments along the tidal reach from Newhaven up to Barcombe Mills, which primarily protect agricultural land and around 2000 properties. On the River Adur the EA is working on the flood defence embankments along the north of the A283 road bridge beyond Steyning and Upper Beeding.

Future Focus –

- EA identification of opportunities to revert the Adur and Ouse catchments back to a more natural state
- Reconnect rivers with their floodplains to deliver flood storage measures that meet CFMP targets, while saving money on maintaining potentially unsustainable flood defences and offering new opportunities for both biodiversity and access

2.3 Land & Sea

A. Introduction

Land and sea are linked in many ways. In environmental terms this is principally through our waste products and land runoff reaching the marine environment - deliberately or unintentionally - and impacting water quality. There is also the risk of estuarine and coastal flooding through tidal surges caused by rising sea levels. Saline intrusion into the freshwater groundwater aquifer is a further possible future threat of rising sea levels partly driven by climate change. Coastal erosion and deposition is another natural process that could have a potentially dramatic influence upon the land. It has the potential to for positive or negative impacts, depending on its nature and location, for example by creating new habitats and geomorphological features or threatening built infrastructure.

B. (Bathing) Water Quality

Sea water quality is important for both our economic (fisheries) and recreational (tourism) use, as well as for the wildlife that inhabits the near shore area. Nutrient enrichment is a major pressure in the marine environment. Additional nutrients – mainly nitrogen and phosphorus resulting from wastewater effluents and agricultural run-off – cause “eutrophication” of the waters. This stimulates the growth of algae and other plants, damaging the balance of the natural environment and potentially threatening human and wildlife health through algal blooms and “red tides”.

Current Policy & Practice –

The aim of the original Bathing Water Directive (76/160/EEC)

http://europa.eu/legislation_summaries/consumers/consumer_safety/l28007_en.htm from 1976 is to protect public health and the environment from faecal pollution in bathing waters through compliance with mandatory standards, or meeting (higher) guideline standards of microbiological and physico-chemical measures. Monitoring of water quality takes place at popular bathing areas throughout the bathing season (mid-May to end of September). There are five statutory ‘bathing waters’ in the Biosphere area that are monitored to assess compliance with the EU Bathing Water Directive, covering almost the entire coastal stretch from Shoreham Harbour to Saltdean (no statutory water sampling takes place at the private beach at Newhaven). The description and the overall annual quality indicators of the waters off the coast of the Biosphere over the last six years (2007-12) are described in Appendix 1. This shows that all achieved the minimum level required and by the last year all achieved the higher standard.

For many years people’s wastewater has passed through Victorian sewers to Portobello Wastewater Treatment Works at Telscombe Cliffs, where it receives basic screening treatment before being pumped out to sea through a 1.8km long sea outfall pipe. As a result, Brighton and Hove is one of the last places in Europe to meet the requirements of the EU Urban Waste Water Directive (91/271/EEC).

Furthermore, the Adur & Ouse catchment pilot project, led by the EA to implement the Water Framework Directive, includes the Sussex Coastal Water Body which extends out to 1 nautical mile from the coast and includes the river estuaries of the Adur and Ouse in the proposed Biosphere area. Its coastal working group, shared with the Biosphere Project, is contributing to an overall Catchment Plan that proposes objectives, targets and actions to improve the health and water quality of the coastal water body.

In addition, diffuse pollution from land runoff of nutrients and contaminants is being partially addressed through agri-environment scheme measures covering ‘resource protection’ to reduce the impact of nutrient enrichment on the water environment.

Future Focus –

A revised Bathing Water Directive (2006/7/EC), which sets much tighter standards than the original Directive, is being progressively implemented up to 2015. It uses two microbial parameters to assess water quality and classify bathing water:

- Excellent (twice as stringent as the current Guideline standard)
- Good (similar to the current Guideline)
- Sufficient (twice as stringent as the current Mandatory standard)
- Poor (for waters which do not comply)

There will be a new requirement for information about water quality and potential sources of pollution in bathing waters to be provided on-site and via the internet, with regular reviews of the list of monitored bathing waters including public participation.

Southern Water has developed a £300m environmental improvement scheme to bring cleaner seas to East Sussex through a new wastewater treatment works and sludge recycling centre in Peacehaven (at Lower Hoddern Farm). It is able to fully treat the 95 million litres of wastewater generated each day by the residents of Brighton and Hove, Peacehaven and Telscombe, before the cleaned wastewater is pumped further out to sea through a 2.5 km long sea outfall pipe.

Shoreham Port Authority (SPA) is committed to implementing measures to improve water quality and reducing water pollution.

Adur & Ouse WFD Partnership Catchment Plan – Coastal Group:

- By 2018, improve water quality in the Adur and Ouse Coastal and Transitional Water bodies
- Consider best practice for improving bathing waters with the view to achieving 'blue flag' status (www.blueflag.org/) for Brighton & Hove at least



C. Coastal Flood & Erosion Risk Management

The sea can both erode and deposit material along the coast and generally moves suspended material in an eastwards direction up the Channel with the force of longshore drift. The shingle beaches which dominate the Biosphere's foreshore were deposited at the end of the last ice age. Although small amounts of shingle are added from erosion of flints out of the chalk cliffs, flood and coastal erosion risk management can stop this erosion and so cut off the supply. Piers, marinas, jetties and groynes can also stop shingle moving along the coast.

Coastal development increases the demand for flood and coastal erosion risk management works and can constrain the natural movement and development of our coastal habitats. Sea levels meanwhile are rising by about 6mm a year in the South East due to a combination of the effects of climate change and the sinking of land since the end of the last ice age. The combination of sea level rise and coastal development leads to a phenomenon called 'coastal squeeze'. This is where coastal habitats are prevented from rolling landwards as they would naturally with sea level rise because of hard structures behind them.

Extreme high spring tides and storm surges meanwhile can expose the land to coastal and estuarine tidal flooding events. An estimated 1100 properties in Brighton & Hove are at significant risk of coastal flooding from rising sea levels.

Current Policy & Practice –

Coastal local authorities can use the optional permissive powers set out in the Coast Protection Act 1949 to 'protect the coast from erosion and encroachment by the sea', with most choosing to actively protect their coastlines. These councils can apply to the EA for grant aid towards the development of plans and strategies for the implementation of capital schemes for the protection of the coast. The EA, on behalf of DEFRA, has an overarching national responsibility for all coast defence and encourages local authorities to take a strategic, joined-up approach to coastal management through the South East Coastal Group in this region. It has produced the South Downs Shoreline Management Plan (SMP - revised version, 2006)

www.chichester.gov.uk/index.cfm?articleid=16843 from Beachy Head to Selsey Bill, which is a large-scale assessment of coastal processes risks, and how to reduce them.

More detailed strategy studies follow on from the SMP and look at sections of the coast and make recommendations for the practical implementation of the policies. Three main strategies cover the Biosphere coastline: Brighton Marina to the River Adur (2012-14); Brighton Marina to Saltdean (2001); and Saltdean to Newhaven (2000).

The Brighton Marina to River Adur Flood and Coastal Erosion Risk Management Strategy is currently being developed from 2012 to 2014 by BHCC and Adur District Council (ADC) to provide a high level risk assessment and a non-statutory policy framework to sustainably address it. A Strategic Environmental Assessment and Environmental Impact Assessment have been carried out to inform the detailed objectives of the strategy under development, which will be finalised in 2014. The overriding objective is to set out the strategic planning of flood and coastal erosion risk management assets for the next 100 years based on the significant human and natural factors and what kind of defensive measures are suitable and affordable.

The Adur Tidal Walls scheme is receiving £16 million funding to provide better protection from tidal flooding for properties and businesses on both banks of the River Adur, and is now working on detailed design of flood defence works. In addition to flood risk management, the scheme will include waterfront regeneration opportunities, landscape and public access improvements – including better linkages to the South Downs National Park. It will also assist with advancing strategic employment and residential development opportunities west of the River Adur.

The Shoreham Harbour Regeneration Project seeks to create a high quality exemplar sustainable development at Shoreham Harbour. A key aspect of this project is ensuring the implementation of a comprehensive flood defence solution that enables regeneration through a mixed use development and improved environmental quality.

The EA's management policy to 2030 for the great majority of the Biosphere coastline is to "hold the existing defence line", although to the east in three stretches (at Telscombe, between Peacehaven and Newhaven, and at Tide Mills) its approach is for "no active intervention". SMPs also try to predict rates of coastal erosion, with the rate for our coastline over the next 100 years currently assessed as negligible.

Future Focus –

- BHCC and LDC to commence work on a Flood and Coastal Erosion Risk Management Strategy for the coast from Brighton Marina to Newhaven from 2013

2.4 Overall Approaches

A. Introduction

Significant new approaches which address growing issues have emerged in recent years. The valuation of the benefits provided by nature - “ecosystem services” - is now a key area for ecologists and economists to increasingly work together to achieve both environmental conservation and socio-economic wellbeing. ‘Green Infrastructure’ (GI), meanwhile, is an approach that looks to achieve multiple benefits for people and nature from networks of greenspace, especially those in urban areas with links to new development. Lastly, climate change is an increasing issue for human society and the natural world, with the key approaches to addressing it based upon mitigation (reducing emissions of greenhouse gases) and adaptation (preparing for unavoidable impacts).

B. Ecosystem Services

Ecosystem Services are “the benefits people obtain from ecosystems” and are typically divided by the key international (Millennium Ecosystem Assessment, 2005) and national (UK National Ecosystem Assessment, 2011) framework studies into four types:

- **Provisioning services** - cover the goods from nature that we value and are generally most familiar with, including food, water, and fibre such as timber
- **Cultural services** - we generally recognise yet may not explicitly value, such as recreation and less tangible elements like an appreciation of landscape character and spiritual inspiration
- **Regulating services** - we perhaps pay less attention to, but which are vital to our quality of life. These include purification of water, soil and air quality, mitigation of flooding and climate impacts, and overarching services such as plant pollination and disease control
- **Supporting services** - underpin the above and are the core ecosystem processes and structures which maintain the conditions for life, such as nutrient cycling, plant productivity from photosynthesis, and ecological community relationships of predator and prey

A distinct yet related concept is that of the ‘Ecosystem Approach’, which represents “a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way and recognises that humans, with their cultural diversity, are an integral component of many ecosystems” (UNEP CBD 2000). This is a more holistic and process-orientated concept that is not focused upon valuation of human benefits per se but more on a fairly shared natural environment for all of its components, including a recognition of the intrinsic value of nature.

The concept of ecosystem services is being increasingly adopted nationally by decision-makers and stakeholders across different sectors, from farming to fishing to nature conservation, as a holistic approach to understanding, valuing and managing our environment. National studies show that nature’s benefits are typically undervalued, or not valued in conventional economics and governance. As a result, many services, such as biodiversity and marine fisheries, are in long-term decline and/or are seriously degraded. When set against increasing human population and consumption, combined with impacts from climate change, there is a need to incorporate such thinking into traditional socio-economic approaches. Unless this is done it will be difficult to make progress towards more sustainable development.

Many of the individual ecosystem services are specifically addressed in different chapters – for example, biodiversity, farmed food and fisheries – while the key local issues of water resources and flooding are covered in this Linkages chapter. This section instead focuses on to what extent the concept of ecosystem services is and should be incorporated into local policy and practice in the proposed Biosphere area.

Natural England's National Character Area (NCA) analysis of the whole of the South Downs (2013) shows that a number of services are most significant in the context of the sub-area of the Biosphere.

South Downs National Character Area (NCA) analysis – Natural England

Provisioning services

Food Provision - major cereals (on dip slope) and lamb (eastern downs) production.

Water Availability - the important chalk aquifer is under significant stress, including the Brighton Groundwater Management Unit that supplies Brighton and surrounding areas.

Regulating services

Regulating Climate - carbon sequestration can be increased by increasing organic matter inputs and by reducing the frequency / area of cultivation of the generally impoverished mineral soils, although the area around Brighton has a notably higher proportion of carbon stored in the top soil horizon (5-10%) especially in wetland and woodland areas.

Regulating Soil Erosion - the light soils here are shallow and prone to loss through erosion, especially where organic matter levels are low after continuous arable cultivation or where soils are compacted.

Regulating Water Flooding - action is needed to store water or manage run-off in locations that reduce flooding and provide environmental benefits. In the Adur catchment, increasing water storage and infiltration on the Downs can assist in controlling or reducing surface water flood risk in the downstream urban areas of Shoreham and Brighton & Hove. The significant risk of river flooding along the River Ouse at Lewes is proposed to be addressed through actions including increased flooding downstream of Lewes Brooks Site of Special Scientific Interest (SSSI) wetland, while tidal flooding represents the main risk at Newhaven.

Regulation of Coastal Flooding and Erosion - at Brighton the long-term policy is to 'Hold the Line', with the same short-term policy at Peacehaven and Saltdean to maintain cliff-top assets.

Cultural services

Recreational Opportunity - the South Downs makes a major contribution to the health and wellbeing of the population of the South East region, although the high car dependency of visitors impacts upon tranquillity. The coastal towns including Brighton and Hove also provide important and historic recreational opportunities.

Sense of Place/Inspiration - the elevated chalk ridge of open, exposed downland scenery, the typically dispersed downland settlement pattern, the distinctive use of flint in traditional buildings, and the rare English elms all contribute to a strong sense of place.

Biodiversity - the internationally important lowland chalk grassland in particular is a major asset.

Geodiversity - the coastal stretches provide an important opportunity to observe and interpret geological formation and geomorphological processes.

Tranquillity - the open downland ridge represents a precious resource within the highly developed South East, although remaining areas of tranquillity and dark night skies are under continued threat especially from the significant impacts of the coastal conurbations upon the adjacent downland.

Sense of History - the range of historic assets include Iron Age hillforts and ridgeline Bronze Age barrows, linked by ancient ways over the downland, as well as historic parkland landscapes and a strong sense of urban history in the distinct architecture and Victorian associations of Brighton & Hove.

Current Policy & Practice –

BHCC's draft City Plan (Part 1) policy 'SA5' on the South Downs which, while not referring to ecosystem services directly, describes how it will work in partnership with SDNPA and others to protect and enhance the natural beauty of the National Park. This includes many relevant elements such as promotion of sustainable land use management systems; biodiversity conservation and enhancement; protection of historic features and sensitive aquifer protection zones; addressing catchment flood management issues; improving public access and

sustainable transport; and promoting a stronger visitor experience including sustainable eco-tourism and the provision of gateway facilities.

Natural England has applied a standardised Ecosystem Services (ESS) valuation framework to its revised NCA 125 description of the South Downs, to define which services are most important here (as summarised above). It also sets out which measures would have the greatest impact upon the provision of these services to inform policy application. The 'South Downs Way Ahead' Nature Improvement Area (NIA) project includes a strong thematic focus on ecosystem services provision, including evaluation of the benefits derived from chalk downland as well as addressing groundwater quality. The Lewes & Ouse Valley eco-nomics (L&OVe) group is working with the NIA initiative to identify and map the services of greatest significance and to attribute a value to them by working with local people including land managers to raise awareness of the links to social and economic wellbeing.

Future Focus –

Planned:

- Habitats and nature conservation features that provide ecosystem services such as climate change adaptation, water purification and storm water control, and which contribute to health and wellbeing, will be promoted, conserved and protected throughout Brighton & Hove
- Both SDNPA and NE are developing a focus on integrating ecosystem services in to land use decision-making

Potential:

- Improving planning policy to deliver ESS
- 'Payments for Ecosystem Services' (PES) approach to develop at our local level? (e.g. by SDNPA and water companies)

C. Climate Change – mitigation & adaptation

Local climate records show a trend of rising average temperatures and falling average rainfall in spring and summer (contributing to greater 'water stress'), with more than 60 notable severe weather events of extreme heat, cold, drought and flooding reported in the local media of Brighton & Hove between 2000 and 2010.

According to the 'UKCP09' national climate change projections, milder, wetter winters and hotter drier summers to south-east England are expected, as well as increased frequency and intensity of extreme weather events, changes in rainfall distribution and seasonality, and a rise in sea levels. The most likely scenario is that by 2050 (compared to the 1969-90 baseline) in Brighton & Hove there will be:

- an increase of 2.8°C in the summer mean, and a 3.2°C increase in average maximum daily summer temperatures
- a 2.2°C increase of the winter mean, and a 1.9°C increase in average maximum daily winter temperatures
- a 26% decrease in summer rainfall, and a 14% increase in winter rainfall
- sea level rises of 6mm a year

Climate change will significantly impact nature and people alike. Changes to landscape character, ecosystem services, flood regimes, habitat dynamics and species interactions (including increased prevalence of invasive non-native species) are possible. For example, more large scale and widespread flooding (both freshwater and coastal) is predicted from increased winter rainfall and more frequent intense storms; whereas reduced periods of groundwater recharge through the drier summer months may reduce groundwater flooding events. The human population impacts are likely to be greater on vulnerable groups, including the very old and very young, and people with health conditions and those who live in poor housing conditions. The potential for flooding and coastal erosion affecting urban areas will mean that the built environment requires protection and adaptation to the effects of climate change.

Current Policy & Practice –

Responses to climate change fall in to two categories:

- Mitigation - reducing greenhouse gas emissions, as the causes of human-induced climate change, through energy efficiency measures and switching to alternative forms of transport and energy
- Adaptation - preparing local environments and communities for the unavoidable impacts

Over 300 local authorities in the UK have signed up to the 'Nottingham Declaration' to address the causes of climate change and prepare for its impacts, including Brighton & Hove City Council (BHCC). This has now been succeeded by the Local Government Association's 'Climate Local' initiative. The Brighton & Hove Sustainable Community Strategy commits to reducing the city's carbon emissions by 42% by 2020 and 80% by 2050; targets which are consistent with the UK Climate Change Act (2008). Brighton & Hove's approach to tackling climate change comes via the Brighton & Hove City Climate Change Strategy (2011-2015), with implementation principally addressed through the One Planet Living framework principles, especially 'Zero Carbon', as set out in the Urban chapter of this strategy. East Sussex County Council (ESCC) has produced a 'Climate Change Strategy for East Sussex' (2009) and has measures in its Environment Strategy (2011); Lewes District Council (LDC) has a 'Climate Change Adaptation & Mitigation Plan 2009-16'; West Sussex County Council (WSCC) has a climate change board and works on adaptation measures through its sustainability team.

Biosphere partners that have also produced climate change strategies include the Sussex Wildlife Trust's 'Weathering the Changes' report (2008), and the EA's national 'Climate Change Adaptation Strategy 2008-11'. The SDNPA is beginning to examine these issues as it prepares its Management Plan.

CO₂ emissions have fallen in recent years in the South East, with Brighton & Hove undergoing an estimated equivalent 15.6% per capita reduction between 2005 and 2009. This reduction, largely mirroring a national trend, is not anticipated to continue without deliberate targeted mitigation efforts.

Natural England has developed a biodiversity climate change vulnerability model in the South East (which has now been expanded to national level) to produce a spatial analysis of different BAP habitats to inform adaptation responses to increase their resilience.

Future Focus –

Planned:

- Suite of actions proposed in the Brighton & Hove City Climate Change Strategy (2011-2015) under five main themes which address both mitigation and adaptation: low carbon economy; low carbon homes and buildings; low carbon transport; renewable and sustainable energy resources; and adapting to climate change
- LDC is developing a revised Climate Change Action Plan for adoption in late 2013 (to update its 2010 plan), as part of its actions under the Local Government Association initiative 'Climate Local'
- ESCC to reduce greenhouse gas emissions (at least in line with national targets) - by reducing fossil fuel energy consumption; increasing energy efficiency and developing appropriate local sources of renewable energy; becoming more adaptive to climate change; and helping individuals and communities do likewise by developing and implementing adaptation plans (Environment Strategy)
- Civic planning to prepare for the increasing frequency of extreme weather events - temperature and precipitation
- Supporting those most affected by climate change will be required to ensure that action to tackle climate change does not increase health inequalities

Potential:

- Application of the England Biodiversity Strategy's Climate Change Adaptation Principles ('Conserving biodiversity in a changing climate') e.g. create buffer zones around high-quality habitats
- Greening of our urban environments to counter the 'heat island' effect of built-up areas, including street tree planting for increased shade (with consideration of tree species/genotypes from more southerly climates as recommended by Forest Research) and drought-tolerant municipal planting in urban green spaces
- Role/freedom of 'natural processes'? e.g. saline vs. freshwater floodplain & coastal defence needs

D. Green Infrastructure

Green infrastructure (GI) is defined as “a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities” (National Planning Policy Framework, NPPF, 2012). It is an approach that focuses on the active planning and management of multi-functional green space networks to bring benefits both to people and nature. While GI is increasingly being considered for new developments in urban areas, it also needs to be integrated into existing spaces and communities. Multi-functionality is a fundamental principle of this approach, so that a broad range of ecosystem services are delivered on individual sites and which, when taken together, form an overall strategic network that is functionally connected and widely accessible.

The different types of greenspace that can make up such networks as the lifeblood of urban areas – including parks, gardens and green roofs – are each considered in the Urban chapter. The links between individual units might be through ‘green corridors’ - including cycleways, footpaths, rail lines and river banks – helping to connect urban and rural environments, as described under the ‘Landscape Connectivity’ section of this chapter.

“GI provides opportunities for strategic planning to protect and enhance the natural environment and add tangible value to communities in economic, social and environmental terms. It creates places that are more resilient to the rising temperatures and extreme weather events associated with climate change, that have distinct local character, and in which people want to live, work, and visit; places that promote wellbeing, productivity, educational benefits and crime reduction; and places where communities can actively engage with their local environment” (Town & Country Planning Association – The Wildlife Trusts 2012).

It provides a range of functions, including landscaping, flood control, recreation, cool spots in a warming climate, food production, safer routes and biodiversity conservation. Together, these form a ‘life support system’ and generate a wide range of environmental and quality of life benefits as well as potential significant economic value, for example by attracting tourism revenues or reducing healthcare costs. A GI approach has particular relevance to issues associated with water and climate change, and green networks for wildlife populations and human recreation.

Functional green spaces to deal with water include flood storage areas and sustainable drainage schemes (SuDS) such as soakaways, grassed swales, water gardens, green roofs and permeable pavements in urban areas. SuDS are a more cost-effective approach to managing surface water run-off which seeks to mimic natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off-site as quickly as possible. They reduce flood risk by attenuating the rate and quantity of surface water run-off from a site; promoting groundwater recharge; absorbing diffuse pollutants, improving water quality; and potentially providing civic amenity benefits.

GI therefore has the potential to provide adaptation to climate change by reducing the likelihood and severity of flooding particularly from storm water runoff and flash floods. It can also improve micro-climates for people through shading and evaporative cooling to combat extreme heatwaves and drought. GI can play a role in climate change mitigation, too, by reducing energy consumption through extensive green roofs and mature tree canopies which reduce the ‘heat island’ effect of urban areas and hence reduce the need for energy-intensive cooling systems as well as water demands. The carbon savings associated with this reduced energy requirement have been calculated to be considerably greater than the amount captured directly by urban trees through photosynthesis.

Current Policy & Practice –

National planning guidance on GI is given in the NPPF, including support for the use of SuDS to ensure that development does not increase flood risk elsewhere (NPPF paragraph 103). The Building Regulations 2000 (Approved Document Part H) establishes a hierarchy for surface water disposal which encourages a SuDS approach. The South East Green Infrastructure framework gives regional policy context and key tools to develop high quality green infrastructure into the heart of both new and existing communities.

An Interim Code of Practice on SuDS has been developed by the Environment Agency and the Construction Industry Research and Information Association (CIRIA). A range of applied guidance on GI planning and delivery is available from the Town & Country Planning Association (TCPA), including 'Planning for a Healthy Environment – good practice guidance for green infrastructure and biodiversity' (TCPA-TWT 2012), 'Biodiversity by Design', and 'Climate Change Adaptation by Design', and Natural England's 'Green Infrastructure Guidance' (2009).

Southern Water's Water Resources Management Plan 2010-2035 (2009) includes a policy to encourage the creation of green roofs and Sustainable Urban Drainage Systems as part of flood risk management or mitigation measures work.

There is currently an absence of local practice examples of GI application in our area.

Future Focus –

Planned:

- BHCC (CityParks) to produce a detailed action plan by 2015 to implement Biosphere strategic policies for the city's 'green infrastructure'
- ESCC is developing guidance for its Districts to develop green infrastructure strategies in 2013, including mapping all known GI assets across the county; an overall analysis of functionality has been carried out to help identify gaps and opportunities, in support of management of the landscape and habitats and to ensure that appropriate environmental infrastructure associated with new development is planned for
- ADC to include policies in the emerging Adur Local Plan and Joint Area Action Plan for Shoreham Harbour that recognise the importance of green infrastructure, and ensure that the key sustainability priorities at Shoreham Harbour are met.
- ADC to promote use of SUDs in all new developments
- EA work with planning authorities and developers to discuss potential for green infrastructure in urban areas and through new developments including SUD schemes and creating more green roofs

Potential:

- Sustainable design standards for BHCC new build/extensions to include Sustainable Urban Drainage Systems and green roofs?

2.5 Key Policies

The key policies on 'Linkages' topics in the Biosphere include:

- Landscape connectivity (ecological) – including the NIA, Brighton & Hove Green Network, Brighton & Hove City Plan
- South East River Basin Management Plan (WFD)
- Adur & Ouse Catchment Management Plan (2012)
- Catchment Abstraction Management Strategy (for Adur & Ouse catchments combined)
- EA Catchment Flood Management Plans (River Adur & River Ouse)
- Local Flood Risk Strategies (BHCC, ESCC, WSCC) being developed – under the Flood and Water Management Act (2010)
- EC Bathing Water Directive
- Shoreline Management Plan - Beachy Head to Selsey Bill
- Coastal Defence Strategies – including Brighton Marina to River Adur Flood and Coastal Erosion Risk Management Strategy
- NE National Character Area 125 for the South Downs (2013)
- Brighton & Hove Climate Change strategy (2011)
- ESCC 'Climate Change Strategy for East Sussex' (2009)
- LDC 'Climate Change Adaptation & Mitigation Plan 2009-16'
- ADC Sustainability Strategy (2010); ADC Interim Planning Guidance and draft Development Briefs (2013) for Shoreham Harbour
- Brighton & Hove Surface Water Management Plan (SWMP) (being developed)
- Southern Water & South East Water 'Water Resources Management Plans'
- ESCC green infrastructure strategic guidance (2013)

2.6 Existing Information

- Landscape connectivity (ecological) – Brighton & Hove Green Network
- Biodiversity Opportunity Areas (BOAs) descriptions – Sussex Wildlife Trust
- South East River Basin Management Plan (WFD)
- Adur & Ouse Catchment Management Plan (2012)
- Catchment Abstraction Management Strategies (River Adur & River Ouse)
- EA Catchment Flood Management Plans (River Adur & River Ouse)
- Brighton & Hove Strategic Flood Risk Assessment (SFRA) (2012), JBA Consulting for BHCC www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/ldf/Strategic_Flood_Risk_Assessment_Jan_2012.pdf
- 'Bathing Waters' monitoring by EA-SWS
- Brighton Marina - River Adur Flood & Coastal Erosion Risk Management Strategy study
- NE National Character Area 125 for the South Downs – including ecosystem services provision assessment
- Local Climate Impact Profiles for B&H (2011) and WSCC (2009)

Chapter 3 RURAL ENVIRONMENT



3

CHAPTER 3 – Rural Environment (South Downs National Park area - a Biosphere “buffer zone”, including “core areas” within)

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SUMMARY

The rural area of the Biosphere is entirely within the South Downs National Park. The spine of the National Park is a ridge of chalk with a steep north-facing scarp slope and a more gentle dip slope running towards the sea and with fingers into the urban areas. The dip slope also has deep-cut dry valleys scoured out by ice and water in former climatic conditions. The chalk landscape is one of openness and big skies. In contrast, below the scarp the Low Weald is an area of heavy clay soils - completely different to the light thin soils on the chalk downs. The Weald area is also a much more enclosed landscape with small copses, hedgerows and small enclosed fields.

A natural spring line occurs at the base of the chalk, with water flowing from the chalk block groundwater. The resulting streams and tributaries flow into the rivers Adur and Ouse. This supply of freshwater has given rise to a series of villages and small settlements, rural communities with a long association with the landscape of the area. The parishes are long and narrow, each taking in land on the top of the downs, the steep scarp slope and the more fertile soils of the Weald. This is reflective of a long history of these villages working the land to the best advantage, with a combination of sheep grazing and arable cropping.

Today the South Downs is still a farmed landscape: over 90% of the rural area of the Biosphere is in agriculture. However, land managers are also key partners in environmental schemes, taking measures to protect the groundwater, improve chalk grassland habitats, encourage the recovery of declining farmland bird species, and protect and enhance the historic environment.

The rural area is also a place of recreation: a wonderful network of paths and bridleways offer opportunities for walking, cycling and horse riding, while the more adventurous take to the air on paragliders. The rural area provides a green lung and a healthy environment for the inhabitants of the towns and city. However, with this comes the challenge of balancing nature, agricultural production and recreation, and developing a common understanding between all users of the countryside.

Current projects in the rural area are focusing on connecting and restoring habitats such as the internationally important chalk grassland, Environmental Stewardship schemes on farms to improve conditions for farmland birds and projects to protect water sources. There are also programmes to develop green tourism initiatives, encouraging diversification in the local economy.

In the future, we will build on current projects that encourage sustainable land management alongside a connected network of wildlife habitats. In addition, there will be a focus on valuing the services provided by ecosystems and integrating this with rural land management. Another area for future work will be developing local markets for local produce. Finally there will be an ongoing project to raise understanding and awareness to connect the urban areas with the rural areas.

3.1 Introduction to the Rural Environment

The rural element of the Biosphere falls within the South Downs National Park (SDNP). This important protected landscape wraps around and connects via green corridors into the urban areas. The landscape is a mix of farmland, woodland, scrub and species-rich chalk grassland with gently rolling downs and steeper scarp slopes shaped by the underlying chalk geology. River valleys bisect the chalk and smaller freshwater features, such as dew ponds and chalk springs, can be found in an otherwise dry environment.

The proximity of this area to large centres of population means that it is an important place for recreation, tranquillity, culture and production of food and a clean water supply. There are extensive opportunities for recreation through the rights of way network and open access land. The underlying aquifer supplies most of the local drinking water and activities on the surface can impact on water supply quality and quantity.

There is a long history of Man's activities in the area which has shaped the environment. Today, agri-environment schemes such as Higher Level Stewardship (HLS) enable management for nature conservation and other environmental objectives.

The rural element contains the core nature conservation sites comprising some 1700 hectares of nationally and internationally designated habitat and associated species. Surrounding this core, the majority of the countryside forms the buffer zone and contains many more locally important nature conservation sites as well as numerous historic cultural features.

- Special Qualities of the South Downs

(www.southdowns.gov.uk/__data/assets/pdf_file/0017/180017/SDNPA_Special_Qualities.pdf)

The SDNP has seven special qualities:

- Diverse, inspirational landscapes and breathtaking views
- A rich variety of wildlife and habitats including rare and internationally important species
- Tranquil and unspoilt places
- An environment shaped by centuries of farming and embracing new enterprise
- Great opportunities for recreational activities and learning experiences
- Well-conserved historical features and a rich cultural heritage
- Distinctive towns, villages and communities with real pride in their area

- Landscape character areas

(taken from the South Downs Integrated Assessment by SDNPA and South Downs National Character Area Assessment by NE)

The landscape of the area subdivides into four character zones, as summarised below: the open downs, scarp slopes, foot slopes and river floodplains.

Specific Characteristics Unique to the Adur to Ouse Open Downs:

This character area exhibits open rolling upland chalk scenery typical of the Open Downs landscape type. The blunt, whale-backed downs reach a dramatic 248m at Ditchling Beacon and are furrowed by extensive branching dry valley systems which produce deep, narrow, rounded coombs. Two Iron Age hillforts overlook the Weald (Devil's Dyke and Ditchling Beacon), and a Bronze Age enclosure at Wolstonbury and a hillfort commands the coastal plain at Hollingbury. This character area also contains the battlefield of Lewes, on which a battle was fought in 1264, and a 20th century Chattri, an Indian military cemetery and war memorial. The Jack and Jill windmills at Clayton are features of the skyline, revealing the power of the wind in this exposed landscape and associated with its long history of arable cultivation.

The location of Brighton on the edge of this area means that this character area has been influenced by urban fringe features such as road cuttings and traffic associated with the A23(T) and A27(T), views of built development, electricity pylons, golf courses, and a cluster of communication masts at Truleigh Hill. The proximity of Brighton also means that there are a large number of potential users of the area – including networks of open access land, which tend to coincide with the steeper slopes and areas of chalk grassland. The extensive network of public rights of way and car parking facilities, particularly around Devil's Dyke, make this a highly accessible landscape. Public transport routes between Brighton and Devil's Dyke, Ditchling Beacon and Stanmer Park enhance countryside access further. The South Downs Way National Trail follows the ridge of the northern scarp along much of its length and provides a range of recreational opportunities such as cycling, walking and horse riding as well as providing magnificent panoramic views. Sustrans cycle route 89 also shares part of this route and the Sussex Border Path provides north-south access across the downs.

A number of chalk grassland-dominated Sites of Special Scientific Interest (SSSIs) are within the area, including Beeding Hill to Newtimber Hill SSSI, Clayton to Offham escarpment SSSI and Wolstonbury Hill SSSI. Castle Hill Special Area of Conservation (SAC) is an internationally important chalk grassland site and supports a particularly rich orchid flora which includes the nationally scarce Early Spider Orchid *Ophrys sphegodes*. The area is further characterised by distinctive fragments of nationally important chalk grassland that clings to the steep scarp and valley slopes, supporting many threatened species of plants, such as the Frog and Musk Orchids, and the critically-endangered Red Star Thistle. These are in addition to threatened butterflies and invertebrates.

An 18th century landscaped park at Stanmer is an important feature of the Adur to Ouse Open Downs. Although large parts of the park are now converted into modern arable fields, parts of the original parkland pasture survive around Stanmer House, with 18th century plantations occupying the south-western flanks, and further smaller clumps and belts of trees contributing to the diversity of the landscape. The original boundary is still evident, particularly where it is formed by a high stone wall. Stanmer village is a typical estate village.

Specific Characteristics Unique to Mount Caburn:

This character area exhibits chalk scenery typical of the Open Downs landscape type. However, it is unique in that it is a small, isolated 'island' of downland. The area includes a rather discontinuous, and partially wooded, north-east facing scarp which extends from Malling Hill to Glynde Holt. There is a particularly high density of chalk quarries on the scarp, with extensive white scars highly visible from surrounding areas.

The location of this area adjacent to Lewes, Ringmer and the railway station at Glynde makes it potentially accessible by a large number of people with high recreational use evident. Considerable areas of chalk downland provide open access land. In addition, parts of the downs are popular for para-gliding. However, the absence of roads ensures that the landscape retains a remote character.

This character area is no exception in terms of its rich biodiversity. Particularly characteristic are areas of unimproved chalk grassland, which include the extensive and internationally important Lewes Down SAC. The area also supports two small chalk pits (Southerham Machine Bottom Pit SSSI and Southerham Works Pit SSSI), which are designated as SSSIs for their national geological importance.

The large number of prehistoric and later earthworks are typical of the landscape type. Distinctive features in this character area are the Iron Age defensive sites at Ranscombe Camp and The Caburn that occupy commanding positions at the southern edge of the downs.

Specific Characteristics Unique to the Adur to Ouse Downs Scarp:

The Adur to Ouse Downs Scarp exhibits physical characteristics typical of its type. However, a unique physical characteristic is Devil's Dyke, a complex landform and distinctive landmark that is formed from the intersection of a dip-slope valley and scarp-face coomb. It is also the deepest single coombe in the chalk karst of Britain. A further feature are the abandoned chalk quarries, for example at Offham and Pyecombe, which reveal the exploitation of chalk in the past to produce lime for fertilising the acidic soils of the farmland of the Low Weald to the north.

Almost unbroken tracts of unimproved chalk grassland, scrub and hanger woodland are present along the scarp slope, contributing to the outstanding ecology. Occasional areas of arable land, improved pasture grassland and semi-natural woodland occur on more shallow slopes along the scarp, extending into it from the intensively farmed footslopes and open downland which sandwich the escarpment. A range of woodland and scrub types occur, including Ash and Beech woodland hangers, species-rich woody scrub which includes Juniper, a UK priority Biodiversity Action Plan (BAP) species. The majority of the scarp carries national nature conservation designation, including a total of four SSSIs that fall wholly or partly within the character area, as well as several individual chalk grassland and woodland areas designated as Sites of Nature Conservation Importance (SNCI).

Countryside access is good in this character area, with the majority of the scarp designated as open access land and an area of registered common on the scarp above Fulking. Many rough sheep tracks, rights of way, cattle tracks (marking the route of stock movement to the coast for export) and tank/military tracks zig-zag across the open scarp and ascend the coombes, providing good access on foot and horseback. There are also a number of way marked walks at Ditchling Beacon, and public access to both Ditchling Beacon and Devil's Dyke by bus from Brighton. The precipitous slopes are more difficult to access; two rural roads wind their way up the scarp – one at Devil's Dyke and the other at Ditchling Beacon. The A273 takes advantage of the less steep scarp above Clayton where it ascends directly onto the downs, linking Hassocks with Brighton. Although this scarp is perceived as highly natural and tranquil, there are pockets of activity where hang-gliding and para-gliding are popular sports.

Specific Characteristics Unique to the Adur to Ouse Scarp Footslopes:

The Adur to Ouse Scarp Footslopes cover a relatively large area at the foot of the northern scarp of the Adur to Ouse Downs, between Upper Beeding and Lewes. The footslopes extend some way north of the scarp, and include parts of the Low Weald, exhibiting a number of different geological bands. These include Lower Chalk, Upper Greensand, Gault Mudstone and Lower Greensand. The area also includes a small area of Weald Clay at its very northern boundary, north of Ditchling. The Lower Chalk at the base of the steep scarp has been eroded into a smooth concave form with large modern arable fields replacing the former medieval open field systems. These chalk slopes support some remnant chalk grassland, e.g. a small area of Beeding Hill to Newtimber Hill SSSI. North of this is a narrow band of Upper Greensand bench.

Moving away from the scarp slope, the older Gault Mudstones are revealed. Here, irregular enclosed fields represent a largely intact late medieval landscape with many fields originating as woodland assarts. This area has a more 'Wealden' character. Frequent but small blocks of ancient woodland of pre-1600 date, as well as more recent plantations and game coverts (e.g. Foxhole Shaw near Hurstpierpoint). Many of these woodland blocks are classified as ancient woodland, and a number carry non-statutory designation, for example Tottington Wood SNCI. Ecologically they are notable for supporting a range of ancient woodland plant species, as well as providing important habitat for breeding birds. Woods Mill Countryside Centre and Nature Reserve is located in the north west of the character area and is the headquarters of Sussex Wildlife Trust, an environmental education centre. It comprises coppiced woodland, meadows and a lake, attracting a wide variety of wildlife including Nightingales, Woodpeckers, Turtle Doves and Warblers. Within the clay vale are outcrops of sandstone which give rise to sandy areas, such as around Ditchling, which support pasture and coniferous plantations like Ashurst Meadows - Plumpton SNCI. There are also a number of sand quarries associated with this geological formation, demonstrating the economic value of the sands.

Typical of the scarp footslopes, the junction between the chalk and clay is marked by springs and a string of nucleated villages. Edburton, Fulking, Poynings, Westmeston, Plumpton, and Offham are all typical springline villages, some developing on areas formerly occupied by Roman villa estates (Danny, Clayton and Plumpton). The villages are linked by an underhill lane, indicating the course of the ancient coaching lane at the scarp foot. The steep chalk scarp forms a dramatic backdrop to these villages, such as at Fulking. This area of scarp footslopes is typical of its type in that it contains a number of picturesque parkland landscapes that were developed at Plumpton, Danny and Newtimber Parks, although the small size of these provides an indication that the character area was deemed too valuable for agricultural use to waste on unproductive aesthetics.

This area supports a well developed network of rights of way with a north-south orientation providing access between the downs to the south and the Low Weald to the north.

Specific Characteristics Unique to the Ouse Floodplain:

The physical characteristics of this landscape character area are generally typical of its landscape type, exhibiting a flat valley floor prone to periodic waterlogging, with land used predominantly as permanent pasture. The area is notable for its extremely wide floodplain at the convergence of the Glynde and Ouse. During the 16th century, the area was a shallow lake for much of the year, until drainage was introduced in the 18th century. Small 'islands' at High Rise and Low Rise are the remnants of the eroded chalk uplands.

The extensive low-lying floodplain contains a number of ecologically rich wetland areas, including Lewes Brooks SSSI and Offham Marshes SSSI. These wetland sites are particularly notable for their ditch systems and wet grasslands, have an especially rich aquatic flora, and support a number of notable invertebrate species. Beddingham Grazing Marsh and Glynde Reach also provide a further example of a wetland site of particular ecological interest as reflected in its SNCI designation.

The Ouse Floodplain's tranquil character is affected on its edges by urban development (including the former port of Lewes), major roads (including the A27), the mainline railway, sewage works and transmission lines, all contributing to the perception of a busy landscape. However, for many centuries the Ouse was a major transport route for Lewes's businesses and there has historically been a significant amount of activity in the river floodplain. Most notable in terms of access today are the public rights of way along the top of the artificial floodbanks that border the river, extending from Lewes to Newhaven. The South Downs Way National Trail crosses the valley at Southease, providing access from the station to the surrounding downs. In 2000 there was major flooding in Lewes (affecting 613 homes and 200 commercial premises), prompting a number of targeted flood prevention measures currently being undertaken in the valley.

This character area is dominated by a series of enclosed fields that are now subject to modern farming. However, a small portion of the traditional landscape of grassland meadows and wet woodland survives at the Railway Land nature reserve in Lewes. Remnant systems of water meadows are also evident. Signs of the industrial history of the valley survive north of Lewes, where the channels around the Papermill Cut served both the paper industry and chalk quarrying. The Ouse Floodplain is different from other major river floodplains in that it contains a number of areas of settlement – including the historic village of Cliffe, which developed as an ancient ford, and The Brooks Industrial Estate. Lewes is a former port, positioned at the junction between the Downs and Weald. At the southern end of the valley Newhaven and its port surround the mouth of the River. This area has an industrial character with the new Energy Recovery Facility dominating the skyline.

Specific Characteristics Unique to the Adur Floodplain:

The physical characteristics of this landscape character area are generally typical of its landscape type, exhibiting a flat valley floor prone to periodic waterlogging with land use predominantly permanent pasture. The area is particularly notable for its salt extraction, a major industry in the valley throughout the medieval period. Salt extraction from tidal marshland is mentioned in the Domesday Survey. Evidence of the medieval salt-extraction industry survives in various places along the floodplain today as saltern mounds.

The Adur Floodplain's tranquil character is affected by the proximity of urban development (at Steyning and Upper Beeding), a major chalk quarry and cement works (Shoreham Cement Works), major roads (including the A283 and A27), and transmission lines. Many of these are located in adjacent character areas, but affect the perception of the landscape of the floodplain. Most notable in terms of access today are the public rights of way along the top of the artificial floodbanks that border the river, extending from the Low Weald to Shoreham. A Sustrans cycle route (no. 79) runs along the eastern bank of the River Adur. The South Downs Way National Trail crosses the Adur and follows the 'Downs Link' (a dismantled railway that now connects the North Downs and South Downs to Steyning).

This character area is dominated by a series of enclosed fields that are subject to modern farming. To the south are small areas of saltmarsh and tidal mudflats along the bank of the river. These habitats form part of the Adur Estuary SSSI. The Adur Floodplain is typical of the major river floodplains in that settlement is generally absent.

- Vision for the South Downs

SDNPA has defined the following vision for the South Downs Management Plan to 2050:

The iconic English lowland landscape and heritage will have been conserved and greatly enhanced. These inspirational and distinctive places, where people live, work, farm and relax, are adapting well to the impacts of climate change and other pressures.

People will understand value and look after the vital natural services that the National Park provides. Large areas of high quality and well-managed habitat will form a network supporting wildlife throughout the landscape.

Opportunities will exist for everyone to discover, enjoy, understand and value the National Park and its special qualities. The relationship between people and landscape will enhance their lives and inspire them to become actively involved in caring for it and using its resources more responsibly.

Its special qualities will underpin the economic and social wellbeing of the communities in and around it, which will be more self-sustaining and empowered to shape their own future. Its villages and market towns will be thriving centres for residents, visitors and businesses and supporting the wider community.

Successful farming, forestry, tourism and other business activities within the National Park will actively contribute to, and derive economic benefit from, its unique identity and special qualities.

3.2 Nature Conservation

A. Introduction

The soils derived from the chalk are mostly thin, well drained and poor in both minerals and nutrients. They only support slow rates of plant growth, which is why specialist chalk grassland species are a feature in surviving fragments of unimproved land. Areas of deeper soils, with better fertility, are found on the dip slope and in valley bottoms. In a few places, windblown soils called 'loess' have been deposited on top of the chalk. This is thought to have been laid down during the last ice age. It often supports rare habitat types such as nationally important chalk 'heath'. Small areas of this habitat can be found across the downs in the Biosphere but an important site is at Pyecombe Golf Course.

A series of themed and spatial initiatives are being developed that focus on improving landscape function and equality, with an emphasis on landscape-scale initiatives that deliver multiple enhancements to landscape character, heritage, access and natural resources. Nature conservation action through the 'South Downs Way Ahead' Nature Improvement Area (NIA) partnership project seeks to apply the 'Lawton principles' of "bigger, better and more joined-up". Ecological networks are being mapped to use as a spatial targeting tool for shared conservation objectives. Finally, improved quality of protected biodiversity sites (see map) is sought as an outcome of the (draft) SDNP management plan.

B. Key Habitats

The general outcome sought in the (draft) SDNP management plan is:

- A well managed and better connected network of habitats and increased population and distribution of priority species now exist in the National Park

- Chalk Grassland:

Chalk Grassland Fact File

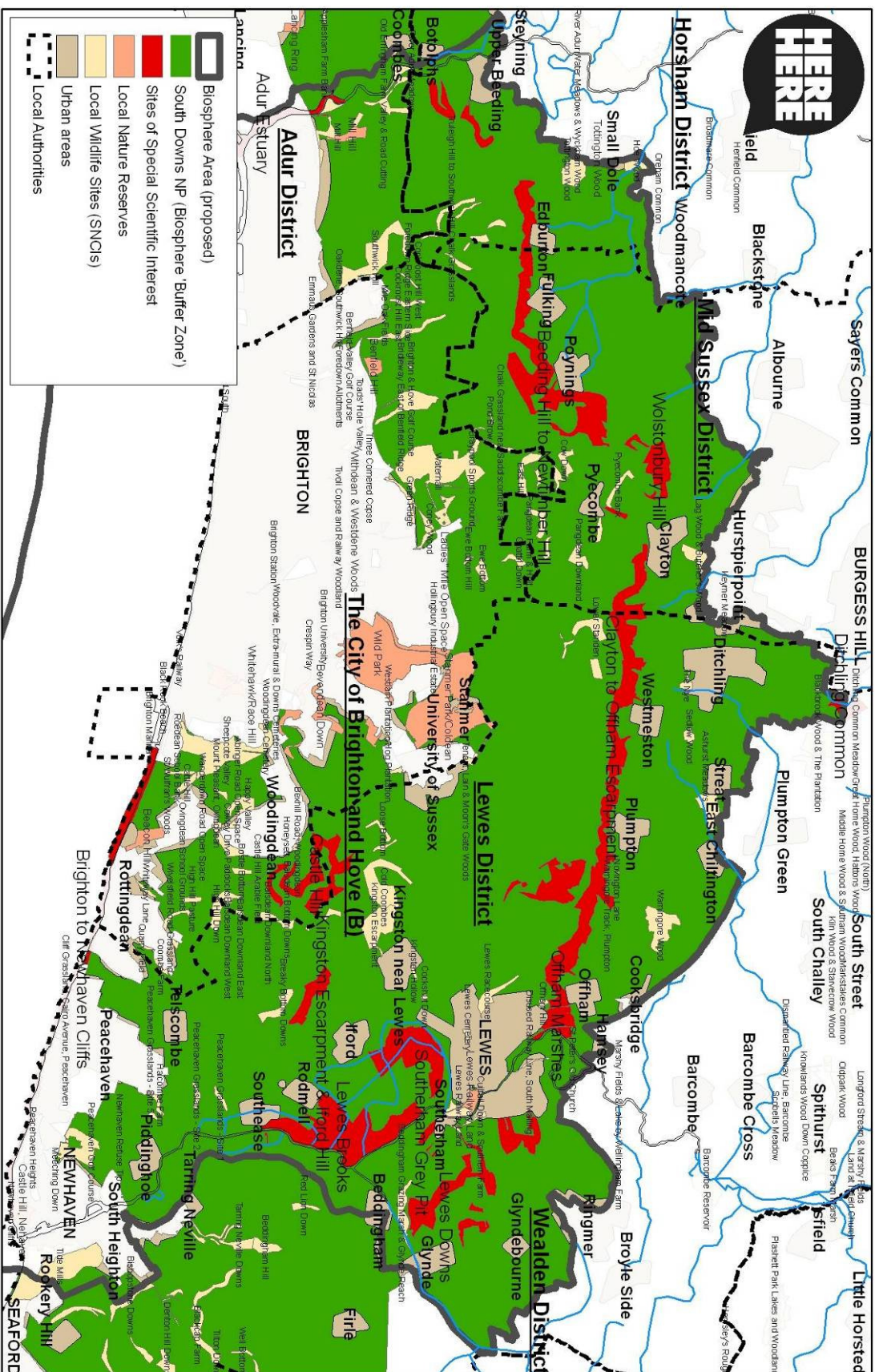
- Area of unimproved calcareous grassland. 1362 Hectares, approximately 7% of land in the rural area
- A square metre of chalk grassland turf can contain over 40 different higher plant species

The remaining areas of calcareous grassland are found on the steeper slopes of the South Downs. The thin chalk soils and poor nutrient status create harsh environmental conditions, while regular grazing prevents any individual species from dominating. As a result, this is a species-rich habitat with up to 40 plant species found in a square metre and an abundant insect life including some species associated solely with this habitat.

The condition of this resource varies considerably; about 50% is in favourable management with a rich diverse sward and appropriate grazing management; in Brighton & Hove City Council's (BHCC) area a third of the c. 300 ha area meets "favourable conservation status". Other sites suffer from lack of appropriate grazing, and invasion by the more dominant Tor grass which reduces diversity or invasion by scrub.

Chalk grassland habitats deteriorate due to a lack of appropriate management that leads to dominance by coarser grasses, scrub invasion and succession to woodland. They may also be destroyed through agricultural improvement (ploughing/application of fertilisers or chemicals). Fragmentation of habitats can further lead to isolation of populations of key species reducing their viability and ability to adapt to change. An over-reliance on environmental payments to ensure suitable management of grassland sites is an additional risk to the sustainability of management.

Brighton & Hove and Lewes Downs Biosphere (proposed) Rural Environment & Nature Conservation



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Current Policy & Practice –

A considerable amount of the chalk grassland in the biosphere area is within protected sites, National Nature Reserves (NNR) and Sites of Special Scientific Interest (SSSI) with further areas recognised locally (Local Wildlife Sites, or Sites of Nature Conservation Importance). Many of these sites are managed by conservation organisations such as the National Trust, while others are grazed by land managers as part of environmental schemes. Lowland chalk grassland is a UK Biodiversity Action Plan (BAP) priority habitat for conservation.

Chalk grassland is maintained by grazing, ideally with sheep. This maintains a shorter sward where many of the specialist plants thrive. Restoration of chalk grassland sites may also require other management including the removal of scrub, specialist grazing projects by Exmoor ponies to tackle Tor grass or Herdwick sheep to deal with Bramble. Many key areas have conservation designations and are managed by the Sussex Wildlife Trust or the National Trust. Other areas are managed by local authorities or are in the Higher Level Stewardship agri-environment programme.

Future Focus –

- NIA chalk grassland restoration and re-creation works from 2012 to 2015, with targeting based upon its habitat potential modelling study (2012, SDNPA-SBRC)
- Connect historic ancient chalk grassland sites to improve durability and permeability to benefit the special plants and invertebrates
- Promote enhanced environmental management of chalk grassland habitats and control scrub invasion
- Conserve species-rich woody scrub and seek opportunities to extend such habitats, particularly the occurrence of juniper which is a UK priority BAP species

- Farmland:

Farmland Fact File

- Area of land in agricultural production 18,370 ha (96% of rural area)
- Of this area 4142 ha are part of the BHCC downland estate
- Area of agricultural land in environmental stewardship schemes 9,345 ha (49%)
- Of this 2,178 ha is part of the BHCC downland estate
- Area of land in organic production 972 ha (5%)
- Of this 173 ha is part of the BHCC downland estate

Across the South Downs National Park, 85% of the land is farmed. The thin chalk soils are not especially productive and are littered with flints, so historically mixed farming has always been common. This creates a patchwork of grasslands, arable fields and fallow areas which can be excellent habitats for farmland birds whose populations nationally have been in sharp decline.

The landscape of this part of the South Downs is traditionally fairly open but it is broken in places by small copses and hedgerows. Hedgerow species include Hawthorn, Blackthorn and Elder, and these areas provide a good food supply and nesting cover for a variety of small birds and mammals. Small copses are often linked to game cover crops. They also benefit many other species.

Threats to farmland habitats include the changing economics of individual enterprises; a lack of management of hedgerows and copses; pressures from public recreation including crop damage or dog attacks on livestock on the urban fringe especially; and agricultural pests and diseases.

Current Policy & Practice –

Farmlands are covered by various local policies, including BHCC's 'City Downland Estate Policy' (formerly known as the 'Downland Initiative') as well as Biodiversity Action Plans for Sussex and Brighton & Hove covering the habitats of Farmlands (including 'Arable Field Margins' Habitat Action Plan) and Hedgerows.

Farming in the area is a mix of grazing stock and arable cropping. Crops grown include Oil Seed Rape, cereals, beans and Linseed, while the main livestock are Sheep and Beef Cattle. In recent years some sheltered south facing slopes have been planted with vines, which now play an important role in the English wine industry.

The majority of farms in the area are also entered into environmental stewardship schemes and undertake works to benefit farmland birds and other wildlife.

The area is a Nitrate Vulnerable Zone (NVZ), a designation to protect the groundwater supply that limits the use of nitrogen fertilisers on crops and also controls the storage and use of animal manures.

Future Focus –

- Targeting of agri-environment schemes for maximum benefits within ecological restoration zones
- Introduce advanced agronomy approaches to farming for 'win-win' economic and environmental benefits
- Targeted advice to land managers to promote changes in practices to benefit nature conservation and groundwater quality

- Woodland:

Woodland Fact File

- Area of woodland in rural area of the Biosphere 1704 ha (9%)
- Of which 504 ha are part of the BHCC Downland estate
- Links to Biodiversity Action Plans for 'Lowland mixed woodland'

Although woodlands are not a common feature of the landscape of the Eastern Downs, there are still some important woodland sites which add to the diversity of the area. These include an area of Juniper scrub and the more typical climax calcareous Pedunculate Oak, Ash and Beech woodlands found at Newtimber and Clayton Holts. The shrub layer in these woods includes Field Maple and Hazel, while the ground flora includes Dog's Mercury, White Helleborine and Fly Orchid. Some excellent examples of individual species of considerable age can be found in these woods including Large-leaved Lime and Hazel.

In other areas, secondary woodland has developed as part of a succession from grassland and then scrub. These tend to be dominated by Sycamore and Ash, often with Hawthorn scrub. At Stanmer Park, the woodlands are a mix of typical calcareous species augmented by landscaping and an arboretum, once part of the historic parkland. To the north of the downs below the scarp slope the soils change to wetter Wealden clays and the landscape is much more enclosed with small fields bounded by hedgerows and frequent copses. In the past, many of these woods were managed for Oak timber and Hazel coppice. A few are still managed like this today.

The main threat to woodland habitats comes from a lack of management, with other issues including loss of habitat due to development, and damage from browsing animals (Deer), pests and diseases.

Current Policy & Practice –

The national Forestry Commission has an overall policy of conserving and restoring native woodland cover on 'ancient woodland' sites (> 400 years old). Native broadleaved woodlands, like other priority habitats, are addressed for nature conservation through the Biodiversity Action Plan (BAP) process (including Locals BAPs for Sussex and Brighton & Hove), as is Wood Pasture & Parkland – a good example of the latter being at Stanmer Park by Brighton. Hedgerows are a further woody habitat (and BAP priority) for conservation focus, and are considered under 'Farmland' above.

The level of management in woodlands is extremely variable, with some areas having no management and following natural processes of decay and regeneration. These generally have no public access. In other woodlands, active management is undertaken to remove dangerous trees and less desirable species. Areas of coppice woodland have a regular management on a 15 to 25 year cycle, which is necessary to maintain viable coppice stools. Woodlands are often used for the breeding of Pheasants for winter game shoots.

Much of the BHCC woodland estate of some 500 hectares is classed as 'Open Access' land to the public, but receives little planned management other than essential tree safety works.

Future Focus –

- Bring more woodlands into active management through targeted advice and woodfuel incentives (SDNP emerging priority)
- Manage hanger woodland to ensure a diverse species and age structure by light thinning, clearance of some of the scrub, re-coppicing (especially hazel) and replanting as necessary
- Consider opening up paths/rides for access.
- Promote sustainable woodland management and local markets for woodland products such as wood fuel, biofuel or timber
- Seek opportunities to create new woodlands and to restore coniferous plantations to native species within mapped ecological networks and in line with landscape character assessment

- Freshwater Habitats:

Freshwater Fact File

- Length of rivers in the rural area of the Biosphere – 21.5 km
- 25 chalk streams and springs emerge from the base of the chalk ridge

The major river valleys of the Adur and Ouse bisect the chalk downs, north to south, separating the Brighton chalk block from neighbouring chalk areas. These two rivers are both tidal through the downs but the flood plains are crossed by numerous ditches, pools and grazing marshes. The Lewes Brooks (to the south of the town of Lewes on the river Ouse) and Offham Marshes (to the north) are both SSSIs with important assemblages of wetland plants, invertebrates and amphibians. The ditch systems and wet grasslands of Lewes Brooks have a particularly rich flora and attract nationally important populations of winter birds.

The Rivers Adur and Ouse, and their tributaries, are used extensively for coarse fishing. Both rivers provide important spawning grounds for Sea Trout. Non-migratory Brown Trout are distributed throughout the middle and upper reaches of the River Ouse and many of its tributaries, and occur widely within the Adur catchment. The River Adur and River Ouse support Bullhead (*Cottus gobio*) and Lamprey (*Lampreta* sp.), which are Annex II species under the EU Habitats and Species Directive. They are also designated Biodiversity Action Plan (BAP) species.

At the base of the chalk slope, chalk springs and streams appear, fed by the groundwater aquifer. The chalk springs at Offham are one of the finest examples in Britain, while many of the chalk streams provide breeding gravels for Sea Trout. A recent study of spring-fed chalk streams on the South Downs revealed the Biosphere area to contain some of the best examples in the world.

The chalk downs have a chain of dew ponds which were created to provide water for livestock in an otherwise dry landscape. These clay lined features hold some water all year but are largely recharged by winter rainfall. The ephemeral nature of some ponds has led to some unusual wildlife on the top of the downs, including populations of the Great Crested Newt and the Fairy Shrimp, both nationally rare species (the latter of which was surveyed by Sussex Biodiversity Record Centre in 2012).

Impacts on freshwater habitats include agricultural land drainage; over-abstraction of water resources; physical alterations; water pollution; invasive non-native species including silting-up; dominance of aggressive plant species; and for ponds, damage to their banks from livestock poaching.

Current Policy & Practice –

Floodplain Grazing Marsh and Ponds are BAP national priority habitats. The most significant legislation affecting the water environment is the European Water Framework Directive. This is being lead by the Environment Agency which is also delivering flood risk management plans in both catchments and the coast.

Areas of grazing marshes are maintained through seasonal grazing - the ditches that cross these areas are cleared on a rotational basis, usually one bank at a time, to remove excess silt and vegetation.

Dew ponds need little maintenance unless they cease to hold water. They are then restored by replacing the clay lining. In some cases it may be necessary to treat invasive non-native species, which can be achieved through mechanical removal or use of targeted herbicides.

Future Focus –

- Ensure that the water environment's value is realised
- Promote management of wetlands to ensure that we value their function in flood risk management, and provision of clean water alongside biodiversity
- Conserve and expand the traditional landscape of grassland meadows and wet woodland on the floodplains
- Promote new habitat creation and enhancement as part of managed retreat and flood management regimes
- Survey and incrementally enhance the characteristic chalk springs and streams
- Collate and maintain a high quality evidence base on all aspects of re-naturalising water bodies in the Adur and Ouse Catchments
- Monitor the condition, extent and connectivity of riparian, riverine and wetland habitats in the Adur and Ouse catchments
- Identify, research and find funding sources for re-naturalisation projects throughout the Adur and Ouse catchments
- Encourage urban and rural populations and land and watercourse managers to play a positive role in sustainable water management

Note that coastal habitats are covered exclusively in the *Coastal & Marine Environment* chapter of this strategy.

C. Key Species (Groups)

The general outcomes sought in the (draft) SDNP management plan are:

- a well managed and better connected network of habitats, and
- increased population and distribution of priority species in the National Park

- Farmland Birds:

The target species for the South Downs farmland bird initiative

(www.rspb.org.uk/ourwork/projects/details/313491-south-downs-farmland-bird-initiative) are Corn Bunting, Grey Partridge and Lapwing. Actions for these also benefit other species characteristic of farmland including Skylark, Linnet and Yellowhammer. Lapwings are declining breeding birds on the downs but may be more frequent in the farmland habitat than on the grazing marshes of the river floodplains. Grey Partridges are expanding from further west in response to habitat improvements targeted through HLS schemes, and Stone Curlews have recently started to breed in the area. The key requirements of the Farmland Bird Package are the 'Big Three' of winter food (often provided by overwinter stubbles), summer food, and suitable nesting habitat throughout the breeding season especially for chicks. Farmland birds have been in decline in southern Britain over the last few decades. This has been due to habitat loss resulting from changes in agricultural techniques such as autumn crop sowing and a move from hay-cutting to silage. Key risks are changes in farm practices, disturbance by recreational activities (especially dog-walking), predation and climate change. Reform of agri-environment schemes and policy will also have a major impact.

Current Policy & Practice –

A farmland bird initiative has been running in the area for several years (led by RSPB, Natural England and the South Downs National Park Authority) which encourages farmers to provide the necessary conditions for supporting and expanding populations of the key species. Environmental Stewardship schemes are thus promoted to farmers and targeted spatially by RSPB, NE and SDNPA to deliver the 'Big Three' requirements through the Farmland Bird Package, with suitable options in Environmental Stewardship (either Entry Level (ELS) or Higher Level (HLS)) including winter stubbles, bird feed crops, fallow plots for nesting Lapwing and Stone Curlew, arable margins and beetle banks.

Future Focus –

- Continue to promote the farmland bird initiative to ensure stable and increasing populations of the special farmland bird species, in particular Stone Curlew, Lapwing, Grey Partridge and Corn Bunting.
- Continue to develop best practice prescriptions for arable margins, beetle banks, seed crops and in particular fallow plots for nesting Lapwing and Stone Curlew
- Targeting of agri-environment schemes (HLS/ELS and successor schemes) for maximum benefits within ecological restoration zones

- Downland Butterflies:

The diverse downland flora supports a wide variety of specialist invertebrates, including some important populations of butterflies. The Adonis, Chalkhill and Small Blues are all restricted to chalk grassland along with the Silver Spotted Skipper. All these species have close associations with downland plants such as kidney and horseshoe vetch. Other regular downland species include Brown Argus, Dark Green Fritillary, Grizzled and Dingy Skippers.

Populations of both Chalkhill Blue and Adonis Blue have declined significantly over the past century. However, Adonis blue populations are starting to recover in some areas. Brown Argus distribution spread in the mid 1990s but declined from 1997-2000.

All four blues species (including Brown Argus) have been negatively impacted by the loss, fragmentation and degradation of chalk grassland habitat. Such habitat loss occurs either through a lack of management or over-grazing, linked to changes in the agricultural economy. Climate change and the collection of rare species are other potential threats.

Current Policy & Practice –

Small blue is a national BAP priority species because it is rare and localised, and the population has undergone a significant decline over recent decades. Chalkhill Blue and Adonis Blue are both assessed as being of medium priority nationally by Butterfly Conservation. The Dingy Skipper (*Erynnis tages* subsp. *tages*) is a specific focal species in the Brighton & Hove LBAP.

Management of important chalk grassland sites is carried out both by conservation and farming land managers through appropriate grazing and scrub control to encourage growth of their caterpillars' food plants.

Future Focus –

- Implement the 'Brighton Blues' project (NIA) to restore and connect chalk grassland habitats for rare butterflies, focused on the 4 'flagship species' as indicators of habitat restoration and reconnection to create landscape-scale improvements
- NIA chalk grassland restoration and re-creation works (2012-15 and beyond)
- Actions for Dingy Skipper in the Brighton & Hove Local Biodiversity Action Plan (LBAP) are to ensure existing sites are managed appropriately (by 2018), improve ecological connectivity between populations (by 2020) and consider re-introductions where circumstances allow

- Plants:

The downland turf can support up to 40 species of plant per square metre and many of these have a close association with the harsh conditions and nutrient-poor thin chalk soils. Regular grazing also helps to reduce competition from more aggressive species. Unusual species such as Round Headed Rampion, Chalk Milkwort and Autumn Gentian can be found on areas of old chalk grassland, while at least 17 species of orchid are known to grow in the area. The orchid flora includes the nationally rare Burnt Tip, Musk and Early Spider Orchids. The grasslands are also important for fungi, especially the Waxcaps. The management of agricultural holdings for farmland birds also benefits arable plant species, a group which has suffered the greatest declines of British plants over the last 25 years, such as Night Flowering Catchfly and Pheasants Eye. Good remaining areas for such 'arable weeds' include around Woodingdean.

The principal threats are from a lack of, or poor management of grasslands, and a lack of grazing, leading to dominance by more aggressive species; or conversely over-grazing, agricultural improvement or change. Climate change and plant theft by collectors are other potential threats.

Current Policy & Practice –

The Brighton & Hove LBAP focuses on the specific focal species of the 'Arable Annual Group', including Pheasant's-eye (*Adonis annua*), Shepherd's-needle (*Scandix pecten-veneris*) and Spreading Hedge-parsley *Torilis arvensis*, as well as the annual Red Star-thistle (*Centaurea calcitrapa*) in horse-grazed grasslands, White Helleborine (*Cephalanthera damasonium*) and the lichen *Physcia clementei*, both of which have their only remaining local colonies at Stanmer Park.

Management of important chalk grassland sites is carried out both by conservation and farming land managers through appropriate grazing and scrub control.

Future Focus –

- Targeting of agri-environment schemes (HLS/ELS and successor schemes) for maximum benefits within NIA focal areas
- NIA chalk grassland restoration and re-creation works (2012-15 and beyond)
- The Brighton & Hove LBAP Arable Annual Group proposed targets are to raise awareness (by 2017) and ensure sustainable conservation at selected sites (by 2020)

- Other Species: (invertebrates, fish, herptiles and mammals)

In addition to those species groups specifically mentioned above, there are numerous other species in the area that are either of national or local importance and included in Biodiversity Action Plans or species protection measures.

The chalk grasslands are important for the rare Wartbiter Cricket, Glow Worms and reptiles including the Adder and Slow Worm.

The wetlands of the Ouse valley are important for amphibians, including large populations of Common Toad and Palmate Newt. In addition, there are important populations of the aquatic Great Silver Beetle, Hairy Dragonfly and Variable Damselfly.

Other notable local species include the Hazel Dormouse, bat species such as the Barbastelle, Bechstein's, Serotine and Brown Long Eared Bat, Brown-banded Carder Bee (*Bombus humilis*) and the Hornet Robberfly (*Asilus crabroniformis*), all of which (along with Adders) are listed as specific focal species in the Brighton & Hove Local Biodiversity Action Plan (LBAP).

Fish populations (both freshwater and estuarine) on the Adur and Ouse rivers represent an important mixed (coarse and game) recreational fishery and economic resource, as well as some species of conservation interest such as the migratory Sea Trout. Monitoring under the Water Framework Directive shows some waterbodies to be failing on the basis of their poor fish status, notably on the River Ouse and Glynde Reach, which has multiple obstructions to fish passage.

Threats to the other important species of chalk grasslands and wetlands come from inappropriate grassland management (including poor grazing), and habitat loss, land drainage, water pollution or flooding respectively.

Current Policy & Practice –

Chalk grassland is being targeted for positive management and restoration through appropriate grazing and scrub control. Management of grazing marshes is being promoted through appropriate seasonal grazing and maintenance of ditches.

The Adur & Ouse Catchment Management Plan seeks to address failing fisheries.

Future Focus –

- Relevant specific actions for species of biodiversity concern (e.g. in the Brighton & Hove LBAP) are to be identified.

The Adur & Ouse Partnership (Fisheries group) has developed objectives and targets including the following relevant elements:

- Fisheries within the catchment will provide enhanced recreational opportunities and economic benefits
- Target: River restoration measures improve recreational opportunities and enhance the economic benefits of fisheries
- Target: Ensure that barriers to fish migration and movement do not compromise the achievement of good ecological status or potential

D. Geology

The chalk scarp and dip slopes of the South Downs have been shaped by nature and man, resulting in some important geological sites. Devil's Dyke is a key site for periglacial and chalk geomorphology. It is the most famous and remarkable of all chalk dry valleys and the largest single coombe anywhere in the chalk karst in Britain. It is recognised as a spectacular example of Pleistocene erosion of chalk.

At Southerham, outside Lewes, three former chalk quarries are of national geological importance. The Grey Pit exposes nearly the entire chalk marl and the lower half of the grey chalk. It is important for the cretaceous stratigraphy and the abundance of fossil bivalves and fish. Machine Bottom Pit is well known historically for its fish fossils including sharks and rays, while the Works Pit holds the best remaining exposures of the Ranscombe, Lewes and Seaford members in the Middle and Upper Chalk.

Threats to geological interest include recreational damage, land-filling of old quarries or their inappropriate development.

Current Policy & Practice –

The three old chalk quarries at Southerham by Lewes represent important geological SSSIs. Other sites are identified as non-statutory Local Geological Sites (formerly known as Regionally Important Geological and Geomorphological Sites or RIGGS) which have been recently surveyed in our area, including for example at Stanmer village within Stanmer Park.

Little management is currently undertaken, but SSSI sites are protected and monitored.

Future Focus –

- Promote geodiversity and increase understanding of the value of historic sites and their relevance to the earth's heritage e.g. through more public interpretation and events (working with the Sussex Geodiversity group)

3.3 Sustainable Socio-Economic Development

A. Sustainable land management

This is an overall guiding approach to the sustainable development of the rural environment, with the following future principles proposed as part of the (draft) SDNP management plan:

- Encourage sustainable land management based on an ecosystems services approach, including linking land management and water resource management
- Develop incentives which focus on enhancing water resources, water quality and biodiversity while optimising carbon reduction and capture, flood risk reduction and sustainable food production
- Promote a better public understanding of the benefits and value of the goods and services provided by the rural environment
- Establish 'Payments for Ecosystem Services' (PES) as a key delivery mechanism (through an initial pilot scheme)
- Action: Produce a masterplan for the publicly owned BHCC downland estate to maximise the opportunities to integrate sustainable farming practices with biodiversity conservation, and access to nature including steps to maximise the benefits of ecosystem services. Include sustainable land management, protection of natural resources, provisioning of local food, sustainable businesses and opportunities for access, education, health and wellbeing

Draft policies include:

- Conserve and enhance the natural beauty and special qualities of the landscape and its setting, in ways that allow it to continue to evolve and become more resilient to the impacts of climate change and other pressures
- Develop landscape-scale partnerships and initiatives to focus on enhancing the key ecosystem services delivered by the National Park
- Protect and enhance tranquillity and dark night skies
- Create more, bigger, better-managed and connected areas of habitat in and around the National Park, which deliver multiple benefits for people and wildlife
- Conserve and enhance populations of priority species in and around the National Park, delivering targeted action where required
- Favour natural functions and processes in and around the National Park where they support the value and resilience of terrestrial, freshwater, marine, coastal and estuarine habitats
- Focus the prevention, control and eradication of invasive non-native species on those that are most harmful to biodiversity
- Increase the knowledge and understanding of the National Park's cultural heritage so that it is better protected and more people enjoy and have access to it
- Improve the management of heritage assets, particularly focussing on those that are 'at risk' including that from crimes against heritage

B. Local and Sustainable Food

In the rural area of the Biosphere area, an estimated 85% of land is farmed. This land provides many more services than simple crop and meat production. On the fringes of settlements there are some small-scale local food growing initiatives and community orchards producing organic produce for local consumption, with local enterprises including regular farmers markets in Lewes and Brighton, production by Plumpton College students, and local beer (Harveys in Lewes) and increasingly wine (Breaky Bottom near Telscombe).

Issues include the national and international nature of agricultural markets, which are governed by global trading prices; the power of major purchasers such as the supermarkets; the availability of processing plants (the nearest major flour mill is 150 miles away); and the relative lack of low-intensity and organic agricultural practices in the current economic climate.

Current Policy & Practice –

The Brighton & Hove Food Strategy ‘Spade to Spoon: Digger Deeper’ (2012)

(www.bhfood.org.uk/food-strategy) elements include aims to grow, produce and process more of its food consumption locally in an environmentally sound manner, and to promote and celebrate local and sustainable food with residents and visitors alike.

ESCC’s Environment Strategy (www.eastsussex.gov.uk/NR/rdonlyres/3A10AB21-1AA5-4BBD-AEF6-93F68587B766/0/draft_environment_strategy.pdf) includes a focus on food by linking food to the local area, farm diversification, and community growing projects: “Reduce the environmental impacts of food production and distribution, improve health through better diets and support the agricultural and food economy of the county”. They have recently produced a ‘Sustainable and Healthy Food Action Plan’ for East Sussex.

Future Focus –

- Identify barriers to local markets for local food and seek solutions
- Promote local and community food production and local heritage species, including heritage fruit and vegetable varieties with links to the area
- Identify the scope to encourage greater organic production?
- ESCC to increase the proportion of locally produced food in the public and hospitality sectors
- ESCC to identify locations where people can grow more of their own food, including community allotments and land-sharing

C. Sustainable Transport

The rural area has an excellent network of public rights of way which can link urban areas to the countryside, and a diverse network of local road transport routes.

Issues include developing financially viable bus services as part of the sustainable transport agenda, to reduce dependence on the car and change perceptions so visitors leave the car at home. There is also a need to reduce barriers to safe cycling and walking.

Current Policy & Practice –

BHCC and ESCC have Local Transport Plans and Air Quality Action Plans (rural and urban).

The Breeze buses run from the centre of Brighton to key destinations on the South Downs, reducing dependence on the car and promoting a more sustainable form of access. In addition, safe cycling routes are being developed to encourage recreational use of the countryside and utility use such as commuting.

Future Focus –

The policies in the (draft) South Downs management plan include;

- Promote and enhance suitable railway stations as gateways for non-car travel into and around the National Park
- Improve existing transport provision for visitors and communities, especially by increasing the availability of Sunday and evening services
- Encourage cycling for both commuting and leisure purposes through the development and promotion of safe cycle route networks while protecting future potential opportunities

Potential future SDNP PMP actions include:

- Make enhancements to public transport, cycling and walking facilities which reduce car use, including improving safety for cycling and walking
- Enable local communities to access essential services without having to rely on the car
- Encourage more visitors to the countryside to use public transport
- Remove barriers and promote access for all
- Sympathetically designed highways maintenance and capital projects to have better incorporated roads into the landscape
- Impact of heavy goods vehicles to be reduced
- Signage repair, design and de-clutter projects to enhance landscapes / distinctiveness, and advertising signage to be better controlled
- Green infrastructure in urban areas both in and out of the National Park to provide effective linkages between people and wildlife
- Embed green infrastructure provision in the planning process
- ESCC to begin to implement a Strategic Open Spaces Strategy for East Sussex to provide greater public access to open space from 2012

D. Culture and Community

The South Downs is recognised as one of the first areas in Britain to be occupied by early humans. As a result there is a rich heritage of man and the environment with many historical sites throughout the Biosphere area. There are also many cultural connections, from poets to painters, composers to writers. The culture also has a global influence from times when soldiers fought in the two world wars and were based in the area, with the most prominent local memorial being the Chattri, north of Brighton.

The rural environment of the South Downs contains an incredibly rich archaeological heritage, in particular from pre-Roman times, with 54 statutory Scheduled Ancient Monuments (SAMs) (www.english-heritage.org.uk/caring/listing/scheduled-monuments/).

Examples of sites from different periods include:

- Neolithic Monuments (c. 3500BC) – nationally important sites include the causewayed enclosure at Offham Hill by Lewes
- Bronze Age and Iron Age (c. 2000BC – 43AD) – Iron Age hill-forts exist on the Downs scarp slope at Devil's Dyke, Ditchling Beacon and Thundersbarrow Hill
- Roman (43AD-410AD) – several Roman villas and other sites can be found, including Randolphs villa near Hassocks
- Saxon (410AD-1066AD) – Lewes was settled by the Saxons
- Medieval (Post 1066) – the remains of a Norman motte and bailey castle can be found on the Downs at Edburton

Away from the urban areas there are many smaller communities, varying from a cluster of cottages around a farm holding to the villages of the Weald and the Ouse Valley that sit on the line of freshwater springs that emerge from the chalk.

Sustainable land management includes not just environmental and economic considerations but also care of our local heritage, in particular buried archaeological remains. Issues include cultural heritage assets at risk (e.g. Ditchling Hill fort, partially ploughed) and historic parkland at risk (Stanmer Park). The wider issue of a reduction of services in rural communities is also key.

Current Policy & Practice –

Organisations that are active include SDNPA Cultural Heritage Strategy lead and Conservation officers, WSCC and ESCC archaeologists, 'Sussex Past', ESAMP, Brighton & Hove Archaeology Society (includes Stanmer public excavation 'community digs' and events programme).

Future Focus –

- Actively involve communities in the development and design (including housing need) of their local rural area so they are able to influence change and enjoy the benefits of its goods and services
- Encourage communities to better understand and value their surrounding environment, the services it provides and the impact of their actions
- Conserve and enhance landscape character and local distinctiveness (SDNP emerging priority)
- Manage cultural heritage assets sustainably and greatly reduce the number of sites 'at risk' through positive interventions including through environmental schemes
- Encourage a better public understanding of the importance of heritage and landscape and the links between culture, community and nature (through contemporary artists and writers)

- Enhance the quality of life of communities based upon a comprehensive understanding of essential community services and support for meeting community needs
- Encourage more people to take part in cultural heritage activities, including learning opportunities and volunteering
- Integrate cultural heritage projects with the ecosystems services benefits
- Deliver events, projects and performances that are inspired by the landscape

E. Local Economy – farming & tourism

The economy of the rural area is predominantly based on farming and tourism. Farming largely relies on national markets and the viability of different enterprises is governed by market prices (and subsidies). The tourism industry is still growing and evolving.

Current Policy & Practice –

The area's local authorities and SDNPA in particular have a range of policies concerned with the rural economy, including a focus on farming and countryside tourism. For example, BHCC produced a Planning Advice Note on 'Farm Diversification' (in October 2005) and wishes to see sensitive use of redundant farm buildings (especially the complex at Stanmer).

In terms of local farming economics, BHCC's tenanted farmland estate supports 77 FTE jobs, generates c. £0.5 million in rental income each year and has 16 farm diversification initiatives operating.

With regard to tourism, many visitors are day visitors. A few new enterprises have begun to tap into the sustainable tourism market, including the National Trust at Saddlescombe Farm developing a café and information barn. A car-free camp site is also being established.

Future Focus –

The policies within the (draft) SDNP management plan are:

- Support the financial viability of farm businesses through appropriate infrastructure and diversification developments, in particular encouraging those that will support sustainable farming
- Develop the market for and production of sustainable food, drink and other products with a South Downs National Park provenance
- Develop a consistent and co-ordinated approach to the promotion and marketing of the South Downs National Park as a sustainable visitor destination
- Support the development and maintenance of appropriate recreation and tourism facilities and visitor hubs including a mix of quality accommodation, which responds to market demands and supports a sustainable visitor economy
- Encourage and support tourism providers to develop sustainable business practices and increase knowledge about the National Park's special qualities to provide a distinctive and high quality visitor experience

Potential future SDNP PMP actions include:

- Make the South Downs National Park a beacon for sustainable development
- Develop a diverse and sustainable economy that contributes to the wellbeing of local communities
- Encourage a wide variety of business and employment opportunities which are aligned to the protection of the environment and are sustainable
- Make businesses more environmentally sustainable

- Encourage businesses that supply local services for rural communities, promote local distinctiveness, maintain the land-based economy and use local products and produce
- Ensure that financial interventions for agriculture support sustainable farming and improve the environment for nature and people
- Effectively tackle the negative impacts of development and incremental small-scale cumulative change on landscape and heritage
- Agricultural and forestry businesses are linked to local markets and business opportunities
- Support for diversification and green tourism initiatives
- Support for service development in villages and market towns to support rural communities
- Reduce the carbon footprint through energy efficiency, renewable energy, new technologies and sustainable construction
- Make branded local produce more sought after and available
- Promote and develop traditional rural skills
- Enable tourism to expand sensitively, become more sustainable and strongly related to safeguarding the special qualities of the area, and connected to the landscape
- Enhance visitor enjoyment of the area and quality of experience
- Develop hubs, gateways and information points with high quality visitor information provision
- Increase the number of businesses accredited to the Green Tourism Business Scheme
- Encourage day visitors to become staying visitors, who will then put more money into the local economy

F. Health and Wellbeing

The wide open spaces of the rural parts of the proposed Biosphere area provide excellent opportunities for recreational activities, exploration and quiet reflection. The area can contribute greatly to the health and wellbeing of local communities, providing opportunities for exercise, from gentle walks to longer rambles, cycling, horse riding, picnics or kite flying. Some areas can be tranquil, away from traffic and hustle-bustle of daily city life. There are also opportunities for practical involvement through volunteering, engaging in activities from gardening to footpath management, and as prescribed by some doctors, the Green Gym (www.tcv.org.uk/greengym).

Current Policy & Practice –

There are many current initiatives to encourage local people into the countryside, from health walks to the development of multi activity trails.

Future Focus –

- Improve the health and wellbeing of communities through increased access and use of the natural services and special qualities that the area offers
- Increase walking opportunities and other activities to improve people's health and wellbeing
- Improve the range of opportunities that exist for people of all abilities and backgrounds to visit and enjoy the special qualities of the area
- Promote the rural environment as a benefit to deal with health issues in neighbouring urban areas
- Development of multi activity trails to promote health

ESCC's Environment Strategy (2011) principle to promote the use of open and green spaces as part of healthier and more active lifestyles, by:

- Promote the use of open spaces, including the countryside, beach, parks and gardens as a means of enabling everyone to live healthy and active lives
- Ensure that 90% of the population of the county has access to a natural greenspace within five minutes of their home to provide the opportunity to be active outdoors on a daily basis
- Promote everyday active travel with walking and cycling routes through green corridors
- Green Infrastructure strategies should be put in place that identify the key functions for different landscape (and townscape) areas, to help to prioritise areas for recreational use and those which should remain undisturbed for wildlife

3.4 Key Policies

The key policies on the rural environment of the Biosphere include:

- South Downs National Park Partnership Management Plan (consultation draft, July 2013)
- South Downs National Park Vision (2012)
- Local Biodiversity Action Plans – for Sussex, and Brighton & Hove (2013)
- Nature Improvement Area (NIA) - business plan (2011)
- Adur and Ouse Catchment Plan (2012)
- BHCC 'City Downland Estate Policy' (formerly the 'Downland Initiative') (2013)
- South Downs Natural Character Area assessment, by Natural England (2013)

3.5 Existing Information

- State of the South Downs National Park report (2012)
www.southdowns.gov.uk/about-us/state-of-the-national-park-report-2012
- South Downs Management Plan 2008-2013 (old AONB plan, not adopted by new SDNPA body in 2011)
www.southdowns.gov.uk/__data/assets/pdf_file/0003/123294/SD_Mgt_Plan_Intro_part_A.pdf
- South Downs Integrated Landscape Character Assessment (2011 update by SDNPA)
www.southdowns.gov.uk/planning/integrated-landscape-character-assessment
- South Downs National Character Area assessment by NE (2013)
www.naturalengland.org.uk/publications/nca/south_downs.aspx
- South Downs National Park Vision (2012)
- South Downs National Park Special Qualities (2012)
- Sussex Local Biodiversity Action Plan www.biodiversitysussex.org
- Brighton and Hove Local Biodiversity Action Plan (draft 2012)
www.brighton-hove.gov.uk/index.cfm?request=c1248574
- Citations and Condition Assessments for the following SSSI sites (14) in the Biosphere:
www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
 - Adur Estuary
 - Beeding Hill to Newtimber Hill
 - Brighton to Newhaven cliffs
 - Castle Hill
 - Clayton to Offham Escarpment
 - Ditchling Common
 - Kingston Escarpment
 - Lewes Brooks
 - Lewes Downs
 - Offham Marshes
 - Southerham Grey Pit
 - Southerham Machine Bottom Pit
 - Southerham Works Pit
 - Wolstonbury Hill
- East Sussex County Landscape Assessment
www.eastsussex.gov.uk/environment/landscape/default.htm

Chapter 4 URBAN ENVIRONMENT



4

CHAPTER 4 – Urban Environment (Biosphere ‘Transition Areas’)

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SUMMARY

The main urban areas in the proposed Biosphere are the City of Brighton & Hove and the towns of Lewes, Newhaven, Peacehaven, Telscombe, Southwick, Shoreham-on-Sea and Shoreham Beach. They are home to around 358,500 people, more than three-quarters of whom live in the fast-growing city of Brighton & Hove. Our settlements contain extensive networks of urban greenspace - made up of a mixture of public parks, private gardens, and other open spaces such as housing grounds, cemeteries and sports areas. These are generally well-connected to each other and their rural downland surrounds.

The three local authorities of Brighton & Hove City Council (BHCC), Lewes District Council (LDC) and Adur District Council (ADC) are actively working with local organisations and communities to improve the natural value of green spaces and further sustainable development by encouraging more eco-friendly lifestyles of both residents and visitors to reduce our ecological footprint. Such initiatives are being pursued through the 'One Planet' and 'Smarter Living' programmes in Brighton & Hove and Lewes District respectively for example, and span energy, transport, food, water and local economics, among other elements.

There are many examples of good practice across the different urban areas. For example, in Brighton & Hove the Parks service has introduced more sustainable management of public parks by switching annual bedding areas to wildlife-friendly and drought-resistant perennial plants; increased the area of urban fringe chalk grassland sites, easily accessible to the general public, managed with sheep grazing; and created new chalk habitats of 'butterfly banks' in different green spaces. In Lewes, the innovative Railway Land Project has created new freshwater habitats and opened the community-built and -run sustainable building of the Linklater Pavilion, while chalk grassland has been restored from former intensive arable farmland at Landport Bottom over many years. ADC are introducing less intensive grass-cutting regimes in some areas, and actively work with volunteer groups on wildlife-friendly planting schemes. Innovative sustainability projects are also being run in both Brighton & Hove and Lewes to increase local food growing, promote cycling and associated infrastructure, and reduce energy and water consumption within council buildings.

The Biosphere Project aims to build on and expand this good work by developing an integrated vision of all urban greenspace as performing multiple functions and bringing diverse benefits – from public recreation to wildlife conservation to flood mitigation, for example, as a holistic network of "green infrastructure". It seeks to manage public green spaces in more sustainable ways and to further engage local community groups in the conservation and improvement of the natural environment.

Important habitats and species will be better conserved through Local Biodiversity Action Plans (LBAPs). This includes better connecting the fragmented chalk grasslands around our towns with both their rural downland and urban greenspace neighbours working with local people to achieve this. We wish to support measures by local groups and residents to promote and adopt sustainable lifestyles, through, for instance, more local food-growing and encouraging active travel to live healthier lives. We will encourage new development to integrate high environmental performance and living green surfaces to soften the hard built-up nature of our urban areas and so improve their functioning.

Flagship projects underway or being planned which embody these Biosphere principles include: the Big Parks Project in Peacehaven to create a new multi-functional greenspace for local people; the creation of new wildflower grassland within urban green spaces under the 'Towns to Downs' focus of the 'South Downs Way Ahead' Nature Improvement Area project; and the planned mixed use development through the Shoreham Harbour Regeneration Project as an exemplar of sustainable development that delivers socioeconomic regeneration whilst raising environmental quality.

4.1 Introduction to the Urban Environment

The built-up area of the City of Brighton & Hove, the Lewes District towns of Lewes, Newhaven, Peacehaven and Telscombe, and the Adur District settlements of Shoreham-on-Sea, Shoreham Beach and Southwick, constitute the principal urban areas in the proposed Biosphere Reserve. Other smaller rural settlements in the National Park area of the Biosphere are considered as part of the *Rural Environment* chapter.

- Brighton & Hove

(Note that figures given for Brighton & Hove are for the whole of the City Council's administrative area rather than the built-up area only, unless indicated otherwise)

Brighton & Hove is the largest conurbation in Sussex, a compact attractive hilly city located in a geographic administrative area of 8,267 hectares (approximately 40 square kilometres or 15 square miles) with 11 kilometres of seafront and a population of almost 275,000. It enjoys a national reputation as a vibrant and liberal cosmopolitan location, based upon a historic seaside tourist resort and contemporary centre for the arts, digital industries and conferences. The city developed through Regency and Victorian times to expand over the surrounding hills and valleys into the last century, but is now constrained in size and future growth by the South Downs National Park (SDNP) to the north and the English Channel to the south.

The urban area is contained within the A27 road by-pass which represents a barrier to the chalk downland to the north and constitutes the general boundary of the national park in the west. Between the built-up area and the SDNP lie more than 50 varied parcels of 'urban fringe' land (areas of residual 'encapsulated countryside') which cover a total area of 479 ha (~6% of BHCC) especially in east Brighton.

Downland areas are quite well-connected, however, through the extensive network of open space that extends right into the heart of the city as a mixture of semi-natural habitats and more formal managed public green spaces, including parks, sports' fields and school grounds. This public 'urban greenspace' is further augmented by privately owned areas, principally domestic gardens, which are more significant in outer suburban neighbourhoods. The city's network of parks and open spaces plays an essential role for relaxation, recreation and sports, and community and cultural events for both residents and visitors. Demand and use of parks and open space has increased with the growing population and popularity, however, with access to open space limited in central areas of the city and sports' and recreation facilities under pressure.

Made up of distinct urban and suburban neighbourhoods, Brighton & Hove's population density is over 30 residents per hectare – far greater than both the regional and national averages. In the city centre there are as many as 60-200 dwellings per hectare. The average household size is just over two persons per household (substantially lower than the regional and national averages), contributing to the pressure on housing and public open space provision.

The population of Brighton & Hove, numbering 273,500 people in 2011, includes many in higher grade professional occupations, although there is a growing lower-paid proportion. The continuing and predicted population increase is making demands on the creation of new jobs. Some of the city's areas suffer from high levels of disadvantage, which is manifested as marked differences in physical and mental health, and life expectancy between neighbourhoods. The city forms part of a Sussex Coast housing market (including Lewes District and coastal West Sussex) that has experienced huge increases in house prices over the past decade and significant in-migration from London (including many commuters), with a lack of both affordable housing and business premises.

Lewes District:

- Lewes town

Lewes is the county town of East Sussex with a population of 16,650 and lies entirely within the South Downs National Park. It is located on the River Ouse where it flows southwards through a gap in the South Downs. Significant parts of the town are at risk of flooding from the river and there was a severe flood in the town in October 2000. It is considered to be one of the best preserved small market towns in England, with a thriving town centre, strong sense of community, and significant artistic and cultural heritage, making it a popular tourist destination.

Lewes town has the largest retail centre in the district, with a number of local specialist shops, and has excellent public transport connections with direct rail services to London, Gatwick Airport, Brighton and Ashford International. Lewes is an important administrative centre, with 44% of jobs being in public administration, education and health. Public institutions include the Crown and County Courts, prison, and headquarters of the County and District Councils, Sussex Police, Ambulance Service and local NHS Trust, as well as Sussex Downs College.

The historic town of Lewes has little room for expansion but a high demand for in-fill development. The core of the town contains many old "twittens" lanes and comprises three individual settlements – Lewes High Street, Southover and Cliffe – each preserving its own identity. Beyond there are a number of well-preserved Victorian/Edwardian neighbourhoods.

- Newhaven

Newhaven is located on the English Channel coast at the mouth of the River Ouse and has a population of 12,230. The South Downs National Park lies immediately to the north and east of the town. The historic core of the town is located on a slight spur of the Downs to the west of the river, although the rapid post-war expansion of Newhaven has seen the town extend across the valley to encompass the villages of Denton and South Highton in the east.

Newhaven has had a harbour for sea-faring vessels since the 16th Century. Today, the main services operating from the harbour are the cross-channel ferry to Dieppe and commercial trade in aggregates and scrap metals. There is also a commercial fishing fleet and a small marina. In 2010, only 253,000 passengers travelled through the port (a 23% reduction from 2007) and the amount of freight handled declined to its lowest level for 10 years at 824,000 tonnes. There are a number of derelict and under-utilised sites that offer significant opportunities for regeneration near to the harbour and there has been significant recent waterfront redevelopment at West Quay. Denton Island has recently seen an upsurge in economic activity with the successful establishment of the Enterprise Centre and Newhaven campus of Sussex Downs College.

A very high proportion of jobs in the town (31%) are in manufacturing, with a concentration of industry and a range of facilities involved in waste management. Consequently, there are a significant number of potentially contaminated sites. The retail offer within the town centre is declining with a number of vacant units. The majority of retail development in recent years has occurred on former industrial land on the east of the river.

- Peacehaven & Telscombe

Peacehaven and Telscombe (as well as East Saltdean) are located on the English Channel coast and have a combined population of 22,260. The settlement extends from the cliff top overlooking the sea towards open downland to the north and west. Coast defences protect most areas of cliff top development from erosion by the sea. The settlements are characterised by low density 20th Century residential development, laid out on a grid street plan. This reflects Peacehaven's early origins as a speculative seaside resort at the turn of the 20th Century.

Despite its large residential population, Peacehaven only provides 5% of the total employment in the district. Consequently, most residents have to travel out of the town to work, particularly to Brighton. The A259 coast road is the only vehicular route in and out of the urban area, and includes priority bus lanes for the frequent service to and from Brighton. The Meridian Centre provides a commercial and public facilities, with further services scattered along the A259 road. The town has a strong feeling of community with many local community groups and well-attended local events. A major new public park is currently being created in Peacehaven.

Adur District:

The combined population of the three Adur settlements included in the Biosphere area is 33,810; the rest of the District lies beyond to the west of the River Adur.

- Shoreham-on-Sea

Shoreham-by-Sea is the largest town centre in the District and is bounded by the River Adur to both the west and south, with the National Park lying to the north. It has a historic core with a grid pattern that has a distinctive character, having been established by the Normans at the end of the 11th Century. Old Shoreham to the north was an agricultural village by Anglo-Saxon times, with St Nicolas Church probably dating from this period. The most important landmark in Shoreham-by-Sea is the Norman St Mary de Haura Church. The town centre has a range of cafes, restaurants and niche shopping facilities, notably along the pedestrianised East Street. Shoreham has a blossoming art and cultural scene, with the Ropetackle Arts Centre being the prime focus including in the annual Adur Festival in June.

The commercial port of Shoreham Harbour lies immediately to the east. It handles large quantities of cargo, both imports and exports, including aggregates, timber and grain, as well as hosting marine services including a resident commercial fishing fleet as well as leisure uses. A regeneration project for Shoreham Harbour is planned to reconfigure, consolidate and enhance the commercial Port and to re-develop the Western Harbour Arm to provide in excess of a 1,000 dwellings with new employment and ancillary retail units. It is also planned to provide new areas of "public realm" space and a riverside cyclepath to improve the environment.

Shoreham Airport (now known as Brighton Airport) lies adjacent to the River Adur to the west, just outside the Biosphere area. The airport was the first commercial airport in the country, established in 1910 and being heavily involved in both World Wars, with a renowned Art Deco terminal building.

- Southwick

Southwick lies in the east of the District, next to Brighton & Hove, and was first recorded in the Domesday Book but also hosted a Roman villa on the present-day Manor Hall Road. The town grew as the south coast became a popular holiday destination in Victorian times, and expanded further with the arrival of the railway in 1840. Southwick town centre is a thriving retail area built in the 1960's to the north of the railway station. The Green here provides an important high-quality recreation space which contributes to the Southwick Conservation Area neighbourhood.

- Shoreham Beach

This modern settlement lies on the south side of the River Adur opposite Shoreham-by-Sea, and is built upon the shingle bank thrown up over the centuries by the sea. Converted railway carriages became summer homes around the turn of the 20th century, and Bungalow Town, as it was then known, became home for a short time to a flourishing film industry. The Church of the Good Shepherd was built here in 1913. It was cleared for defence reasons during the Second World War and is now completely developed for modern houses.

4.2 Nature Conservation

A. Introduction

Nature conservation designations (see map) cover 16% of Brighton and Hove's administrative area. The two national statutory Sites of Special Scientific Interest (SSSIs) cover 139 ha but are located predominantly in the rural and coastal environments of Castle Hill and Brighton to Newhaven Cliffs, respectively. There are five declared Local Nature Reserves (LNRs) covering 1.1% of the city and a further three proposed LNRs covering a further 7.1% of the area. This creates a total area of 690 ha spread across both urban and rural environments, with the non-SDNP sites comprising Whitehawk/Race Hill, Bevendean Down (parts), Ladies Mile Open Space, and Withdean & Westdene Woods. Sixty-two (non-statutory) Local Wildlife Sites (LWS), formerly called Sites of Nature Conservation Importance (SNCIs), were identified up to 2013 when a full review was undertaken of existing and new potential sites. The existing sites cover 612 ha and include well-loved locations such as Sheepcote Valley, Green Ridge and Three Cornered Copse. There are also four identified Local Geological Sites in Brighton & Hove, one of which (the Gold Stone in Hove Park) lies within the urban environment of the Biosphere. The Brighton & Hove Local Biodiversity Action Plan (LBAP) aims to increase the coverage of designated terrestrial protected sites to at least 17% by 2020.

Lewes District wholly or partly contains eleven of the fourteen SSSIs in the Biosphere area, mostly in the rural SDNP area. Lewes District Council owns thirteen nature reserves, as well as common land areas, covering 344 hectares in total. Ten of the reserves are situated within the proposed Biosphere area in Lewes, Newhaven and Peacehaven, and cover around 100 hectares. They are managed for wildlife and people, through the LDC Ranger team using a standardised approach for integrated site management planning, and include two designated LNRs (Lewes Railway Land and Castle Hill, Newhaven), both of which have been awarded 'Green Flag' status. In addition to its direct nature conservation management, LDC has a role in monitoring and promoting positive management of the thirty-nine Local Wildlife Sites (SNCIs) in the Biosphere area, half of the eighty such sites across the District that cover 1,225 ha total area, with a further nineteen Local Geological Sites.

One SSSI, the Adur Estuary at Shoreham-by-Sea, lies within the Biosphere area of Adur District, as well as two (of three for ADC) declared LNRs at Mill Hill and Shoreham Beach. The District has eleven designated LWS/SNCI sites, of which six sites lie within the proposed Biosphere area and include vegetated shingle beaches, chalk grassland and meadows. Four of these are in 100% positive conservation management, with the other two being 75% and 80% positively managed.

All public authorities must have regard to biodiversity conservation so far as is consistent with exercising their functions according to the Natural Environment and Rural Communities Act (2006). This Act also lists specific individual 'Habitats and Species of Principle Importance for Conserving Biodiversity' as a framework for identifying conservation priorities in parallel with the UK Biodiversity Action Plan (BAP). The Brighton & Hove Local Biodiversity Action Plan (www.citywildlife.org.uk/forum/viewtopic.php?f=5&t=37) provides a framework for nature conservation within Brighton & Hove, based upon the national priority habitats and species of greatest significance and specialness locally. The LBAP contains individual action plans for fifteen habitats and eighteen species (/groups), drawn from 115 nationally important species that have viable populations here. These priority habitats are mainly distributed in the surrounding rural and marine areas (and hence are covered under these chapters) but they do include the two exclusively urban habitats of Parks & Gardens (plus garden ponds) and 'Urban Commons' ("brownfield" sites of former development). The Sussex LBAP serves as a wider framework for all of the Biosphere's urban (and other) areas furthermore.

Anecdotal evidence suggests a continuing loss of species and habitats. The BHCC LBAP vision is that biodiversity is effectively conserved and enhanced by 2020, involving decision-makers and local communities through a common understanding of its importance and needs. This will be achieved through the application of five principles, including mainstreaming and integrating informed landscape-scale biodiversity conservation in society and with other land uses to share its benefits.

The landscape-scale designation of a Nature Improvement Area (NIA) was awarded to the South Downs Way Ahead partnership in 2012 (www.naturalengland.org.uk/ourwork/conservation/biodiversity/funding/nia/projects/southdowns.aspx). It covers five focal areas along the South Downs including all of Brighton & Hove's 'Green Network', linked to the National Park's downland to the north, as well as Landport Bottom near Lewes. DEFRA Government funding over three years will deliver significant improvements for wildlife and people focused on restoring and creating chalk grassland habitats and connections, and engaging communities in local nature conservation and sustainable use of ecosystem services.

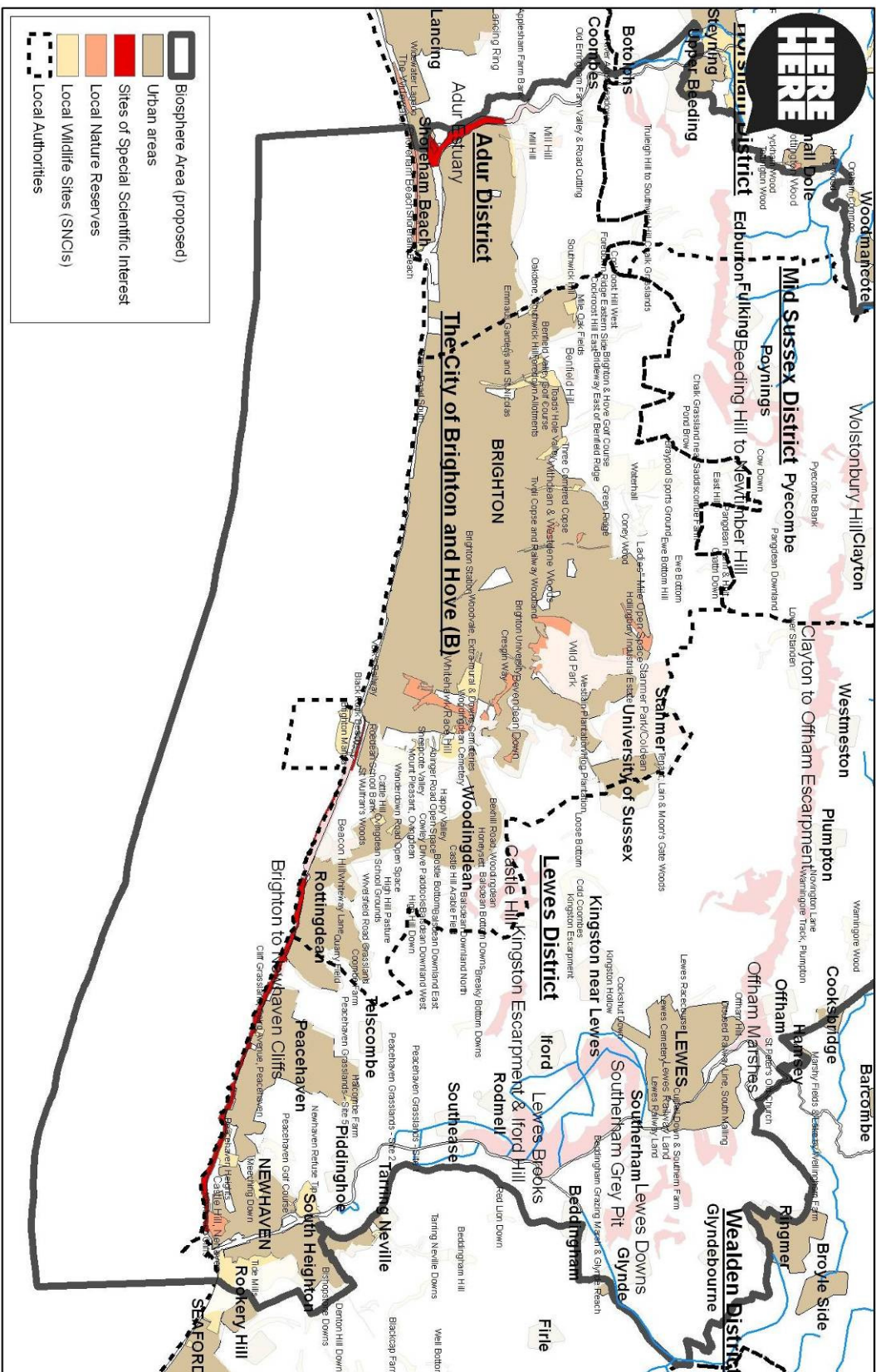
BHCC also receives support from Natural England's Higher Level Stewardship (HLS) scheme over a 10-year period (until 2021) to conserve and enhance 23 sites that it manages through the introduction of sheep grazing and scrub control. Eight LDC nature reserves and open spaces are managed under a Natural England Higher Level Stewardship (HLS) agreement (2011-2021) for chalk grassland restoration, grassland, woodland, pond and heathland management.

Biodiversity information resources include an audit of all wildlife habitats (BHCC-SBRC 2009), which has been subsequently adapted by the Biosphere Project and merged with mapping from the Open Space, Sport and Recreation Study (2008) in the built-up area to create an integrated land use map. The Brighton & Hove Green Network study (2009) considers all of the wildlife habitat and greenspace area to identify potential core areas, buffer and connection (corridor) zones to promote an integrated natural network through the urban area that links to the rural fringes. Species records are principally held in the Recorder database by the Sussex Biodiversity Record Centre (SBRC), with a further limited number of records having been submitted to BHCC's City Wildlife website and the Booth Museum of Natural History.

Finally, there is substantial interest in wildlife and conservation among local groups and the public in the city, with the Brighton & Hove Wildlife Forum (BHWF) constituting the civil society body with a citywide agenda and around 60 individual local 'Friends' groups being actively engaged in conservation management on their local sites across the city.

The urban areas also contain geological conservation interest, a subject which is more fully covered in the *Rural* and *Coastal & Marine* chapters.

**Brighton & Hove and Lewes Downs Biosphere (proposed)
Urban Environment & Nature Conservation**



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B. Key Habitats

i. Urban green spaces

Open space and biodiversity in urban areas make an immeasurable contribution to our quality of life and wellbeing, as well as presenting health, recreation and sustainable transport opportunities. They significantly contribute to local neighbourhood character and serve to moderate local climate and pollution.

All of our open space is deemed precious and should be retained, used and expanded where possible. Although local authorities only have a statutory duty to provide open space in the form of cemeteries and allotments, there is a clear policy in Brighton & Hove of retaining open space and a strong presumption against its development for other uses. Given the projected increase in Brighton & Hove's population, in theory open space provision would need to increase by 13% (170 ha) by 2030 to maintain present levels to meet the adopted standard of quantity. This is not practically possible, however, so the predominant focus lies in meeting and improving quality (scope for use) and accessibility (walking time/distance) standards.

Green spaces in Brighton & Hove cover an area of almost 1300 hectares, although about two-thirds comprises downland and woodland areas in the fringing rural environment. This greenspace is a mix of semi-natural green space (55%) - mostly in the SDNP rural area - with parks and gardens (18%), amenity green space (12%), outdoor sports' facilities (9%), allotments (5%), and school grounds (1%) mainly located within the built-up area. This equates to just over 5 hectares of open space existing per 1,000 people, with much variation in local provision including identified areas of deficiency. For semi-natural greenspace areas only, the provision levels fall to 2.8 hectares per 1,000 population for BHCC's whole area, and just 0.4 hectares per 1,000 population in the built-up area (around 100 hectares area, across 260 sites).

Adur DC currently owns almost 140 hectares of land that is used as "public open space".

Current Policy & Practice – Brighton & Hove:

The Brighton & Hove Local Plan (2005) is the adopted development plan for this local authority's area. The majority of its policies have been "saved" and are used for determining planning applications. Some relevant policies in the Local Plan include:

Brighton & Hove Local Plan (2005)
Design, Safety and quality of development (Chapter 3) – QD15 Landscape Design; QD16 Trees and Hedgerows; QD17 Nature conservation features; QD18 Species Protection; QD19 Greenways; QD20 Urban Open Space; and QD21 Allotments
An integrated approach to nature conservation and the countryside (Chapter 7) – all "saved" policies

BHCC's City Plan (Part 1) (draft submission version, January 2013) (<http://consult.brighton-hove.gov.uk/portal/bhcc/ldf/cp1?pointId=1337261461175>) will replace a number of policies in the Local Plan. The City Plan Strategic Objective 'SO10' (for 2030) relates specifically to supporting the implementation of the objectives of the Biosphere Reserve Management Strategy, such as green infrastructure and biodiversity conservation. The Open Space policy ('CP16') undertakes that the council will "work collaboratively to safeguard, improve, expand and promote access to Brighton & Hove's open spaces (public and private) and the diverse range of experiences that they offer". This is to be achieved through generally retaining and enhancing open space and its management, including requiring new development to contribute to this policy to meet the additional needs that it generates.

The City Plan policy on Biodiversity ('CP10') aims to conserve, restore and enhance biodiversity (and access to it) through partnership working at a landscape scale (including through the NIA) to contribute to the Brighton & Hove Local Biodiversity Action Plan (LBAP) targets for priority habitats and species. BHCC has produced various Supplementary Planning Documents (SPDs) and Planning Advice Notes (PANs) relevant to Biosphere objectives, including 'SPD11' 'Nature Conservation and Development'.

Lewes District:

Lewes District has a Local Plan (2003) which will be superseded by a Joint Core Strategy (with SDNPA) from 2014, for which 'Part 1 – Proposed Submission Document' was produced for consultation in January 2013. Some relevant policies of the present Plan include:

Lewes District Local Plan (2003)

ST14 Water Supply; ST20/21 Recycling and Re-use of Materials; ST30 Protection of Air and Land Quality; E10 Tourism General Strategy; CT2 Landscaping Conservation and Enhancement; RE2 Existing Recreational Open Space; RE9 Allotments

Adur District:

The Adur Local Plan (1996) is the adopted development plan that will be superseded in future by the emerging Adur Local Plan, a consultation draft version of which was published in 2012. Relevant policies of the present Plan include:

Adur Local Plan (1996)

AR1 Protection of Open Space; AR4 Protection of allotments; AR5 Provision of play space in new developments; AR6 Provision of public open space in large new residential developments; AR9 Protect land of nature conservation interest; AR11 Seek improved recreational facilities on or adjacent to the Beach

The Council's current policy for open space, nature conservation and biodiversity includes continued protection and enhancement of the District's landscape, cultural heritage and biodiversity; improved access to green spaces (and the river and sea), including green links from urban areas; and within the context of a Green Infrastructure strategy to provide an interlinked network of multifunctional open spaces.

Adur District undertook an Open Space, Sport and Recreation Study 2005 (and a Playing Pitch Review in 2006, updated in 2012), with an independent review of its Parks and Open Spaces undertaken in 2013 to inform the emerging Local Plan and Parks Strategy (2013-18). A pilot project has planted wildflowers in a former traditional shrub bed, which has received positive local public feedback.

Future Focus –

Brighton & Hove -

Planned:

Brighton & Hove Local Biodiversity Action Plan (2013):

- Increase the overall extent of LBAP habitats by at least 60 ha by 2030, mostly within or adjacent to the NIA area
- Improve the condition of important habitats in Brighton and Hove to get 90% of LBAP habitats in favourable or recovering condition
- Get 50% of Local Wildlife Sites (Sites of Nature Conservation Interest) to be in favourable condition and at least 95% in favourable or recovering condition

Brighton & Hove Joint Strategic Needs Assessment (JSNA, 2012):

www.brightonhovecitypct.nhs.uk/about/improving/jsna/

- Engage with the public to encourage them to make better use of their local environment and become more actively involved in it. Focus on hard-to-reach groups and those who are least active and live in the areas with most deprived access to green space to achieve health benefits

BHCC City Plan Part 1 – Open Space provision (CP 16):

- Make better use of currently under-used public and private spaces

- Promote multiple use of individually classified open space areas, including for nature conservation and local food-growing
- Provide new public open space from other green spaces, potentially as designated 'Local Green Spaces' in response to development
- Improve access to areas with more open space

BHCC CityParks:

- BHCC CityParks to create fifteen new chalk 'B-banks' covering 1.5 ha area in total and 6 ha of new urban chalk grassland from amenity grassland on housing estates by 2015 (under the NIA programme)
- BHCC CityParks to produce an action plan by 2015 for the city's "green infrastructure" that is fully integrated with Biosphere principles and includes practical projects to deliver
- Site management planning for the most important green space sites to be progressively developed over time (with potential for community-produced examples according to an agreed standard) to better inform and direct practical management regimes
- HLS programmes implementation by BHCC & LDC until 2021

Potential:

- Integration/enhancement of the Brighton & Hove Green Network by enhancing site quality, management, linkages and removing blockages along corridors on the ground
- Investigate scope to collect and remove mown cuttings from prioritised diverse non-grazed grassland sites, subject to the capital cost, operational cost/benefit, legal & practical feasibility of management options
- Assess scope for further expansion of grazing management across urban green spaces, including use of rare and historic breeds/species

Lewes District -

Planned:

- Production of LDC LBAP in 2015
- NIA project implementation, including community engagement, promoting understanding of Ecosystem Services and integrating Lewes Railway Land to project
- Site management plan production for all directly owned/managed nature reserves and open spaces
- Better interpretation of key sites, including Landport Bottom and Castle Hill LNR (Newhaven)
- East Sussex County Council's Green Infrastructure strategy (2013) will seek to identify the current/potential contribution of green spaces to varied functions including wildlife connectivity

Potential:

- Further to the present grounds maintenance contract, future development of an Open Spaces / Green Infrastructure strategy (including possible urban green network mapping) linked to the developing Joint Core Strategy

Adur District (Council):

Planned:

- Review and update management plans for Local Nature Reserves
- Implementation of more environmentally-friendly maintenance regimes to benefit insects through species-specific planting, rather than high-maintenance annual bedding

- Encouraging drought-resistant shrubs and extra ground cover around all new plantings (including trees) to lessen the need for artificial watering, working in partnership with local community and volunteer groups
- Maximise opportunities for increased biodiversity and areas of new formal and informal open space in new strategic housing sites
- Ensure improved access at Shoreham Harbour to open spaces and the provision of enhanced public realm along the river frontage as part of sustainable development
- Public realm enhancement scheme from the new Shoreham Footbridge to Shoreham Beach in 2013, and extend Shoreham Boardwalk to increase accessibility to the beach

Potential:

- Enhanced footpath provision on the west bank of the River Adur, and improved footpath links across the A27 main road to the National Park

Management options, both current and future, for individual types of urban green space (rather than all open space as above), are detailed below in approximate order of their potential nature conservation interest.

- Parks:

Public parks and gardens are protected as greenspace by both national and local planning policy, although their management is often highly intensive and so they may lack natural diversity and quality.

Brighton & Hove has 232 hectares of parks and public gardens across a network of almost 100 Council-owned and managed sites of greatly varying size, nature and public usage. More than one-third of these (36) are classed as “of significance”. They range from the city’s largest parks, including Preston Park and Hove Park (both about 13 ha in area), to numerous pocket parks and grassed areas covering no more than a few hundred square metres. Six of the city’s foremost parks have the prestigious national ‘Green Flag’ status. About 50 children’s playgrounds can be found in public parks across the city. In addition, there are almost 40 privately owned and managed parks and gardens complexes in the city.

More residents in 2008 had visited (91%) and were satisfied (82%, rising to 89% in 2012) with their local park than the regional and national averages. People living in more deprived areas (especially around east Brighton) and council housing tenants reported lower usage levels (79% and 75%) despite the local proximity of significant greenspace areas. Common management challenges resulting from intensive public use include dog-fouling, littering and enforcement of other park’s byelaws, as well as perceived anti-social behaviour.

LDC manages over 185 hectares of parks, formal gardens, open spaces, sports’ pitches, cemeteries and closed churchyards.

Adur DC owns almost 140 hectares of land used as “public open space”, including urban green spaces (about 70 hectares) as well as beaches and downland sites.

Current Policy & Practice – Brighton & Hove:

CityParks is Brighton & Hove City Council’s in-house department of about 150 staff responsible for the care and management of Brighton & Hove’s public parks and outdoor sports’ facilities. It also manages other council departments’ green spaces including housing estates, school grounds, cemeteries and road verges. In addition it has a roving team of rangers, horticultural and arboricultural staff.

The current Parks & Open Spaces strategy dates back to 2006, upon which the service’s aims to protect and enhance parks, manage them more sustainably, engage communities and reduce barriers to their use are based. BHCC CityParks is involved in a number of externally funded partnership projects, including ‘Access to Nature’ for deprived communities and housing estates (with Sussex Wildlife Trust), and the ‘South Downs Way Ahead’ NIA. Major internal flagship parks’ projects include the HLF-funded restoration of The Level and proposals to improve the Valley Gardens area running down to Old Steine.

BHCC CityParks’ management practice has evolved significantly in recent years to include a focus on more natural elements and sympathetic management for biodiversity and environmental sustainability, including:

- switching from intensive annual bedding schemes to more sustainable wildlife-friendly and drought-resistant perennial shrubs (2012)
- less intensive grass-cutting regimes with some collection of cuttings (in two eastern parks in 2012), and introducing grazing management to urban fringe sites
- wildlife conservation areas and habitats created e.g. chalk ‘butterfly banks’, based upon the pioneering Liz Williams Butterfly Haven by Dorothy Stringer High School on the Surrenden educational campus
- establishment of the council’s current ranger service to engage with the public, and promote local ‘Friends’ groups to jointly deliver improvement projects
- more nursery wildflower cultivation
- greatly reduced chemical use (herbicides up to 2008)
- some local composting and on-site chipping of woody waste

Lewes District:

LDC has a broad Environment Policy (2008)

(www.lewes.gov.uk/Files/env_env_policy_march2008.pdf) and subscribes to an external Environmental Management Audit System (EMAS) which helps to monitor its environmental management including use of pesticides, peat and water.

Parks and open spaces are managed through an external grounds maintenance contract (2004-2014) which covers over 230 sites ranging from parks to small verges. It includes grass-cutting (over 92 hectares area) maintenance of hedges and shrubs, annual bedding displays, maintenance and inspection of 32 children's play areas, path-clearing, seat maintenance and litter collection.

LDC is working on the 'Big Parks Project', a major landscape creation project on over 22 ha of land around the new Southern Water wastewater treatment works at Peacehaven. The park will be created by 2014 with £1.7 million funding, and will include community recreation facilities, nature areas, formal play and habitat creation elements.

Adur District:

ADC has a joint grounds maintenance team in-house that manages public parks and gardens across Adur and Worthing. It is moving towards a more environmentally-friendly approach to management, including introducing less intensive grass-cutting regimes in specified areas and planting schemes to boost local biodiversity and reduce water consumption. ADC seeks to work in partnership with local community and volunteer groups, who are encouraged to undertake additional tree planting and other wildlife-friendly planting. A pilot project is underway for example for community gardeners to plant and maintain flower beds on the seafront.

Lastly, the Sussex LBAP includes a Habitat Action Plan on Parkland, albeit it with a historic landscaped parks focus (especially those with veteran trees) rather than modern urban parks.

Future Focus –

Parks offer an excellent opportunity to act as a “shop window” to the local public on best innovative green management practice, to further boost local wildlife, functioning of the city's green network and enrich people's daily lives.

Brighton & Hove -

Planned:

- Development of an action plan including a focus on Brighton & Hove parks by 2015 that reflects Biosphere principles
- Full integration of biodiversity conservation into BHCC park design and management, including staff training (by 2016), and the management of all publicly owned open space (by 2020) (Brighton & Hove LBAP)
- Implement Biosphere principles at individual site level through progressive “naturalisation” of management wherever possible (in the context of other uses and interests), by developing specific objectives/activities and informed by adequate information (including through monitoring)
- Expansion of native and wildlife-friendly/drought-resistant species planting, including locally-sourced plants and seeds, and integration with local food-growing
- Maintain six Green Flag Parks and attain Green Flag status additionally for The Level

Potential:

- More ecological and sustainable treatment of green waste as locally as possible
- BHCC CityParks staff training (especially the ranger service) in practical ecology and conservation, including scope to share learning with local park Friends groups
- Assess feasibility of extending recycling in parks

Lewes District -

Planned:

- Management plans for sites where appropriate
- Integration of Big Parks Project

Potential:

- LDC to seek ways to "green" the external grounds maintenance contract, especially when re-tendered in 2014
- Green Flag award accreditation
- Climate change adaption planting with green bedding etc

Adur District -

Planned:

- Carry out a full and independent review of the District's green areas in 2013, to support the production of the Adur Parks Strategy (2013 -18) (including sub-strategies on play provision, sports facilities, and ornamental sustainability)
- Increase opportunities to enhance biodiversity within parks and gardens

- Semi-natural green space:

While most natural habitat is found in the rural SDNP area of Brighton & Hove, the built-up and urban fringe areas of the city do include numerous isolated small habitat patches (mostly <2 hectares area). These include:

- compact woodlands and scrub
- fragments of wildflower-rich grassland (including larger areas of rare chalk grassland in east Brighton)
- pockets of other habitats (e.g. ponds) generally found within larger parks and other green spaces such as cemeteries
- green corridors throughout urban areas of extensive grass road verges (e.g. Surrenden Road in Brighton) and (private) railway line-side vegetation corridors

The seafront beaches also represent a significant and accessible area of urban outdoor space in the Biosphere – these are addressed in the *Coastal & Marine Environment* chapter.

Current Policy & Practice –

- Wildflowers sown by BHCC CityParks along the central reservations of Lewes Road (perennials) and Eastern Road (annuals)
- ESCC and WSCC maintain schedules of Notable Wildlife Verges, indicated by marker posts, to encourage their sensitive management for flora and fauna
- Lewes District Council and Plumpton College graze a flock of Southdown sheep at Landport Bottom chalk grassland restoration site by Lewes
- Network Rail manages lineside trees and other vegetation to control safety risks and reduce service disruption from fallen leaves in the autumn

Future Focus –

Brighton & Hove -

Planned:

- Management of urban woodlands for people and wildlife, involving the local community in work and products e.g. Coldean, Hollingbury

Potential:

- Public semi-natural green space with significant conservation interest needs adequate survey information and sympathetic management, as agreed with council departments responsible and local stakeholder interests
- Work with Network Rail (and Highways Agency?) to encourage positive conservation management

Lewes District -

Potential:

- Wildlife verges – consideration of reduced grass mowing of species-rich areas based on listed sites and new mapping

'Urban Commons':

Previously developed "brownfield" sites on disturbed ground are rare in Brighton & Hove due to a lack of heavy industry, but more prevalent in Newhaven and Shoreham Harbour. Such areas can support very diverse flora and fauna, especially where they are located on nutrient-poor, free-draining artificial substrates. Nutrient enrichment and a lack of disturbance (leading to vegetation succession) are the main threats to these habitats, as well as site re-development to meet socio-economic needs.

Current Policy & Practice –

By their nature, sites with such habitats are often ephemeral and transitional in nature, with no local sites thought to strictly meet the national UK BAP Priority habitat classification of 'Open Mosaic Habitats on Previously Developed Land'. Some scattered areas of railway sidings, abandoned allotments and former landfill sites where there is bare ground and regular disturbance are similar in nature however.

Future Focus –

Brighton & Hove -

Potential:

- Surveys of potential sites
- Disturbance management of suitable sites
- Potential site "restoration"/creation work

Cemeteries & Churchyards:

Eleven different cemeteries are located in Brighton & Hove, most of which are publicly owned and managed, and reasonably large at 5-10 ha size. Examples include those along Bear Road (including a designated LWS/SNCI for its old wildflower grassland) and Old Shoreham Road. Lewes Cemetery is also a designated LWS/SNCI for its unimproved grassland, although this is not currently under a positive conservation management regime. The 45 churchyards, in contrast, are mostly privately owned by the Church and are less than 1 ha in size. They do, however, include valuable green space, such as St. Nicholas' Church (the oldest building in Brighton) in the heart of the city. Local gravestones support some rare lichen species as well as being important heritage assets of local 'folk art' stone carving.

Current Policy & Practice –

BHCC Bereavement Services is the council department responsible for the operation of public cemeteries in Brighton & Hove, with the grounds management conducted by BHCC CityParks according to their maintenance 'service level agreements' which may include some management for nature conservation where possible. Some of the city's churchyards are managed by Cityparks where there is no longer burial use.

LDC's external ground maintenance contract includes the maintenance and operation of three cemeteries and grounds maintenance of seven closed churchyards.

Future Focus –

Brighton & Hove -

Potential:

- Promote the substantial scope for more conservation management of cemeteries and churchyards in agreement with council managers and local users (through revisions of the maintenance "service level agreements")
- Investigate churchyard nature interest and management, and seek to encourage their sympathetic management for nature conservation and partnership working

Lewes District -

Potential:

- Improve the management for nature conservation of designated LWS site(s) at least

- Amenity green space:

Over 600 discrete mapped amenity greenspace sites exist in Brighton & Hove, located across housing estates, university halls of residence, and roadside grass areas for example; 90% are less than 0.5 ha in area. The two largest areas are on the two university campuses at Falmer. Most are managed intensively and conventionally through the regular mowing of grassland. LDC has 15 ha of grassland classed as “housing land” located within urban housing estates.

Current Policy & Practice –
Brighton & Hove -

- Housing estates – creation of ‘Pocket Parks’ and management for wildflowers e.g. Albion Hill
- Road verges – mowing reduced and cuttings collected in 2012 on two roadsides e.g. Surrenden Avenue

Lewes District -

The Parks team is responsible for a 10-year external contract (which commenced in January 2011) valued at £132,000 per year to manage housing land, including grass-cutting, hedgerow maintenance and shrub bedding. Council housing tenants (especially the elderly and disabled) can join a ‘Garden Maintenance Scheme’ to have their garden maintained under the grounds maintenance contract.

Future Focus –
Brighton & Hove -
Planned:

- Creation of wildflower grassland areas on BHCC housing estate grounds under the NOA Project, working with local residents associations

Potential:

- Work with Residents Associations to encourage natural habitats including wild flowers
- Work with estate management departments of both universities to explore scope to increase the natural interest of their grounds for both wildlife and people (including through institutional Biodiversity Action Plans)

Lewes District -

Potential:

- LDC to seek ways to make grounds maintenance contract more “nature-friendly”
- Adaptation of housing grassland contract – aim to reduce mowing of species-rich grassland
- Amendment of the garden maintenance scheme for council tenants to include provision of wildlife gardening

- School grounds:

There are around 100 state schools in the Biosphere area that invariably all have some green space, the majority of which are under a hectare in area (in Brighton & Hove). A few locations are much more significant in size, including the c. 20 ha public Surrenden campus (which includes two “butterfly havens”) and a similar area at the private Roedean School. Colleges and secondary schools generally have larger areas, although they also have more students using them.

Current Policy & Practice –

BHCC is the Local Education Authority (LEA) for the state schools in Brighton & Hove, with the grounds management mostly conducted by BHCC CityParks according to set maintenance contracts. Brighton & Hove uniquely developed a School Grounds Biodiversity Action Plan (BAP), which was actively pursued in 2006-8 with 16 individual schools signed up and various new wildlife areas created. Of these, Moulsecoomb primary school has been a pioneer in the positive natural development of its grounds for children and local nature and heritage (www.moulsecoomb.brighton-hove.sch.uk/HE/Contents.html). A survey of school grounds was carried out in 2012.

East Sussex County Council is the LEA responsible for schools and their grounds in Lewes District. West Sussex County Council is the LEA responsible for schools and their grounds in Adur District. A number of Adur schools have established gardens to encourage healthier eating, awareness of food-growing and to improve biodiversity within school grounds.

Future Focus –

Brighton & Hove -

Planned:

- Biosphere Project engagement with schools through the BHee initiative
- Encourage more wildlife areas and integrated educational use within schools

Potential:

- Promote a more naturalistic focus within the internal maintenance contracts held with CityParks (subject to other objectives and cost constraints)
- Open up grounds to public access outside of school hours? (BHCC CP16 ‘Open Space’ proposed policy)

- Gardens (private):

Gardens often offer more complex vegetation structure and diverse composition of plants (and associated animals) than other types of urban green space, with many gardens also containing freshwater aquatic habitats, mostly in the form of small, lined, permanently wet garden ponds. In Brighton & Hove there may be as much as 7,000 ha of private gardens, divided between the 63,000 houses (and bungalows) that represented half of all households in 2011. These vary in size and nature across the city with the relative density of housing. A substantial number of people lack access to a garden, however, for quiet recreation or food-growing.

Current Policy & Practice –

Gardens are protected from development by national and local planning policies. However, “backland development” has been a significant cause of private garden loss in Brighton and Hove, and typically takes place in the larger gardens which have greater nature conservation value. Furthermore, fashions in gardening have tended to move towards more hard surfacing (e.g. concrete or decking) and fewer natural areas, which reduces the area available for wildlife to use. Garden ponds can be perceived as a safety concern by new owners, leading to them being filled in. Wildlife interest often suffers from intensive management including the addition of invasive alien plant species and fish from garden centres.

ADC has developed a new initiative called ‘Garden Share’ under the stewardship of Transition Town Shoreham, whereby residents with no garden space link up with householders not able to manage their own gardens, to the benefit of both parties

Future Focus –

Brighton & Hove -

Planned:

- Promote wildlife gardening (including garden ponds) to the public and through retailers (garden centres) and bodies such as ‘In Bloom’.
- Stanmer Nursery (BHCC CityParks) to become a “centre of excellence” for sustainable gardening and local wild flowers e.g. promoting/selling species which are drought-resistant and enhance biodiversity

Potential:

- Increase the proportion of private open space that is managed with biodiversity conservation as an objective
- Encourage people to leave wild areas in their gardens and avoid converting their space to hard surfaces
- Carry out garden habitat surveys
- Promote organic gardening practices
- Promote garden flowers which require less water

Adur District -

Potential:

- Work with partners (BHCC, WSCC, SDNPA) to increase public awareness and encourage greater biodiversity in gardens and other urban spaces (“pocket gardens”)

- Allotments:

Allotments offer important spaces not just for small-scale local food-growing (important given increasing food poverty), but also as spaces for people to take healthy exercise and relax as well as providing potential havens for local wildlife in which there is much interest. There are 37 allotment sites in Brighton & Hove, one of the largest in the country, which vary in size considerably (from 0.15 to 9 ha in area) with most being small (< 1 ha). Larger areas occur mainly in the eastern end of the city. Three sites provide specific features for limited mobility users. A total of around 3,000 allotment plots exist in the city, with much interest amongst other residents to take on a plot as indicated by the waiting list of around 1,800 people (in July 2013).

Adur District has approximately 25 hectares of land as allotments.

Current Policy & Practice –

BHCC allotments (www.brighton-hove.gov.uk/index.cfm?request=c1249655) are managed by CityParks, which works with community organisations including the Brighton & Hove Allotments Federation (BHAF www.bhaf.org.uk); Brighton & Hove Food Partnership (BHFP www.bhfood.org.uk); Brighton & Hove Organic Gardening Group (BHOGG www.bhogg.org); community food projects such as Harvest, Whitehawk Community Food Project, Nourish community farm, Moulsecoomb Forest Garden, Stanmer Organics, and Fork and Dig It; and housing, health and rehabilitation organisations using allotments as part of their work. Limited resources are restricting BHCC's capacity to further develop the allotment resource in the face of such great demand, although the council continues to explore cost-effective methods to expand or adapt the allotment service to accommodate a greater number of plot-holders. New plot-holders are offered reduced plot sizes and new allotment areas with small plot areas have been opened up. Finally, many allotment holders are also interested in the natural value or potential of their plots, and may garden in wildlife-friendly ways such as avoiding harmful chemical treatments or pursuing fully organic production.

ADC has an Allotments Strategy, and is one of very few local authorities that has grown its allotment portfolio. It encourages community use as well as by individuals.

Future Focus –

Brighton & Hove -

An Allotment Strategy is being developed for the city in 2013, by BHCC working with a wider strategy group and in consultation with stakeholders and the public, with six draft objectives that include some of the following elements below:

Planned:

- Use allotments for residents to increase local food production and connection with nature
- Identify the potential for new allotment sites citywide to increase the number of plots

Potential:

- Greater sustainability of allotment sites, particularly regarding water usage (including through the council's Automated Meter Reading (AMR) programme?)
- Greater autonomy of site management by users?
- Encourage organic growing on allotment plots
- Encourage wildlife-friendly sites by incorporating nature areas/elements (within the maximum 25% uncultivated area, while avoiding pernicious weeds becoming a problem)
- Scope to work further with allotment-holders on conservation initiatives, such as recording wildlife, supporting surveys, analysing records, encouraging plants for pollinators and voluntary restrictions on harmful chemical use
- Greater integration with other greenspace as part of Brighton & Hove's Green Network, and with other interests through the CVSF-hosted 'Greenspace Network' of active citizens in this area

Adur District -
Planned:

- Development Brief to be prepared to identify space for additional allotments
- In the context of a reducing grounds maintenance budget, seek greater community involvement to identify areas of open space suitable for community growing/gardens

- Outdoor sports' facilities:

Almost 100 sites for formal recreation (sports such as football, cricket and tennis) exist in Brighton & Hove, although a particular lack of space for outdoor sport exists. Their scope for nature conservation is likely to be limited, given the intensive management required for their primary uses, although opportunities may exist for minimising chemical use (only used on fine turf sites) and incorporating natural elements or fringes.

Current Policy & Practice –
BHCC:

- Carrying out organic fertilising on high-profile football and rugby pitches
- Changing perimeters of sports' fields to meadow management cutting regimes
- Two defunct 'pitch and putt' sites have been put over to meadow management
- Spot-treating broad-leaved weeds on fine sports' areas rather than blanket coverage of herbicide

LDC:

The external ground maintenance contract for sports' facilities includes:

- Winter sports' maintenance of 24 football and rugby pitches
- The maintenance of three high quality bowling greens, four cricket pitches and two grass surfaced tennis courts

ADC:

- ADC directly maintains most of its outdoor facilities: football, rugby, bowling greens, tennis and cricket pitches
- ADC has outsourced its Leisure function to a private company that runs its two main leisure centres however (at Southwick and Lancing Manor)

Future Focus –
Brighton & Hove -
Planned:

- Areas becoming defunct in the future to be considered for wild flower habitat restoration/creation
- Encouraging more diverse grass and herb species on sports' pitches as compatible with their primary use

Adur District -
Planned:

- Following the 2013 independent review of Open Space, Sports and Recreation Space, ADC will agree priorities for future spending (including £1.35 million of 'Section 106' development contributions from Brighton and Hove Albion FC from its local development) to improve formal open space provision across the District (including a new 3G floodlit pitch)

ii. Urban green features

In addition to the open spaces addressed above, a significant resource of vegetation exists in the built environment of our streets and houses in the form of trees in civic spaces and streets, and the growing numbers of vegetated buildings (green roofs and walls) being developed.

- Street trees:

Urban trees provide a wide range of significant environmental benefits, including:

- filtering out air pollution (by up to 60%)
- cooling local climate (by up to 10%)
- buffering against storm water runoff
- improving people's health and wellbeing
- providing wildlife habitats
- helping to combat climate change by locking up carbon

There are some 12,000 individual street trees in Brighton & Hove, composed of a mix of ornamental and native forest trees, including Elm, Lime, Horse Chestnut and Sycamore, many of which were originally planted in Victorian and Edwardian times. A high proportion of the street tree stock is 90-110 years old and constitutes a largely ageing population. There are many more trees of diverse species located in the city's parks, open spaces and on private land, which need less frequent pruning management.

Pride of place goes to the National Collection of Elms (*Ulmus*), made up of some 19,000 hardy trees spread across the city as a whole, the only place in Britain where such a diversity of different-aged Elm trees of more than a hundred different varieties and cultivars can be appreciated (www.brightonelm-trees.com/index.html). The collection provides a valuable centre of genetic diversity, with many trees being exceptionally rare or virtually extinct elsewhere. Our two English Elm (*Ulmus procera*) trees – the 'Preston Twins' in Preston Park – are the largest known examples in the world. The national Tree Register records include seven exceptionally endangered types of elm in our collection. Many forms are resistant to Dutch Elm Disease, which devastated these trees across the rest of the country during the 1970s (arriving in Brighton in 1971). The Elm trees in turn provide critical habitat for the important White-Letter Hairstreak butterfly and dependent lichen species.

Current Policy & Practice –

BHCC has produced the Supplementary Planning Document SPD06 on 'Trees and Development Sites'. Local authorities have a statutory 'Duty of Care' to inspect all street trees and as far as practicable retain them in a healthy condition, with additional conditions of maintenance on trees by highways and public footpaths. BHCC inspects all street trees every two years, with interim or major pruning on a 2-4 year cycle. Additional issues and expense are posed by the ageing street tree population as well as structural instability problems due to winter road salt application, highway and kerb reinstatement and disease.

As far as possible all street trees that are removed are replaced by the council. Replacement and new tree planting is carried out directly by the BHCC CityParks Arboricultural Service, as well as being encouraged amongst local groups, including through a public Tree Trust fund. Annually, 250-500 replacement and new trees are planted each year.

Brighton & Hove maintains a long-running and internationally-renowned Dutch Elm Disease control programme, within which diseased trees (both public and private) are quickly removed by BHCC before the host fungus can spread further inside the "cordon sanitaire". BHCC collaborates closely with Adur District Council on the vulnerable western boundary and liaises with other neighbouring district and county councils. Removed infected Elms used to be burnt at a local licensed site, but are now chipped in-situ and used for biofuel under a cost-neutral scheme. Such trees are replaced with disease-resistant varieties.

The BHCC City Plan (Part 1) Policy 'CP13' on Public Street and Spaces includes a focus on incorporating trees and other planting for biodiversity wherever possible when making improvements to the city's public urban realm in priority urban areas to enrich people's quality of life and enhance the city's 'green network'.

LDC's Parks team is responsible for managing the council's tree stock, involving individual tree assessments, surveys, planting and maintenance programmes.

ADC has a joint Parks Team with Worthing Borough Council (WBC) that manages the Council's tree stock. A Diamond Jubilee wood of sixty trees was planted by volunteers in 2012, with a further partnership project with WBC in 2013 set to plant over 4,000 trees.

Future Focus –
Brighton & Hove -
Planned:

- BHCC City Trees (& Woodland) Strategy draft for future production, to establish a management plan to further diversify the local trees populations' species mix and age classes
- Protect trees from other management and works around them

Potential:

- Conserve and diversify the Elm population by working with other national and international experts
- Identify scope for more new street tree planting, including factoring in ongoing maintenance costs
- The National Elm Collection needs more public information and promotion

- Green buildings:

Green roofs and walls are a common feature of buildings in a number of other countries, and are belatedly increasing in prominence in the UK as their benefits are recognised, including:

- increased urban biodiversity
- reduced building energy consumption (for heating or air conditioning)
- adaptation to climate change
- moderation of local climate
- reduced air pollution by up to 30% (by green walls in 'urban canyons' of built-up road corridors)
- reduced storm water runoff (quantifiable decreases by green roofs) – please note that Sustainable Urban Drainage Systems (SUDS) are covered in the *Linkages* chapter

Brighton & Hove is fortunate to boast one of the largest and oldest green walls in existence, in the form of the vegetated seafront wall that extends for over a kilometre in length and more than ten metres height along Madeira Drive. The largest green roof in the UK has been created at the wastewater treatment works in Peacehaven by Southern Water. Other examples include:

- Regency Square – a half-hectare green roof public space over an underground car park
- University of Sussex, Falmer – plans to put car parks below ground and replace with widespread green roofs
- Brighton Station – green walls in the recent re-development of this area
- Brighton's North Laines – by Infinity Foods shop
- Bellerbys College, Brighton – swift nest boxes in the walls
- Linklater Pavilion, Lewes – sedum roof

Green building features potentially offer a highly space-efficient way of furthering green networks in a urban areas, if obstacles to their more widespread use can be overcome.

Current Policy & Practice –

BHCC planning policy has required the incorporation of biodiversity into all new development since 2005 through its nationally-recognised Supplementary Planning Document (SPD) 11 on 'Nature Conservation & Development', as well as SPD08 on 'Sustainable Building Design'. SPD11 quantifies the amount of biodiversity features required and offers developers options to achieve their quota, which include green walls and roofs using native vegetation.

The BHCC City Plan (Part 1) Sustainable Buildings policy (CP8) further requires that all new development proposals demonstrate how the development enhances biodiversity. There is a Brighton & Hove 'Building Green' group to promote awareness and the application of good practice locally, as well as a national 'Green Roof Toolkit' guide by the Environment Agency.

Future Focus –

Brighton & Hove -

Planned:

- Development will maximise opportunities to incorporate urban greening into new development, including the creative use of techniques such as green roofs and walls, to deliver a net increase in biodiversity

Potential:

- Planning policy should require green building features on a larger proportion of new buildings so that it becomes a mainstream approach in the mind of developers and the public
- The retrofitting of existing buildings with green features is needed with funding incentives provided to do so, in tandem with high-profile examples on public buildings being instated as exemplars

C. Key Species (Groups)

The approach taken by Biodiversity Action Plans is that most species' needs can be addressed through habitat conservation measures. However, the Brighton & Hove LBAP includes a detailed focus on 18 species (/groups) of particular importance that are considered to require specific measures. The principal urban focal species of these include Starlings, Swifts, Herring Gulls, Peregrine Falcons and the White-letter Hairstreak butterfly.

A number of other urban species are included in the wider group of 115 nationally important species occurring in Brighton & Hove, including for example:

Hedgehog (mammal)
 Common Toad, Common Lizard, Grass Snake, and Slow-worm (amphibians and reptiles)
 House Sparrow, Song Thrush, Black Redstart (birds)
 Toadflax Brocade (moth)
 Henbane, Nettle-leaved Goosefoot, Yellow Vetch and Yellow Vetchling (plants)

- Birds

- Starlings:

Starlings (*Sturnus vulgaris*) are a "flagship" species for the area, with their mass roost gatherings ("murmurations") of thousands of birds over the Brighton piers being perhaps our best known and loved natural phenomenon, and their staccato chatter recognisable to many urban dwellers. They are also a species that links the three Biosphere environments, since they nest in urban buildings, forage for food over the surrounding countryside and return to roost at night in the winter months to coastal structures. The number of breeding Starlings in the UK has fallen rapidly, however, with an 87% decline over 25 years (apparently mirrored in our local area), due to a reduction in availability of food (particularly Earthworms), changing garden fashions, the use of pesticides, and a growing shortage of nesting sites as older buildings are renovated to exclude access to roof cavities.

Current Policy & Practice –

Starlings are on the Red List of birds of high conservation concern and are classed as a "species of principal importance for the purpose of conserving biodiversity" under the NERC Act (2006). The RSPB runs public viewing sessions on the seafront in the winter months to encourage public awareness and appreciation.

Future Focus –

Brighton & Hove -

Planned:

- Protect major winter Starling roosts
- Improve feeding and nesting opportunities through sympathetic management and connectivity of urban public open spaces, gardens and homes (both old and new)

- Swifts:

Common Swifts (*Apus apus*) are a wonderful sign of the arrival of spring when they arrive in their annual long-distance migrations from Africa; their acrobatic flights and piercing calls being an iconic sight and sound in our urban environment. Incredibly, the Swift spends almost its entire life on the wing, including eating, mating and sleeping, so these birds deserve our respect and help. Swift colonies tend to be loyal to nesting sites, returning annually for many generations to nest inside the roof space of older houses. There has been a 29% decline since 1995, with numbers of nesting birds in Brighton & Hove apparently having declined markedly in recent years. The main cause of this decline is a reduced availability of nest sites as older buildings are refurbished and no longer offer access into the roof space, whilst most new buildings do not provide opportunities for Swifts to nest.

Current Policy & Practice –

Trials of installing nest boxes on homes in Brighton & Hove have been carried out in recent years to assist the Swift population.

Future Focus –

Brighton & Hove -

Planned:

- Determine the local status of Swift populations in Brighton and Hove to be able to monitor subsequent changes
- Protect existing nest sites and promote artificial nest sites on buildings (including through the planning system) and raise public awareness and support for their needs

Potential:

- Encourage wildlife-friendly gardening, especially garden ponds, to promote insect prey

- Peregrine Falcons:

The Peregrine (*Falco peregrinus*) is possibly the fastest animal in the world, achieving speeds approaching 200mph. It is an amazing sight to watch as they plummet from on high upon a hapless pigeon. They have started to increasingly colonise tall urban structures from their original rocky cliff habitats. As a top predator with a high public profile, this bird can act as a good indicator of environmental quality. Peregrine numbers have recovered well since a disastrous national decline in the 1950s, caused by pesticides poisoning, and begun to re-colonise Brighton and Hove during the 1990s. This spectacular bird can be seen on Sussex Heights building in Brighton, Shoreham Power Station, Lewes Quarries and Newhaven Cliffs.

Current Policy & Practice –

The Peregrine is given special protection under Schedule 1 of the Wildlife and Countryside Act 1981, although it is now considered safe enough to place on the green list of bird species of conservation concern. There is an ongoing threat from the risk of illegal persecution.

Future Focus –

Brighton & Hove -

Planned:

- Monitor the breeding success of local populations
- Avoid adverse impacts on nest sites from any proposed developments

- Herring Gulls:

The Herring Gull (*Larus argentatus*) is well-known to local residents and visitors alike, often for the wrong reasons as it tears open refuse bags and steals ice creams. They are a characteristic species of our city, however, with their familiar cries typical of a seaside location, and to the extent that they are the nickname and mascot of Brighton & Hove Albion football club. Despite local population increases in coastal urban areas, from scavenging our rubbish and nesting on the many roof spaces, this species is globally threatened. Indeed, the UK breeding population of Herring Gulls has declined by 69% since 1969. Containment of refuse has improved street cleanliness but reduced the availability of food for these birds.

Current Policy & Practice –

Herring Gulls are classified as a Red List species of high conservation concern due to their wider decline. It is also a “species of principal importance for the purpose of conserving biodiversity” under section 41 of the Natural Environment and Rural Communities Act (2006). Herring Gulls can be controlled for public health under a licensing system by Natural England.

Future Focus –

Brighton & Hove -

Planned:

- Develop a monitoring strategy to understand the local population dynamics, including results from the 2015 JNCC seabird census if possible

- Insects

- White-letter Hairstreak butterfly:

The White-letter Hairstreak butterfly (*Satyrion w-album*) is an attractive butterfly, though it is rarely seen as it inhabits the high canopy of Elm trees. It breeds on various Elm species and its numbers fell considerably during the 1970s Dutch Elm disease outbreak. It is now recovering in some places. Brighton & Hove's National Elm Collection hosts the largest national population of this species, with notable populations around Preston Park and The Level. It is not thought to be under particular threat in the city.

Current Policy & Practice –

The White-letter Hairstreak is a “species of principal importance for the purpose of conserving biodiversity” under the NERC Act (2006).

Future Focus –

Brighton & Hove -

Planned:

- Better understanding of the distribution and abundance of the urban population (by 2016) and plant Elms (the food plant) and general butterfly-friendly plants (nectar sources) (by 2020)

- Bees:

Honey Bees (*Apis mellifera*) and other bees are very important for plant pollination (a critical ‘ecosystem service’) and represent a good ecological indicator species of the health of our natural environment. As a generalist insect species, Honey Bees represent the requirements of many other insects (and other wildlife) to a good extent, hence actions to reverse their declining numbers (a consequence of multiple factors) will have wider benefits also. There is increasing public interest in and awareness of their plight.

Current Policy & Practice –

The renowned Laboratory of Apiculture & Social Insects (LASI) at the University of Sussex (www.sussex.ac.uk/lasi/) has produced a ‘Sussex Plan for Health and Well Being’ for local Honey bees, and has carried out local studies to illustrate their activity across the landscape over repeated years and the principal areas and plants being used by them.

Future Focus –

Brighton & Hove -

Planned:

- Map bee movements to illustrate the best wildflower areas locally, and potential for enhancement through planting and habitat creation in both urban and rural environments
- Use bees as ecological indicators of habitat creation/restoration schemes e.g. butterfly banks & grasslands (NIA)

Potential:

- Use bees and LASI's local activity mapping to show the importance of a diverse local environment and role that individual land managers, farmers and gardeners can play to boost their populations for mutual benefit
- Use bees to tell a story to the public, including school children, about our environment, its health and needs (as being done at Dorothy Stringer school, Plumpton College and Linklater Pavilion)
- Promote “plants for pollinators” to householders at garden nurseries e.g. Stanmer Nursery

4.3 Sustainable Socio-Economic Development

Introduction

Brighton & Hove's ecological footprint in 2011 was calculated as 5.14 global hectares (gha) per person (which equates to 3.5 planets worth of per capita consumption). This is considerably above the regional and UK averages (5.09 and 4.64 gha respectively), although this has reduced since 2004 (5.72 gha). A challenging target of a reduction in the city's ecological footprint to 2.5 gha per person by 2020 (half the present level) and 1.25 gha per person by 2050 (a quarter) has been set in the Brighton & Hove Sustainable Community Strategy. Lewes District has used the Stockholm Environmental Institute to monitor its ecological footprint, which in 2010 was 5.61 gha (range of local variation 4.96-6.01 gha).

Brighton & Hove is the world's first designated 'One Planet Living City'. One Planet Living (www.brighton-hove.gov.uk/index.cfm?request=c1267674) is the city's approach to reducing its ecological footprint and to furthering sustainable development. The city's Sustainability Action Plan (2013-16) sets out agreed actions under ten 'One Planet principles' (see below), and received independent accreditation from BioRegional in 2013 of how to enable residents to live well within a fairer share of the earth's resources. It is a detailed programme for both BHCC's own operations ('One Planet Council') and actions across Brighton & Hove ('One Planet City'). The One Planet approach was developed by BioRegional and WWF to tangibly address and mainstream the challenges of sustainable development and a sustainable economy. Fifty initiatives in 32 countries are approved to use the One Planet approach, including the London Borough of Sutton, Middlesbrough Council and the London 2012 Olympics. The ten 'One Planet principles' are:

1. Zero carbon - making buildings more energy efficient and delivering all energy with renewable technologies
2. Zero waste - reducing waste arisings, reusing where possible, and ultimately sending zero waste to landfill
3. Sustainable transport - encouraging low carbon modes of transport to reduce emissions, and reducing the need to travel
4. Sustainable materials - using sustainable products that have a low embodied energy
5. Local and sustainable food - choosing local, seasonal food for a healthy, low impact diet higher in vegetable than animal protein; and reducing food waste.
6. Sustainable water - using water more efficiently in buildings and in the products we buy; tackling water course pollution; adapting and preparing for severe weather events including flooding and drought
7. Land use and wildlife - protecting and expanding old habitats and creating new space for wildlife
8. Culture and community - nurturing a culture of sustainability, community and a sense of place which builds on local cultural heritage. Events and venues are run with sustainability in mind, reducing waste and the need for transport and using sustainable food options in catering
9. Equity and local economy - inclusive, empowering workplaces with equitable pay; support for local communities and fair trade
10. Health and happiness - encouraging active, sociable, meaningful lives to promote good health and wellbeing

The One Planet Living framework forms the basis of this Biosphere management strategy's overall approach to its 'sustainable socio-economic development' objective, and is the specific agreed approach within the urban Brighton & Hove part (only) of the Biosphere area. Note that Principle 6 'Sustainable Water' is partially covered under the *Linkages* chapter (catchment management elements), and Principle 7 'Land use and wildlife' is subsumed within the 'Nature Conservation' part of this *Urban* chapter (and *Rural* chapter too).

Lewes District Council has developed the 'Smarter Living' programme (www.smarterliving.org.uk/) to promote and enable pro-environmental behaviours through a "bottom-up" approach that works with discrete communities who are empowered to select actions they prefer to reduce their collective impact. Several measures are used to monitor success including greenhouse gas emissions and ecological footprints. LDC has been registered and reporting under the Environmental Management and Audit Scheme (EMAS) since 1999, and certified to the International Standard ISO 14001 since 2002, with environmental improvement now ingrained within the organisation's culture.

Adur District Council has a joint Sustainability Strategy (2010) with Worthing Borough Council (WBC) that provides a basis on which to develop objectives, targets and action plans which incorporate sustainability into local activities. Initially the focus is primarily on internal council operations and services, especially where financial savings can be realised, from which the strategy is intended to be flexible and evolve. ADC has a joint Sustainability Officer with WBC.

A. Carbon / Energy

(Note that only reducing CO₂ emissions from buildings and their use are covered here, with the transport, food and goods sectors covered under other principles; climate change and the natural environment is addressed in the *Linkages* chapter).

Brighton & Hove's carbon emissions (a component of its ecological footprint) were 5.7 tonnes per person in 2005, and reduced by 12.3% by 2010 (with domestic emissions reducing by 7.8%) – higher than the regional and national averages. Buildings in Brighton & Hove contribute around 42% (514,000 tonnes per year) to its carbon footprint, as many of them are older than the national average (two-thirds pre-1945) with many having solid walls and a high number of heritage buildings. There are significantly more converted flats and fewer owner-occupied homes (62%), and a significantly higher privately rented sector (23%), making many of these private sector properties hard to treat with standard energy efficiency measures. Fuel poverty (defined as where a household has to spend more than 10% of its income on heating) rose to 13.5% in Brighton & Hove in 2010, which is higher than the South East average.

Adur District's carbon emissions were 5.75 tonnes per person in 2006, of which domestic-only emissions were 2.37 tonnes per capita – less than the regional and national averages.

In Lewes District, the Stockholm Environmental Institute assessed the greenhouse gas footprint in 2010 as 17.1 tonnes of carbon equivalent (range of local variation 12.01-19.36). It is important to note that this uses a different method from that used for Brighton & Hove and Adur, so is not directly comparable.

Current Policy & Practice –

The Brighton & Hove Sustainable Community Strategy (www.bandhsp.co.uk/index.cfm?request=b1158724) aims to reduce carbon emissions by 42% by 2020 and by 80% by 2050. The implementation actions of the Brighton & Hove City Climate Change Strategy (2011-2015) ([http://present.brighton-hove.gov.uk/Published/C00000120/M00003226/AI00022734/\\$20111031151124_001100_0002279_MicrosoftWordBrightonHoveCityClimateChangeStrategyNOVEMBER2011.pdfA.ps.pdf](http://present.brighton-hove.gov.uk/Published/C00000120/M00003226/AI00022734/$20111031151124_001100_0002279_MicrosoftWordBrightonHoveCityClimateChangeStrategyNOVEMBER2011.pdfA.ps.pdf)) will be delivered principally through the One Planet Living framework principles. Brighton & Hove City Council's 'One Planet Council' objectives are to set annual 4% reduction targets, to be based upon accurate buildings energy consumption information to make them energy efficient. BHCC has produced the Planning Advice Note 'PAN02' on 'Microgeneration'. BHCC signed the European Union "Covenant of Mayors" in January 2013, making a commitment to baseline emissions monitoring and producing a Sustainable Energy Action Plan, based on the One Planet Living plan.

BHCC achieved a 3.3% reduction of total CO₂ emissions between 2010/11 and 2011/12. It has applied energy efficient design standards and new technologies to school extensions and its council housing stock is relatively energy efficient, also some solar PV is being fitted, and energy efficient street lighting is being installed. The council and partners run an award-winning

'Eco Open Houses' annual event to showcase homes that demonstrate local best practice. Priority vulnerable private sector housing has benefitted from work by the Brighton & Hove Energy Action Partnership (BHEAP) with BEST funding to deliver home energy efficiency measures including 1400 loft insulations, 1100 cavity wall insulation, 1500 heating measures, and 150 solar water heating systems. Small and medium sized businesses have received a series of workshops under the EU-funded Low Carbon Essentials programme.

LDC has embarked on a range of activities using its EMAS and Smarter Living programmes to reduce its own greenhouse gas footprint and, leading by example, that of the local community.

ADC has been implementing an Energy Efficiency Programme that seeks to reduce its annual energy spend by £1.3 million. As well as maximising space savings and reducing the number of Council-owned buildings, approaches being pursued include voltage optimisation, standby savers for computers and solar generation.

Future Focus –
Brighton & Hove (planned):

- The B&H Sustainable Community Strategy sets a challenging target to reduce the city's carbon emissions by 42% by 2020 and by 80% by 2050 from the 2005 baseline
- The long-term vision for the whole city of Brighton & Hove is that the energy hierarchy (demand reduction, energy efficiency, renewable energy) is applied to all areas of consumption, and wasteful consumption is avoided
- The wider 'One Planet City' objectives are that energy efficiency and Low and Zero Carbon technology are promoted in new buildings and all existing buildings, where practically and economically feasible
- The objective is that new domestic developments meet the 'Code for Sustainable Homes' level 4 for energy from 2012, level 5 from 2016, and zero carbon status (level 6) by 2018
- The aim is to retrofit energy efficiency in existing homes through retrofit solutions funded by the Government's Green Deal or similar incentive schemes for householders
- On-site renewable energy technologies will feature in new build and on existing buildings where economically and practically feasible
- 15% of the city's energy to be generated from renewable technologies by April 2020 - using a combination of solar PV, renewable heat, wind, combined heat and power, anaerobic digestion and biomass; as informed by the Sustainable & Renewable Energy Study (AECOM, January 2013)
- Support projects across the city that help individuals, organisations, local community groups and companies adopt a trajectory towards zero carbon
- BHCC buildings over which the council has direct influence will be energy efficient
- BHCC to ensure that new building design will minimise energy demand and incorporate on-site renewable energy technologies where economically and practically feasible
- BHCC electricity supply will be continue to be sourced from renewable sources

Lewes District (planned):

- ESCC to encourage and support the transition to a low carbon economy in the county of East Sussex, including measures in its new Economic Development Strategy

Adur District (planned):

- WSCC Green Deal to be implemented along with ADC Sustainability Strategy policy.
- Continued development of Shoreham Port Authority as a location for renewable energy developments including training, skills development, and an education centre.

B. Waste Management

The amount of residual waste produced per household in Brighton & Hove was 577kg in 2011/12, down from 656kg five years previously. 28% of this waste was recycled or composted, 45% diverted to energy recovery and 25% sent to landfill. The amount of waste sent to landfill is reducing to less than 10% in 2013/14 with the Newhaven 'energy from waste' facility becoming operational. Up to 10 tonnes of household goods are re-used monthly by Brighton & Hove residents through 'Freegle' (<https://direct.ilovefreegle.org/main.php?action=look&groupid=21>).

Lewes District's strong support for waste avoidance has resulted in a consistently low figure of 511kg per household in 2011/12 (a drop of 12.5% over the last five years) or 293.5kg waste per head (a drop of over 15% in five years).

Adur District has the best rate, with 484kg of residual waste collected per household in 2012-13 (which has remained stable for the past few years) and a recycling rate of 34% (which has declined slightly from a peak of 37% in 2009-10).

Current Policy & Practice –

Brighton & Hove:

BHCC's 'One Planet City' objectives reflect those of its Municipal Waste Management Strategy (as reviewed in 2012) which is the main policy document for management of household waste in the city. The strategy aims to manage waste in line with the waste hierarchy, namely to reduce, reuse and recycle as much waste as possible (to high value end uses), and recover energy from the remainder of the waste (in preference to disposing of it to landfill). The strategy sets recycling targets of:

- 40% by 2015/16
- 50% by 2020/21
- 70% by 2025/26

It also seeks to reduce the amount of residual waste per household to 571kg by 2020/21 and 542kg by 2025/26. It also aims to:

- Ensure by 2020, no more than 2% of all waste (domestic, commercial or construction) by weight will be sent to landfill – with the rest to be reused, recycled, composted or burned for energy recovery
- Develop the infrastructure to enable recycling of commercial waste to achieve a trajectory towards zero waste by 2025

In recent years, Brighton & Hove has built a comprehensive waste infrastructure to divert waste from landfill through the Materials Recovery Facility, composting facility, and the Energy Recovery Facility in Newhaven. Communal recycling bins have been trialled in 2012 in the city centre where recycling rates were low. The trial resulted in a significant 70% increase in the weight of material collected for recycling. An ongoing focus on reducing food waste is being run with the Brighton & Hove Food Partnership, since organics make up 30% of household waste. The Brighton Paper Round business is operating a food waste collection service for businesses with a target of diverting 1200 tonnes pa of food from landfill.

BHCC's own internal waste management includes the collection of most waste streams, with general waste from council buildings being incinerated at the Energy Recovery Facility in Newhaven and thus no waste going to landfill. A staff awareness raising programme has begun to promote waste reduction, improve recycling and support staff engagement. Construction and demolition waste is covered by policies to promote re-use, recycling, waste reduction and sustainable design. Under the council's Strategic Construction Partnership, all projects have a Smart Waste plan with calculated site specific waste analysis data. The council has received a national award for cutting waste from construction and demolition, and for encouraging contractors to reuse and recycle materials. Waste recycling in all council construction projects is currently measured and independently verified. BHCC has produced the Supplementary Planning Document SPD03 on 'Construction and Demolition Waste'.

Brighton & Hove and Lewes District share a joint Waste and Minerals Local Plan (to 2026), which has been approved by Brighton & Hove City Council, East Sussex County Council and the South Downs National Park Authority and submitted to the UK Government.

Lewes District:

Lewes District Council has signed up to the Zero Waste Charter (Report No 275/03) as a long-term aspirational plan to reduce, and then eliminate, waste, and has lobbied the Government to enable the Charter's goals to be met. These include support for home composting and opposition to mass burn incineration as a means of waste disposal. In 2009, LDC signed the Waste Collection Commitment, which sets out the principles that should underlie domestic waste and recycling collection services, including ensuring that the needs of its residents are a central element. These principles will help to maintain LDC's high standards in waste and recycling services, ensure that quality as well as cost is considered when undertaking reviews of service, and forge stronger ties with the Waste & Resources Action Programme (WRAP) on a national level. LDC will continue to follow the waste hierarchy, placing an emphasis in terms of education on waste avoidance. Climate change and sustainability issues will continue to be integrated into LDC's approach on waste, particularly in support of the educational agenda.

Lewes District Council currently collects 10 different materials on its kerbside collection round, principally by zero emission electric vehicles that are charged on a green tariff. The three phases of sorting resident, kerbside, and plastic and cans at its Materials Recovery Facility (MRF) have enabled consistent production of a high-quality high-value "recyclate". In June 2013 LDC started domestic collection of food waste (around 10% of waste overall, and an estimated 1681 tonnes annually) which goes to a commercial bio-composter.

East Sussex County Council leads on waste reduction, reuse and recycling measures across the county, with overarching targets for these. It is also investigating actions on food waste, and commercial and industrial waste.

Adur District:

Adur District Council has launched a new waste and recycling facility, which has significantly reduced waste and increased recycling rates, working through a joint Contract Services team with Worthing BC that has increased efficiencies and enabled further investment. There is a recycling target of 38%, using a single household recycling bin (and optional extra green waste bin), with increased publicity and education programmes slowly helping to achieve this target. ADC has now signed up to the WRAP waste collection commitment, to drive towards a much more challenging target of 75% household waste recycled by 2020.

ADC offers a commercial waste recycling service, primarily for paper/card with other materials being investigated. ADC sends around 4,000 tonnes of commercial waste annually to a local 'energy from waste' plant, in line with its commitments under the West Sussex Commercial Waste Strategy to reduce the environmental cost of this element.

WSCC are commissioning a new mechanical biological treatment facility at Brookhurst Wood (near Horsham) which will dramatically reduce the amount of the county's household waste being sent to landfill from 2014.

Future Focus –

Brighton & Hove (planned):

- Promote reuse and recycling to high value uses, including closed loop recycling
- By 2025, 70% of domestic waste by weight will be reclaimed, recycled or composted. The target is that residual waste will reduce by 10% per household by 2025
- By 2020, no more than 2% of all waste by weight will be sent to landfill – the rest will be re-used, recycled, composted or burned for energy recovery
- Develop the infrastructure to enable recycling of commercial waste to achieve a trajectory towards zero waste by 2025

- BHCC internal waste reduction programme to set targets for annual review, in order to implement resource efficiency across the organisation and achieve an 85% recycling rate on internal operations within 3 years
- At least 90% of waste by weight generated by council construction and demolition work will be reclaimed or recycled

Lewes District (planned):

- LDC expansion of direct recycling of business waste
- LDC reinvigoration of the Flotsam and Jetsam Scrap store taking commercial off-cuts for redistribution to schools and clubs

Adur District (planned):

- Achieve recycling rate of 38% in 2013/14, and continue to work towards 75% by 2020
- Identify and implement new opportunities for commercial waste recycling

C. Sustainable Transport

After an increasing trend in traffic for many years, decreases in traffic numbers have been recorded since 2007/8, with a notable shift towards local cycling and walking with corresponding expected health benefits. There is an increasing trend, however, in the number of diesel and older petrol vehicles on the road which have greater air quality impacts. Car ownership in Brighton & Hove is the lowest in the South East region and one of the lowest nationally, with the city recently coming second (behind London) out of 26 cities scored by the Campaign for Better Transport for having least dependency on the car. Bus patronage and cycling and pedestrian movements in and out of the city centre have continued to increase since 2000. The number of bus trips taken within Brighton and Hove are more than double the number in the next best comparable area nationally. Brighton & Hove was ranked in the top 10% of local authorities for walking and cycling in 2011.

Left unchecked, traffic congestion and air quality will decline further in Brighton & Hove, however, with nitrogen dioxide air quality principally from vehicle emissions (especially commercial vehicles) showing no overall improvement in Brighton & Hove over the last 10 years despite the existence of an Air Quality Management Area (AQMA) here since 2008. Transport is responsible for 26% of annual CO₂ emissions that cause climate change.

An AQMA was declared in Lewes town in 2005, and there is now an emerging air quality issue in Newhaven too. An AQMA is also in force in Shoreham High Street, with a Management Plan containing a number of air quality improvement measures including regulating new developments.

The wider issue affecting urban and rural environments alike is that much of the South East region at times suffers from elevated levels of ozone pollution and nitrogen dioxide deposition, including from sources across the English Channel in North West Europe.

Current Policy & Practice – Brighton & Hove:

BHCC has a range of sustainable transport policies, a Brighton and Hove Air Quality Action Plan (2011), and was awarded Transport Local Authority of the Year 2010-11. BHCC aims for progressive annual reductions in its own travel carbon emissions (which were 836 tonnes of CO₂ in 2011/12). BHCC is planning a £10.45 million programme to deliver integrated/sustainable transport measures over three years from 2012 as part of its Local Transport Plan.

Brighton & Hove has been improving the promotion and provision of sustainable travel modes - public transport, cycling and walking - through major external funding sources including 'Better Bus Area' (£3.4 million for 2012-15); Local Sustainable Transport Funding (£4 million for the Lewes Road 2011-15); two EU-funded projects (e.g. Archimedes £2.2 million for small-scale transport projects); and designated Cycling Town investment. Over 30 Pedal Cycle Parking Bay locations have been established and eight on-street Electric Vehicle Charging Points installed. One car club operates with over 80 vehicles across the city, and car parking charges have been used to incentivise sustainable travel and reduce congestion. An extensive 20 mph speed limit has been introduced in 2013 to large areas of the city, with further areas proposed.

Sustainable transport infrastructure is integrated into significant new developments. Active travel planning for business, schools and individuals is promoted especially through the 'JourneyOn' website. 70% of BHCC staff travel for work is by sustainable modes (especially bus) and c. 75% of staff travel to work journeys are sustainable. Flexible working and measures for ongoing fleet vehicle replacement to models with higher environmental performance are being progressed.

Lewes District:

Since 2005, Lewes DC has encouraged residents, workers and visitors to travel more sustainably by improving promotion and provision of sustainable travel modes including public transport, cycling and walking. DEFRA funding for 2008-2013, provided through the air quality improvement grant scheme, has enabled a number of modal shift initiatives and highway improvements to be made in Lewes town. These include the provision of a new car club

operating three cars; workplace cycle challenges (2010/2011, 4,568 cycle trips logged, 9,527 tonnes of CO₂ saved); cycling and walking maps improving access to the SDNP, better cycle storage provision and the installation of EV charging points. Lewes town has introduced a 20 mph speed limit in 2013 to smooth traffic flow and reduce congestion and associated pollution.

LDC works closely with East Sussex County Council (ESCC) as the transport authority, including the recent award of Local Sustainable Transport fund to ESCC for Lewes town and SDNP of £1.5 million, and Newhaven £2.2 million. Marketing and promotions' activity includes the ESCC travel choices website, providing information about accessing more sustainable travel and information on school and workplace travel plans. Key to encouraging people to use cycling is the delivery of the 'Bike It Initiative' which will provide intensive support to promote cycling within organisations, including cycling incentive schemes, cycling events, cycle training and maintenance training. Improving sustainable transport infrastructure is integrated into significant new developments through sustainable accessibility improvement contributions secured through Section 106 agreements and/or planning conditions.

ESCC has developed a full Local Transport Implementation Plan (2011/12 – 2015/16) that includes infrastructure and service measures to support sustainable modes of transport.

Adur District:

ADC works with West Sussex County Council (WSCC) WSCC to ensure that sustainable transport is promoted and enhanced wherever possible. ADC has introduced a bike loan and car-sharing scheme for staff. New large scale developments are required to implement Travel Plans and a range of other sustainable transport initiatives, including real-time bus passenger information, EV charging points and information packs for new residents; development contributions have also enhanced sustainable transport provision.

Recent major funded projects in Adur include £5 million grant funding to the Shoreham Harbour Regeneration Project to improve vehicular and pedestrian accessibility to local railway stations, and the pedestrianisation of East Street in Shoreham to provide cyclepath access from the Downs to the coast. The new Shoreham Footbridge (National Lottery-funded through Sustrans) will improve pedestrian and cycle movements to Shoreham Beach and the coastal cyclepath route to Worthing. The Adur Valley Project previously secured the bridlepath along the former railway line east of the River Adur.

Future Focus –

Brighton & Hove (planned):

'One Planet City' objectives -

- To enable people to travel more sustainably by supporting active and healthy travel, such as cycling and walking.
- To increase the use of low emission forms of transport and help people to avoid travel (using technology)
- To minimise the impacts of transport-related air and noise pollution on people, and the natural and built environment

'One Planet Council' objectives -

- To provide more opportunities for staff to travel sustainably throughout the working day
- To enable walking, cycling and travelling by public transport to become the norm, and to reduce the need to travel to and during work
- To inspire and influence contractors, businesses and local organisations to travel sustainably, through leading by example

BHCC is aiming for zero carbon travel at work, with year on year reductions in emissions and targets set via council carbon budgets.

Lewes District (planned):

- ESCC LTP for LDC area - improvements to real time bus passenger information, cycling and walking initiatives including improved signage, and wheels to work schemes will help incentivise and improve access to sustainable travel and aims to reduce 12,500,000 vehicle kilometres and CO₂ emissions by 11,100 tonnes
- ESCC to take forward measures to increase the number of trips taken by walking and cycling and to promote them as beneficial to health by March 2016
- LDC is working with the Sussex Air Quality Partnership on developing and adopting an air quality and planning mitigation guidance document that aims to ensure that new development does not worsen air quality
- LDC is moving to a more agile working environment and will provide initiatives and improved IT to enable more flexible home working, reducing the need for staff to travel especially during peak travel times
- LDC is working towards the adoption of a staff travel plan that will encourage staff to travel more sustainably and currently provides a travel choices website. There is also a commitment to the reduction of fleet CO₂ emission thresholds
- LDC has secured an EV charging point to be installed at its main office. This will provide an opportunity to pilot LEV technology and further encourage staff to use lower emitting EV/hybrid technology
- ESCC to implement a package of Low Emissions Strategy (LES) measures for East Sussex to reduce emissions of air pollution and CO₂ from 2012?
- Secure travel plans, car clubs and EV charging point infrastructure through the planning system for development applications

Adur District (planned):

ADC-WBC joint Sustainability Strategy -

- Continue sustainable transport initiatives within Local Development Documents
- ADC is working with the Sussex Air Quality Partnership on developing and adopting an air quality and planning mitigation guidance document that aims to ensure that new development does not worsen air quality
- Conduct a Green Fleet review with cost-effective options for sustainable fuels, vehicle measures, and possible driver training
- Adopt a joint Green Travel Plan, and investigate its extension into the public arena
- 'New Ways of Working' council programme to increase home-working and reduce private car journeys (through pool cars and encouraging walking and cycling to work)
- The Shoreham Harbour Regeneration Project is committed to promoting new development that reduces car ownership and promotes sustainable modes of transport

D. Sustainable Materials

Taking sustainability into account when deciding which products and services to buy, whether by organisations or individuals, can help to contribute to the local economy, reduce environmental impacts and deliver social benefits to residents. The current economic climate is an incentive to repair, reuse, share, consume collaboratively and generally be more resourceful. The immediate challenge is to better inform people of local sustainable options to do so to inspire mainstream uptake. The ultimate aim is to create a circular materials economy rather than the current linear model of “take, make, waste”, by joining up and developing further the many local examples of good practice across the area, many of them community-based. Promoting existing services that facilitate the reuse and sharing of goods and services is key, particularly those with high embodied energy such as construction and building refurbishment.

Current Policy & Practice –

BHCC has a sustainable procurement policy and toolkit to support council staff in making responsible purchasing decisions and seeking details of tendering organisations' sustainability programmes. The One Planet vision is that all goods and materials used for construction or consumer goods are made from renewable or waste resources with low embedded energy, and wherever possible are sourced locally. The council has a dedicated reuse webpage to inform people of other organisations' reuse schemes available in the city. There are multiple examples of well-established community and online services, social enterprises, businesses and clubs that facilitate reuse and sharing in our area, with hundreds of businesses handling second-hand goods, many repair and maintenance providers, and an increase in emerging businesses making or selling products from recycled materials.

LDC has been monitoring its materials' purchasing since 1995 and under its EMAS since 1999 which has led to the continual reduction in the amount of harmful materials purchased by the authority. It is incumbent within major contracts to judge the efficacy of environmental impacts.

ADC has an adopted sustainable procurement policy that includes ensuring that energy efficiency is a basic requirement of any Council procurement process.

There is a lack of monitoring of local reuse and availability of recycled materials. More evidence needs to be generated on the social, economic and environmental benefits to ensure businesses adapt and new investment is attracted to handle the system and infrastructure changes required especially in waste management, materials processing and re-manufacture.

Building construction is the priority sector on which to focus efforts to use materials more sustainably given its high ecological footprint. BHCC has adopted planning policies that encourage the use of sustainable materials within all planning applications. It requires developers to complete a 'Sustainability Checklist' for new residential developments that includes a pioneering tool to estimate the embodied carbon of building materials. The authority requires assessment of new and refurbished buildings under BREEAM and Code for Sustainable Homes for all development that is “medium scale” and larger, and for all new dwellings. All major building components and finishing elements are assessed under the 'Green Guide' which uses life cycle assessment methodology.

A strong and diverse community of local designers, academics, architects and developers are addressing issues of resource scarcity, material challenges and changing consumer behaviour. For example, building a new community centre entirely from local waste materials in 2013 by Brighton University Arts department: “The House That Kevin Built” (<http://arts.brighton.ac.uk/business-and-community/the-house-that-kevin-built>).

Future Focus –

Brighton & Hove (planned):
'One Planet City' objectives -

- create a circular materials economy (rather than our current linear model of “take, make, waste”)

- engage people in sustainable resourceful use of local materials and expand projects which focus on low carbon materials and associated services
- for the community and business sectors to increase by 20% the reused and recycled materials used in local production of goods by 2016 and then by 50% by 2020, combined with a 50% increase in consumption of locally sourced, low carbon goods and services by 2016
- the targets for the construction and design sector are for 20% of materials in all domestic building to be reused, recycled or locally produced, rising to 50%, and for 95% of 'waste' in all domestic building and retrofitting projects to be reused/recycled locally

'One Planet Council' objectives -

- to embed sustainability principles throughout its procurement activities and contracts, and to develop ways to monitor progress on what these achieve
- selecting sustainable and efficient products and materials which have a minimal effect on the environment over their whole lifecycle
- select products that are sourced from local, fair and ethical suppliers as far as possible
- develop a supply chain that maximises opportunities for community benefit and economic gain, and reduces inequality and financial exclusion within the city
- Promote "plants for pollinators" to householders at garden nurseries e.g. Stanmer Nursery

Lewes District (planned):

- ESCC to promote sustainable consumption and production

Adur District (planned):

- ADC to implement a 'Developers Charter' to ensure that new developments secure local procurement of services and materials and local employment opportunities
- Require new developments to meet a minimum 'Code 4 for Sustainable Homes'

E. Local and Sustainable Food

To produce enough food to feed the population of Brighton & Hove approximately 70,000 hectares of productive agricultural land are needed. With our current diet, Brighton & Hove would need farmland eight times the size of the city's area, equivalent to a third of the area of West Sussex, in order to feed itself. Our current food system is unsustainable, based on long-distance transport systems and intensive, polluting production methods. Indeed food is responsible for 26% of Brighton & Hove's ecological footprint. Each year the food produced on that land requires approximately 750,000 barrels of oil and almost 625 million tonnes of fresh water. In all, this generates an estimated half-million tonnes of greenhouse gases.

Current Policy & Practice –

Brighton & Hove:

Brighton & Hove's food strategy 'Spade to Spoon: Digging Deeper' (2012)

(www.bhfood.org.uk/food-strategy) sets out a long-term vision for the city's food system to be healthy, sustainable and fair, with nine overall aims and multiple objectives and actions set out over a five-year action plan for the strategy's partners. BHCC is the first local planning authority to develop guidance and processes to encourage food growing on council land. BHCC's Corporate Procurement Strategy, Code of Practice and Toolkit (2012) includes guidance on specifying sustainable food through council contracts, and it has produced the Planning Advice Note PAN06 on 'Food Growing and Development'.

All of Brighton & Hove's schools have achieved 'Healthy School' status

(www.education.gov.uk/schools/pupilsupport/pastoralcare/a0075278/healthy-schools), and the council's school meals contract has achieved a bronze 'Food for Life' sustainability standard. Additionally, 23 of the city's child nurseries have been awarded the Healthy Choice Award for their catering provision. The major initiative of Harvest Brighton & Hove is an ambitious urban food-growing programme that is getting people growing food, sharing skills and finding more space for growing food. More than 100 individual local food-growing projects and initiatives exist across Brighton & Hove, with 60 growing spaces and traditional allotment areas, including those in parks (e.g. Preston Park and Dyke Road Park) and in small urban patches (e.g. Hanover Community Centre and London Road rail station). There are further projects that promote organic food production, including demonstration plots and training sessions. A new 'Sheep Share' scheme has been developed to directly purchase the lamb grazed in city greenspace on the urban fringe from the local grazier.

Lewes District:

Sustainable food action is being carried out by a number of organisations across Lewes District with different emphasis being placed on social, environmental and traceability issues. LDC is part of a Sustainable Food Working Group (within the East Sussex Environment Strategy) made up of representatives from different sectors. A Sustainable and Healthy Food Action Plan for East Sussex is being produced in 2012. Common Cause (a local co-operative) is working on a range of social housing and food projects, as well as producing a guide to setting up a community allotment, creating a database of funders for community food projects, and running the Lewes Farmers Market, Organic Allotment Project and the Ringmer Community Orchard. Action in Rural Sussex (AiRS), in partnership with Brighton Permaculture Trust, has over the last three years planted school and community orchards in eight locations in Lewes District, carried out apple cookery workshops, and produced two books on apples and orchards including one for children. Over 70 small orchards have so far been planted in schools and communities across Sussex by them, with plans for more. LDC has instigated the creation of two orchards and two allotments, based on education and training, as well as a monthly Farmers Market. A number of popular local retailers stock locally produced food. A successful bid to the Big Lottery Fund in partnership with the Community Chef is delivering cookery and nutritional skills to audiences in isolated and deprived rural communities. Transition Town Lewes' Food Group is running the Friday Market in Lewes and various other small food project initiatives such as mapping fruit trees throughout the district.

ESCC has principles in its Environment Strategy (2011)

([www.eastsussex.gov.uk/NR/rdonlyres/A9FAC9B8-4CF7-466B-8312-](http://www.eastsussex.gov.uk/NR/rdonlyres/A9FAC9B8-4CF7-466B-8312-1E409DBCC699/0/environment_strategy_for_east_sussex.pdf)

[1E409DBCC699/0/environment_strategy_for_east_sussex.pdf](http://www.eastsussex.gov.uk/NR/rdonlyres/A9FAC9B8-4CF7-466B-8312-1E409DBCC699/0/environment_strategy_for_east_sussex.pdf)) to reduce the environmental

impacts of food production and distribution, improve health through better diets, and support the agricultural and food economy of the county.

Adur District:

ADC is working with Transition Town Shoreham on a local 'Garden Share' scheme, and with its joint Local Strategic Partnership to promote the benefits of healthy eating and buying local initiatives, as well as facilitating projects to create community gardens and orchards.

Future Focus –

Brighton & Hove (planned):

One Planet City/Council objectives, derived from the Brighton & Hove Food Strategy -

- Reduce the element of the ecological footprint related to food from the current level of 1.43 global hectares per person to 0.67 by 2025 (based on REAP data for Brighton & Hove, from Best Food Forward 2011 www.resource-accounting.org.uk/downloads/south-east/brighton-and-hove)
- Public organisations will have healthy, ethical and environmentally responsible food procurement policies and practices
- Waste generated by the food system is reduced, redistributed, re-used and recycled
- More food consumed in the city is grown, produced and processed locally using methods that protect biodiversity and respect environmental limits
- The city has a vibrant, sustainable food economy of thriving local businesses, local products and employment opportunities

Brighton & Hove Food Partnership proposed sustainable food work with the Biosphere Project -

- Livestock grazing as a key component of landscape management, with lamb and beef sold directly locally, connecting producers to markets through supporting infrastructure potentially including local product branding
- Supporting orchards in particular, to provide local access to fresh fruit and engage people with nature and improve public health

(Note that farm diversification and greening are covered in the *Rural* chapter, and promotion of local sustainable fisheries is covered in the *Coastal & Marine* chapter)

Lewes District (planned):

- Sustainable and Healthy Food Action Plan for East Sussex seeks to increase the amount of local food available in town and village stores and markets in the county, and increase the proportion of locally produced food in the public and hospitality sectors
- Identify locations where people can grow more of their own food, for example in community allotments and through land-sharing

Adur District (planned):

- Work with the Local Strategic Partnership to promote the "buy local" campaign, local food production and healthy eating
- Support local farmers market and the annual Food and Drink Festival
- Expand the 'Garden Share' initiative
- Work with local groups to identify suitable public land for community gardens/orchards

F. Sustainable Water

(Note that the urban demand element only is included here, with other water resource and flooding issues covered in the *Linkages* chapter).

Our area lies within a “highly water-stressed” region, with per capita water consumption above the regional average. Most of our water supply comes from the groundwater aquifer of the surrounding Brighton chalk block, which is classified by the Environment Agency (EA) as “poor” (failing) status in quantity and “at risk” (declining) in quality.

Current Policy & Practice –

The overarching policy is the EU Water Framework Directive (implemented by the Environment Agency in England), which requires more sustainable management of water resources.

In terms of practice, Southern Water is installing water meters for almost every home in Brighton & Hove by the end of 2013, some 74,000 in total. BHCC has introduced local water metering to some of its civic buildings which has contributed to significant water saving and is rolling this out to others. It is also mapping all of the water meters across its property portfolio to enable early identification of water leakage at some council sites. BHCC and LDC convene emergency committees at times of pending drought to address both internal and external information for staff, other organisations and the public.

LDC's services are seeking ways to reduce water consumption over and above an ongoing drive to reduce water use, and advice on water saving practices is given via road shows and seminars. Linklater Pavilion in Lewes is a collaborator in the national Water Efficiency in Buildings Network.

Future Focus –

Brighton & Hove (planned):

‘One Planet City’ objectives -

- Reduce pollution of urban drainage networks and the sea
- Have a best practice approach to water drainage and storm water in refurbishments and new builds
- Have city wide water reuse and reduction campaigns and projects in place to support communities in reducing water consumption
- Reduce water demand in new housing and current housing, and from businesses - the Environment Agency, Southern Water Services and South East Water actively focus upon reducing water demand in the area

‘One Planet Council’ objectives - (through BHCC developing a water strategy and action plan)

- Efficient water use across councils buildings and schools
- Reduction and better management of water leaks

Adur District (planned):

- ADC to promote water efficiency in emerging Local Plan policies

G. Culture and Community (including Archaeology and Cultural Heritage)

Brighton & Hove is internationally recognised for its arts and cultural offer, with the sector playing a crucial role in driving the city's economy, identity and way of life. Its vibrant festival programme includes the world renowned Brighton Festival, Brighton Photo Biennial and Cine City, and outdoor events are a major part of the city's cultural offer to residents and visitors. Cultural activities are generally based upon partnership working through creative networks, including the key thematic partnership of the Brighton & Hove Arts & Creative Industry Commission of around 70 community and voluntary organisations and creative entrepreneurs. Unusually for a local authority, BHCC directly runs some of the city's major venues and attractions, including the Brighton Centre and the Royal Pavilion and Museums (RPM).

There is a rich archaeological heritage in the urban as well as the wider rural environment of the proposed Biosphere area, with three main statutory Scheduled Ancient Monuments (SAMs) in Brighton & Hove, four in Lewes town and one in Newhaven. Important urban sites (both visible and buried), many of which are publicly accessible, include:

- Palaeolithic - Black Rock raised beach, where bones of one the earliest human occupants of Sussex and now-extinct Ice Age animals were found. This site is described for its geology in the Coastal & Marine chapter
- Neolithic Monuments (c. 3500BC) – nationally important sites include the causewayed enclosures at Whitehawk Hill (SAM) in Brighton and Offham Hill by Lewes. Rottingdean's Beacon Hill (SAM) is the location of two Neolithic long barrows (burial mounds)
- Bronze Age and Iron Age (c. 2000BC – 43AD) – a number of Iron Age hill-forts exist including at Hollingbury (SAM) in Brighton. The Brighton bypass construction revealed hitherto unknown Bronze Age settlements at Downsview, Varley Halls and Mile Oak, as well as Stanmer Park having an important settlement
- Roman (43AD-410AD) – Valley Gardens on the Steine in Brighton was a main thoroughfare and a villa lay just south of Preston Park (which may itself yet reveal ancient Roman sites), and Southwick had a villa on the area of Manor Hall Road
- Saxon (410AD-1066AD) – there were a number of Saxon burials by Dyke Road Park in Brighton, and Lewes and Old Shoreham are Saxon settlements
- Medieval (Post 1066) – a monastic farm existed in the area of the old Brighton Town Hall. The main streets of old Brighton (North Street, East Street and West Street,) are the ancient boundaries of this developing medieval town, with the Laines contained within these. Lewes has a Norman Castle and medieval Priory. Shoreham is a Norman settlement
- Later periods (1700s to Present) – numerous historical sites from all periods occur in Brighton & Hove, culminating in the Royal Pavilion built from the late 1700s, while Newhaven Fort is a SAM

Lewes District is an important visitor destination, with 3.1 million visitors each year. It has superb natural assets lying within the South Downs National Park with cliff-top coastlines and attractive countryside. Newhaven has a strong community and sense of pride in the town, with over 150 active community groups and a successful community development association.

"Community resilience" in Brighton & Hove, according to the Young Foundation's Wellbeing & Resilience Measure (WARM), shows levels of social capital to be higher in more affluent areas of the city, although residents in more deprived areas feel to a greater extent that their interests are being promoted. The city scores poorly under the 'belonging' category, with lower proportions of people being members of decision-making groups despite the fact that it is the fourth highest ranking local authority in the country for residents wanting to be involved in local decisions. Feelings of belonging increase with age, however, from the low levels reported by young adults, with a higher proportion of older people participating in a group which makes decisions affecting their local area. Brighton & Hove is rated poorly on community social cohesion, perhaps due to its young and transitory population.

Current Policy & Practice –

The Brighton & Hove Arts & Creative Industry Commission is the key thematic partnership working on local culture.

BHCC was the first council to achieve joint certification to the International Standard for Environmental Management (ISO 14001) and the new British Standard for Sustainable Events (BS 8901) in 2010. Hence event organisers and promoters at council-run venues and at events on outdoor land owned by the council are encouraged and supported to integrate sustainability in their operations through the Sustainable Events Programme.

All Royal Pavilion and Museums buildings have sustainability plans in place that focus on energy use, lighting, materials and water consumption, and recycling. The Keep is a capital development of an archive centre which will be an excellent model of sustainability and will create much better access for the public to materials. The city's Jubilee Library is an award-winning environmental building. There has been significant investment in the Brighton Centre to reduce energy and water use, and increase recycling. Cultural solutions to social issues arising from the city's late night economy have been developed, including the White Night festival which won a Beacon award for its approach.

Future Focus –

Brighton & Hove (planned):

- All major venues and destinations owned or managed by BHCC should have a sustainability action plan or other robust environmental management system
- Further development of BHCC's sustainable events programme to achieve the new ISO 20121 events standard and develop guidance for events organisers
- A local partnership plan to enhance local culture will be based upon active community involvement
- Showcase projects will be developed to deliver a deeper local awareness of culture and heritage, including environmental exhibitions, festivals, and site-specific initiatives

H. Local Economy (including Tourism and Equity)

Brighton & Hove is a regionally important centre for employment, retail, tourism, leisure, transport hub (road, rail and sea), health and education, catering to both residents and people living in neighbouring districts that are part of its 'Travel to Work Area'. The local economy was estimated to be worth £4.2 billion in 2008 (prior to the economic recession), with the city being a major European business conference and tourist destination. It attracts 8.5 million visitors per year, who contribute over £732 million to the local economy (13% of the city's income) and support 17,500 jobs (14% of the city's workforce). Brighton & Hove is a member of the 'Coast to Capital' Local Enterprise Partnership which is especially focused upon international trade thorough Gatwick Airport. It has a thriving arts sector, and creative industries including the digital media sector which provides over 10% of employment.

In Lewes District as a whole, 3.1 million visitors annually spend £155m and support 2,300 jobs. Lewes town as the County Town of East Sussex hosts the county's public authorities (employing a quarter of its residents), is an important visitor destination and rail and bus gateway to the South Downs National Park, and maintains a strong independent retail sector. Lewes town boasts good road and rail links to London, the Gatwick Diamond, Brighton & Hove and Eastbourne. It has good links to the national cycling network and its central position in the South Downs National Park provides new opportunities for business, tourism and visitors. It is a great place for talented and ambitious people to live and run businesses, while also enjoying the excellent quality of life that it offers. However, low average earnings and high house prices make housing unaffordable for many local people and the difficult public spending environment now makes Lewes town vulnerable to job losses.

Newhaven has a significant port and is an important gateway to Europe with its ferry service to Dieppe transporting 250,000 passengers and 200,000 tonnes of freight cargo across the Channel annually. It also has a local fishing fleet. Newhaven has benefitted from regeneration in recent years: the West Quay has been redeveloped; an Enterprise Centre has been established; and investment has been made in improving the skills of local residents. The town has been badly affected by the economic recession, however, and generational deprivation is entrenched in some of the community with 13% of adult residents claiming out of work benefits.

The settlements of Peacehaven, Telscombe and East Saltdean were first developed in the early 20th Century as "plotlands" and have gradually expanded since then with their own distinct character. Whilst these towns are predominantly residential, employment and business opportunities are focused on retail and services along the coastal road, as well as in the Meridian Centre and on the Meridian Industrial Estate.

The economy of Adur District is closely linked to the larger conurbations Brighton & Hove and Worthing to the west which offer greater employment opportunities, hence only 44% of Adur's workforce work within the District. The largest employment sectors here are 'wholesale retail and vehicle repair' which account for 21% of total employment. Shoreham Harbour provides a concentration of employment in mining and quarrying and in manufacturing. Whilst the manufacturing sector has been performing relatively well in Adur, traditional manufacturing across the region continues to decline. Adur supports small-scale tourism mostly by day visitors, with tourism generating more than £42 million annually and supporting 1,100 jobs representing 6.2% of the employee workforce.

More employment land is needed in Adur District to increase the number and type of jobs available, reduce out-commuting and encourage investment back into the local economy here. Adur is the most deprived local authority in West Sussex and has 3 designated Local Neighbourhood Improvement Areas (LNIAs) within the proposed Biosphere area. These are Eastbrook (Fishersgate), Southlands (Shoreham-by-Sea) and Hillside (Southwick). The Governments Indices of Multiple Deprivation (IMD) indicate that Adur is 145th most deprived out of 354 local authority areas in England. Eastbrook and Southlands are in the 20% most deprived wards in England.

Current Policy & Practice – Brighton & Hove:

BHCC has an economic development strategy (as revised for 2013-18), working with the Brighton & Hove Economic Partnership, which has five strategic objectives including growing jobs in high-value and low-carbon sectors, improving the skills base and employment opportunities, and creating a strong and influential 'City Region' and maintain the city's distinctive offer. A City Investment Prospectus has been produced. The City Employment & Skills Group has a three-year Plan (2011-14) and a Local Employment Scheme to link people out of work with jobs. The Brighton & Hove Chamber of Commerce has set up a Green Chamber Collective (www.businessinbrighton.org.uk/our-members/sector-groups/green-chamber-collective) to promote the benefits of green business, and other business support is available through the West Sussex Sustainable Business Partnership (<http://sustainablebusiness.org.uk/>). Business directories have been developed such as the Brighton Green Pages and the Green Chain website. The Brighton & Hove 10:10 campaign (www.brightonandhove1010.org/) is encouraging businesses to sign up and cut their carbon, and Albion in the Community has a "Want to Work" Green Champion scheme. The Wired Sussex network has developed a support programme for local digital industries, and a feasibility study is underway on establishing an environmental sector development agency along similar lines. The annual Eco Technology Show launched in 2012 created a national spotlight on sustainability initiatives and environmental businesses locally. BHCC applied to Government for a 'CityDeal' based on the 'Eco Tech' sector growth potential of the city region. It also applied to be a 'Future Cities' demonstrator to integrate the city's systems, and secured funding for ultrafast broadband ('Wireless City') development. A **Green Brighton Guide** (www.greentraveller.co.uk/green-holidays-brighton) for visitors has been produced as part of a new eco-tourism strategy. Brighton & Hove has 'Fair Trade' city status to promote greater international equity, with the steering group having developed a visitor guide to leading outlets, a website and promotional events.

BHCC focuses on equality and inclusiveness as a priority, both internally and externally via community participation through the **Community Engagement Framework**, City Engagement Partnership and the Community and Voluntary Sector Forum to develop wider participation in city decision-making. Internally, BHCC's Equality and Inclusion Policy and Action Plan (2012) includes the production of Equalities Impact Assessments (EIAs) for all policy documents, and staff groups are supported to give a collective voice to minorities within the council. This resulted in an excellence award from the 2011 Equality Framework for Local Government Diversity Peer Challenge. A Living Wage Commission has been established and BHCC has raised its minimum rate of pay to this level (£7.20 per hour), while a citywide campaign has been initiated.

Lewes District:

Lewes town in Lewes District is home to numerous local residents and businesses that actively promote social and environmental progress through national and local initiatives such as Transition Town and the Lewes Pound.

Newhaven is now entering exciting times as a key regeneration area, which, it is hoped, will strengthen employment opportunities. Its new energy renewal facility, land development opportunities, and rail and sea connections are helping it to emerge as a centre for redevelopment, including waste management. Its solid technical and marine skills base and links with Brighton & Sussex universities can further help it to become a centre for green industries and innovation, as highlighted by it being chosen as the on-shore base for the proposed E-On Rampion off-shore wind farm.

The construction of Southern Water's new wastewater treatment plant in Peacehaven, together with two large housing developments, has provided significant funds and land for the development of a new large park.

Adur District:

In Adur District, Brighton and Hove Albion Football Club is developing a £29 million First Team Training and Academy facility to the west of Shoreham Airport (outside of the Biosphere area), on ADC land that was to have been developed as public open space for football pitches and

hence is making “planning gain” contributions to public sporting facilities in the area. ADC works in Partnership with the West Sussex Sustainable Business Partnership CIC.

Future Focus –

Brighton & Hove (planned):

One Planet Living vision and common objectives -

- where thriving, diverse and resilient local economies support fair employment, inclusive communities and international fair trade
- Equity and Inclusiveness, physically and socially
- Living Wage

One Planet City objectives -

- Employment, in particular promoting jobs in the green economy
- Participation e.g. (pilot) neighbourhood governance models; participatory annual budget setting; supporting the Community and Voluntary Sector Forum's work on wider participation in city decision-making
- Supporting fair trade

One Planet Council objectives -

- BHCC to implement the Equality and Inclusion Policy and Action Plan

Additional -

- Provide support and stimulate growth and improvement of environmental sectors companies in tandem with increased public and business demand (through the 'Green Growth Platform' for Sussex in 2014-2019, led by the University of Brighton)
- Further development of Brighton & Hove's distinctive offer of arts, culture, food and (eco-) tourism through the 2013-18 Economic Strategy and Action Plan, including working with the Biosphere Partnership and SDNPA especially

Lewes District (potential):

Joint Core Strategy Part 1 – Proposed Submission Document (January 2013 consultation draft)

Vision (by 2030) -

Lewes town -

- Strengthen its role as a county town, but without the public sector and the tourism industry dominating the town's economy
- Be attractive to those who live in the town, those who visit and the businesses that exist or wish to establish themselves in the town, through the provision of affordable housing and a range of premises to meet modern businesses needs
- The natural asset of the river will have been recognised in recent developments and the economic and recreational opportunities presented by the heritage assets of the town will have been utilised, while also being conserved and enhanced

Newhaven -

- Significant regeneration to develop and strengthen its economic base as the focus for enterprise and training within the district, with links to the two universities in Brighton
- Economic regeneration centred upon port generated activities, hi-tech industries and tourism, with the town acting as the continental gateway to the adjacent National Park
- A revitalised and more accessible town centre, with an improved public realm and a greater range of uses and activity, including those to meet local needs, aided by an improved highway network, greater connectivity to the town's railway stations and a high quality public transport corridor along the A259

- The natural asset of the river through the town will have been maximised through redevelopment opportunities, thereby enhancing this unique area of the town for residents and visitors alike

Peacehaven and Telscombe -

- The A259 will have a high quality sustainable transport corridor, thereby improving the accessibility of this part of the district to neighbouring coastal towns and cities where higher order services and facilities exist
- The provision and quality of recreational and community services will have been enhanced and opportunities to deliver employment floor space to help establish a greater presence of local businesses in the town will have been realised

Adur District (potential):

Emerging Adur Local Plan (2012 draft) Vision (by 2028) -

- Regeneration benefits for Adur will have been secured, particularly focussed on areas suffering deprivation (six wards). Residents will enjoy an improved quality of life and wellbeing through better access to higher quality jobs, better choice in housing including affordable homes and new and improved local services and community infrastructure.
- Most development will have been focussed around Adur's main communities, and measures taken to make these more sustainable communities, with reduced impact on the environment. Whilst many of Adur's residents will continue to visit other centres for employment and some retail and leisure functions, the district and its town and village centres will continue to have an important role in providing employment, leisure and community facilities, whilst also acting as a destination for visitors
- Through new development at Shoreham Harbour, Shoreham Airport and other strategic sites, new opportunities for education and skills training will have been created along with a range of employment opportunities to benefit economic prosperity of the District, with a particular focus on reducing the deprivation in those wards most in need

For Shoreham Harbour, the Shoreham Harbour Regeneration Project is conceived as a high quality exemplar sustainable development initiative with a proposed mix of residential, employment, community, education, leisure and ancillary retail development, high quality affordable housing, increased employment opportunities, and skills and education facilities/opportunities to high environmental standards. This development seeks to support the overall regeneration objectives of increasing housing and employment opportunities and skills in the area, whilst also raising environmental quality that mitigates and adapts to climate change, where the natural environment is enhanced (ensuring new public realm and cyclepath access along the riverfront and enhanced connectivity to the South Downs). The regeneration work will also provide an opportunity for consolidating, reconfiguring and enhancing activities of the Port of Shoreham, which will continue to play a vital role in the local economy. Relocation of some commercial uses will result in a more attractive urban environment and an improved interface between the Harbour and the rest of the District.

The main focus for ADC is to address social deprivation issues and meet future housing and employment needs. ADC also wishes to further improve the "public realm" through new developments that promote tourism and especially staying visitors to the area.

I. Health and Wellbeing (including Recreation and Access)

Brighton and Hove is a member of World Health Organisation (WHO) Healthy City programme (www.healthycities.org.uk/), supported by the Healthy City Partnership (HCP), as well as becoming part of the WHO Global Network of Age Friendly Cities. A Health & Wellbeing Board is being established in Brighton and Hove at present. The Joint Strategic Needs Assessment, a statutory wide-ranging analysis and high-level overview of the local population's health and wellbeing needs, highlights that there are higher than average mental ill health needs and persistent health inequalities across the city. Alcohol and other substance misuse are serious issues being addressed by dedicated programme boards. Other high impact issues include healthy weight and good nutrition.

Brighton and Hove residents are happier, more satisfied and feel their life is more worthwhile compared with the UK average (84% versus 80% for the latter measure), according to the Office for National Statistics survey of happiness and wellbeing (in July 2012). 96% of all residents are satisfied with living in Brighton & Hove, greater than the national average of 86% in England. Young people (25-34 year olds) are especially satisfied with living in the local area according to the City Tracker survey (average 96% versus 88% of all ages). Place satisfaction was generally lower in more deprived areas. Wellbeing is linked to health and longevity.

Current Policy & Practice –

The national Marmot Review in 2010 recommended improvement in the availability of good quality open and greenspaces across the social gradient as a key policy objective to improve health and wellbeing. The Brighton and Hove Health and Wellbeing Strategy includes Emotional Health and Wellbeing (including Mental Health) as one of its five priorities. Access and recreation is addressed by the Brighton & Hove Local Access Forum (LAF).

A number of local projects focus upon improved health through contact with the outdoors environment, including the BHCC 'Health Walks' project, the Stanmer Experience project which promotes Nordic walking, and people with mental health issues getting therapeutic benefits from the local countryside ('Grow' project).

The impacts of urban noise and light pollution are other elements of concern. DEFRA are considering designating some local open spaces in Brighton & Hove as "quiet areas". The Noise Abatement Society is working with BHCC and local people to create a city 'sound map', which will be used to tackle noise problem hot spots. The University of Sheffield has also carried out a study here with these two bodies to investigate the quality of outdoor environments for social and recreational use.

Future Focus –

Brighton & Hove (planned):

One Planet vision -

- to make it easy, attractive and affordable for people to lead happy, healthy lives within their fair share of the earth's resources

'One Planet City' objectives -

- Council, partner organisations, communities, residents work together to support people to achieve and maintain a healthy life, and to reduce health inequalities across the city
- Brighton & Hove makes the most of assets throughout the community and environment in order to improve health and wellbeing
- Local services are designed with physical and mental wellbeing in mind, and local people and communities will be involved and participate in shaping wellbeing
- Progress towards achieving the One Planet vision in Brighton & Hove will be demonstrated by monitoring health and wellbeing outcomes, including self reported wellbeing, active living, and health inequalities, and then targeting specific action on local inequalities to those most in need

One Planet Council objectives -

- Colleagues design and deliver services with sustainability in mind
- Colleagues are encouraged to be healthy, take accountability and respect each other

Adur District (planned):

- Review of ADC open spaces in 2013 to seek to greatly increase participation levels in sport to promote health and wellbeing through greater internal council co-ordination. Scope to provide green gyms and other free facilities in areas of deprivation to identify
- ADC to work with partners to maximise public access to the natural environment including the river, coast and downs through the Adur Tidal Walls project (with WSCC and the EA) and the Shoreham Harbour Regeneration project (with Shoreham Port Authority and BHCC).

4.4 Key Policies

The key policies on the urban environment of the Biosphere, by local authority area, include:

Brighton & Hove:

- BHCC Corporate Plan (2011) <http://corporateplan.brighton-hove.gov.uk/>
- BHCC City Plan Part 1 (proposed submission version April 2013) – including CP 16 Open Space & CP 10 Biodiversity policies; and Brighton & Hove Local Plan (2005) policies QD17, QD 18, NC2 – NC4 www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/ldf/Proposed_Submission_City_Plan_Part_One.pdf
- Brighton & Hove Local Biodiversity Action Plan (LBAP) (adopted version 2013)
- Brighton & Hove One Planet Framework www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/sustainability/Extended_Report_Revised_Final_amended.pdf
- Brighton & Hove One Planet Living City – Sustainability Action Plan (2013-16) www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/PandR%20version%20OPL%20SAP%283%29%20with%20Foreword%20s.pdf
- Brighton & Hove Sustainable Community Strategy (2010) www.bandhsp.co.uk/downloads/bandhsp/B_HSP_Sustainable_Community_Strategy.pdf
- Brighton & Hove Food Strategy (refresh 2012) www.bhfood.org.uk/food-strategy

Lewes District:

- Lewes District Sustainable Communities Strategy (2008-11) vision www.lewes.gov.uk/community/12300.asp
- Lewes District Local Plan Part 1 – Joint Core Strategy, Proposed Submission Document (January 2013 version) – core values include “Look after our environment” & “Regeneration and Enterprise” <http://cmispublic.lewes.gov.uk/Public/Binary.ashx?Document=4927>
- LDC Core Strategy (draft 2012) key policies: Core policy 8 – Green Infrastructure, 9 – Air Quality and 10 Natural Environment and Landscape character www.lewes.gov.uk/corestrategy/
- LDC Core Strategy 2030 visions for distinct areas, including Lewes, Newhaven; Peacehaven and Telscombe; and the rural South Downs
- LDC Environment Policy (2008)
- LDC Environmental Management Audit Scheme (EMAS) – policies and auditing system
- LDC Sustainability Strategy (draft for 2013 publication)
- Lewes District Public Realm Framework (in preparation 2013)

Adur District:

- Adur Local Plan 1996 (Saved Policies)
- Adur Local Plan Consultation Draft (2012) and Revised Draft (September 2013)
- ‘Waves Ahead’ - Adur and Worthing Joint Sustainable Community Strategy (2010-2026)
- ADC Sustainability Strategy (2010, being revised 2013)
- ADC Parks Strategy (2013-2018) (draft 2013)

4.5 Existing Information

Brighton & Hove:

- BHCC City Plan (Part 1 - proposed LDF submission version, February 2013)
- Brighton & Hove Local Biodiversity Action Plan (2013)
- Brighton & Hove One Planet Sustainability Action Plan (2013)
- Brighton & Hove State of the Local Environment study (2011)
<http://www.brighton-hove.gov.uk/index.cfm?request=c1256214>
- Brighton & Hove Habitat Audit 2007- 2009 (unpublished report - BHCC-SBRC 2009)
- Green Network study (SWT report to BHCC, June 2009)
- Brighton & Hove Open Space, Sport and Recreation Study (PMP report to BHCC, October 2008) based on national 'PPG17' Planning for Open Space, Sport and Recreation
- BHCC SPD11 on Nature Conservation & Development
- BHCC Urban Characterisation Study (2009)
- BHCC Climate Change Strategy (2011)
- Brighton & Hove Sustainable Community Strategy (2009)
- Brighton & Hove Food Strategy (2012)
- BHCC Economic Development Strategy (being revised 2012/13)
- BHCC Parks & Green Spaces Strategy (2006)
- Brighton & Hove Joint Strategic Needs Assessment (JSNA) (2012)

Lewes District:

- Sussex Extensive Urban Survey by Roland Harris for ESCC-WSCC-BHCC (2007) – specific reports cover Lewes, Newhaven and Peacehaven; as well as Brighton & Hove
http://www.westsussex.gov.uk/living/planning/the_county_plan/west_sussex_character_project/extensive_urban_surveys_eus.aspx
- East Sussex County Landscape Assessment
www.eastsussex.gov.uk/environment/landscape/default.htm

Adur District:

- ADC Parks Strategy (2013-2018) (draft)
- Mill Hill Nature Reserve Strategy (in the South Downs National Park)
- Shoreham Beach Local Nature Reserve Management Plan

Chapter 5 COASTAL & MARINE ENVIRONMENT



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CHAPTER 5 – Coastal & Marine Environment
(a Biosphere ‘Transition Area’, with a marine ‘Buffer Zone’ chalk reef)

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SUMMARY

The Biosphere's coastal and marine area stretches from Shoreham Harbour in the west to beyond Newhaven Port in the east, and incorporates a diverse range of coastal, estuarine and marine environments. The coastline includes spectacular chalk cliffs and long stretches of pebble beach. Marine habitats range from sheltered intertidal muds to intertidal chalk gulleys, and from undulating underwater sandwaves to reef outcrops. These are home to a great range of species, from commercial fish such as Black Bream to rare Short-snouted Seahorses.

This environment is important to people also, for commercial fisheries and marine trade, as well as offering opportunities for new development, tourism, recreation, and cultural heritage. The inshore fishing fleet is important here and targets a diverse range of species to provide food and income. The two ports of Shoreham and Newhaven are significant hubs for international trade and transport. The coastal and maritime heritage has a strong influence on the local culture.

Key policies and legislation for the coastal and marine environment include:

- The Marine Strategy Framework Directive (MSFD), a European policy which aims to achieve Good Environmental Status in our seas by 2020
- The Water Framework Directive (WFD) which aims to protect and enhance water bodies including all estuarine and coastal waters out to one nautical mile offshore
- The Bathing Water Directive sets standards for the water quality in coastal waters
- The Marine and Coastal Access Act 2009 provides a framework for the sustainable use of our marine resources. Through this framework, an integrated system of Marine Plans to manage our seas is being developed for coasts and estuaries
- A recommended Marine Conservation Zone (MCZ) – 'Beachy Head West' – is proposed for designation
- Local Biodiversity Action Plans set key objectives for biodiversity conservation
- The Sussex Inshore Fisheries and Conservation Authority (IFCA) is reviewing the management of inshore fisheries through byelaws and possible voluntary code of practice agreements to protect sensitive areas

These international, national and local initiatives will combine to deliver the shared UK vision for clean, healthy, safe, productive and biologically diverse oceans and seas. This vision underpins the "ecosystem services" which make the Biosphere so important for recreation, tourism, trade and transport, and which provide income, employment and leisure for local people and visitors.

The local community plays an active part in supporting the understanding of the marine environment, especially through the national voluntary initiatives of Shore Search and Sea Search to study and record the coastal and marine environment in our area. Such initiatives have helped identify a network of non-statutory marine Sites of Nature Conservation Importance on the coast and near-shore area. A collaborative Sussex Coastal Habitats Inshore Pilot project is developing a near-shore habitat map to aid understanding of the marine environment.

The coastal fisheries have all been assessed against internationally agreed sustainability criteria, providing a transparent audit of the sustainability of these fisheries. Indeed, many of the fisheries here have elsewhere been successfully certified according to the Marine Stewardship Council criteria.

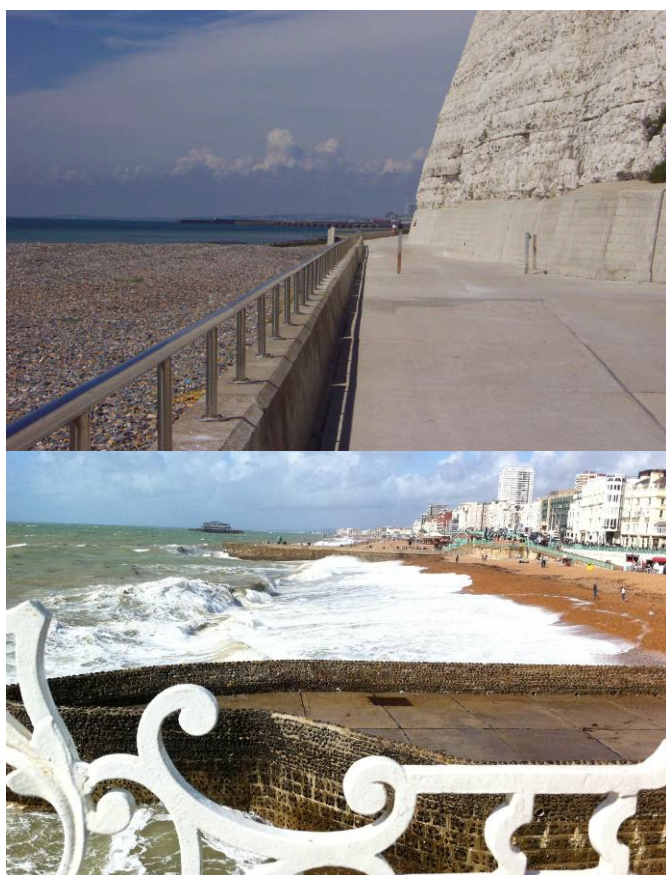
The quality of our coastal waters is set to improve as a result of Southern Water's £300 million environmental improvement scheme at Peacehaven wastewater treatment works. The Adur & Ouse Partnership catchment project seeks to improve coastal waters to meet WFD objectives.

The Biosphere Project aims to support effective local marine protected areas, promote local sustainable fisheries, and encourage greater learning and public awareness about the coastal and marine environment. It will seek to integrate Biosphere principles into the developing Marine Plan and actively support the proposed 'Beachy Head West' MCZ.

5.1 Introduction to the Coastal & Marine Environment

The chalk cliffs that stretch from Newhaven to Brighton Marina provide an iconic backdrop to the pebble beaches below, which stretch westwards to Shoreham. In the east, the beach overlays the chalk block, which is eroded to form an intertidal wave-cut platform with chalk gulleys. These extend into the sub-tidal zone, where they form species-rich, diverse sublittoral gulley and reef habitats.

Two world-famous landmarks dominate the view to the west: Brighton Pier and the remains of the West Pier. Looking landwards on a hot summer's day, the importance of the coast for recreation and the economy becomes apparent by virtue of the number of visitors who enjoy the area. The estuaries of the Adur and Ouse, which bound the Biosphere on the western and eastern extents, provide yet more landscape diversity. They are important transport and economic hubs, as well as havens for wildlife.



- Nature of the Coast and Sea

The coastline of the Biosphere area supports important examples of coastal vegetated shingle, a globally rare habitat found only in SE England, New Zealand and Japan. Notable locations in are Tide Mills SNCI by Newhaven and Shoreham Beach LNR.

A wide variety of birds feed and nest in the area. The Biosphere is particularly important to Gulls, Auks and Gannets, but rarer species such as Terns, sea ducks and Grebes are also present. There is a small Kittiwake colony on the cliffs at Newhaven and breeding Fulmar, Peregrine and probably Rock Pipit nesting between Brighton and Newhaven. The two river estuaries include expanses of intertidal mudflats that provide feeding grounds for a variety of wading birds, particularly Redshank (*Tringa totanus*), Dunlin (*Calidris alpina*) and Ringed Plover (*Charadrius hiaticula*).

Within the Adur Estuary SSSI, which opens to the sea at Shoreham, the communities are varied but typical of an estuary of its type, their substrates ranging from pebbles, cobbles and muddy sand at Soldier's Point close to the mouth of the river to silt and clay with fine sand. These habitats comprise BAP habitats. Muddier sites feature the polychaete worms King Ragworm (*Hediste diversicolor*) and *Streblospio shrubsolii*, and the oligochaete worms *Tubifex costatus* and *Tubificoides pseudogaster*. The Shoreham outer harbour area is a haven for a host of marine flora and fauna, with the wooden wharf pilings supporting a range of algae, hydroids, sponges, truncates and barnacles. The *Fucus* sub-species of saw and bladder wrack are most common and a variety of fish and crabs forage on the rich feeding ground. Purple sandpipers winter on the harbour walls in small numbers. Moving upstream the Adur begins to open out into a large expanse of mudflats known as the 'Saltings' and beds of mussels (*Mytilus edulis*) dominate the area under the A259 road bridge, where the channel narrows and tidal streams are stronger. The barnacle (*Semibalanus balanoides*), the shore crab (*Carcinus maenas*) and horse mussel (*Modiolus modiolus*) are also present here. Upstream of the bridge extensive salt-water pools develop at low tide.

Sat on a flat, gently shelving coastal platform, the near-shore waters of the Biosphere area are shallow (<15m in depth) and moderately exposed. Significant series of "sand waves" exist in places on the seabed where the bedrock forms outcrops which are commonly modified to mixed sediment habitats on account of lag gravel deposits.

Most of the seabed is covered by mobile sediments, ranging from cobbles, made largely of flint, to finer sediments of gravels, sands and mud. Shell substrata are also common, dominated by shells of Slipper Limpet (*Crepidula fornicata*). The sediments are important for bottom-dwelling invertebrates and fish. Some areas provide nesting for Black Bream (*Spondylus cantharus*). Various shipwrecks form significant oases for marine life and act as nurseries for fish, crustacea such as Brown Crab (*Cancer pagurus*) and Lobster (*Homarus gammarus*).

A discontinuous chalk ledge runs parallel to the Sussex coast from Worthing to Brighton, following the line of the 10m depth contour. This ledge gives rise to a unique series of low underwater chalk cliffs with north-facing scarp slopes, notably Looe Gate and South-West Rocks. The cliffs vary in length and height and are colonised by foliose red algae on the upper horizontal surfaces of the cliff tops. A chalk outcrop known as Marina Reef lies at approximately 15m depth, rising to about 3m above the surrounding seabed, 1.5 km south of the Marina. The dominant faunal cover of the sublittoral chalk (a Biodiversity Action Plan habitat) is a hydroid-bryozoan turf with sponges common on the silted sloping surfaces, together with the Horseshoe Worm (*Phoronis hippocrepia*). Sub tidal chalk is often bored by bivalve molluscs such as common piddock, and empty bore holes are home to a range of crevice dwelling animals. Some piddock holes have created particularly species-rich habitats used by a range of invertebrates, shellfish (crabs) and worm species.

Brighton Marina adds to the diversity of species found in the marine environment. The pontoons support shallow sub-tidal algal species that would otherwise be found in deeper waters, namely *Laminaria* spp. and the red seaweed *Nitophyllum punctatum*, as well as the non-native Japweed, (*Sargassum muticum*) and *Grateloupia* spp. A number of sessile invertebrates occur, including ascidians, plumose anemones (*Metridium senile*) and various sponges. Short-snouted Seahorses (*Hippocampus hippocampus*) are also regularly recorded in the sheltered waters of the Marina.

The open sea of the Biosphere area is frequented by cetaceans, including Bottlenose Dolphins (*Tursiops truncatus*) and Harbour Porpoise (*Phocoena phocoena*).

- Culture of the Coast and Sea

There is evidence of settlements in the Biosphere area as early as Neolithic times, although the first real documentary evidence for Brighton is an entry in the Domesday Book, when it was called Brighthelmston.

Brighthelmston developed into a thriving fishing town, at one stage boasting the largest fleet in the South-East of England. In 1750, Dr. Richard Russell published a Latin dissertation *De Tabae Glandulari*, in which he recommended the use of sea-water for the cure of enlarged lymphatic glands. Dr Russell advocated that people try the water near Brighton proclaiming that sea water was superior to those cures provided by inland spas. Russell's efforts have been credited with playing a role in the populist "sea side mania of the second half of the eighteenth century". Royalty discovered the town during the latter half of the 18th century, and in 1783 the Prince of Wales arrived with his entourage. He took to the place to such an extent that he had a villa built, the famous Marine Pavilion, complete with a dome and rotunda. The shopping area known as The Lanes evolved from being fisherman's cottages into a unique assortment of shops, boutiques, cafés, pubs and restaurants.

In Shoreham-by-Sea, fishing provided livelihoods for around 100 boats in the 1880s, with most of their effort being directed at the mid-channel oyster beds. In 1850, it was recorded that some 200,000 tons of oysters and scallops were sent inland by rail from Shoreham, destined for fishmongers' slabs in the capital.

Sussex is one of the most heavily wrecked coasts in the UK, with many occurring along the proposed Biosphere stretch. The rich underwater archaeological heritage includes many shipwrecks of cultural significance for their history, as well as a number being important angling and recreational dive sites.

Thus the coast and the sea have always been at the heart of the attraction of the Biosphere, from the significant fishery on its coast to the beaches which remain a major tourist attraction.

- Ecosystem Services of the Coast and Sea

There is a need to consider the interconnectedness of the natural environment of the coast and sea, and its relationship to the land (a focus for the *Linkages* chapter) and people, through an understanding from an "ecosystem services" perspective.

For example, intertidal coarse sediment plays an important role in beach protection and provides feeding sites for wading birds at the strandline. It also attracts fish which scavenge, with the habitat providing a beneficial ecosystem service to both commercial and recreational fisheries.

Subtidal sediment provides important nursery grounds for many ecologically and commercially important fish. It also supports seabirds. Marine sediments have an important role in the global cycling of many elements, including carbon and nitrogen. Nitrogen and phosphorous remineralisation provide a significant contribution to the nutrients required by primary producers in the water column. Marine sediments may act as temporary or permanent sinks for pollutants, particularly toxic metals.

It is thus important for the many existing organisations and partnerships who manage and look after the coast and sea, that they communicate and work together to join-up and integrate action to achieve the possible multiple ecosystem services benefits.

5.2 Nature Conservation

A. Introduction

- Relevant Policies & Processes

The UK Government's vision is of "clean, healthy, safe, productive and biologically diverse oceans and seas". The UK is committed under the OSPAR Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic) and other conventions to implementing a Marine Protected Area Network, defined as "an ecologically coherent network of well-managed marine protected areas", to protect, conserve and restore the range of species, habitats and ecological processes that have been adversely affected by human activities; prevent degradation and damage by following the precautionary principle; and protect and conserve the best representative maritime areas.

Marine Conservation Zones (MCZs) (www.defra.gov.uk/environment/marine/protect/mpa/mcz/) are a new marine protected area designation under the Marine and Coastal Access Act (2009), for which recommended sites have been identified by Natural England working together with all relevant stakeholders. Each recommended MCZ has a draft Conservation Objective to "maintain" or "recover", based upon a sensitivity matrix assessment. The Biosphere area includes the 'Beachy Head West' rMCZ which DEFRA is considering for designation by 2014.

For Beachy Head West proposed MCZ (see map below), the levels of activities currently occurring are considered acceptable and therefore the draft conservation objective is to "maintain" the current status. Restrictions may have to be introduced if the conditions decline. Once designated, Natural England will produce detailed conservation advice for each MCZ to assist the relevant public authority in the implementation of management measures (voluntary codes or statutory byelaws).

The Marine Management Organisation (MMO) is responsible for enforcing the general offence of damaging Marine Conservation Zones (MCZs).

Inshore Fisheries and Conservation Authorities (IFCAs) have a duty to further the conservation objectives of MCZs and will be expected to introduce byelaws regulating fishing activity where necessary. IFCAs also enforce Marine Management Organisation (MMO) nature conservation byelaws within the six nautical mile limit.

The Marine Strategy Framework Directive (MSFD) aims to achieve Good Environmental Status (GES) in Europe's seas by 2020, by protecting the marine environment, preventing its deterioration and restoring it where practical, while using marine resources sustainably. A suite of qualitative descriptors has been developed to determine GES, including: maintenance of biological diversity; potential control of non-indigenous species; healthy commercial fish and shellfish populations; naturalness of marine food webs; minimisation of human eutrophication; sea floor integrity; and regulation of human impacts, contaminants and pollution effects.

The Water Framework Directive (WFD) is a strategic framework, led by the Environment Agency in England as the "competent authority", designed to improve and integrate the way water bodies are managed throughout Europe. The aim is to reach good chemical and ecological status in both inland and coastal waters (estuaries and coastal waters out to one nautical mile) by 2015 where possible, or Good Ecological Potential (GEP) where not.

The Adur & Ouse Partnership is a pilot project which has developed a Catchment Plan that includes the following Objective and associated Targets:

Facilitate Actions to Achieve Good Ecological Status and Good Ecological Potential in Transitional and Coastal Waters:-

- By 2012, support the management of protected areas
- By 2013, where opportunities exist seek to reduce pressures on the marine ecosystem
- By 2020, improve the naturalness of coasts and estuaries

The South Downs National Park (SDNP) incorporates a 20km stretch of coastline (down to the mean low water mark) and is concerned with planning around the land-sea interface. The SDNP coastline starts in the west with a small section between Brighton Marina and Rottingdean, and then overlaps with the Sussex Heritage Coast landscape designation to the east of our proposed area between Seaford and Eastbourne. Further local Heritage Coast policies extend eastwards from Lewes, peripheral to the proposed Biosphere area. Heritage Coasts are stretches of our most beautiful, undeveloped coastline, which are managed to conserve their natural beauty and improve accessibility for visitors.

The Sussex Local Biodiversity Action Plan (LBAP) comprises six coastal and nine marine habitat action plans in total, including blue mussel beds for example. More than half (8 out of 15 total) of the Habitat Action Plans of the Brighton & Hove Local Biodiversity Action Plan (2013) concern marine or coastal habitats, as well as three specific focal species. The Brighton & Hove LBAP includes a target of protecting at least 10% of Brighton & Hove's coastal and marine areas by 2020, compared to 1.2% (of its coastal area) at present.

- Nature Conservation in the Biosphere Area

The coastal and marine environment within the Biosphere area contains a diverse range of habitats and species of national and local ecological importance. Ecological interest within the Biosphere includes statutory and non-statutory designated sites, as well as undesignated sites (see map below). The key designated sites are summarised in Appendix 2 in coastal and marine section tables, followed by detailed individual site descriptions.

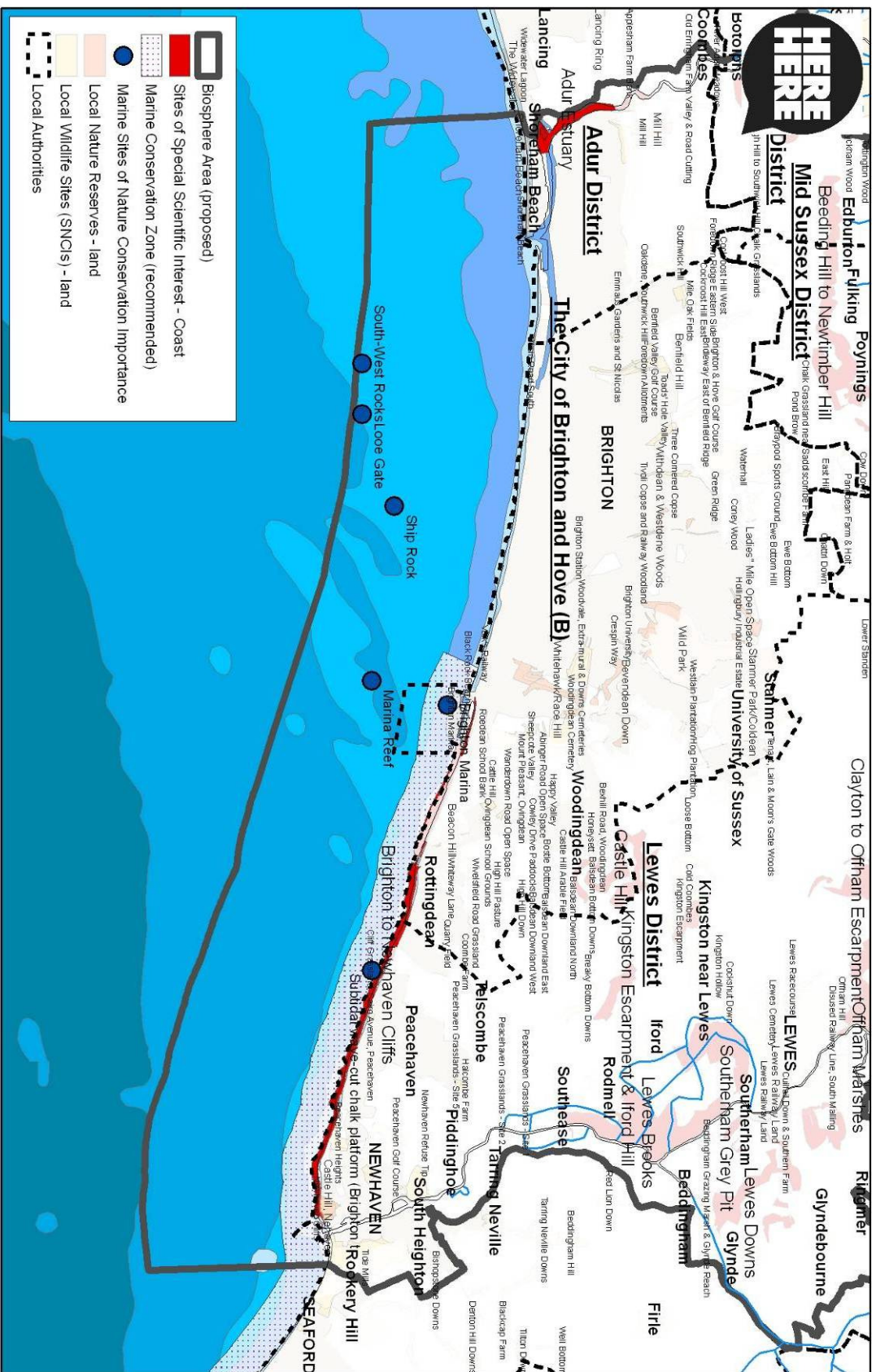
The coastal sites comprise two (nationally important) Sites of Special Scientific Interest (SSSIs) – the 'Adur Estuary' and 'Brighton to Newhaven Cliffs' – and two statutory Local Nature Reserves (LNRs) and eight non-statutory Local Wildlife Sites (LWS), or Sites of Nature Conservation Importance (SNCIs), containing mainly rare vegetated shingle BAP habitat or coastal grassland.

The principal marine site is the proposed Marine Conservation Zone (MCZ) of 'Beachy Head West', running parallel offshore to the seaward marine parts of the SSSI chalk cliffs referred to above. Also present are six designated non-statutory Marine Sites of Nature Conservation Importance (mSNCIs), comprising four subtidal chalk ledge outcrops, Brighton Marina and the subtidal wave-cut chalk platform from Brighton to Newhaven. A total of 24 marine SNCIs have been identified in Sussex (by East Sussex and West Sussex County Councils, and Brighton & Hove City Council) through SeaSearch using voluntary divers.

However, despite varied information on the marine environment being collected, including by Sussex Seasearch divers, there is no accurate map of the benthic (bottom) habitats found in the Biosphere area. The diversity of offshore habitats, their biodiversity and conservation value is therefore often poorly understood. This may result in lost opportunities to engage the community with the value of coastal resources and costs to developers who must seek to attain this type of information when looking for development approval.

Sussex IFCA, Sussex Wildlife Trust and others are thus working on the Sussex Coastal Habitats Inshore Project (SCHIP) to create a detailed habitat map for the Sussex "coastal water body" (out to one nautical mile) to inform its protection and management, with scope for this to be extended out further in the future with additional funding.

Brighton & Hove and Lewes Downs Biosphere (proposed) Coastal-Marine Environment & Nature Conservation



B. Key Habitats

- Coastal

The main coastal habitats, which are identified as Local Biodiversity Action Plan (LBAP) habitats, are:

- Coastal vegetated shingle (0.8 ha area only in Brighton & Hove, with more substantial areas around both Shoreham Beach and Newhaven as part of the 350+ ha in Sussex and 5800 ha in the UK)
- Maritime cliffs and slopes (4.2 ha area in Brighton & Hove)
- Intertidal chalk (32.6 ha area in Brighton & Hove)
- Intertidal saltmarsh
- Intertidal mudflats
- Intertidal Underboulder Communities

- Coastal vegetated shingle:

This internationally rare habitat is very restricted at the local level of the proposed Biosphere area, as well as being the most “near-natural” (terrestrial) habitat here too and of local geomorphological interest. Vegetated shingle habitat in our area supports a number of rare and locally notable BAP species, including the leafhopper *Ulopa trivia*, Toadflax Brocade *Calophasia lunula* and Light Feathered Rustic *Agrotis cinerea* moths, and plants such as Sea Knotgrass *Polygonum maritimum*, Frosted Orache *Atriplex laciniata* and Sea Bindweed *Calystegia soldanella*.

Current Policy & Practice –

Coastal vegetated shingle is a “habitat of principal importance for the purpose of conserving biodiversity” under section 41 (England) of the Natural Environment and Rural Communities Act (2006).

Future Focus –

- Maintain the total extent of coastal vegetated shingle habitat (in Brighton and Hove) with no net loss, and establish programmes to achieve favourable or recovering condition as necessary (by 2015)

- Marine

Within the marine environment, the following additional BAP habitats are present:

- Subtidal sands and gravels
- Sheltered muddy gravels – subtidal sediments
- Fragile sponge and anthozoan communities on subtidal rocky habitats (unusually being found here only at the Outer Harbour arm of Brighton Marina)

Internationally important habitats are also potentially found in the area e.g. rocky and biogenic (*Sabellaria* or Blue Mussel *Mytilus edulis*) reefs, but there has been no systematic high resolution survey of the seabed in the area as yet.

Further (non-BAP) habitats include:

- Piers / harbour walls
- Shallow wrecks
- Shallow reefs

C. Key Species (Groups)

- Fish:

Marine fish species on the Sussex BAP comprise the Undulate Ray (*Raja undulata*), Herring (*Clupea harengus*), Plaice (*Pleuronectes platessa*), Horse Mackerel (*Trachurus trachurus*), Mackerel (*Scomber scombrus*), Dover Sole (*Solea solea*) and both species of seahorse (*Hippocampus hippocampus* and *Hippocampus guttulatus*). Anadromous fish species comprise Twaite (*Alosa fallax*) and Allis Shad (*Alosa alosa*), European Eel (*Anguilla anguilla*), Smelt (*Osmerus perlanus*), Atlantic Salmon and Sea Trout (*Salmo trutta*). The native Oyster (*Ostrea edulis*) is also on the Sussex BAP, as are Spurdog (*Squalus acanthias*), Porbeagle Shark (*Lamna nasus*), Short Fin Mako (*Isurus oxyrinchus*), Basking Shark (*Cetorhinus maximus*), Tope (*Galeorhinus galeus*) and Blue Shark (*Prionace glauca*). Another occasionally sighted species is the Grey Triggerfish (*Balistes capriscus*).

- Short-snouted Seahorse (*Hippocampus hippocampus*)

This species is singled out for special attention by the Brighton & Hove LBAP, with targets proposed to improve understanding of their local distribution and habitat requirements (by 2015) and protect populations from damage. Furthermore, these species are protected under the provisions of the Wildlife and Countryside Act, 1981 (as amended).

- Plants:

Two coastal plant species are identified as specific focal species requiring individual conservation measures in the Brighton & Hove LBAP.

- Hoary Stock (*Matthiola incana*) Hoary Stock is a plant of maritime cliffs and slopes which has its Sussex stronghold on and around the cliffs from Brighton Marina to Rottingdean; the conservation objective is to ensure that its current local distribution and abundance is maintained.

- Sea Heath (*Frankenia laevis*). Sea Heath is normally a plant of upper saltmarsh and transitional habitats, but in Brighton and Hove it grows east of Brighton Marina on the sea cliff and in the spray zone – the objective is to maintain the extent of its known populations to 2020.

D. Geology

The Geological Conservation Review (GCR) identified two adjacent sites by Brighton Marina: Friar's Bay to Black Rock Marina Cenomanian-Maastrichtian, and Black Rock, Brighton and Coastal Section Periglacial of South East England. Both are now GCR and Local Geological Sites (LGS, formerly known as Regionally Important Geological and Geomorphological Sites, or RIGGS).

Both are part of the (nationally important) SSSI of 'Brighton to Newhaven Cliffs' which is primarily designated for its geological interest. The SSSI provides the best and most extensive exposure of the *Offaster pilula* geological zone in England. It is an important collecting site for fauna of the upper Santonian and Lower Campanian due to the excellent accessibility of the cliff base. The cliffs are also an important reference section for the Upper Cretaceous.



Of particular interest is the cliff section at the western end (immediately behind Asda) where the chalk changes to a sandy material containing an ancient 'raised beach', with an interpretation panel that explains:

It "is an exceptional geological section... that comprises one of the most extensive sections of ice age geology visible in Northern Europe... [in which] it is possible to reconstruct long-term climate change and sea level rise spanning a period of a quarter of a million years"

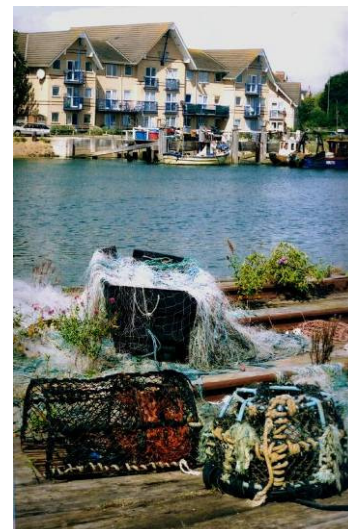
Dr. Matthew Pope, Archaeologist, University College London



5.3 Sustainable Socio-Economic Development

A. Local and Sustainable Food (Commercial Fisheries)

There is a very important fishery in the marine area of the Biosphere. Target fish and shellfish include sole, plaice, cod, lobsters, and crab. Fish are harvested from within the Biosphere area using a variety of means including both 'static' and 'mobile' fishing methods. Mobile demersal fishing gears ('trawls') towed across the seabed will have an impact on the seabed which is likely to influence local biological communities. The scale of influence varies throughout the area depending on the nature and the scale of fishing and the sediment type present. The impact of fishing with mobile gear ranges from high levels of bycatch (Hall and Mainprize, 2005), reduced seabed ('benthic') community biomass and productivity (Hiddink et al., 2006), reduced benthic species richness (Collie et al., 2000) and direct physical impacts on habitats (Kaiser et al., 2002). While the impacts of static gears on benthic systems are relatively little studied, the 'footprint' of this fishing method is less than mobile gear, although some damage can result to attached benthic species (Johnson, 2002).



Current Policy & Practice –

Inshore fisheries management in England is the primary responsibility of the Inshore Fisheries and Conservation Authorities (IFCAs), set up under the Marine and Coastal Access Act (2009) in 2011. The Sussex IFCA regulates commercial fisheries within open coastal waters out to the six nautical mile (nm) limit under its duty to sustainably manage sea fisheries resources and to protect marine ecosystems from the impact of fishing.

The Marine Management Organisation (MMO) was also established under the same Marine Act (2009) and licenses fishing activity and manages UK fishing fleet capacity and fisheries quotas. The Environment Agency has the responsibility to protect migratory fish.

IFCAs are required to ensure effective management of marine habitats in the inshore area, including activities such as recreational sea angling, bait digging and seaweed gathering. IFCAs have a duty to manage fisheries sustainably and are expected to introduce byelaws regulating fishing activity in MCZs where necessary. IFCAs also have powers to regulate fisheries and other private fishing rights in nature conservation sites. In order to sustainably manage sea fisheries resources, IFCAs will need to gather evidence, evaluate options, propose management solutions and, where necessary, develop and agree byelaws. They will further need to evaluate outcomes and review the effectiveness of any action taken.

The Marine Strategy Framework Directive (MSFD) requires that "populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock."

Locally there is a comprehensive Food Strategy and Action Plan "Spade to Spoon: Digging Deeper" for Brighton & Hove, as the first local authority in the UK to develop one by working through the Brighton & Hove Food Partnership (BHFP - www.bhfood.org.uk) to raise awareness of food issues, educate about food and health, and promote local food and better access. Among the broad range of complex issues of our current food system contained within the strategy is a focus on seafood to develop a local fish plan for local sustainably caught fish. There is little public knowledge of the nature of local coastal fisheries however, for example on the provenance of local fish and how it is caught, as was evident in a public debate held under the auspices of BHFP in Brighton in 2012. There is thus an issue of supporting greater awareness of what constitutes and how to source sustainable local fish. The public is being asked by BHFP to sign up to a "fish pledge" of changes that individuals can make to support this campaign.

There are some 70 registered commercial fishing vessels operating in the Biosphere area – 28 from Shoreham, 20 from Newhaven and 20 from Brighton – the majority of which are inshore boats under 10m in length (including all of those based in Brighton Marina) which operate nets

and traps to catch a variety of fishing and shellfish. Shoreham Port and Newhaven Harbour hold a wider range of vessels that vary from quarter boats to under 10m multi-purpose vessels to large nomadic beam trawlers, with larger vessels (over 14m) which operate further offshore as their fishing within the 0-6nm mile limit is restricted. The vast majority of fishing boats in the Biosphere area use trammel nets, drift nets and pots and traps, and there are a number of vessels which use trawls.

Future Focus –

- By 2015, IFCA's will have reviewed the local fisheries management byelaws and have put in place plans to manage key local fisheries resources
- By 2014, the first tranche of Marine Conservation Zones will have been designated and management measures will be developed and introduced to protect the sites from damaging activities
- Promote greater public understanding and awareness of local sustainable fisheries and how to support these

The Brighton & Hove Food Strategy Action Plan will:

- Develop a local fish plan to support and promote local sustainably caught fish to restaurants, hotels and residents
- Link to the national campaign to stop consumption of fish on the Marine Stewardship Council (MSC) endangered list, and to the 'Sustainable Fish Cities' programme

B. Local Economy (Marine Planning & Licensing, Economic Development, and Tourism)

The “ecosystem services” that are provided by the coastal and marine elements of the Biosphere are valuable and can attract investment. This section details some of the major infrastructure and development plans of relevance which are envisaged within the Biosphere. The Biosphere project can support these plans by underpinning their sustainable development.

Please note that Flood and Coastal Risk Management is addressed in the *Linkages* chapter.

- Marine Planning & Licensing

Current Policy & Practice –

The Marine Management Organisation (MMO) is responsible for preparing marine plans for the English inshore and offshore waters. The aim is to ensure a sustainable future for our coastal and offshore waters through managing and balancing the many activities, resources and assets in our marine environment. The plans will set the direction for decision making at a local level to lead to efficient and sustainable use of our marine resources. Marine planning is intended to guide the most suitable locations for different activities, manage marine resources sustainably, work with all marine users to integrate and balance all current and future activities, and take a holistic approach to decision making. The MMO has a duty to take decisions on proposed developments in the plan area in accordance with the Marine Policy Statement (MPS) and marine plans.

Marine Plans are a new approach to the management of our seas. The South Inshore (out to 12 nautical miles) and South Offshore marine plan areas are the third and fourth areas in England selected for marine planning, with the former extending along the coastline from Dover to the River Dart. The MMO has produced a ‘Statement of Public Participation’ in 2013 setting out how it will engage stakeholders in the process of developing the plans through to their completion in 2015. Other publications to date include a futures analysis, information on tourism, and a draft seascape assessment for the Marine Character Area (no. 7) ‘Selsey Bill to Seaford Head’.

Marine planning and licensing should not be considered as separate entities. The marine planning system will set the regulatory framework within which individual licence decisions will be made on a case-by-case basis, similar to the process in the terrestrial planning system with local development frameworks and planning permission. The marine planning system will provide the framework for consideration of a licence application and the decision to grant or refuse a licence as it will give clear direction regarding the nature of activities that may be permitted in a given location.

Since 2011, the MMO has been responsible for most marine licensing in English inshore and offshore waters, under the Marine and Coastal Access Act (2009) to regulate many activities involving a deposit or removal of a substance or object below mean high water or in any tidal river. This can include the construction of a port or wind farm, dredging operations to create a channel or abstract minerals, and the use of munitions. The MMO will consult statutory authorities on any application before issuing a license. The Secretary of State is the licensing authority for oil and gas-related activities, however, and administers marine licences through the Department for Energy and Climate Change.

Future Focus –

- The Marine Management Organisation (MMO) will publish final Marine Plans for the South Inshore and South Offshore areas in 2015, following an extensive development process using the best available evidence, expert technical advice and extensive stakeholder consultation
- Once developed, each plan will be subject to a sustainability appraisal to ensure that the objectives within it are the most sustainable options
- To support an understanding of the marine environment and to provide an insight into the diversity of habitats offshore, local bodies will seek to work with the Sussex Biological Records Centre to develop up-to-date information and records, in an

appropriate format, of the coastal and marine habitats and species so as to inform marine planning decisions and support the sustainable development of the Biosphere

- Economic Development

The present major proposed developments are set out below.

- 'i360' West Pier Observation Tower and Heritage Centre: (www.westpier.co.uk/the-future/i360/)

At 175 metres, and with an observation pod rising to 141 metres, the i360 will be Britain's highest observation tower outside London – taller even than the London Eye. The i360 development is a private sector led £35m visitor attraction developed by the same team that delivered the London Eye. The i360 will create jobs, boost the conference and visitor economy of the city and the wider region, and attract upwards of 800,000 visits per year. It provides the final catalyst to complete BHCC's seafront development strategy and therefore contribute to the wider economic resilience and development of the city. It is iconic in scale and design and will raise the profile of the city and the region on the national and international business, convention and tourism stage. The i360 will be designed to use as little energy as possible over its life and will provide an iconic platform from which to view the Biosphere. It is planned to start operation in the summer of 2015.

- Rampion offshore wind farm: (www.eonenergy.com/About-eon/our-company/generation/planning-for-the-future/wind/offshore/Rampion)

The Government is committed to a rapid increase in offshore wind deployment in order to maintain a secure energy supply, tackle climate change, meet its renewable energy targets for 2020 and beyond, and deliver green jobs for the UK. To this end, offshore wind farms are now being developed on a large scale as part of a programme called 'Round 3'.

The Crown Estate, which grants leases for the use of the UK seabed for offshore renewable energy construction, following a competitive process, awarded the right to develop an application for the consents to build a Windfarm to E.ON. The 'round 3' area, known as Rampion, is some 13km south of the Biosphere land area. E.ON estimates that the area's wind resource "over the long-term, could generate more than 2,100 gigawatt hours (GWh) of electricity each year. In a typical year... the project could generate enough electricity for the domestic needs of the equivalent of around 450,000 homes. That's more than two thirds of the homes in the whole of Sussex, including the city of Brighton and Hove".

E.ON has carried out an Environmental Impact Assessment (EIA) for the Rampion Offshore Wind Farm, as required under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 and in line with the relevant National Policy Statements. They have consulted widely in 2012-13 on the development proposal and the Environmental Statement, prior to submitting a Development Consent Order application for the 700 MW project of up to 175 wind turbines over 139 km² maximum area to the Infrastructure Planning Commission in March 2013. An examination process commenced in summer 2013, with a final decision by the Government expected in summer 2014. If approved, construction would take place from 2015 for operation to start in 2018/19. E.ON estimates that the scheme would create 65-85 full-time permanent jobs in addition to the benefits of generating renewable energy. If given consent, it will be important for the Biosphere Project to work with E.ON, particularly with regard to support for local projects and public awareness of the environment.

- Shoreham Harbour: (www.shorehamharbour.com/ and www.shoreham-port.co.uk)

The Shoreham Harbour Regeneration Project is conceived as a long-term high-quality sustainable development initiative with a proposed mix of residential, employment, community, education, leisure and ancillary retail development. It will link closely with the existing communities of Shoreham-by-Sea, Southwick, Fishergate and Portslade. This development seeks to support the overall regeneration objectives of increasing housing and employment opportunities and skills in the area, whilst also raising environmental quality that mitigates and adapts to climate change and enhances the natural environment. The changes will enable sustainable living that will set an example to other areas nationally and internationally.

- Newhaven Port: (www.newhavenportauthority.co.uk)

Newhaven Port and Properties, which manages Newhaven Port, and its partners have developed a Port Master Plan (PMP) for the port of Newhaven to form a strategic framework from which the port will develop over the next 20-30 years. Its starting point was recognition that Newhaven needs a higher level of economic activity, leading to long-term job creation, in order for both the town and the port to have a sustainable future.

E.ON has chosen Newhaven Port as the operations and maintenance base for the proposed Rampion Offshore Wind Farm if the development is granted approval. As part of this the Newhaven Port Access Road to expanded hard-surfaced and built-up areas is proposed to be developed at the eastern end of the site at Tide Mills SNCI.

- Tourism

BHCC's 'A refreshed strategy for the visitor economy 2008/2018' includes some coastal focus as follows:

- Consider the development of attractions and activities that embrace the role of the sea.
- Widen the understanding and knowledge amongst visitors of the marine ecology of the city, nature reserves and wildlife habitats through improved interpretation and leaflets while ensuring visitor numbers to these areas do not result in irreversible damage
- 'Tourism Places in Brighton & Hove' – The Seafront
- Continue to develop the identity of the seafront as the city's "shop window" and one of the most visited parts of the city particularly in summer. The space along the seafront, the sea, the beach and the buildings behind the main road all offer opportunities for further improvement, new developments and attractions

BHCC produced a revised draft Seafront Strategy (November 2012) covering all 13km of seafront for public consultation, to update its approach to this "meeting place...between town and sea" of the Seafront Development Initiative (1992). It focuses on economic development through seven themes – from active recreation and tourism, to regeneration, access, connectivity and coastal protection. [http://present.brighton-hove.gov.uk/Published/C00000705/M00004040/AI00030988/\\$SeafrontStrategyNovFinalDraftVersion.pdfA.ps.pdf](http://present.brighton-hove.gov.uk/Published/C00000705/M00004040/AI00030988/$SeafrontStrategyNovFinalDraftVersion.pdfA.ps.pdf)

- Ecotourism focus (BHCC):

"There is the opportunity for the Seafront to play an important role in the development of eco-tourism as another example of the need for the tourism offer of the city to keep re-inventing to remain competitive. While eco-tourism is very much a newly emerging form of tourism, there is a great deal of potential across the city of eco-tourism visitor attractions, from the newly established South Downs National Park in the north to the possibility of wind farms being located in the sea."

The proposed Rampion offshore wind farm could thus become a new tourist attraction, with scope for boat trips to operate from Shoreham Harbour for example.

C. Health and Wellbeing (Water Recreation)

A stroll along Brighton promenade or the Undercliff walk on a summer's day soon demonstrates the value of recreation at the beach to tourists and locals alike. The many visitors to the beaches of Brighton & Hove, some 8 million each year, come to enjoy sunbathing, swimming, amusement park entertainments, and sampling the many seafront cafés, bars, restaurants and nightclubs. A proportion also participate in more active water sports, such as kite surfing, surfing, canoeing, sea angling and diving. The importance of the region to coastal water sports is demonstrated by the popularity of the annual 'Paddle round the Pier' festival, which is the largest free beach festival in Europe. Many thousands of leisure craft are moored in Shoreham, Newhaven and Brighton.

Current Policy & Practice –

Recreational fishing takes place from all of the area's ports, with Brighton Marina being home to 20 or so charter angling vessels, and Shoreham and Newhaven also being important centres. The diversity of fish and the location of these ports relative to large towns and cities makes the area very important to charter and private angling. As well as supporting an important economic activity, sea angling from both sea and shore throughout the proposed Biosphere area provides significant recreation opportunities to a large number of locals and visitors alike. The 'Sea Angling 2012' government-sponsored survey showed this recreational pursuit to be important in the Biosphere area. Such information can help to improve the scientific understanding of fish stocks off our coast, as well as ensuring that the needs of sea angling can be represented as effectively as possible in future marine policy development.

There are many dive clubs which are either based in or visit the Biosphere area. Attracted by the shallow waters, numerous wrecks and sites of biological and geomorphological interest, divers have provided a fascinating insight into the underwater environment, and the active Seasearch scheme (www.seasearch.co.uk/) has proved an excellent resource for collecting records of the sealife and habitats to inform conservation and management. The Sussex Seasearch project, part of the national Seasearch programme, provides a unique opportunity for the community to provide evidence on marine habitats and species.

Future Focus –

- Engage with recreational sea anglers as possible, in addition to commercial fishermen, to further local marine conservation and awareness
- The Sussex Seasearch project plans a series of dives in the Biosphere and will support the training and development of local divers

D. Culture and Community (Cultural Heritage & Maritime Archaeology)

- Cultural Heritage

The importance of the Biospheres' rich fishing heritage takes centre stage at Brighton Fishing Quarter, an area at the heart of Brighton's seafront, in addition to commercial activity at the West Quay in Newhaven and at Shoreham Port. Although the many boats that once put to sea off the pebbles on Brighton seafront have moved to the more sheltered harbour of Brighton Marina, the Fishing Quarter provides a reminder of the importance of the industry to the history of the area. The Quarter is occupied by Brighton fishermen, local artists, photographers and independent traders, and has a rich heritage and character unlike anywhere else.



Current Policy & Practice –

A number of local festivals take place annually around the themes of the sea and fishing. These include the Newhaven Fish Festival, the Brighton Fish Festival, “Blessing of the Nets” ceremony (an ancient tradition) in Brighton and contemporary “Paddle round the Pier” festival in Hove.

Future Focus –

- Promote conservation, awareness and greater public engagement in the local coastal and marine environment through such established events

- Maritime Archaeology

Shoreham Harbour is historically an important fishing and commercial port, providing great potential for wreck sites along this frontage. This is reflected in the number of wreck sites recorded on the Maritime Sites and Monuments Record (MSMR) held by the County Councils. There is, however, only one wreck site designated under the Protection of Wrecks Act 1973. It is called the ‘Black Cat’ and is located at the entrance to Brighton Marina. The wreck is a French sail craft from the medieval/post-medieval period, dated approximately 1400-1500 AD, and is believed to be one of the oldest known shipwrecks for England. A number of guns have been raised from the site since its discovery in 1974.

Current Policy & Practice –

FIPAD (<http://fipad.org/>) is a voluntary reporting Protocol for reporting finds of archaeological interest that will help us better understand the UK's rich maritime history. This Protocol is currently being trialled in the Sussex Inshore Fisheries Conservation Area.

Future Focus –

- The protection of these sites is required as they can be damaged due to smothering and abrasion (due to disposal and coastal processes) and removal (due to extraction, fishing operations and development)

5.4 Key Policies

The key policies on the 'Coastal and Marine Environment' of the Biosphere include:

- Marine and Coastal Access Act (2009)
- EC Marine Strategy Framework Directive (MSFD)
- EC Water Framework Directive (WFD) – to protect and enhance water bodies including all estuarine and coastal waters out to one nautical mile offshore (EA lead body)
- EC (revised) Bathing Water Directive – water quality compliance monitoring
- MMO 'South Inshore' Marine Plan (being developed 2013-15)
- Marine Conservation Zone designation and management process – involving DEFRA, the MMO, IFCA, NE and other local authorities and bodies
- Sussex IFCA strategy and management/annual plans
- Local Biodiversity Action Plans – Brighton & Hove (2013) & Sussex
- BHCC 'A refreshed strategy for the visitor economy 2008/2018' and new Ecotourism focus
- BHCC Seafront Strategy "refresh" (2012 draft), update of the original 'Seafront Development Initiative' (1992)
- Newhaven Port Master Plan (2012)
- Shoreham Port Master Plan (2010)
- Shoreham Harbour regeneration area – Joint Area Action Plan consultation draft planned for 2014 (by BHCC, ADC and WSCC), in addition to development briefs for specific areas

5.5 Existing Information

- E.ON Environmental Statement for proposed Rampion offshore wind farm development
- Sussex Inshore Fisheries & Conservation Authority – annual plan and reports
- Sussex Inshore Fisheries & Conservation Authority – research plan 2012-15
www.sussex-ifca.gov.uk/repository/Sussex_IFCA_Strategic_Research_Plan.pdf
- MMO South 'Inshore' & 'Offshore' Plan documents – including futures analysis, information on tourism, and a (draft) seascape assessment for the Marine Character Area (no. 7) 'Selsey Bill to Seaford Head'
- MMO Fisheries reports (national, with local information within)
- JNCC BAP priority habitats and species descriptions
- Sussex Seasearch data and reports

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Chapter 6 KNOWLEDGE, LEARNING & AWARENESS



CHAPTER 6 – Knowledge, Learning & Awareness

“For a Common Understanding”

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SUMMARY

The Biosphere is about people and the environment – it is about understanding, enjoying and reaping the benefits the environment provides in a sustainable way. Getting people engaged in the environment, whether that be through volunteering, learning, or simply increasing awareness of the recreational opportunities is key. Increasing our understanding through research, monitoring and professional training will help improve and conserve the Biosphere for future generations. The Biosphere Project aims to support individuals to take a progressive learning journey from awareness and knowledge to active engagement in the environment by:

1. Encouraging broad public understanding, enjoyment, support & engagement
2. Promoting environmental education and interpretation to encourage positive behavioural change
3. Supporting environmental research and monitoring which leads to greater understanding and local application
4. Facilitating professional training for a strong skills base to conserve, manage and enhance our environment

Academic research in the Biosphere is led principally by the two Universities of Brighton (UoB) and Sussex (UoS), which were rated in 2012 as two of the top three greenest universities in the UK. It covers a very broad range of subjects which span the local physical, living and socio-economic environments. A range of applied research is being carried out which informs local environmental management practice, such as characterising local pollination and foraging by bees. A 'Biosphere (Higher) Education Board' will be established to co-ordinate, educate and facilitate future delivery, and a Research Plan developed to address specific research questions. Monitoring of the local ecology and environment is carried out by both statutory and voluntary bodies to assess the condition of designated nature conservation sites and inform their effective management. There is a need for partnership working to encourage applied local research studies, and to implement more comprehensive standardised monitoring approaches.

Environmental education takes place formally across around 100 schools, 5 or so colleges (Further Education) and 2 Universities (Higher Education). The Brighton & Hove environmental education project (BHee) aims to reach the majority of the pupils in the 70 state primary and secondary schools here. Many local schools are working on 'Eco-School' status, improving their school grounds for nature and learning, and/or are engaged in outdoor learning through visits to environmental centres and programmes such as 'Forest Schools'. A key objective is to encourage more schools to take part in such initiatives, as well as to build their capacity to deliver environmental education themselves. There is great potential to use the coastal environment also as a learning centre through the 'Wild Beach' programme. Local colleges and universities provide various higher level courses focussed on the environment, in particular Plumpton College which focuses on land-based rural management learning and training.

Professional training for people working in and looking after our environment includes vocational land-based training, as well as teacher training in universities and schools, and specialist CPD courses. Support and training for volunteers is key, given their significant contribution to the environment in local communities. Business development is also important. The local area is fortunate to have dedicated environmental education centres, including at Woods Mill and the Lewes Linklater Pavilion environmental change study centre. The Dorothy Stringer Environmental Centre proposes to build a flagship 'Big Nature Centre' to expand environmental learning and teaching capacity in Brighton & Hove for children and adults alike.

Greater awareness of the local environment by the general public, and their relationship to it, is fundamental to generating a passion for and engagement with the Biosphere area on their doorstep, and so encourage voluntary involvement in its conservation and sustainable use. There are a variety of groups, activities and events for people to become involved, from local 'Friends of' site conservation bodies, natural history societies and local charities, activities such as archaeological digs, food growing, health walks, green gyms, and a year-round calendar of stimulating events, and interpretation and information resources. The challenge is to re-connect people to their surrounds and turn growing interest into tangible positive action.

6.1 Introduction to Knowledge, Learning & Awareness

Knowledge, learning and awareness of the local environment is a fundamental focus for the Biosphere Project, given the significant number and variety of local learning and research institutions present, and the high level of public interest and involvement evident. Our Biosphere's unique nature stands out in various ways: for example, having two of the three greenest universities in the UK (in 2012), leading the way in adopting the national 'Eco-Schools' programme and especially by integrating biodiversity into this.

The Biosphere's learning 'infrastructure' ranges from Primary up to Higher Education institutions, as well as dedicated environmental education centres such as the Linklater Pavilion in Lewes. The area contains:

- Around 100 state schools (primary and secondary levels)
- several independent (private) schools
- 5+ further education and foundation colleges
- a specialist land-based college of Plumpton
- the 2 Universities of Brighton and Sussex

The main audiences for environmental learning and awareness-raising can be divided between:

- formal and informal learners - broadly equating to education of children/young people and information dissemination to adults
- permanent residents and temporary visitors to the area

Further specific audiences can be identified from these broad divisions, for example according to their thematic and geographical focus, or their social and age-based demographic.

Despite the well-developed learning infrastructure and relatively well-educated local population overall, there are both general and localised educational issues in our area. These include the significant pressure on school places and infrastructure from increasing numbers of children entering the education system in the last decade. There are significant pockets of local deprivation in urban areas associated with low educational achievement, with GCSE attainment in Brighton & Hove's schools being well below the national average (though improving), for example. Such social inequalities can also extend to environmental awareness and engagement, despite council housing estates in urban fringe areas often having valuable sites for natural learning located right on their doorstep.

The challenge is to stimulate interest in the local environment by effectively demonstrating and communicating its relevance to the lives of people in the community. The general societal phenomenon of increasing disengagement from the physical natural environment, perhaps related to greater digital and indoor 'distractions', combined with ever-increasing restrictions on children's freedom to play independently outdoors because of safety fears, has resulted in widespread detachment and ignorance of nature. Some have described this as a "nature deficit disorder", in which it becomes even more important to actively encourage re-connection with the "real world" of the local environment, and especially engender nature contact for young children through the environment of their school grounds. While many schools in our area are part of the national 'Eco Schools' programme, this is often driven by a single individual, rather than being a genuine whole school approach, making it vulnerable to being discontinued with subsequent staff changes.

A key challenge for the Biosphere Partnership will be to develop adequate baseline information to enable future monitoring of changes, and seek to attribute this to our planned positive measures. This applies both to physical enhancements of the environment as well as changes in the attitudes, knowledge and behaviours of target audiences.

6.2 Research & Monitoring – academic (higher education)

A. Introduction

Our two universities are the lead bodies for academic research on the local environment, playing a significant role in local understanding, environmental management and sustainable development. Research is carried out at varied levels, from undergraduate and postgraduate to postdoctoral, and can include grant-funded and commercial consultancy projects. Together, the two universities have more than 33,000 students (79% of whom are undergraduates). Both universities continue to grow.

UoB has over 21,000 students and 2,600 staff in across five campuses, three of which are in Brighton (the others are in Eastbourne and Hastings). UoB has been in existence for over 150 years and has one of the best teaching quality ratings in the UK as well as a strong research record. It counts itself among the UK's greenest universities, being ranked third in the 'People and Planet Green League' in 2012. One of its core focuses is on "becoming a centre of excellence in building sustainability into research and teaching and learning, and collaboratively building sustainable learning communities".

UoB has a range of policies and strategies covering its environmental impacts as well as engagement with the wider community. Implementation of green measures is directed by a high-level Sustainable Development Management Group, which works with a grassroots Environmental Action Network of staff and students. Varied green projects are taking place with a major focus on an ambitious carbon reduction target of a 50% cut by 2016. The Carbon Management Team has earned the Carbon Trust Standard's award for its focus on reducing energy consumption, generating renewable energy, integrating infrastructure (especially greener IT through a new advanced data centre), and encouraging positive behavioural change. The university has also adopted the EcoCampus Environmental Management System, which is led by the Estate and Facilities Management department. It is making efforts to reduce its food, residential, energy and transport impacts, and has a Biodiversity Action Plan to inform grounds management for nature conservation.

UoS has some 12,500 students (including 3,325 postgraduate students) and over 2,000 staff. Nearly one-third of staff and 40% of postgraduate students come from overseas, drawn from more than 120 countries. The University is based entirely on its Falmer Campus, which was purpose-built on downland in 1961. UoS is a research-intensive university and a member of the '1994 Group'. In 2012-13 it was rated the 13th best university in the UK, 34th in Europe and 110th in the world, and its research activity places it among the top 30 UK universities. The University was awarded first place in the 'People and Planet Green League' in 2012.

UoS has an Environmental Policy and joined the EcoCampus Environmental Management Scheme in 2008, for which it was awarded 'Gold' status in 2011. It has adopted the Higher Education sector's target to reduce carbon emissions by 34% for 2005-2020 through its carbon management plan. A suite of projects has reduced carbon emissions by 399 tonnes since 2009, with funding from the HEFCE's Salix Revolving Green Fund. Further funding of £0.5m is now being used to replace as much campus lighting as possible with low-energy LED technology. Other initiatives include the redesign of its Shawcross Data Centre to incorporate world-class energy efficiency, and a new student residence building awarded BREEAM 'Excellent' standard and a Green Apple Award for environmentally sustainable construction. Its Habitat Advisory Group has supported the creation and sensitive management of wildflower meadows, flower beds, woodlands, ponds and new walks across the campus. From 2013 its catering on campus includes using local and Fairtrade produce.

The South Downs Learning Partnership, a SDNPA-led initiative, has developed a research strategy focused on six themes (part of the "emerging priorities" of the draft SDNP partnership management plan) to promote an applied focus to information needs in the area, and is investing in its delivery from 2013.

Other organisations generating environmental information include those involved in monitoring the local environment, and range from statutory bodies such as Natural England and the

Environment Agency, through local authorities to voluntary bodies such as local natural history societies.

Future Focus (General) proposed –

- All HE Institution Biosphere Partners (UoB, UoS, PC) propose to work together (and with the wider partnership) through a 'Biosphere (Higher) Education Board' to co-ordinate, educate and facilitate the delivery of this crucial element
- Elements under consideration include co-ordination of related research, international links (including a possible conference), environmental educational provision, student volunteering, campus active learning, and linking with local businesses
- A Research Plan will be developed to address specific research questions (to be identified) and so allow us to better understand and monitor the Biosphere area
- The research plan will set out the baseline situation and determine the research required to complement the monitoring activities under our three principal objectives, to enable us to evaluate our positive impacts over time, potentially making use of national or local ecosystem services frameworks for example
- The principal mechanism to address applied issues will be through university student projects, both postgraduate and undergraduate
- Links will be made to wider spatial areas as possible, including the World Network of Biosphere Reserves
- SDNP to develop a research programme leading to a robust evidence base about the National Park and the issues affecting it (Partnership Management Plan draft 2013)

B. Physical Environment

Research on the “abiotic” physical environment spans diverse academic disciplines including geology, hydrology and climate science.

The University of Brighton's School of Environment and Technology (SET) seeks to generate new knowledge of earth systems and of human actions that affect the environment. This is grouped around three key themes - greener technologies, earth system science and environmental management.

Current Policy & Practice –

UoB is carrying out various Applied Geosciences projects in the Biosphere, including:

- Climate change impacts on rainwater recharge ('CLIMAWAT')
- Improved management of river and coastal waters ('AQUAMANCHE')
- Evaluation of groundwater flooding ('FLOOD')
- Response of coastal environments to future sea-level and climate change
- Monitoring and management of air quality
- Physical modelling of sediment movement and waves in coastal environments (by the Ground, Water and Structural Engineering school)

UoS carries out research that includes pollution of aquatic environments.

BHCC sponsors coastal protection research and surveys on the chalk cliffs and their evolution with particular regard to public safety.

Future Focus –

University of Brighton:

- An applied research project to address marine erosion around Shoreham Port

University of Sussex:

- Investigating catchment influences on water quality, to identify pollution sources that can impact aquatic wildlife

C. Living Environment

Research under Life Sciences disciplines on the local “biotic” environment is especially focused on the science of ecology and its practical application.

The University of Brighton's Ecology, Landscape and Pollution Management research stream focuses on chalk grassland, wetland and urban ecology, conservation biology, and using GIS in landscape management.

UoS carries out a range of research within the School of Life Sciences (the largest at UoS) on a broad range of topics, including world-leading research on honey bees and social insects, and the impacts of pesticides on pollinators, through to global analyses informing conservation decisions at international level.

Both universities actively collaborate with the National Trust through postgraduate research on their local downland sites.

Current Policy & Practice –

The University of Brighton runs various local environmental research projects, including:

- Urban biodiversity of Brighton & Hove – including human-wild mammal interactions
- Pollination ecology and conservation
- Chalk grassland communities (diverse studies)

Research by UoS on the local natural environment includes:

- Honey bee research by the renowned Laboratory of Apiculture & Social Insects (LASI) (www.sussex.ac.uk/lasi/), headed by Professor Francis Ratnieks, which is helping Honey bee populations and beekeepers, including mapping local foraging movements, and assessing and informing urban planting for pollinators
- Insect population and community ecology (Dr Alan Stewart), using fundamental ecological principles to assist the conservation of rare and endangered species including informing local chalk grassland restoration and management
- Evolutionary biology including the behaviour of local Sweat bee populations (Prof. Jeremy Field)

Local research by Plumpton College is primarily focused on sustainable land use (including wine science):

- Ground-nesting birds and micro-habitat exploitation
- Biodiversity impacts of flax/linseed cultivation
- Land use and chalk stream water quality
- Habitat fragmentation and population genetics of the hazel dormouse

Future Focus –

University of Brighton:

- Targeted research on the ecological diversity of urban, rural and marine environments

University of Sussex:

- Continued applied research on local honey bee populations, their management and conservation, as well as on wild sweat bees and bumblebees
- Developing aerial drones and land use image analysis techniques to understand how to optimise local pollinator diversity and abundance
- Restoration/re-creation of species-rich South Downs chalk grasslands communities
- Species studies on rare/declining insects such as glow worms

Other:

- Collaboration of BHCC and RBG Kew (Wakehurst Place) on wildflower propagation and research at Stanmer Nursery (NIA project)

D. Socio-economic Environment

Social Sciences research includes a focus on the disciplines of human geography, economics and the arts. Research projects also address diverse environmental sustainability issues such as transportation, energy, pollution and greener behaviours.

UoB's 'Society, Space and Environment' theme is developing multi-disciplinary knowledge on social access, disadvantage and exclusion (<http://www.brighton.ac.uk/set/research/themes/socenv/access.php?PageId=130>), and emphasises shared knowledge and transformative learning. Specific research centres focus on the aquatic environment, coastal regeneration, water strategy, outdoors health and aesthetics, for example. The 'Sustainable Construction and Environmental Planning' research theme of the built environment includes research centres such as the Centre for Sustainability of the Built Environment and a Waste and Energy Research Group. The Health faculty is aiming for UoB to become a Health Promoting University, while the Faculty of Arts has a multi-disciplinary Sustainability Network.

Since 2003, the University of Brighton has been working on many community engagement projects across a wide range of disciplines, in collaboration with the local community, BHCC and commercial organisations through its far-reaching Community University Partnership Programme (CUPP). This has involved over a 100 academics, 1,000 students and 500 local community partners.

UoS has a long-standing tradition of excellence in the social sciences. There is a long tradition of rural history at UoS based in the History and Geography departments. The School of Global Studies has a diverse and evolving research agenda, including ecological transformations such as climate and environmental change, evolving earth systems and global health challenges. UoS's Politics Department is active in researching European climate and energy policy. The Science Policy Research Unit (SPRU) includes an Energy and Environment group and Sussex Energy Group focused on the transition to sustainable, low carbon energy systems as well as energy security. The Centre for Gender Studies, within the Department of Sociology, offers a range of expertise including broad themes of gender and citizenship such as media and new technology. The Centre for World Environmental History is an important research centre which works in partnership with Kew Gardens and the British Library on Historical Climate Change, as well as closely with UoS's renowned Institute of Development Studies.

Current Policy & Practice –

University of Brighton socio-economic research projects include a focus on:

- Cultural ecosystem services – ground-breaking research led by UoB since 2009 as part of the National Ecosystem Assessment (NEA) which provided the evidence base for the UK Government white paper 'The Natural Choice'

- Access to urban food, communal food growing and community resilience – funded projects under the ‘Connected Communities’ programme from the Economic and Social Research Council (ESRC) and Arts and Humanities Research Council (AHRC)
- Recreation environments
- Urban space
- Landscape and disability
- Disadvantaged groups
- Building and energy modelling, and life-cycle assessment
- Sustainable refurbishment
- Tourism research on perceptions of the new South Downs National Park
- Ecotherapy and Ecopsychology local research
- Multi-functional urban space networks (‘Continuous Productive Urban Landscapes’)
- Sustainable architecture/design - “The House That Kevin Built” reused waste
- Environmental arts e.g. creation of natural sculptures by a local women's art group on local sites

The University of Brighton’s Community University Partnership Programme (CUPP) has run local environmental projects including:

- Neighbourhood engagement in climate change
- Sustainable living in social housing
- Local food and gardening diverse initiatives, including horticultural therapy

Current socio-economic “environmental” research projects by the University of Sussex include:

- Work with the South Downs ‘Learning Through Landscapes’ audit of social and educational value
- Knowledge Transfer Partnership with Newhaven Community Development Association
- Infrastructure systems and carbon management
- Renewable energy - solar power & waste heat recovery
- SPRU major projects including ‘Innovation and Energy Demand’ on low-energy innovations, and ‘Accelerating and Rescaling Transition to Sustainability’ on innovation through sustainability initiatives in European city-regions
- Digital Economy Community and Culture network
- Environmental psychology ongoing investigations using social psychology methods to affect individuals’ engagement in pro-environmental behaviours, including a DPhil study on food waste as well as other research on encouraging healthier lifestyles behaviours
- Sensory food satisfaction in promoting healthy and sustainable eating behaviour (‘SensWell’)
- Post-university employment experiences
- Lone parents’ engagements with education and training

Plumpton College carries out socio-economic research on agriculture (including viticulture) and on the outdoors, health and well-being. Its research includes:

- Flax production across Europe
- Practical viticulture/viniculture trials with local wine producers

- Climate change and vine cultivation and its sustainability impacts
- Community-supported agriculture
- Health and well-being effects of equestrianism
- Relationship between society and the natural world
- An eco-health audit for the South Downs National Park Authority
- Water recreation

The Sussex Inshore Fisheries Conservation Authority (IFCA) Strategic Research Plan (2012-15) (www.sussex-ifca.gov.uk/repository/Sussex_IFCA_Strategic_Research_Plan.pdf) comprises three research themes to inform local marine management and compliance programmes:

- Sustainable exploitation of fish stocks – stock assessments and fish biology research
- Ecosystem interactions – habitats, species, Marine Protected Areas, fishing and bycatch
- Socio-economics – including fish landing values, recreation, and marine archaeology

Future Focus –

University of Brighton:

- Further expansion of environmental research associated with clean energy, waste management, bio-contamination treatment and monitoring; including projects on developing a novel approach to capturing tidal energy
- Lead a Sussex-wide 'Green Growth Platform' with national HEFCE funding in 2014-2019, to stimulate growth of environmental sectors companies and provide them with support to improve their performance in terms of knowledge / innovation and skills / training. There will also be a focus on community and business engagement to stimulate demand / uptake of environmental goods and services
- Social science research into tourism, outdoors health, land access and human relationships with the natural world; including ESRC/AHRC-funded projects under the 'Connected Communities' programme
- CUPP support to Biosphere research and training projects by, for example, providing specialists workshops, student volunteers and wider academic engagement with partners

University of Sussex:

- Future socioeconomic research includes a new major funded project on wind farms and a grant proposal on reducing individuals' use of air travel for leisure purposes
- UoS itself has plans to both expand and green its Falmer campus through a potential major re-development to place car parks underground, and introduce new green roofs and buildings which use environmental technologies

Sussex Inshore Fisheries & Conservation Authority (IFCA) research:

- Develop a stock assessment, harvest strategy and harvest control rule information for each fish stock (as a long-term outcome)
- Understand (and where possible mitigate or reduce) any undesirable effects on the wider physical or biological environment that are caused by people's interactions with the marine ecosystem
- The Sussex Inshore Fisheries and Conservation Authority (with partners SWT, SDNPA, EA and the Channel Coast Observatory) is working to create a near-shore habitat map (out to one nautical mile) of the Biosphere under the SchIP project

E. Monitoring (Environmental)

Applied monitoring of the local environment includes a strong ecological focus. Monitoring of other elements of the environment, such as freshwater quality, also takes place.

Current Policy & Practice –

- Natural England carries out ecological condition monitoring of nationally important designated nature conservation sites (Sites of Special Scientific Interest) under the 'Common Monitoring Standards' system
- BHCC has developed a monitoring & reporting system to DEFRA for its identified Local Wildlife Sites (formerly known as Sites of Nature Conservation Importance) to meet the 'SD160' national indicator requirements; East Sussex and West Sussex County Councils are responsible for the other SNCIs in the Biosphere area beyond this
- Detailed habitat condition assessments of chalk grassland sites are being carried out in Nature Improvement Area focal areas by Sussex Biodiversity Records Centre (SBRC)
- SBRC receives and catalogues multiple species records (in the 'Recorder' database) for Sussex and hosts a database of environmental surveys carried out; BHCC's 'CityWildlife' website also hosts records from 300 contributors
- Marine and intertidal records are instead collated using the 'Marine Recorder' database. Sussex Seasearch (managed by Sussex Wildlife Trust, formerly by East Sussex County Council) uses volunteer divers to map the nearshore seabed, whilst Sussex Shoresearch (also run by SWT) uses volunteers on land to map the intertidal area
- UoB is running a scheme for Earthwatch volunteers over several years to study the urban mammal fauna across Brighton
- RSPB runs the 'Volunteer & Farmer Alliance' programme to monitor farmland bird assemblages on selected participating farms
- The Sussex Ornithological Society (SOS) co-ordinates British Trust for Ornithology surveys including the recent Bird Atlas, whose volunteers surveyed all tetrads for breeding and wintering birds
- Plumpton College monitors habitat exploitation and breeding territories of ground nesting farmland birds year-round, as well as population recording of all birds on its estate, and water quality in the chalk streams
- Butterfly Conservation's Sussex branch carries out butterfly transects recording for the national monitoring scheme, and initiated the public 'Big Butterfly Count' programme
- The Environment Agency regularly monitors the chemical and biological quality of freshwater rivers across a network of sampling sites

Future Focus –

General:

- Progress with biodiversity action will be built into reporting systems (under the B&H LBAP)
- More standardised ecological monitoring is needed (dedicated surveys & uniform recording coverage)
- Baseline information on the present state of the environment, according to the three Biosphere objective areas, needs to be compiled, to identify elements for future monitoring and research, especially through university student projects
- The local Biosphere area should be a principal focus for applied academic studies, as a pilot area or part of wider research for publication; international links should be made through the Biosphere network, including to access European funding and expertise

Fresh Water (Adur & Ouse WFD Partnership - Surface Water Quality/Natural Rivers):

- Establish a mechanism for sharing information, maps and data within the Adur and Ouse Catchment
- Either adopt or set up a comprehensive monitoring programme to measure the progress and success of the work
- Target: Develop a framework for water quality monitoring on the Adur and Ouse, and establish water quality monitoring at the earliest opportunity
- Target: Draw together local resources and learn from current work / case studies on surface water quality monitoring in river catchments

Marine (Adur & Ouse WFD Partnership – Coastal Group):

- Use evidence to better understand the marine environment and its pressures
- Target: By 2013 Describe the MPA networks contribution to the protection of the marine environment in Coastal and Estuarine Waters
- Target: By 2014 Identify and support monitoring work that communities may undertake to support and extend the current monitoring programme
- Target: By 2015 understand the role of the estuaries in supporting commercial fish populations
- Target: By 2020 have enough evidence to agree actions to improve the marine and estuarine ecosystem in the Adur and Ouse water

6.3 Environmental Education

A. Introduction

This section on environmental education covers formal learning approaches. The next section on public awareness and engagement, is concerned with informal means of encouraging learning and participation of wider audiences. Formal educational provision ranges from compulsory school education at primary and secondary levels, through to the optional stages of further education (16-18 years age college level), higher education (post-18 years university level) and adult education.

B. Schools

There are around 100 state schools in the proposed Biosphere area. The majority are in Brighton & Hove, which has 70 primary and secondary schools. A further 14 primary and three secondary schools are located in the Lewes District area of the Biosphere, and 11 primary Schools and two (secondary) academies in the Adur District area. A number of well-known independent (private) schools are also located here, including Brighton College, Roedean School and Lewes Old Grammar School.

Schools may include elements of environmental education through virtually any subject (especially sciences), if employing an integrated cross-curricular approach to teaching. The topics of Citizenship in secondary schools and potentially PSHE (Personal Social Health & Emotional wellbeing) in primary schools are the generic areas through which this education is often delivered. Many schools in the Biosphere have also pursued and been awarded 'Eco School' status, a national scheme to help make all schools sustainable and bring about behaviour change in young people (and through them the wider community).

Current Policy & Practice –

BHCC has developed the Brighton & Hove Environmental Education (BHee) programme as the main delivery framework, which is being managed from 2011- 2014 by the Sussex Wildlife Trust (SWT) and Resource Futures. BHee's goals are to increase the number of accredited Eco-schools (especially in poorer areas); increase involvement in the 'One Planet' sustainability approach of BHCC; increase understanding of local biodiversity; and help partnerships of schools and community groups to use local habitats for learning.

These aims are being achieved with children through pupil workshops, principally within schools as well as local greenspace and beach visits. The BHee project is facilitating contacts between primary and secondary schools for environmental education, as well as sixth form colleges and special schools. There is an annual Eco-schools conference focused local environment. A schools education pack is being developed to create lesson plans based on the environmental photo exhibition of local arts body, FotoDocument (<http://fotodocument.org/fotodocument-fringe/fotodocument-fringe-brighton-hove-schools/>).

Brighton & Hove is believed to be unique in having a School Grounds Biodiversity Action Plan (BAP), reflecting the fact that 15% of the public green space of the city consists of school grounds. The BAP was the subject of intensive implementation in 2006-8 to advise 60 schools and help schools to carry out funded wildlife improvements. The BAP focus led to the creation of the annual Brighton & Hove schools 'Heritage and Environmental Festival' which is held at Moulsecoomb Primary school (www.moulsecoomb.brighton-hove.sch.uk/HE/Contents.html). This is located in one of the most deprived areas of England and was awarded the 'Learning Outside the Classroom' SE Regional Award in 2009 for the creative development and use that it makes of its school grounds. The festival enables several hundred primary age children to take part in activities ranging from archaeology to ecology to the arts. It also trains teachers.

East Sussex County Council (ESCC) is the Local Education Authority (LEA) in the Lewes District part of the Biosphere. Its Environment Strategy (2011) includes an objective to "encourage people to enjoy, understand and take action to safeguard our natural environment for future generations and reconnect young people with nature to stimulate and educate them to

be advocates for the natural environment in the future". ESCC has developed a sustainable schools web-based toolkit under its former 'Carbon Hub' project to support reduced carbon emissions and improved resource efficiency in their schools.

West Sussex County Council (WSCC) is the LEA in the Adur District part of the Biosphere. It supports a locally developed initiative called 'Engauge' to encourage schools to pursue sustainability measures under nine areas. It also runs an educational programme called 'Wastebuster', which Adur District is a partner in, providing a multimedia teaching resource as part of the national curriculum to support waste reduction and recycling in all primary schools.

Outside organisations that run environmental initiatives in local schools include:

- South Downs National Park – 'Our South Downs' programme of outdoor learning, aiming to engage with 0.5 million local children from > 700 schools, working with national charity 'Learning through Landscapes' <http://learning.southdowns.gov.uk/>
- SWT - 'Forest Schools' (www.sussexwildlifetrust.org.uk/education/forest_school/index.htm) and 'Sussex Beach Schools' (www.sussexwildlifetrust.org.uk/blog/2012/06/beach-school/)
- Shoreham Beach - marine education work (by Steve Savage) (www.fosbeach.com/education-on-shoreham-beach/)
- Brighton Peace & Environment Centre - global awareness and sustainability (www.bpec.org/)
- Harvest - local food project (www.harvest-bh.org.uk/)
- Sustrans Bike It - sustainable transport (www.sustrans.org.uk/what-we-do/bike-it/wheres-bike-it/bike-it-in-brighton-and-hove)

SWT's 'Forest Schools' programme of child-centred outdoor activities is focused on "bushcraft" skills for local schoolchildren and runs through the year in the Brighton area, with training courses in leadership for teachers also provided. The organisation, 'Circle of Life Rediscovery', is similarly active in East Sussex.

SWT has worked in Lewes with South Malling primary school by engaging them with their neighbouring Malling Down 'Living Landscape', and developing the school grounds for nature and learning through native habitat creation. The Railway Land Wildlife Trust in Lewes works with the local Priory secondary school to develop and deliver environmental sustainability learning projects which are innovative and 'owned' by the pupils. These involve PGCE trainee teachers from UoS.

The 'Wild Beach' pilot project of SWT, working with IFCA and other local marine bodies, is working with one Brighton school to engender learning and personal development through this environment. SWT is also running the HLF-funded 'Making Waves' project for three years to reconnect local communities with the sea's rich wildlife. This takes place through school workshops, teacher training and community events. Brighton is one of the initial focus areas.

Future Focus –
Planned:

- Build Environmental Education capacity in schools beyond lead individuals e.g. the BHee project aims to enable a larger number of teachers to become aware of the special local nature nearby
- Develop high quality learning experiences, particularly in the outdoors, and resource materials that link to the special qualities of the National Park (Partnership Management Plan draft 2013)
- Expand SWT's 'Wild Beach' pilot project to other schools and develop a teacher training programme to use the marine environment as a learning centre

- ESCC to support schools to use the Sustainable Schools Toolkit (via their Carbon Hub), to increase awareness about the environment among young people (ESCC Environment Strategy)
- Encourage better links between local schools and Local Nature Reserves (e.g. Castle Hill LNR, Newhaven)

Potential:

- Further development/delivery of the B&H School Grounds Habitat Action Plan, including increased training for teachers?
- Implement a “bio-literacy”/”bio-numeracy” survey for schoolchildren, enabling milestones for improvement to be set (from Dorothy Stringer high school)
- Promote a “resilience education” approach, based on systems thinking, civic environmentalism and ecology (from the Lewes Linklater Pavilion)

C. Colleges

There are three ‘Foundation’ Colleges in the area, which act as partner colleges of the University of Brighton and offer foundation degrees: City College (Brighton & Hove), Sussex Downs College (Lewes campus) and Plumpton College.

Plumpton College, a Biosphere Partner, provides a wide range of educational land-based courses and professional training on the environment, rural communities and professions. It operates six sites across Sussex, two of which (the main campus at Plumpton, and Stanmer Park by Brighton) are located within the proposed Biosphere area. It provides a range of mainly Further and Higher Education courses, as well as training, to a total of 4,200 students. As a well-established partner in local rural life, Plumpton shows a strong commitment to environmental conservation and sustainable development beyond education. This includes:

- its modernisation programme of the working dairy farm
- grazing and scrub control of the chalk grassland it manages within the nearby SSSI (including National Trust and BHCC downland)
- co-operation with the Ouse & Adur Rivers Trust (OART) to develop water quality and soil erosion monitoring
- energy efficiency monitoring of buildings
- campus demonstration projects on sustainability – including ground source heating systems, wood fuelled heat generation, rain water harvesting, reed bed water filtration, and earth-walled low environmental impact buildings

Other Further Education (FE) colleges in the area include for example BHASVIC and Varndean colleges in Brighton, a further campus of Sussex Downs College in Newhaven, and Ringmer Community College near Lewes.

Current Policy & Practice –

Plumpton College has a Strategic Plan which includes an environmental focus. Policy is disseminated throughout the College departments via self-assessment reports and management and improvement plans, as well as by practical units such as the Woodland Committee. It has an active student conservation volunteer group “New Leaf”. Plumpton College offers some 300 courses through its 10 departments and is expanding in size and range year on year. Its academic courses which involve the local environment and sustainability include:

- (Higher Education) FDS in: Countryside Management; Forestry & Woodland Management; Arboriculture; and Agriculture

- (Further Education) BTEC Levels 2 & 3 in: Environmental Conservation; Game Management; Forestry; Forestry & Arboriculture; and Agriculture

Future Focus –

- Planned development of a University Technical College, Newhaven CleanTech, as a technical academy (for 600 14-19 year olds) specialising in marine and environmental engineering, to open in September 2015. This is being progressed by a partnership of local organisations, including UoB, engineering to support the regional growth of marine and environmental industries through engagement with business and community partners
- Expansion of Plumpton College's delivery of outdoor education training, including through a new BSc degree programme in Leisure Tourism

D. Universities

The two Universities of Brighton and Sussex run a suite of undergraduate and postgraduate courses that provide environmental education to their students, for example in environmental sciences, water and urban environments. Furthermore sustainability is an overarching theme across all degree programmes, and work experience and volunteering is actively encouraged by UoB through both optional course units and summer volunteer schemes.

Current Policy & Practice –

UoB runs 13 undergraduate degree courses (BSc/BA) with a core environmental focus, such as in Ecology and Environmental Sciences. It also runs 10 postgraduate Masters degree courses (MSc/MA, plus MPhil/PhD) with a similar focus, including 'Sustainability of the Built Environment' and 'Water and Environmental Management'.

UoS offers a number of degrees with a strong environmental focus, including BSc undergraduate degrees in Ecology and Environment (in conjunction with the Global Studies and SPRU departments), as well as in Biology and Geography. An MA option on energy and climate security is also offered. The Law School is developing a focus on the Environment through new research and teaching staff.

An active 'Widening Participation' (WP) initiative is pursued at UoS to engage those young people from local schools who are less likely to go on to Higher Education. For example, the Life Sciences department runs introductory and Biology Experience days for different ages.

Future Focus –

University of Brighton:

- Ongoing provision and development of environmental courses, and further overall enhancement of the undergraduate and postgraduate curriculum to support the wider development of future global citizens as advocates for sustainable communities

University of Sussex (potential):

- Incorporate Biosphere content to UoS 'WP' sessions for local secondary schools
- Better engage students in the local environment and communities through both their course studies and extra-curricular activities

E. (Environmental) Education Centres

Several dedicated environmental education centres operate in the Biosphere area:

- Woods Mill – the longest established environmental education centre in the area, near Henfield at SWT's headquarters
www.sussexwildlifetrust.org.uk/education/page00004.htm

- Linklater Pavilion at Lewes Railway Land LNR – a new and ground-breaking community environmental change study centre www.railwaylandproject.org/Linklater
- Dorothy Stringer Environmental Centre, Brighton – home to the innovative ‘butterfly havens’ www.dorothy-stringer.co.uk/env_centre.html
- Booth Museum of Natural History www.brighton-hove-rpml.org.uk/museums/boothmuseum/pages/home.aspx
- Brighton Peace and Environment Centre (city centre) www.bpec.org/
- Stanmer Organics and the Earthship sustainable building, Brighton www.lowcarbon.co.uk/earthship-brighton/stanmer-organics

Various other institutes (in addition to further education colleges) provide adult education courses which could include a local environmental focus – for example the Friends Centre, Whitehawk Inn, and Bridge Community Education Centre in Brighton. There are also environmental learning programmes through organised groups such as the Scouting movement, Duke of Edinburgh award, and the new SDNP-focused John Muir award.

Current Policy & Practice –

SWT’s environmental education centre at Woods Mill offers a wide range of programmes supporting the national curriculum at Foundation Stage, and Key Stages 1 and 2 through its variety of wildlife habitats. Over 3000 pupils visit annually from all over Sussex, and especially from Brighton & Hove.

The Linklater Pavilion runs education workshops which include national bodies and has links with the South-east Grid for Learning. It also addresses adult social care and social inclusion with its ‘Nature Corridors for All’ initiative having been recognised in the regional Health and Social Care Awards. Opportunities for out-of-classroom training and experimentation are being expanded, working with UoS, including through an observation beehive and freshwater focus.

The Dorothy Stringer Environmental Centre provides environmental education to its secondary school pupils, as well as an increasing number of local primary schools in Brighton & Hove. It has created two educational “butterfly havens” (chalk wildflower habitat creation areas) that include collaboration with conservationists and artists, and also use its other habitats for outdoor ecological learning.

Future Focus –

Planned:

- ‘Big Nature Centre’ proposal - a flagship £5m project being planned for the Surrenden campus (next to and led by Dorothy Stringer secondary school). It aspires to establish a central community resource for teaching and learning in environmental education, and provide a world-class environmental education resource for schoolchildren and teacher training in Brighton & Hove. Further educational butterfly havens are also planned here (with BHCC CityParks) together with associated interpretation
- Lewes Linklater Pavilion environmental change study centre – future development of programmes including knowledge building, water resources, sea level rise, biodiversity, resilience education, citizenship and social inclusion

Potential:

- Stanmer Park possible visitor centre - BHCC/SDNPA are considering as part of developing this gateway to the South Downs
- Rampion offshore wind farm potential visitor centre - EON to consider establishing a new facility with a focus on the local environment

6.4 Public Awareness & Engagement

A. Introduction

A range of different audiences exist to potentially target environmental information and activities.

Distinct geographic audiences of the three Biosphere environments comprise the following key stakeholders:

- Rural - landowners and farmers
- Urban - greenspace users (including sports and recreation)
- Coastal & Marine - sea-users, especially fishermen

Of the adult resident population, there is a high proportion of recent incomers to the area in Brighton & Hove especially, many of whom are relatively well-educated and qualified professionals. This group includes the many university students who choose to settle in the area after completing their studies. Superficially, this contingent of the population may be relatively amenable to environmental messages and engagement, although they often lack the identification and understanding of the nature of the local area that locally-born people may grow up with.

Children (outside of school) and young people (post-school age) are a key audience, given their role as the next generation of local residents custodians of the environment. Young people may be a neglected group however, often considered as hard to engage and a potential social problem rather than source of opportunity and creative asset. Many youth groups and projects exist in the area, some of which – the Scouting movement and vocational volunteering projects for example - may engage with the local environment.

The 33,000-strong university student population, 13% of Brighton & Hove's population, constitutes a significant number of temporary residents. Many foreign students also come to Brighton to learn English in one of the many language schools. Temporary students may be considered 'hard to reach' and/or a lower priority for engagement in the local environment, since many will not naturally be motivated to invest their limited time in the local community/environment.

Volunteers are a key resource for most local community and environmental groups and projects, contributing substantially to local wellbeing. Brighton & Hove had around 1,600 groups and organisations operating within the community and voluntary sector in 2009 who employed 7% of the city's workforce. 24% of its residents regularly volunteer, through 19,200 volunteer positions that give 57,600 volunteer hours each week. Volunteering is estimated to contribute as much as £98 million to the local economy each year. The Brighton & Hove Volunteer Centre facilitates opportunities and work according to the city's 'Joining the Dots' volunteering strategy (2010-2015) to support them. The Community & Voluntary Sector Forum (CVSF) (www.cvsectorforum.org.uk/) in Brighton & Hove also facilitates advocacy and networking between local community organisations, and has more than 500 members.

Finally, around 12 million tourists, both national and international, visit the Biosphere area each year. They represent a massive potential, though transient, audience for environmental engagement. A key focus is to increase the proportion of visitors who get involved in outdoor activities that deepen their understanding of the environment, and quality of their experience, to add value to both their stay and the growing 'eco-tourism' sector.

Future Focus (General) –
Planned:

- Turn knowledge into action – provide clear links and encouragement for people to get involved

- Share knowledge of ecosystem services (or "nature gain") with the public, community groups and businesses (including Utilities bodies)
- Increase the number/proportion of visitors engaging in "eco-tourism" activities (especially a focus for BHCC and SDNPA)
- Engender widespread understanding of the special qualities of the National Park and the benefits it provides (SDNP partnership management plan "outcome", draft 2013)
- More direct action and responsibility is taken by visitors and residents to conserve and enhance the special qualities and use resources more wisely (SDNP partnership management plan "outcome")
- Maintain visitor enjoyment and influence visitor behaviour in order to reduce impacts on the special qualities and increase visitor spend in and around the National Park (SDNP PMP draft policy)
- Raise awareness and understanding about the National Park with consistent messages that inspire and celebrate a strong sense of place (SDNP PMP draft policy)
- Encourage and support creative and cultural activities which connect with and increase appreciation of the National Park's special qualities (SDNP PMP draft policy)
- Support and enable communities to develop and deliver high quality community-led initiatives that contribute to the understanding, conservation and enhancement of the special qualities of the National Park (SDNP PMP draft policy)
- Develop a consistent and co-ordinated approach to the promotion and marketing of the South Downs National Park as a sustainable visitor destination (SDNP PMP draft policy)

Potential:

- Record personal stories of people's links with nature and its benefits
- Disseminate local environment information through sustainable transport infrastructure (e.g. train companies/stations, buses/stops, cycling & walking, and taxis/car clubs, boats)
- Work with local environmental NGOs to reach out and involve their memberships in the Biosphere Project's overall approach to the local environment

B. Nature conservation

A wide range and diversity of wildlife groups, activities and resources exist in the Biosphere, examples of which are given below (by type of environment) to illustrate their breadth.

Current Practice –

i. Urban Greenspace

- Brighton & Hove 'Friends of' parks & urban fringe sites (about 60 groups)
- Brighton & Hove Wildlife Forum – representing local greenspace groups concerned with nature conservation and addressing citywide issues
- BHCC CityParks rangers – site conservation practical work and role in public events (c. 275/year)
- BHCC CityParks conservation volunteers & community sheep “lookers” (17 sites)
- Brighton Conservation Volunteers – regular practical conservation tasks, group active since 2002
- SWT Youth Ranger volunteers – 16-25 year olds gaining skills on conservation projects across Brighton & Hove since 2007 (now being extended to 12-16 year-olds)
- RSPB youth group 'Brighton Starlings' – for 7-12 year olds meeting monthly with regular field trips
- Booth Museum of Natural History (part of BHCC's Royal Pavilion and Museums) – a historic, free, public facility housing 600,000 biological and 50,000 geological specimens; runs regular public events
- Lewes Wildlife Project (SWT) – regular programme of community and arts events, monthly newsletter, and nature activities in the surrounding 'Living Landscape' including habitat management work on the two local nature reserves, and wildlife gardening
- Railway Land Wildlife Trust project (RLWT) – a previous recipient of the UK-MAB 'Urban Wildlife Award for Excellence'; the first UK reserve to establish a Junior Management Board (children aged 8-12) that has received numerous awards; membership now stands at 250 local families
- Sussex Festival of Nature (formerly 'Springwatch') – the main annual nature event (run by BHCC, with NT & SDNPA in 2012), held at Stanmer Park
- City Wildlife website (run by BHCC) – an internet resource for local wildlife recorders
- University of Sussex Students' Union Volunteering – works with diverse local bodies including the National Trust, Sussex Wildlife Trust, and Moulsecoomb Forest Garden; a collaborative Green Project was run in summer 2011

ii. Rural Countryside

- SDNPA advisory and management work – local practical projects with landowners and farmers to conserve and enhance the environmental value of their land
- South Downs Volunteer Ranger Service (VRS) – works with SDNPA on practical site management tasks, established since 1981
- National conservation NGOs – membership increasing, with about 10% of the population of Sussex being members of an environmental organisation, including:-
 - Sussex Wildlife Trust - the largest conservation charity in the county with more than 30,000 members and a suite of more than 30 nature reserves, including Ditchling Beacon and Malling Down
 - National Trust – locally based at Suddlescombe near Devil's Dyke – active in conservation volunteering and nature walks

- RSPB – includes ‘Volunteer & Farmer Alliance’ farmland bird surveys of local farms, and has local reserves at Lewes Brooks and the Adur Estuary
- Individual natural history/conservation groups such as Butterfly Conservation (Sussex branch) – active recording and events programme including the annual public ‘Big Butterfly Count’
- Plumpton College – annual Open Day on the countryside, farming and environment attracts some 15,000 people; gives varied talks and events to inform local communities

iii. Coastal & Marine Environment

- Sussex Shore Search (SWT-led) – organises a programme of volunteer coastal survey events throughout the year at selected sites to collect records of the species and habitats found
- Sussex Sea Search (MCS, with local SWT support) – part of a nationwide project for volunteer and recreational SCUBA divers, with a very active programme of regular local dives to carry out structured recording and mapping of marine life. This has resulted in a unique insight into the nature of the near-shore environment which forms the basis of the designation and monitoring of marine Sites of Nature Conservation Interest (mSNICs) here
- Marine Week events (Wildlife Trusts/SWT) – family activities to raise awareness, alongside the national ‘Petition Fish’ campaign for a comprehensive network of Marine Protected Areas
- Sealife Centre, Brighton – receives educational school party visits and conducts research and species breeding programmes, as a well-known visitor attraction
- Black Rock, by Brighton Marina – an interpretative signboard has been installed to promote the unique geological and archaeological features of the cliffs there

Future Focus (all environments)

Planned:

- Deliver integrated community environmental education programmes and interpretation in Lewes District (especially at Landport Bottom - LDC & Plumpton College)
- Work with sea-users to promote awareness/disseminate information (e.g. commercial/recreational sea-fishermen, divers, surfers, boaters)

Potential:

- All Biosphere local authorities to work together to undertake promotional activities and educational programmes to increase public awareness of the benefits of different planting and maintenance regimes in urban green spaces to increase biodiversity
- Produce dedicated Biosphere nature posters (e.g. butterflies in 2013), guides (e.g. I-Spy booklets), and electronic applications (e.g. mapping and recording systems)
- Build on the work of Shoresearch and Seasearch programmes to develop further “citizen science” initiatives for the community to generate information
- Promote the importance and value of the coastline (Brighton to Newhaven Cliffs SSSI) as part of a chalk cliffs geo- and bio-diversity coastal interpretation approach
- Seek to work with existing and proposed coastal visitor facilities to integrate Biosphere interpretation e.g. Brighton Sealife Centre, and planned ‘i360’ West Pier Observation Tower and Heritage Centre

C. Environmental sustainability

As for 'Nature Conservation' (above) there are a host of different groups, initiatives and activities addressing the wider challenges of sustainable development in the local environment, as illustrated below (by sustainability elements).

Current Practice –

i. Community & Culture

- Brighton & Hove Greenspace Network – a new forum run by CVSF and Groundwork for city groups
- Groundwork South, Brighton team – run 'Green Doctor' service and multiple projects and events in green spaces
- Access 2 Nature project (SWT-BHCC) 2010-12+ – activities focused especially on deprived neighbourhoods and housing estates, including Forest Schools for community groups, wildlife gardening, and allotment site development with homeless people
- National Trust (Saddlescombe) – runs gardening activities and works with the charities Mind and the local Grow project; hosts arts events at Devils Dyke and Wolstonbury Hill with Red Earth group
- Lewes Linklater Pavilion community education centre – pioneers environmental work with a range of social groups and runs Lewes Railway Land festival
- Brighton Peace & Environment Centre – promotes development awareness and sustainability education.
- Brighton & Hove Archaeological Society – established over 100 years ago, its present membership of around 300 people can take part in field research programmes (including 'community digs') and public outreach events, walks and talks
- East Sussex Archaeology & Museums Partnership (ESAMP) – provides interpretation, education and training opportunities for adult learning with environment and heritage organisations
- Sussex Archaeological Society – manages a portfolio of historic properties (including two in Lewes) and runs the 'Sussex Past' website
- BHCC Culture team – environmental events and commissions, including with the Biosphere Project e.g. 'Reverse Graffiti' rare species street art and spotters guide, and 'Eco Focus' website of local natural environment images by Brighton Photo Fringe
- Adur District Council (including the Parks section) – established Community Groups to work on projects as diverse as play areas, wildflower areas, community allotments, and park development at Fishergate Rec

ii. Food

- Brighton & Hove Food Partnership – multiple initiatives and events, including the Harvest project, to expand local food-growing opportunities and participation, and a new sustainable fish campaign
- Brighton Permaculture Trust – runs projects, events and courses on local food growing, especially orchard fruit, as well as being active in other topics such as green building
- Fork and Dig It social enterprise at Stanmer Organics – provides educational workshops to children/adults and volunteering for local groups, individuals and corporate bodies
- Lewes 'Common Cause' food group – promotes community development including local food projects, active since 1991
- LDC Sustainability team – has helped 15 local schools to develop wildlife and food-growing areas on their grounds

- West Sussex Environment and Climate Change Board 'Local Food' group – looking at promoting access to local food and raising awareness, with local initiatives including garden swaps, community gardens and orchards, and farmers markets.
- Plumpton College – promotes the links between agriculture and nature conservation through national organisation LEAF (Linking Environment And Farming) and the charity FACE (Farming And Countryside Education) to educate children and young adults about sustainable farming
- UoS student societies – including 'Sussex Roots' which grows organic herbs on allotments; and 'Inspir8' which works with local secondary schools to teach students business skills through food-growing

iii. Economy/Tourism

- Brighton & Hove Environmental Industries Partnership – being established
- BHCC EcoTourism focus – including Brighton Green Guide production and 'LoveBrightonEco' social media campaign
- Lewes & Ouse Valley Economics (LOVE) – community work on local "nature gain" (ecosystem services provision)
- UTILISE and Ecosys – Brighton-based environmental consultancies supporting businesses to cut costs and improve their environmental performance

iv. Energy

- Brighton & Hove 10:10 campaign – works with the public and schools to cut carbon emissions
- Transition Town Lewes – designs solutions with local people to build 'resilience' in response to global change (climate, economics, energy and resources) through a focus on energy use, transport, food and housing; launched in April 2007
- Eco Technology Show – new annual national trade and public event in Brighton promoting sustainable building, energy, transport and lifestyle
- Brighton Energy Cooperative – enables community investment in local solar energy installations

v. Health, Recreation & Access

- BHCC 'Health Walks' programme – regular varied walks led by volunteer leaders, which targets inactive, recovering and marginalised people especially
- Green Gym – originally a BTCV-initiated scheme to encourage participation in healthy outdoor conservation work
- Adur District Council (Parks section) – developed outdoor fitness equipment (green gyms) at Southwick Recreation Ground and now three local communities' parks and Shoreham Academy's grounds

vi. Waste

- Magpie Co-operative – community recycling and re-use project in Brighton
- Brighton Paper Round – commercial collection of recyclable materials, including food waste
- Green Centre, Brighton – environmental resource and education centre in Whitehawk that works with local schools on environmental awareness around waste and other issues
- 'SWAP NOW' EU project – ADC and WSCC seek to improve reporting of environmental crime, by recruiting "neighbourhood champions" to look after areas of land to prevent them becoming unofficial dumping grounds for rubbish

vii. Transport

- ‘Lewes Road for Clean Air’, Brighton – a local campaign group promoting sustainable transport
- ‘Active Worthing’ (including Adur) – WSCC partnership with NHS Sussex to encourage cycling and raise awareness of the direct health benefits

viii. Water

- Ouse and Adur Rivers Trust (OART) – volunteer-led protection and enhancement of the two rivers and their catchments
- ‘Love your River’ campaign – a DEFRA national initiative to engage people with the water environment

Future Focus – Fresh Water (Adur & Ouse WFD Partnership - Engagement group):

- Seek to understand more about current perceptions and aspirations for the rivers Ouse and Adur and their catchments
- By 2013, have a clear understanding of the aspirations and perceptions of people within the catchment
- By end of 2015, evolve understanding of people’s aspirations and perceptions to identify any changes after the implementation of the Catchment Management Plan
- Raise awareness of the water environment through the active engagement of landowners, local communities, volunteers and other interested parties
- Identify all relevant groups to work with (by end of 2013)
- Establish mechanism for sharing information (“”)
- Raise awareness sufficiently to have clear direction on how to engage to practically deliver WFD (“”)
- Empower people to own local issues and promote and take action on local solutions within the framework of the wider catchment
- By 2015, develop a properly co-ordinated approach to “getting involved” across the catchment
- By 2015, facilitate more people to actively help to look after their local waterbody
- By 2016, aim to identify more people who value the Adur and Ouse catchments and the contribution they can make to looking after them
- Re-connect people to the aquatic environment by enabling local communities to feel a sense of ownership over their local stream or river. (Adur & Ouse Partnership ‘Water Quality’ group target)
- Public & stakeholder engagement (incl. business) to raise awareness of water efficiency / pollution / drinking water sources (Environment Agency focus)

Future Focus – Sea Water (Adur & Ouse WFD Partnership - Coastal group):

- Promote stakeholder understanding and support for sustainable marine environments
- By 2013, establish and implement a stakeholder engagement plan which identifies who wishes to be involved and how to engage effectively with partners
- By 2014, identify opportunities for communities, government agencies and NGOs to participate and to promote a partnership approach
- By 2015, develop shared access to marine monitoring data

- Engagement with local fishing community on the Biosphere Project, including implementation of the recommended Marine Conservation Zone (rMCZ) and the Newhaven fishing fleet

Future Focus (all other sustainability elements) –

Planned:

- Engage public further in their local environment/heritage through suitable interpretation and events

Potential:

- Walks series guide/leaflets (paper/digital apps) out from urban 'gateways' to rural SDNP
- Ecotourism - share knowledge through smart phone apps / green hotels / new camp sites in and around B&H
- Link with Brighton Festival and Fringe to encourage integral biodiversity and environment strand
- Responsible public use of the countryside information, including new 'open access' areas being created
- Lewes town to develop link between ecosystem services and local currency of the "Lewes Pound"?

The ESCC Environment Strategy (2011) has a principle to increase understanding, appreciation and stewardship of the environment of East Sussex, by:

- Support and encourage volunteering, to allow people to get involved in their local open spaces, support conservation work, and develop new skills and experience
- Encourage people to enjoy, understand and take action to safeguard our natural environment for future generations and reconnect young people with nature to stimulate and educate them to be advocates for the natural environment in the future
- Support environmental networks and voluntary organisations to help create a shared understanding of environmental issues and jointly deliver environmental, social and financial benefits to the county, including through the provision of public services

6.5 Professional Training

A. Introduction

This section is concerned with vocational training of professionals and aspiring individuals to develop the applied skills and focus needed to adequately conserve and improve the environment of the Biosphere area. This is considered separately here from the more generic further and higher education degree courses provided by local colleges and universities, since it addresses shorter-duration specific training opportunities.

B. Research & Monitoring

There is a need for training to develop applied skills on investigating, surveying and tracking changes in the local environment.

Current Policy & Practice –

- Plumpton College provides a range of local practical vocational courses according to demand, as does SWT, whilst the two universities focus more on CPD training of technical subjects (following the loss of the UoS Centre for Continuing Education)

Future Focus –

- SWT is considering developing specialist Continuing Professional Development (CPD) courses in ecological survey and monitoring

C. Environmental Education

This element is concerned with both practical environmental management vocational courses, as well as local teacher training courses.

Current Policy & Practice –

- Environmental management:

Plumpton College provides a broad range of vocational land-based training through a combination of short courses, industry qualifications, apprenticeships, vocational courses for schools (14-16 year-olds), and work-based learning. It has working relationships with some 1,500 employers locally. Its training courses include:

- Short Courses – e.g. NCFE Level 1 & 2 Woodcraft; Wildlife of Sussex; Bee-keeping
- NPTC qualifications – e.g. Professional Chainsaw User; Pruning Operations
- Apprenticeships – e.g. Environmental Conservation; Agriculture; Horse Care
- Work-Based Learning – e.g. BTEC Land-based Operations; Trees & Timber
- Vocational Courses for Schools – e.g. EDEXCEL BTEC Level 1 Land-Based Studies (Agriculture); (NPTC) Level 2 Agriculture

- Teacher training:

The Universities of Brighton and Sussex both provide PGCE & BEd courses which include practical placements in local primary and secondary schools. SWT works with the UoB course to train about 50 primary education trainee teachers each year on how to take learning out of the classroom through a two-day practical programme.

For established teachers there is regular 'In Service' (INSET) training on various subjects, including environmental education, as well as CPD training that teaches teachers how to take learning out of the classroom. The BHee project in Brighton & Hove runs termly teacher training 'twilight' sessions, and also provides both individual and online support to teachers. Dorothy Stringer High School includes environmental education in its induction for new teaching staff.

Future Focus –

- Initiation of a primary schools teacher training programme in Lewes by the Railway Land Wildlife Trust in conjunction with UoS
- Provide training and skills development which relate to the historic and natural environment necessary to conserve, enhance and enjoy the special qualities of the National Park (Partnership Management Plan draft 2013)
- Consideration by UoB of offering professional short courses in the growing local area of environmental technology

D. Public Awareness & Engagement

A wide range of courses are run for the public to expand people's knowledge and appreciation of environmental topics by multiple local organisations.

Current Policy & Practice –

SWT runs over 100 courses each year on a diverse range of environmental subjects, mostly based at Woods Mill near Henfield (within the Biosphere area). BHCC is revising its “e-learning” module on Sustainability, developed for its own staff, to be used for public education through libraries. Local businesses can benefit from specific training such as the Brighton & Hove Chamber of Commerce ‘Green Group’s workshop sessions, as well as the new Environmental Industries Partnership development training for members.

More generally, there is considerable support and training provision for volunteers in the charity sector to effectively work on environmental subjects, as provided by, for example, local conservation bodies NT and SWT. Similarly, many local community development centres provide relevant learning to their staff, volunteers and the wider public to acquire skills necessary for improving the local environment.

Future Focus –

Planned:

- Expand volunteering capacity, and diversify volunteer roles and range of opportunities to deliver National Park purposes (SDNP PMP draft policy)
- BHCC support and funding for the ‘Transforming Local Infrastructure Project’ to include effective support for volunteers and implementation of the Citywide Volunteering Strategy

Potential:

- Develop greater support materials for local volunteers to enable them to take a professional approach and progress their skills base in the local Biosphere environment

6.6 Key Policies

Many of the organisations operating in the Biosphere already have key policies and action plans in relation to Knowledge, Learning and Awareness. The objectives of the Biosphere will feed in to these policies where appropriate. It will provide a framework for sharing knowledge across the region and encouraging a more joined up approach to education, research, engagement and learning. Key policies include:

- University of Brighton EcoCampus Environmental Management Scheme (supported by their Sustainable Development Management Group and Environmental Action Network)
- University of Sussex Environmental Policy
- University of Sussex EcoCampus Environmental Management Scheme (supported by their Habitat Advisory Group)
- Plumpton College Strategic Plan (includes an environmental focus)
- South Downs Learning Partnership - Research Strategy (2013)
- South Downs National Park Partnership Management Plan (draft July 2013)
- Adur & Ouse Catchment Management Plan (2012)
- The Sussex Inshore Fisheries Conservation Authority (IFCA) Strategic Research Plan (2012-15) (www.sussex-ifca.gov.uk/repository/Sussex_IFCA_Strategic_Research_Plan.pdf)
- 'Eco Schools' (national programme)
- Brighton & Hove Community Engagement Framework www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/BH_CEF_Community_Engagement_Framework.pdf
- Brighton & Hove 'Joining the Dots' volunteering strategy (2010-2015)

6.7 Existing Information

- State of the South Downs National Park report (2012) www.southdowns.gov.uk/about-us/state-of-the-national-park-report-2012
- BHCC 'Brighton & Hove Environmental Education' project (BHee) – with SWT and Resource Futures
- University of Brighton Biodiversity Action Plan (Phase 1 Audit) (2009) Maureen Berg and Chris Joyce, School of Environment and Technology, University of Brighton
- BHCC School Grounds Habitat Action Plan
- ESCC Sustainable Schools Toolkit

ACRONYMS APPENDICES



Glossary of Acronyms

ADC: Adur District Council
AMP: Asset Management Plan
AMR: Automated Meter Reading
AQMA: Air Quality Management Area
BHAF: Brighton & Hove Allotments Federation
BHCC: Brighton & Hove City Council
BHFP: Brighton & Hove Food Partnership
BHWF: Brighton & Hove Wildlife Forum
BOA: Biodiversity Opportunity Area
CAMS: Catchment Abstraction Management Plan
CFMP: Catchment Flood Management Plan
CVSF: Community & Voluntary Sector Forum (Brighton & Hove)
DEFRA: Department of Environment, Food and Rural Affairs
DTI: Department of Trade and Industry
EA: Environment Agency
EC: European Community
ELS: Entry Level Stewardship
EMAS: Environmental Management Audit System
ESCC: East Sussex County Council
ESS: Ecosystem Services
FTE: Full Time Equivalent
GI: Green Infrastructure
HLF: Heritage Lottery Fund
HLS: Higher Level Stewardship scheme
IFCA: Inshore Fisheries & Conservation Authority
JSNA: Joint Strategic Needs Assessment
L&OVe: Lewes and Ouse Valley **eco**-nomics
LAF: Local Access Forum
LASI: Laboratory of Apiculture & Social Insects
LBAP: Local Biodiversity Action Plan
LDC: Lewes District Council
LDF: Local Development Framework
LEA: Local Education Authority
LGS: Local Geological Site
LNP: Local Nature Partnership
LNR: Local Nature Reserve
LWS: Local Wildlife Site

MCZ: Marine Conservation Zone
MMO: Marine Management Organisation
MRF: Materials Recovery Facility
MSC: Marine Stewardship Council
NCA: National Character Area
NIA: Nature Improvement Area
NPPF: National Planning Policy Framework
NVZ: Nitrate Vulnerable Zone
PAN: Planning Advice Note
PES: Payment for Ecosystem Services
PMP: Partnership Management Plan (SDNP)
PR14: Periodic Review (2014)
PWS: Public Water Supply
RBMP: River Basin Management Plan
RPM: Royal Pavilion and Museums
RSA: Restoring Sustainable Abstraction
SAM: Scheduled Ancient Monument
SBRC: Sussex Biodiversity Record Centre
SDNP: South Downs National Park
SDNPA: South Downs National Park Authority
SFRA: Strategic Flood Risk Assessment
SMP: Shoreline Management Plan
SNCI: Site of Nature Conservation Importance
SPD: Supplementary Planning Document
SSSI: Site of Special Scientific Interest
SuDS: Sustainable Drainage Systems
SWMP: Surface Water Management Plan
SWS: Southern Water Services
SWT: Sussex Wildlife Trust
UoB: University of Brighton
UoS: University of Sussex
WBC: Worthing Borough Council
WFD: Water Framework Directive
WHO: World Health Organisation
WRAP: Waste & Resources Action Programme
WSCC: West Sussex County Council
WWTW: Waste Water Treatment Works

APPENDIX 1 – Bathing Water Quality

The Bathing Waters of the Biosphere:

Key

M - Bathing water quality compliant with minimum (mandatory) standards of the EC Bathing Water Directive

H - Bathing water quality compliant with higher (guideline) standards of the EC Bathing Water Directive

	2007	2008	2009	2010	2011	2012
Southwick The bathing water is situated on the south coast in West Sussex, adjacent to Shoreham Harbour. The beach is on a thin peninsula of land with the harbour behind. The bathing water is predominantly a groyned, shingle beach but with some sand exposed at low water. The River Adur exits the harbour at the western end of the bathing water separated by a concrete breakwater.	H	M	H	H	H	H
Hove Brighton and Hove is a large resort situated on the Sussex coast of the English Channel. Hove beach is west of the disused West Pier. The gravel slopes steeply at first but levels off with more sand towards low water. Behind the beach there is the bustling promenade with many resort facilities. A beach awarded 'Blue Flag' status.	H	M	H	M	H	H
Central Brighton Brighton and Hove is a large resort situated on the Sussex coast of the English Channel. Brighton Central beach is west of Brighton Pier. The gravel slopes steeply at first but levels off with more sand towards low water. Behind the beach there is the bustling Brighton promenade with many resort facilities.	H	H	H	M	H	H
Brighton Kemptown Brighton is a large resort situated on the Sussex coast of the English Channel. Brighton Kemptown beach is east of Brighton Pier. The gravel and sand beach slopes steeply at first but levels off with more sand towards low water. Behind the beach there is the bustling Brighton promenade with many resort facilities.	M	M	M	M	H	H
Saltdean Saltdean is a village suburb to the east of Brighton, on the Sussex coast of the English Channel. Between the groynes, the gravel beach slopes steeply at first but levels off with more sand towards low water. Behind the beach there is the lido and at the foot of the cliff a promenade all the way to Brighton. This bathing water usually achieves high water quality standards.	H	H	H	H	M	H

APPENDIX 2 – Coastal & Marine Nature Conservation Sites

a) Coastal nature conservation sites

Table - Key designated coastal sites:

Designation Type	Name of Site	Reason for Designation
National Designations		
Site of Special Scientific Interest (SSSI) Notified by Natural England to represent some of the best examples of Britain's natural features. Designated under the Wildlife & Countryside Act 1981	Adur Estuary	Saltmarsh habitats, unusual estuarine plant communities, intertidal mudflats. Important for Ringed Plovers (<i>Charadrius hiaticula</i>) (part also designated as a RSPB reserve)
	Brighton to Newhaven Cliffs	Features of this SSSI include Calcerous grassland, Chalk cliff and wave cut platform, Kittiwake colony (one of only two in SE England) and Chalk reef
Local / Regional Designations		
Local Nature Reserves (LNRs) Designated by local authorities and declared with Natural England, as statutory local sites with importance for both nature and people, with an adopted management plan	Shoreham Beach	Large areas of vegetated shingle habitat, varying in nature with relative stability and natural disturbance from the seaward edge to consolidated inland areas with corresponding types of plant communities
	Castle Hill, Newhaven	Steep chalk cliffs with clay and extensive slump areas and a small area of vegetated shingle at West Beach below. Chalk and maritime grassland and scrub habitats dominate, with a wide range of flora and fauna including nesting kittiwakes, Fulmars, Peregrine Falcons and a variety of gulls
Local Wildlife Sites (LWS) or Sites of Nature Conservation Importance (SNCIs) Defined by Local Authorities and the Sussex Wildlife Trust as a green network of sites of local nature conservation interest to meet Local Biodiversity Action Plan targets. These are non-statutory but form an integral part of the formulation of planning policies relating to nature conservation issues.	Basin Road South	Vegetated shingle habitat, internationally rare habitat. Nationally scarce Tree mallow (<i>Lavatera arborea</i>), Sea Kale (<i>Crambe maritima</i>) and Yellowhorned Poppy (<i>Glaucium flavum</i>)
	Volk's Railway	Vegetated shingle habitat, internationally rare habitat. Nationally scarce Tree Mallow (<i>Lavatera arborea</i>), Thrift (<i>Armeria maritima</i>) and Yellowhorned Poppy (<i>Glaucium flavum</i>)
	Black Rock Beach	Vegetated shingle habitat. Nationally rare Sea Knotgrass (<i>Polygonum maritimum</i>). Also a stop off point for migratory birds and there are records of breeding Ringed Plover (<i>Charadrius hiaticula</i>)

	Brighton Marina	Diverse fauna on a range of artificial and floating substrates in shallow water. Well-studied with good opportunities for the public experience marine life close to shore and important for watching migratory birds in passage.
	Cliff grassland, Cairo Avenue, Peacehaven	Diverse rough grassland and scrub on the cliff top
	Peacehaven Heights	Species-rich maritime calcareous grassland, plus bryological importance of Cheyne Gap gulley and stream
	Newhaven Cliffs	Unimproved species-rich grassland of regional importance, plus hill-top iron-pan
	Tide Mills	Vegetated shingle beach, and a chalk embankment, with saltmarsh with a creek which is an important feeding ground for wading birds and wildfowl, and ponds and a marshy meadow
A small nature reserve, designated by Adur District Council	River Adur	Shingle habitat containing the nationally rare Childing Pink (<i>Petrorhagia nanteuillii</i>)

Nationally Important Biodiversity Sites – coastal:

Adur Estuary SSSI – Located on the west bank of the River Adur. Extending north from the pedestrian bridge across the river, this SSSI is notable for its estuarine plant communities which are unusual due to the relative scarcity of Cord-grass, *Spartina* spp. with Sea Purslane (*Atriplex portulacoides*) dominating most of the areas above mean high water mark, interspersed with frequent occurrences of Annual Seablite (*Suaeda maritima*). Other species dominate towards mean low water, notably Glasswort (*Salicornia* spp.) with a greater abundance of Sea Aster (*Aster tripolium*). The saltmarsh community also contains species such as Sea Lavender (*Limonium vulgare*), Thrift (*Armeria maritima*), Sea Plantain (*Plantago maritima*) and Sea Poa Grass (*Puccinellia maritima*).

The large area of intertidal mudflat within the estuary is important for a variety of wading birds, particularly the Ringed Plover (*Charadrius hiaticula*) which are present in nationally important numbers. Part of the lower reaches of the River Adur, to the south on Norfolk Bridge, has also been designated a reserve by the RSPB. The west bank of the river (particularly to the south of the A259) also supports reptiles (notably, Common Lizards (*Lacerta vivipara*)). Reptiles are protected under Part 1, Section 9 of the Wildlife and Countryside Act, 1990.

The Red Data Book species, Chidding Pink (*Petrorhagia nanteuilii*) flourishes on a relict area of sand dune on the west bank of the lower Adur (outside the designated SSSI). Protected under Schedule 8 of the Wildlife and Countryside Act 1981, this species is confined within the UK to the sandy and shingle coast of Sussex. A nature reserve has been designated to protect this.

Brighton to Newhaven Cliffs SSSI – Brighton to Newhaven Cliffs comprises a 12.5 km stretch of coast between Brighton Marina and Newhaven Harbour. They provide superb exposures through the Upper Chalk of the South Downs with a series of vertical chalk cliffs 20-65m high, and the foreshore platform below them. Although the main interest of the site is geological, the unimproved grassland of the cliff top and cliff face support rare and uncommon plants and beetles, and the only colony of breeding Kittiwakes in Sussex (and is one of only two colonies in the Southeast). Roedean is noted as a site where the nationally rare hydroid *Hartlaubella gelatinosa* has been recorded on the intertidal (Barne et al., 1998).

Locally Important Biodiversity Sites – coastal (selected):

Basin Road South SNCI – This site, in close proximity to Shoreham Harbour, comprises vegetated shingle (a BAP habitat) and rubble that has suffered recent disturbance in places. The southern, more exposed side of the site has been colonised by Frosted Orache (*Atriplex laciniata*) with more sheltered areas containing a range of species including Sea Kale (*Crambe maritima*, a BAP species) and Tree Mallow (*Lavatera arborea*) (both nationally scarce plants), Sea Campion (*Silene uniflora*) and Yellow-horned Poppy (*Glaucium flavum*). Coastal grassland along the roadside also supports maritime species such as Sea Couch (*Elytrigia atherica*) and Rock Samphire (*Crithmum maritimum*).

Volk's Railway SNCI – A species-rich vegetated shingle (BAP) habitat along a length of local railway. The site supports a diversity of notable coastal species including the nationally scarce Tree Mallow (*Lavatera arborea*), Thrift (*Armeria maritima*) and Yellow-horned Poppy (*Glaucium flavum*). The site also has historic interest, being along the line of the railway.

Black Rock Beach SNCI – This site is located west of Brighton Marina, between Marina groyne and the western breakwater to the low tide mark. It comprises vegetated shingle (a BAP habitat). The number of species recorded here is rather limited with the nationally rare Sea Knotgrass (*Polygonum maritimum*) (a BAP species) having temporarily disappeared from this site. However, this species is transitory, being vulnerable to swamping with shingle during storms, and can re-emerge here or nearby in the future. This species is protected under Schedule 8 of the Wildlife and Countryside Act, 1981.

Other nationally scarce plants recorded here include Tree Mallow (*Lavatera arborea*) and Sea Kale (*Crambe maritima*), with further species of interest down as far as High Water Mark (HWM) including Frosted Orache (*Atriplex laciniata*). The site is also an important “stopping off” point for migratory birds and there are records of Ringed Plover (*Charadrius hiaticula*) that breed, or attempt to breed most years.

b) Marine nature conservation sites

Table - Key designated marine sites:

Designation type	Name	Reason for designation
National Designations		
Site of Special Scientific Interest (SSSI) Notified by Natural England to represent some of the best examples of Britain's natural features. Designated under the Wildlife & Countryside Act 1981	Brighton to Newhaven Cliffs	Marine features of this SSSI include the wave cut platform and chalk gulleys
	Adur Estuary	Unusual estuarine plant communities due to the relative scarcity of cord-grass, <i>Spartina</i> spp. The large area of intertidal mudflats within the estuary are important for a variety of wading birds, particularly redshank, dunlin and ringed plover (the estuary is of national importance for this last species)
Marine Conservation Zone (MCZ) (proposed) Designated by the Government, advised by the JNCC and Natural England, MCZs protect nationally important habitats, species and geology.	Beachy Head West	Chalk gulleys with associated littoral chalk communities known to support Blue Mussel beds mixed with Native Oyster, Long- and Short-snouted Seahorses, and the European Eel.
Local / Regional Designations		
Marine Sites of Nature Conservation Importance (mSNCIs) Defined by Seasearch and Local Authorities as sites of local nature conservation interest to meet BAP targets. These are non-statutory but form an integral part of the formulation of planning policies relating to nature conservation issues.	Southwest Rocks	Vertical chalk cliff supporting diverse assemblage of marine species
	Looe Gate	Vertical chalk cliff supporting diverse assemblage of marine species
	Brighton Marina	Unusual plant and animal communities have developed associated with the floating pontoons within the Marina, under extremely sheltered conditions
	Subtidal wave-cut chalk platform (Brighton-Newhaven)	The basis of the proposed Beachy Head West MCZ area here
	Ship Rock or Kings West Ledge, Brighton	Low lying chalk reef/cliff, about 100m long & averaging 0.5m high. Regional importance due to rareness of chalk 'cliff' exposure under water.
	Marina Reef or Measor's Rocks, Brighton.	Reef said to be up to 500m long, though its form varies considerably along its length. It rises to a max height of 3m above the surrounding seabed. Consists of a narrow stratum of chalk (30cm thick) with a softer grey clay beneath, with broken chalk slabs & boulders. Unusual reef form. Local / regional importance

Nationally Important Biodiversity Sites – marine:

Within the Biosphere the coastal strip known as 'Beachy Head West' is a proposed MCZ (MCZ) located mostly eastwards of Brighton Marina.

Regionally / Locally Important Biodiversity Sites – marine (selected):

Looe Gate mSNCI – This site comprises a low lying chalk cliff of approx 0.5m in height, exposed over a length of 220m. The uppermost parts of the cliff support a sparse foliose red algal turf with a dominant fauna of bryozoa and sponge species. Other species recorded on the chalk cliff include anthozoans (anemone and softcoral), tubicolous and 'feather duster' worms, piddocks, sea squirts and various fish species, including bib and poor cod. The seabed fauna is fairly typical of a mixed sediment seabed and includes anemones *Urticina felina* and *Cerianthus lloydii*, the crabs *Necora puber* and *Cancer pagurus*, the Hermit Crab *Pagurus bernhardus*, the topshell *Calliostoma zizyphinum* and chains of Slipper Limpets *Crepidula fornicata*.

South West Rocks mSNCI – This is a length of exposed vertical chalk cliff 270m long, undercut at its base and giving way to a seabed of fine sand and pebbles. The cliff is generally about 1m high, reaching a maximum of 2m in places. The upper part of the vertical face is covered by a dense animal turf of hydroids with foliose red algae on the horizontal surface. Other faunal species of the turf include sponges, bryozoans and soft coral. Further recorded species are piddock bivalves, burrowing sea cucumbers (not recorded since 1990), Cowrie, sea squirts, crustaceans and fish.

Brighton Marina mSNCI – This is an enclosed anchorage with access to the sea. The marina consists of two floating structures and pier piles in shallow water that create a variety of marine habitats with over 100 species recorded. The inner Marina is sheltered, non-tidal and slightly reduced in salinity, the walls of which have a high cover of sea life. The seabed is mostly soft mud with numerous gobies, anemones and small shrimps. The site contains unusual shallow water associations and rare lagoon specialists, due to its sheltered aspect (invertebrates and fish nursery site). The Marina is one of the best studied in Europe and one of the first to be assessed for its biodiversity value.



BRIGHTON & HOVE AND LEWES DOWNS BIOSPHERE PARTNERSHIP:

