The Brighton & Hove Local Biodiversity Action Plan

Adopted: 6th February 2012

Brighton & Hove City Council

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Contents

Summary

1. Biodiversity ('the variety of life on earth') is an integral part of Brighton and Hove. Over half the administrative area of the city is open downland, most of it within the South Downs National Park. Most of the coast of Brighton and Hove is also of national wildlife importance. Within the urban area, natural features such as the National Elm Collection and the network of natural habitats in the urban green space are essential to the character of the city and are highly valued by residents and visitors.

2. Biodiversity is widely recognised as being in serious decline. Co-ordinated action needs to be taken to reverse this and to maintain biodiversity at sustainable levels. Biodiversity action planning emerged from the 1993 Rio Earth Summit, where the 'Convention on Biological Diversity' was signed by 193 states, including the United Kingdom. Biodiversity Action Plans (BAPs) define the actions needed to conserve the most important elements of our biodiversity.

3. This draft Local Biodiversity Action Plan (LBAP) addresses the species and the habitats of particular importance in Brighton and Hove. These have been identified after considering the nationally important species and habitats which occur in the city, together with additional recommendations made by local naturalists. The LBAP also takes full account of the objectives and priorities of current national biodiversity policy and local interest groups.

4. The LBAP will be included in a forthcoming bid to UNESCO for Brighton and Hove, parts of Lewes District and the surrounding areas to be designated a Biosphere Reserve. Biosphere Reserves are world-class natural environments which promote a balanced relationship between people and nature.

5. Successful implementation of the LBAP depends on contributions from the business, public and voluntary sectors as well as environmental organisations. Broad community involvement is important so that local values are fully reflected in the final document.

6. The overall aim (or 'vision') for biodiversity in Brighton and Hove is that by 2020, 'biodiversity will be integrated into decision-making by the Brighton and Hove Strategic Partnership and its member organisations. Local communities will be fully involved in developing and progressing biodiversity conservation and there will be a common understanding of the value of biodiversity and the action needed to maintain and enhance it. The habitats and species of importance in Brighton and Hove will be successfully conserved. Brighton and Hove will be richer in biodiversity, with healthy ecosystems delivering essential benefits for people.'

7. Five principles have been defined to ensure the vision for biodiversity is achieved and the action taken to conserve it is successful. These are:

   Principle 1: Mainstream biodiversity in society
   Principle 2: Integrate the conservation of biodiversity across other land uses
   Principle 3: Conserve Important habitats and species on a landscape scale
   Principle 4: Share the benefits of biodiversity and ecosystem services
   Principle 5: Establish a strong evidence base

8. These five principles are applied to the action plans of all the habitats and species in this draft LBAP.

9. The main body of the draft LBAP comprises separate action plans for habitats and species. Action plans have been prepared for 15 habitats, mostly of national importance but with the addition of some habitats of particular value locally.

10. There are 115 species of national biodiversity importance which have viable populations in Brighton and Hove. Most of these can be catered for by conserving the habitat on which they depend. However some nationally important species have specialist needs which require specific action and the draft LBAP comprises separate action plans for 18 species (or groups of species).

11. Each action plan comprises:

    - A description of the ecology of the habitat or species.
    - An assessment of the threats and opportunities to it.
    - A list of conservation objectives to ensure the habitat or species is conserved.
    - A description of the actions which need to be taken, by when and by who, to achieve the conservation objectives.

Section 1: A Short Natural History of Brighton and Hove

1. Brighton and Hove contains the largest conurbation in Sussex, with a population of nearly quarter-of-a-million people, squeezed into about 40 km^2 (about 15 square miles) of urban area along the coast. Population densities in some parts of the city meet or exceed those of central London. In contrast, the northern half of the administrative area is open and empty chalk downland, part of the South Downs National Park, most of it farmed and under the ownership of the city council.

2. Brighton and Hove has an exceptional natural environment. Its beauty and quality and the proximity to the sea were very important factors in the rapid development of Brighton and Hove during the eighteenth and nineteenth centuries. The chalk Downs and coast remain a major asset today.

3. The character of the city centre is defined as much by the ancient English Elms which line its streets and green spaces as by its distinguished architecture. Brighton and Hove, which hosts the National Elm Collection, is one of the few places in Europe where majestic avenues of ancient Elm can still be seen.

4. In landscape terms, the city is characterised by large areas of ‘encapsulated countryside’ on the urban fringe. Severed from the open downland by development, these fingers of natural green space are of only marginal agricultural value but support large areas of important semi-natural habitat and are popular for quiet recreation.

5. To the north of the by-pass, the Brighton and Hove downland supports significant parcels of ancient, species-rich chalk grassland as well as important colonies of rare arable plants, farmland birds and other downland wildlife.

6. The urban coast, although greatly modified by centuries of intensive recreation, still retains fragments of important coastal habitat along the Volks Railway, Black Rock and at Shoreham beach. The Marina supports a remarkable mix of sea life in its shallow lagoons and the cliffs and foreshore directly to the north and east of the Marina are all part of a nationally designated Site of Special Scientific Interest.

7. So in Brighton and Hove, if anywhere, it is not difficult to see why biodiversity is an integral part of daily life. In fact people living in Brighton and Hove value their natural environment more highly than shopping or nightlife[1], although perhaps because nature is free and apparently abundant, it is all too easy to take it for granted. In fact, just like the city's exceptional architecture, conserving the natural environment needs to be planned and resourced to ensure it remains healthy for future generations to enjoy.

8.

Section 2: An Introduction to Biodiversity

1. The term 'biodiversity' encompasses the whole variety and complexity of life at all scales, including genetics, species, ecosystem and landscape. As well as the rare or threatened species, it also includes the whole of the natural world, from the commonplace to the critically endangered.

2. In 2006, the Natural Environment and Rural Communities Act became law. Section 40 of the Act states that: *'Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'*. This Local Biodiversity Action Plan (LBAP) addresses this obligation for Brighton and Hove. It describes the component parts of our local biodiversity which are of particular value and sets out in detail the action which needs to happen to ensure that biodiversity in the city is sustained into the future.

The Background to Biodiversity Action Planning

3. The term 'biodiversity' emerged as international leaders first began to address nature conservation on a global scale. In 1981, the International Union of the Conservation of Nature initiated an analysis of the matters relating to the conservation, accessibility and use of genetic resources 'with a view to providing the basis for an international arrangement and for rules to implement it.'

4. Twelve years later, following lengthy negotiations among governments, an international arrangement was agreed. In 1993, the Convention on Biological Diversity (CBD) was signed, to date by 193 states, including the United Kingdom. The convention recognized for the first time in international law that the conservation of biodiversity is 'a common concern of humankind'.

5. As well as the objective of conserving biodiversity, the CBD also established the principle of sustainability, recognising that natural resources are finite and must be used in a way which ensures they are not degraded into the future. A third strand of the convention is the equitable sharing of the benefits arising from the use of biodiversity, but it took another seventeen years for this third objective to become a central part of the CBD, with the Protocol on Access and Benefit Sharing at Nagoya, Japan in October 2010.

6. The 2010 Nagoya Biodiversity Summit established a new global vision for biodiversity to 2050, where: 'By 2050, biodiversity is valued, conserved, restored and wisely used,

[1] research for the Local Development Framework in 2006 found that 'parks, open spaces and biodiversity' was ranked third (behind transport and sustainability) by respondents in their list of priorities for a new 'spatial vision' for the City

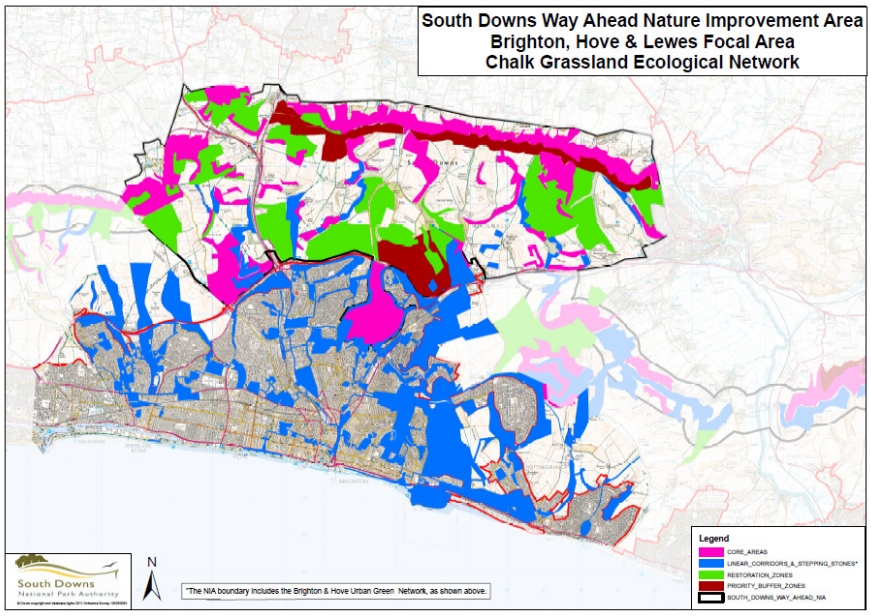
maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people.' The Summit also set a shorter term ambition to halt the loss of biodiversity by 2020, supported by 20 'Aichi targets' to drive action on biodiversity.

7. As a signatory to the CBD, the United Kingdom has established the UK Biodiversity Partnership to define the steps needed to conserve the most important components of UK biodiversity. The UK Biodiversity Partnership has published detailed action plans for many of the habitats and species which are regarded as being of national importance (referred to as 'UK BAP priority species and Habitats'). As well as addressing the CBD, these action plans also contribute towards the June 2011 European Union Biodiversity Strategy objective *'To halt the loss of biodiversity in the EU by 2020 and to "appropriately restore" EU biodiversity by 2050...'.*

8. As well as action plans at the UK level, there are also separate strategies and action plans for conserving biodiversity in south east England (see http://strategy.sebiodiversity.org.uk/ and across Sussex (http://www.biodiversitysussex.org/). These nested plans ensure the national biodiversity priorities are integrated into policy at all levels (although the south east biodiversity strategy does not have specific targets and actions for habitats and species). They also provide opportunities for additional habitats and species to be conserved which do not have national recognition but are nevertheless important at the sub-national level.

9. In June 2011, the Government published 'The Natural Choice' Natural Environment White Paper, as a response to the Nagoya Summit. The White Paper promotes a landscape scale approach to biodiversity conservation and emphasises the value of ecosystem services, public engagement and the integration of biodiversity goals with economic development. This was closely followed by the publication of a new Biodiversity Strategy for England 'Biodiversity 2020 : A strategy for England's wildlife and ecosystem services' with a mission 'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people'.

10. The Natural Environment White Paper commits Government to assist local partnerships to establish Nature Improvement Areas (NIAs). NIAs are landscape-scale designations where particularly strong opportunities exist to enhance networks of habitats. Twelve pilot NIAs for England were announced by Government in February 2012. Much of the urban green space in Brighton and Hove and most of the downland surrounding the city are included in the South Downs Way Ahead NIA (see map below).



Conserving Biodiversity in Brighton and Hove

11. This Local Biodiversity Action Plan (LBAP) addresses the species and the habitats of particular importance in Brighton and Hove. It has been written following consultation with a broad range of local nature conservation groups and local naturalists. These have been defined as the nationally important species and habitats which occur in the city, with refinements and additional recommendations provided by expert naturalists. This list comprises the biodiversity which the city has a particular responsibility to conserve.

12. This LBAP also contributes to the over-arching objective of achieving designation of Brighton and Hove as part of a UNESCO Biosphere Reserve. Biosphere Reserves are 'centres of excellence' where conserving biodiversity is prioritised, alongside economic and social development. For more information on the local bid, see www.biosp**herehere**.org.uk.

Section 3: Making Biodiversity Happen

A Vision for Local Biodiversity

The aim of this Brighton and Hove Biodiversity Action Plan is to achieve the following local vision for biodiversity:

By 2020, biodiversity will be integrated into decision-making by the Brighton and Hove Strategic Partnership and its member organisations. Local communities will be fully involved in developing and progressing biodiversity conservation and there will be a common understanding of the value of biodiversity and the action needed to maintain and enhance it. The habitats and species of importance in Brighton and Hove will be successfully conserved. Brighton and Hove will be richer in biodiversity, with healthy ecosystems delivering essential benefits for people.

Key Principles and Objectives

Five overarching principles have been defined to support the implementation of the vision for biodiversity. Each principle is supported by city-wide targets. They take full account of the goals of the Convention on Biological Diversity Strategic Plan 2011-2020 and the outcomes and priorities of the 2011 England Biodiversity Strategy.

Principle 1 : Mainstream biodiversity in society

- Brighton and Hove will be included in a UNESCO Biosphere Reserve. The Reserve will set a global standard for successfully promoting biodiversity conservation as a way of helping to deliver economic and social benefits.

- People across Brighton & Hove will share a common understanding of the value of the important habitats and species found in the city and the action needed to ensure they are conserved. Local communities will be fully involved in developing biodiversity policy and conservation work. People will be aware of the opportunities and the action that they themselves can take to conserve biodiversity and to use it sustainably. More people will be engaged in biodiversity issues, will be aware of its value and will be taking positive action.

- Biodiversity conservation will be integrated into the decision-making of the Strategic

Partnership and its member organisations. Progress with biodiversity action will be built into reporting systems.

- Local communities and friends groups, supported by the council, will be growing in numbers and will be fully engaged with progressing biodiversity action in the city.

Principle 2 : Integrate the conservation of biodiversity across all other land uses

- The conservation of biodiversity will be integrated into the management of all publicly owned open space, including allotment land. An increasing proportion of private open space will be managed with biodiversity conservation as an objective.

- Working in partnership with Sussex Inshore Fisheries and Conservation Authority, biodiversity conservation will be integrated across the management of our coast and sea to achieve a clean, healthy, safe productive and biologically diverse coast, so far as can be achieved through actions at the city scale.

- Brighton and Hove will work in partnership with the Sussex Inshore Fisheries and Conservation Authority to promote the conservation of the marine environment along its coast, including the designation of a Marine Conservation Zone, the conservation of marine Sites of Nature Conservation Importance and the achievement of Good Environmental Status[2]

- Brighton and Hove Council will have effective working arrangements with its tenant farmers, in partnership with other agencies, to maximise the opportunities to integrate sustainable farming practices with biodiversity conservation and access to nature on the council's farmed estate, including steps to maximise the benefits of ecosystem services[3].

- Brighton and Hove Council and the South Downs National Park Authority will have fully integrated biodiversity into the development control process, including the promotion of the NIA throughout the urban area and surrounding downland. 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.

Principle 3: Conserve Important habitats and species on a landscape scale

- All habitats and species will be recognised as being of value, including the commonplace as well as the rare. Common species will be part of people's daily life experience, providing inspiration, enjoyment and a trigger for curiosity and exploration. Regular contact with the natural world is will be available to all.

- There will be an improvement in the condition of habitats in Brighton and Hove. 90% of LBAP habitats will be in favourable or recovering condition, at least 50% of Local

[2] In accordance with the definition provided in the EC Marine Directive

[3] Ecosystem services are the resources and processes that are supplied by natural ecosystems, including clean water, flood alleviation, food and clean air.

Wildlife Sites will be in favourable condition and at least 95% in favourable or recovering condition.

- The proportion of Brighton and Hove designated as a terrestrial protected site will have increased from 15.9% (2012) to at least 17% by 2020 (see Table 1, below), At least 10% of coastal and marine areas will be similarly protected (there is no figure available for marine areas in Brighton and Hove in 2012).

Table 1: Proportion of Brighton and Hove within a protected area

Designation	**Terrestrial**		**Coastal**	
	Area (ha)	**Area as a % of B&H total area**	**Area (ha)**	**Area as a % of B&H total area**
SSSI/SAC	71.2	0.8	67.6	0.8
LNR & pLNR[4]	690	8.2	0	0
SNCI	578.2	6.9	34.1	0.4
TOTAL	**1339.4**	**15.9**	**101.7**	**1.2**

- There will be targeted action to achieve the recovery of known threatened species of biodiversity importance, including cultivated plants and farmed animals, whose conservation cannot be delivered through wider habitat-based work alone.

- There will be an increase in the overall extent of LBAP habitats by at least 60 ha. This figure corresponds with the amount of additional semi-natural green space needed by 2030 to ensure everyone continues to have good access to natural green space under local planning policy. Most of habitat creation will occur within or adjacent to the NIA.

- Important habitats and wildlife sites will be integrated into the NIA comprising:

    - Core areas of high nature conservation value,
    - Habitat restoration areas,
    - Buffer zones,

[4] pLNRs are proposed Local Nature Reserves awaiting formal declaration under the National Parks and Access to the Countryside Act 1949. Marine SNCIs have also been designated beyond the low water mark but the extent of Brighton & Hove's marine 'catchment' is yet to be defined.

- Wildlife corridors and stepping-stones.

Collectively these areas will comprise a continuous network of semi-natural habitat across Brighton and Hove to promote a more integrated large-scale approach to conservation on land.

The land surrounding the NIA will be managed to support biodiversity conservation objectives

Principle 4: Share the benefits of biodiversity and ecosystem services

- Habitats and nature conservation features that provide ecosystem services such as Climate Change adaptation, water purification, sustainable food and storm water control, and which contribute to health and well-being, will be promoted, conserved and protected throughout the city.

- Everyone in the city will have free access to sufficient good quality, natural green space close to where they live, play and work.

- There will be diverse opportunities for local people to be actively engaged in biodiversity conservation across the city. Collaboration between communities, land managers and decision makers will be well developed from a common understanding of agreed objectives.

- Local groups and individuals who contribute to the conservation management of important habitats and species will be appropriately rewarded. Examples of rewards might include a share in the beneficial products of management, e.g. firewood from coppicing; wild flower seed from chalk grassland harvesting schemes.

- Information on the state of local biodiversity will be widely available through ongoing development of web-based material and other communication and information exchange media.

Principle 5: Establish a strong evidence base

- Monitoring will be in place to enable decision-makers and the public to understand how implementation of the LBAP is progressing.

- Monitoring will assess site quality (include Local Wildlife Sites), habitat quality and habitat connectivity. Species change, including invasive species, will be reported.

- Public awareness, understanding and engagement in biodiversity will also be monitored as will the extent to which biodiversity is integrated into decision making across partner organisations in Brighton & Hove.

- The Booth Museum will have a high profile as a focus for biodiversity research, community engagement and information in Brighton and Hove

Implementing the LBAP for Brighton and Hove

The LBAP will form an integral part of a submission to UNESCO[5] for designation of Brighton and Hove, parts of Lewes District and surrounding area as a Biosphere Reserve. At the time of writing, the intention is for the submission to be made by the local Biosphere Partnership in 2013.

Brighton & Hove City Council has primary responsibility for delivering the LBAP and monitoring progress. The council will work with key stakeholders including the Biosphere Partnership and the City Sustainability Partnership.

The LBAP is ambitious in setting out for the first time the measures needed to ensure biodiversity loss within Brighton and Hove is halted and reversed. Successful implementation will entail overcoming a several challenges. The main obstacles to delivery are likely to be:

Resources: No one organisation is capable of conserving all the important biodiversity of Brighton and Hove. The council will need to work in partnership with a wide range of organisations, local groups and individuals to achieve the progress needed. Local community involvement in developing and implementing biodiversity conservation is particularly crucial and the action plan sets out how this sector will be a part of the process.

Most of the actions described are additional to existing work. It is highly likely that additional resources will be needed for their successful delivery. It is envisaged that the Biosphere Reserve initiative and the Nature Improvement Area designation will put Brighton and Hove in a good position for successful bids to new sources of external funding.

Climate Change may become an increasingly important influence on the objectives of the LBAP. National projections suggest a possible 2-4℃ increase in mean summer temperatures, with milder winters, changes in rainfall distribution and seasonality, more extremes of weather and sea level rise. These have the potential to result in significant changes to habitat dynamics and species interactions. The effects of climate change will kept under active review throughout the LBAP implementation period.

Invasive non-native species are already affecting the biodiversity of the city and may increasingly do so as the climate changes. Recent developments include the arrival of the Harlequin ladybird, which was first recorded in the city in October 2004 and the Horse Chestnut Leaf Miner which is now ubiquitous in the city. Invasion by Cotoneaster is becoming a significant problem on some ancient chalk grassland sites in the city and most of the surviving dew ponds have been colonised by non-native, invasive aquatic plants.

[5] UNESCO (the United Nations Educational, Scientific and Cultural Organization) is the international body responsible for designating Biosphere Reserves.

Section 4: How this Action Plan is set out

1. This LBAP is divided into two sections, each made up of separate action plans which address respectively the important habitats and species of Brighton and Hove.

2. Each action plan comprises:

    - A description of the ecology of the habitat or species, its conservation status nationally and in Brighton and Hove.

    - An assessment of the threats and opportunities for that habitat or species.

    - A list of 'SMART' conservation objectives, (Specific, Measurable, Achievable, Relevant and Time-limited). Any relevant national, regional and Sussex BAP targets are also described.

    - An action table, describing the actions which need to be taken, by when and by whom, to deliver the conservation objectives.

3. Part 1 defines the species of greatest importance in Brighton and Hove (see Table 2). These are defined as:

    - UK BAP priority species[6] which have suitable habitat and native, breeding populations in the city.

    - Species which are not UK BAP priority species but are nevertheless threatened and / or rare and have suitable habitat and significant breeding populations in the city.

    - UK BAP priority species and other species which occur in the city only as casual records, garden escapes or which do not have suitable habitat (or the realistic prospect of creating it), are not included in Table 2.

4. The majority of the species listed in Table 2 do not have their own Brighton and Hove action plans. This is because their needs can be addressed through the habitat action plans. Some UK BAP priority species remain common and are included in the list for research purposes because of large population declines (mostly a group of declining moths). These are included in Table 2 but not addressed through an action plan because the reasons for their decline are poorly understood and there are no known means to address their needs or effectively monitor changes in their populations at the local level.

5. The following species (and groups of species) are considered to have specialist requirements which can be addressed locally and which cannot be adequately addressed through habitat action plans alone. Each of these has a dedicated Brighton and Hove species action plan:

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[6] UK BAP priority species and habitats are those that have been identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP).

Plants

Arable Annual Group
Hoary Stock *Matthiola incana)*
Red Star-thistle (*Centaurea calcitrapa)*
Sea Heath *Frankenia laevis*
White Helleborine (*Cephalanthera damasonium)*

Invertebrates

Brown-banded Carder Bee (*Bombus humilis)*
Dingy Skipper (*Erynnis tages subsp. Tages)*
Hornet Robberfly (*Asilus crabroniformis)*
White-letter Hairstreak (*Satyrium w-album)*

Fish

Short-snouted Seahorse (*Hippocampus hippocampus)*

Reptiles

Adder (*Vipera berus)*

Birds

Herring Gull *(Larus argentatus subsp. Argenteus)*
Peregrine (*Falco peregrinus)*
Starling (*Sturnus vulgaris subsp. Vulgaris)*
Swift, Swallow and House Martin

Mammals

Bats Group
Hazel Dormouse (*Muscardinus avellanarius)*

Other

Lichen*: Physcia clementei)*

6. Part 2 describes the fifteen habitats of greatest importance in Brighton and Hove. These incorporate all fourteen of the UK BAP priority habitats which have a significant representation in the city, plus 'Parks and Gardens' which is not represented on the UK Priority list but which has a substantial proportion of the biodiversity experienced by people in Brighton and Hove on a day-to-day basis. The Brighton and Hove habitats of particular importance are:

The Coast and Sea

Coastal Vegetated Shingle
Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats
Intertidal Underboulder Communities
Intertidal chalk
Maritime cliff and slopes
Sheltered Muddy Gravels – subtidal sediments
Subtidal chalk
Subtidal sands and gravels

The Urban Area

Parks and gardens
Urban Commons (incorporating Open Mosaic Habitats on Previously Developed Land national HAP)

Downland

Farmlands [incorporating Arable Field Margins national HAP]
Hedgerows
Lowland calcareous grassland (including chalk scrub and waxcap colonies)
Lowland Mixed Deciduous Woodland
Ponds

7. There are two additional UK BAP priority habitats which occur in Brighton and Hove which have not been addressed by an action plan, because they are poorly represented by a small number of non-typical examples. These are:

   Wood-Pasture and Parkland. Parts of Stanmer Park and Preston Park could be described as falling into this habitat category.

   Traditional orchards. Represented by perhaps one small orchard at Stanmer Park. This habitat is historically unusual on the South Downs.

Part 2: The Species of Particular Importance in Brighton & Hove

Plants

Arable Plants (Group Species Action Plan)

Ecology

1. Arable fields contain a large proportion of Britain's most endangered plants. These arable specialists are adapted to regular disturbance and many were once abundant 'weeds' before the advent of modern farming techniques. Arable farming has undergone a revolution since the 1940s, with the introduction of mechanisation, improved seed cleaning techniques, herbicides and more intensive cultivation. Most arable plants have consequently become much rarer, showing the greatest decline of any group of British plants over the past 25 years[7]. Often they survive only as dormant seeds, relying on a coincidence of atypical events to flower and set seed.

2. Arable plants follow two growth strategies:

    - Spring germination amongst spring-sown crops
    - Autumn germination in late-sown winter wheat or stubbles

3. A change towards earlier drilling dates, combined with herbicide use means that most species are now confined to the very edges of arable fields, old track ways and road verges.

4. Brighton and Hove has records for the following UK BAP priority species:

Pheasant's-eye	*Adonis annua*
Shepherd's-needle	*Scandix pecten-veneris*
Spreading Hedge-parsley	*Torilis arvensis*

5. In addition the following Brighton and Hove LBAP species, all scarce and declining, have been reported:

Broadleaved Spurge	*Euphorbia platyphyllos*
Corn Gromwell	*Lithospermum arvense*
Corn Parsley	*Petroselinum segetum*
Dense-flowered Fumitory	*Fumaria densiflora*
Fine-leaved Fumitory	*Fumaria parviflora*
Narrow-fruited Cornsalad	*Valerianella dentata*
Nottingham Catchfly	*Silene nutans*
Weasel's Snout	*Misopates orontium*

6. Other species of note include:

Prickly Poppy	*Papaver argemone*

[7] Price, D (2005) *Finding the farms with flora.* Plantlife 42.

Rough Poppy	*Papaver hybridum*
Venus's Looking Glass	*Legousia hybrida*

7. Arable plants might be found almost anywhere on the arable fields to the north and east of the conurbation, but seem to be particularly concentrated to the east of the Brighton and Hove, around the Woodingdean area. In addition to the arable areas, rare arable plants appear fairly frequently on the allotments at Whitehawk Hill.

Status

8. It is illegal to uproot any wild plant without the permission of the landowner or occupier (Wildlife and Countryside Act 1981, Section 13).

9. Pheasant's-eye, Shepherd's-needle and Spreading Hedge-parsley are 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

10. **Intensive agriculture:** Most arable plants are unable to persist under intensive agriculture and will become increasingly scarce without conservation action.

11. **Agri-environment schemes,** particularly Higher Level Stewardship, create opportunities to promote arable plants, including cereal field margins, cultivated and fallow margins and conservation headlands.

12. **Cultivation and landscaping:** Any works in Brighton and Hove which involve disturbance to former arable land, could lead to the re-appearance of long-dormant arable plants. Such works include allotment cultivation, bunding, road works, development and landscaping in school grounds and other public spaces.

Conservation Objectives

National and Sussex

National (2006): Shepherd's-needle (*Scandix pecten-veneris*)

T1: Maintain current range of natural populations within 166 10km squares in the UK

T2: Achieve a 2-fold increase in the area of habitat suitable for the natural colonisation of the species by 2010 in priority areas (the national priority areas do not include Brighton and Hove).

National (2006): Spreading Hedge-parsley (*Torilis arvensis*)

T1: Maintain current range of natural populations with 77 10-km squares in the UK.

T2: Achieve a 2-fold increase in the area of habitat suitable for the natural colonisation of the species by 2010 in priority areas (the national priority areas do not include Brighton and Hove).

Brighton & Hove

1. Identify any locally important areas for arable plants through survey and consultation with local botanists by 2015.

2. Ensure the sustainable conservation of arable plants at selected sites through appropriate management by 2020.

3. Raise awareness of the arable annual species group by 2017.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Collate existing survey information in partnership with local botanists to identify arable annual 'hotspots'	BHCC Cityparks, Sussex Botanical Recording Society	2013 - 2015	
2	Encourage landowner/occupiers of arable plant 'hotspots' to conserve and enhance the sites through advice on appropriate management	BHCC Property Services, BHCC Cityparks, FWAG	2013 - ongoing	
2, 3,	Identify one publically accessible promotional site for arable plants which can be managed specifically for this group. Establish sympathetic management and interpretation through volunteer involvement	BHCC Cityparks, Federation of Allotment Holders	2017	
4,	Produce arable plant promotional material and activities for schools and community groups to include packets of locally harvested arable plant seed to grow	BHCC Cityparks,	By 2017	
3	Connect isolated arable plant 'hotspots' through appropriate management	BHCC Property Services, Farmers, FWAG	2014 - 2020	

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The Hoary Stock (*Matthiola incana)*

Ecology

1. Hoary Stock is a member of the Brassicaceae plant family which includes familiar garden plants such as the Wallflower. It is a perennial, usually with a woody base, which grows up to 75 cm tall, and produces showy, bright purple (occasionally white) flowers in May.

2. There are various forms of Hoary Stock in cultivation, but the wild plant is for the most part restricted to maritime cliffs and slopes in the south and west of England and Wales in the UK.

3. Within Sussex, Hoary Stock is restricted to the coasts of East Sussex and can be found at scattered localities around Beachy Head and Hastings. However the county stronghold for the species are the cliffs from Brighton Marina to Rottingdean, where it grows on the cliff face, cliff top and on the walls and road verges to the north of the A259 coast road.

Status

4. There is some confusion regarding whether Hoary Stock is a native or an introduced plant in the UK. It was included in the first edition of the Vascular Plant Red Data List for Great Britain but excluded from subsequent editions as non-native. Whatever its origin, it is known from botanical records of the cliffs at Kemp Town and Rottingdean since at least 1900 and is a distinctive and widely appreciated part of the coastal flora of east Brighton.

Threats and Opportunities

5. Because Hoary Stock has such a restricted distribution in Brighton and Hove it is vulnerable to catastrophic events such as cliff falls and coastal development. Large clumps of the plant disappeared from the cliff at Black Rock during the cliff falls of 2001. Other plants have been lost from the Marine Gate area during wastewater treatment works there. However Hoary Stock is capable of quickly colonising cliff faces and cracks in walls (such as those along the A259 at Roedean) and remains frequent at the base of the cliffs at Brighton Marina.

Conservation Objectives

National and Sussex

No target data are available for this species

Brighton & Hove

1. Ensure the current distribution and abundance of Hoary Stock is maintained in Brighton and Hove

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Survey Hoary Stock to determine its distribution and status within the city and develop a monitoring programme	Sussex Botanical Recording Society BHCC Cityparks, trained volunteers	2013-15	
2	Ensure populations of Hoary Stock are conserved as a part of development proposals through appropriate policy	BHCC Policy Planning and Development Control teams	2013 - ongoing	
3	Identify possible sites for the expansion of Hoary Stock populations through appropriate management	Sussex Botanical Recording Society BHCC Cityparks, trained volunteers	2015-2020	
4	Increase understanding of Hoary Stock through council publications, local community magazines, etc	BHCC Cityparks, trained volunteers	2013 - ongoing	
4	Make hoary stock plants, propagated from local stock, available for sale to the public and developers through Stanmer Nursery	BHCC Cityparks, trained volunteers	by 2015	

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The Red Star-thistle (*Centaurea calcitrapa)*

Ecology

1. The Red Star-thistle is a native species of flowering plant with a bushy habitat, normally growing to perhaps 50cm in height. The phyllaries (modified leaves at the base of the inflorescence) become straw-coloured and tipped in long, sharp spines. This adaptation to grazing pressure allows it to flower and set seed in heavily grazed environments, where most other plants can survive only as rosettes on the soil surface.

2. Red Star-thistle flowers from July until September, and the seeds ripen from August to October. It is an annual (sometime biennial) and a pioneer species, relying on open patches of bare soil in open, sunny grassland sites for successful seedling establishment. The seeds are not long-lived, most germinating in the first year, although buried seed can survive for about three years.

3. Red Star-thistle occurs sporadically throughout England, but particularly along the south coast, from Bournemouth to Eastbourne. In Brighton and Hove it can normally be found on the urban fringe at Mile Oak and in the Woodingdean area. At both localities it is confined to long established horse paddocks. Here it benefits from hard

grazing, which both prevents other plants from competing with it and opens up patches of bare ground where new seedlings can establish.

Status

4. Red Star-thistle is classified as 'Critically Endangered' in the Vascular Plant Red Data List for Great Britain 2006. Plants classified as 'Critically Endangered' are those considered to be facing an extremely high risk of extinction in the wild in the immediate future.

5. Red Star Thistle is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

6. Because Red Star-thistle is normally an annual and its seeds are relatively short-lived, it can quickly disappear from grassland if grazing pressure is relaxed. The seeds remain in the seed head and tend not to disperse long distances, other than on the hoofs of animals. Herbicides designed to benefit grasses but target dicotyledonous plants in the sward will eradicate it. The plant is therefore reliant on a continuity of heavy grazing at the same locality, without agricultural improvement, for its survival.

Conservation Objectives

National and Sussex
No target data are available for this species.

Brighton & Hove

1. Determine the distribution of Red Start Thistle in Brighton and Hove by 2014.

2. Improve understanding of the importance and management needs of the plant, particularly amongst landowner/managers and pony graziers by 2015.

3. Identify and exploit opportunities to expand existing populations of Red Start Thistle by 2016.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5,	Survey and locate all existing Red Star Thistle populations in Brighton and Hove	BHCC Cityparks, in partnership with Sussex Botanical Recording Society, local volunteers	2013 – 2014	
2,4	Identify landowner/occupiers and graziers which are key to the future conservation of Red Star Thistle and ensure they are aware of its importance and management needs through visits and printed material	BHCC Cityparks, Property Services	2015	
3	Ensure existing populations are safeguarded through tenancy and / or management agreements as necessary	BHCC, Property Services, Natural England	From 2013	
3	Define any key sites suitable for Red Star Thistle re-colonisation to ensure inter-connected populations and work with landowner/occupiers to establish new populations of the plant.	BHCC Cityparks, BHCC Property Services	2015-2016	
4	Make interpretive material on the species available to pony owners and the public	BHCC Cityparks,	2015	

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The Sea Heath *Frankenia laevis*

Ecology

1. Sea Heath (*Frankenia laevis*) is an attractive, mat forming perennial, for the most part confined to the warm, oceanic climate of the coasts of England. It is well adapted to colonising a water stressed environment, with small, linear leaves and stems which creep across the soil surface. It has showy, pink flowers in June.

2. Sea Heath normally occurs in the upper parts of saltmarsh and in saltmarsh-sand dune transitional habitats. However in Brighton and Hove it grows east of Brighton Marina, along the break of slope of the sea cliff and in patches of soil in the spray zone. It occurs here with other plant species commonly associated with saltmarsh-sand dune transitional communities, such as Rock Sea-lavender (*Limonium sp.*), Sea Sandwort (*Honckenya peploides*) and Lesser Sea-spurrey (*Spergularia marina*). However there is some doubt whether Sea Heath is native to Brighton and Hove, or whether it is a garden escape.

Status

3. The Sea Heath is listed as Nationally Scarce in Britain. It is an offense to uproot any wild plant without the permission of the landowner under the Wildlife and Countryside Act (1981).

Threats and Opportunities

4. Sea Heath is vulnerable to rabbit grazing but few, if any rabbits occur along the cliff top between Brighton and Saltdean and none on the foreshore. In Brighton and Hove the plant appears to be stable or increasing, particularly in the Rottingdean area, where it has even colonised soil patches between paving slabs and walls close to the sea.

Conservation Objectives

National and Sussex
No target data are available for this species

Brighton & Hove
Maintain the extent of the known populations of Sea Heath to 2020

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Record and monitor the extent of populations of Sea Heath in Brighton and Hove	BHCC Cityparks, local volunteers., Sussex Botanical Recording Society	2013 - ongoing	
4	Ensure local people are aware of the conservation value of Sea Heath and its habitat through publications and events	BHCC Cityparks	2013 - ongoing	
2	Include Sea Heath, derived from local, wild populations, in suitable planting regimes	BHCC Cityparks	2013 - ongoing	
2,, 4,	Propagate Sea Heath from local, wild populations for use in development schemes and for sale to the public	BHCC Cityparks	2014 - ongoing	
2	Ensure Sea Heath is conserved and protected from damage as part of development.	BHCC Planning Policy, Development Control, Coast Protection.	2013 - ongoing	

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The White Helleborine (*Cephalanthera damasonium)*

Ecology

1. A 40-60 cm tall orchid with long, tapering leaves arranged in two alternating rows up a central stem. The inflorescence comprises a lax spike with 3-15 cream-white flowers.

2. The White Helleborine is a long-lived perennial that appears in April and flowers during May and June. It requires well-drained calcareous soil and reproduces only occasionally, only by seed, and seedling establishment is poor. Although seedlings germinate quite readily, seedling survival only seems to occur at some sites. This might be because separate groups of ectomycorrhizal fungi (from neighbouring tree roots) are needed for seeds to germinate and for seedlings to then develop. As not all trees have these symbiotic fungi, distribution of the White Helleborine may be limited to sites where there are trees that have all the fungi species required.

3. The mature plant suffers from predation by slugs, fungal infection, competition with other plants and deep leaf litter. It is a light-demanding species so only succeeds in woodland glades. However it is not well suited to rotational coppicing because it requires a continuously open canopy, needing decades of well-illuminated conditions to build up the strength to flower. The openness of the glades is also important for the pollinating bees, which do not fly in continuous shade. However it does not compete well with other woodland floor plants, requiring open, light conditions at ground level to survive.

4. Pollination is by small solitary bees which are probably attracted to the plant by Batesian mimicry, whereby the flowers resemble those of other plants which produce nectar and/or pollen. Research suggests simply having large numbers of flowers nearby, in sunny conditions, will attract sufficient bees for some random pollination to occur.

5. In Brighton and Hove, a small population of the White Helleborine persists in the arboretum at Stanmer Park. Here conditions are approaching ideal for flowering, with permanent, sunny glades. The variety of tree species present may also favour a diverse ectomycorrhizal fungal flora, although this has never been investigated.

Status

6. The White Helleborine is included in the British Vascular Plant Red list. It is also a ‘species of principal importance for the purpose of conserving biodiversity’ under

section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

7. The main threats to the White Helleborine are:

8. Collection by orchid enthusiasts.

9. Natural habitat change, often leading to excessive shading or competition with other plants.

10. Inappropriate woodland management, such as coppicing, which prevents plants from becoming established and setting seed.

11. The surviving colony of White Helleborine at Stanmer Park creates an opportunity to promote the expansion and conservation of a nationally rare plant in Brighton and Hove. It might also be possible to establish plants at other sites nearby, to improve the long-term prospects of the plant in Brighton and Hove.

Conservation Objectives

National and Sussex
No target data are available for this species

Brighton & Hove

1. Assess the health of the existing population of White Helleborine in Stanmer Park and collate information on the quality of the habitat and the management.

2. Implement a management regime at the known site with the following elements:

   Glade creation and maintenance to provide open conditions, with an open canopy to ensure that the orchid will establish and flower. Glades should be kept small to offer shelter.

   Understory vegetation in the glades should be controlled to minimise competition. This can be managed by strimming after the summer or by light grazing with cattle over winter. Two cuts a year, once in the winter to control woody growth and once in the early spring (before the orchid shoots emerge) may be used as an alternative.

   Bees should be encouraged by ensuring that flowering species that attract bees and produce pollen at the same time as the White Helleborine are present close by.

3. Monitor the population.

4. Expand the population

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Assess the health of all remaining populations of the orchid and collate information on its habitat and management needs	BHCC Cityparks, Sussex Botanical Recording Society	2013-2014	
3	Ensure management plans are prepared for all significant colonies of the orchid	BHCC Cityparks in partnership with the Sussex Botanical Recording Society, landowners and managers	by 2015	
3	Consider the introduction of orchid seedlings propagated from local stock to other suitable sites in Brighton and Hove	BHCC Cityparks in partnership with the Sussex Botanical Recording Society, Hardy Orchid Society	2015	

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Invertebrates

The Brown-banded Carder Bee (*Bombus humilis)*

Ecology

1. Queen *Bombus humilis* (the Brown-banded Carder Bee) begin to emerge from their hibernation sites during May. They establish nests at the base of coarse grasses, preferring areas of taller but open grassland, although a mosaic of vegetation at different heights is essential to provide nesting and foraging habitats.

2. Worker bees are produced from mid June, taking advantage of the mid-summer flowering peak of plants with particularly deep corollas such as Birds-foot Trefoil, Kidney Vetch, Clovers and Labiates (such as Self-heal). Males and young queens are produced from late July, when mating occurs, so that the young queens can build up food stores to overwinter. Males favour thistles and knapweeds. The most important plant is Red Clover, *Trifolium pratense*, but it is vital that there is a succession of suitable flower resources available from May to September.

3. Ideally the Brown-banded Carder Bee requires large flower-rich sites (10km^2 or more), but it will forage over large distances, in excess of 1km from the nest, and so is able to find localised sources of flowers within the landscape. A matrix of smaller, flower-rich sites within open, agricultural countryside is therefore also suitable. In any case, landscapes that provide much flower-rich habitat, especially in coastal districts, are crucial.

Status

4. Agricultural intensification and the associated loss of flower-rich grasslands have resulted in disappearances of *B.humilis* from over 95% of their known localities nationally over the past 100 years. In Brighton and Hove the species is still recorded from time to time, notably at Castle Hill National Nature Reserve, and at the Dorothy Stringer School Butterfly Haven in 2010. It may be increasing its range.

5. The Brown-banded Carder Bee is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

6. By far the greatest threat to *B.humilis* is the fragmentation and loss of flower-rich, semi-improved grasslands, though inappropriate management, eutrophication or neglect. Flower-rich grassland which are grazed hard or cut during the summer will fail to provide adequate flowers. Uniform swards (through intensive management) will not provide sufficient habitat heterogeneity to sustain populations.

7. The popularity of wild flower seeding in Brighton and Hove creates an opportunity to encourage rare Bumblebees, such as *B.humilis*, to colonise the urban area. The success of the Dorothy Stringer School Butterfly Haven in attracting the species suggests that a network of similar flower 'hotspots' across the city could at least partially substitute for the scarcity of large flower-rich areas.

8. The Environmental Stewardship Scheme has created opportunities to put flower-rich habitats back into the countryside around Brighton and Hove. For example, Higher Level Stewardship options such as HE11 ('Enhanced strips for target species on intensive grassland') can link remaining flower-rich areas via corridors of wild flowers**.**

Conservation Objectives

National and Sussex

Maintain populations of *B. humilis* at all known sites (achieved).

Brighton & Hove

1. To develop a good understanding of the main breeding sites of the Brown-banded Carder Bee in Brighton and Hove by 2016.

2. To increase the number of breeding sites of the Brown-banded Carder Bee in Brighton and Hove by 2020.

3. To raise awareness of the Brown-banded Carder Bee and other rare bumblebees, their life cycles and habitat requirements by 2020.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Systematic survey to locate nest sites, involving specialist recorders	BHCC Cityparks, local recorders	2013 - 2015	
2	Contact owners/managers of important bumblebee sites and explain the significance of the populations on their land.	BHCC Cityparks, local volunteers	2014-16	
2	Ensure the habitat requirements of the Brown-banded Carder Bee are taken into account in the management agreements of Higher Level Stewardship agreements for tenanted farmers	BHCC Property Services, Cityparks, FWAG	2013 - 2020	
2,	Ensure planning policies are included which promote the creation of new wild flower rich habitats into development and landscaping schemes	Brighton and Hove Strategic Partnership, BHCC Planning Policy Team, BHCC Cityparks	2013 - ongoing	
1, 2, 3, 4,	Create a network of 'butterfly havens', following the model at Dorothy Stringer School, across the open spaces of the city. Ensure local communities are engaged their design, creation and management	BHCC Cityparks	2013 - 2020	
1	Promote improved understanding of the needs of bumblebees generally, as flagship species for promoting flower-rich habitats – Bee Aware	BHCC Cityparks, Strategic Partnership, Dorothy Stringer School	2013 onwards	

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The Dingy Skipper (*Erynnis tages subsp. Tages)*

Ecology

1. A small, well camouflaged butterfly with mottled brown wings and low, darting flight. Colonies occur in open, sunny habitats such as chalk downland, railway lines and waste ground, where its main food plant, Bird's-foot-trefoil (*Lotus corniculatus*) grows. Dingy Skipper needs a sparse sward, with patches of bare ground, in a sunny, sheltered situation. Taller vegetation is required for roosting.

2. The Dingy Skipper usually flies from early May until the end of June. After hatching, the larvae hide in tents formed by spinning leaves of the food plant together, and feed through the summer months. By August the larvae are fully grown, when they spin more leaves together to form a hibernaculum to overwinter. Pupation occurs the following spring.

3. The Dingy Skipper is widespread but local throughout England and Wales. The stronghold of the species is the central and southern counties of England, specifically Wiltshire, Hampshire, Surrey and Sussex, where the butterfly is still quite widespread on downland. The majority of populations are thought to be small (less than 100 adults) and those on isolated sites are vulnerable to extinction.

Status

4. The Dingy Skipper is a ‘species of principal importance for the purpose of conserving biodiversity’ under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take ‘reasonably practicable’ steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

5. The main threats to the Dingy Skipper have been habitat fragmentation (leading to the isolation of small, vulnerable populations) and inappropriate management. The conservation of this species may depend on maintaining networks of suitably managed habitat patches over a large area, which allows individuals to move from colony to colony and helps prevent small populations from dying out.

6. Uniform, intensive grazing will not benefit the butterfly because it benefits from short turf with bare soil patches and taller grassland in close proximity. Where the right mix of grassland sward exists, colonies may also be lost due to succession to scrub and secondary woodland.

7. Management should aim to maintain and increase sparse vegetation and especially bare ground and also some taller vegetation for shelter and roosting. Because the females search out the ungrazed shoots of Bird's-foot-trefoil to lay eggs, constant heavy grazing during the summer should be avoided.

Conservation Objectives

National and Sussex
No target data are available for this species

Brighton & Hove

1. Improve understanding of the conservation status of Dingy Skipper by 2015.
2. Ensure sites with existing populations of Dingy Skipper are managed appropriately by 2018.
3. Improve ecological connectivity between existing Dingy Skipper populations by 2020.
4. Consider the re-introduction of Dingy Skipper to appropriate habitat where circumstances allow.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
4, 5	Collate all records of Dingy Skipper in Brighton and Hove and determine distribution and data gaps. Address data gaps through additional survey and publicise results	Butterfly Conservation, local naturalists, BHCC Cityparks	2013 - 2015	
5	Begin monitoring programme on known sites, engaging volunteers from the local community	Butterfly Conservation, local community groups, BHCC Cityparks	2014 - onwards	
3	Review and update site management plans to ensure the habitat needs of Dingy Skipper are addressed	BHCC Cityparks	2013-2016	
2, 4	Include Dingy Skipper habitat requirements in the management of public open space with potential for the species to improve habitat connectivity across the city (including the use of 'butterfly banks' managed by local communities)	BHCC CityParks	2013 onwards	
3	Create suitable breeding habitat on downland where there is potential to re-establish viable new populations which connect existing populations	BHCC Property Services farmers, FWAG	2015 - 2020	

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The Hornet Robberfly (*Asilus crabroniformis)*

Ecology

1. The Hornet Robberfly is one of the largest flies in Britain, with an abdomen length of up to 28mm. It has a combination of habitat requirements which are becoming unusual in the UK, namely:

2. A ready supply of livestock dung (ponies or cattle) from late June to the end of October. The dung offers a suitable habitat for the fly to lay its eggs and attracts an associated dung invertebrate fauna which is an important source of food for the larvae and adult flies. Routine treatment of the livestock with persistent parasite treatments (avermectin wormers) between June and October can have a devastating effect on the species.

3. The sward must be grazed lightly enough to create a mosaic of grassland of mixed height, with plenty of flowers to attract the insect prey of the adult flies.

4. Pasture management affects the success of the Hornet Robberfly. Horse dung is often collected from fields or scattered, whereas the fly uses drying, undisturbed dung mounds for egg laying and perching.

5. The Hornet Robberfly feeds on a range of insects including grasshoppers, beetles, and flies. Adults range over distances of 500m or more from their breeding sites. Eggs are laid in drying, friable soil adjacent to livestock dung. The larval habits are poorly understood, but they probably feed on the fauna associated with untreated livestock dung.

Status

6. The Hornet Robberfly is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

7. The Hornet Robberfly occurs mostly across a wide band of southern England from Cornwall to Kent as far north as a line from the Severn Estuary to the Thames Estuary. However within this area it occurs in perhaps 15 population clusters, including one in Sussex.

8. In Brighton and Hove, the Hornet Robberfly is known to occur on the complex of horse –grazed pastures at Racehill valley, between Bevendean and Bear Road. Here the combination of semi-improved, flower rich pastures and the availability of ample horse dung throughout the summer months create ideal conditions for the species.

9. The fly may occur in pony paddocks anywhere around the urban fringe of Brighton and Hove, but may be restricted by the use of avermectins, the collection of dung or overgrazing. There are no known records for the species in the city outside its core Racehill Valley habitat.

Threats and Opportunities

10. Because Hornet Robberfly has a very restricted distribution in Brighton and Hove and populations can very quickly be damaged by a number of factors, it should be regarded as under severe threat in the city. Particular concerns include:

    - Loss of suitable flora-rich pasture due to an intensification of horse grazing.

    - Treatment of livestock with anti-parasitic drugs leading to reduction or loss of dung fauna. The use of Avermectin-based products is a particular issue. A large amount of the drug passes through livestock unmetabolised and it does not readily decompose once excreted.

    - Land use change leading to reduction or abandonment of livestock and consequent loss of dung habitat.

    - Changes in paddock management involving the removal or harrowing of dung.

11. Conversely, the introduction of sympathetic management techniques to existing horse paddocks around the city could attract new populations of the fly to establish.

Conservation Objectives

National
T1: Maintain the current range of the hornet robberfly.

T2: Maintain key (meta)populations of the hornet robberfly in England and Wales.

Sussex
No target data are available for this species

Brighton & Hove
Assess and ensure the conservation of the habitat of the known breeding site for the fly in east Brighton by 2015.

Strengthen the Brighton and Hove population of Hornet Robberfly by increasing the availability of suitable breeding sites across the city by 2020

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Survey to determine the health of populations of the fly in Brighton and Hove. Monitor populations with the help of trained volunteers	BHCC Cityparks, volunteers, Sussex Biological Record Centre	2013 - 2015	
4	Produce leaflet / interpretive material about the fly, to improve awareness of its importance and habitat needs.	BHCC Cityparks	2014	
2	Promote the management	FWAG, Property Services,	2015	

	needs of the fly and the potential for conservation subsidies with key landowners of existing populations through site visits	Natural England, BHCC Cityparks		
2	Work with land managers to encourage fly-friendly management regimes at least 3 new sites in the city	FWAG, Property Services, Natural England, BHCC Cityparks	By 2020	
3	Seek to introduce appropriate pony / cattle grazing regimes to nature conservation sites which are suitable for colonisation by the fly and under direct council control	BHCC Cityparks	2013 - 2020	

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The White-letter Hairstreak (*Satyrium w-album)*

Ecology

1. The White-letter Hairstreak is distinguished by a white 'W' mark across the underside of its wings. The butterfly breeds on various elm species, including Wych Elm *Ulmus glabra*, English Elm *U. procera* and Small-leaved Elm *U. minor*.

2. The adult butterfly flies from mid June until mid-August. Their eggs are laid on the twigs of the host tree, where they remain overwinter, hatching from mid-March to feed on developing flower buds.

3. Adult White-letter Hairstreak are difficult to see because they spend most of the time high in the tree canopy, although they occasionally come to ground level to nectar on flowers nearby.

4. The White-letter Hairstreak is found throughout England. Its numbers fell considerably during the 1970's Dutch Elm disease outbreak, but are now recovering in some places.

5. Brighton and Hove hosts the National Elm Collection and has probably the greatest number of large, mature English Elm in Britain. These are protected by a Dutch Elm Disease control Area, within which diseased trees are quickly removed before the fungus can spread.

6. Recently recorded White-letter Hairstreak populations persist right into Brighton town centre at The Level, as well as along the A23 and at Preston Park.

Status

7. Included in Schedule 5 of the Wildlife and Countryside Act (1981) (trade only).

8. The White-letter Hairstreak is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

9. Many Hairstreak colonies have disappeared due to the loss of great numbers of mature elm trees to the fungus *Ceratocystis ulmi*, which causes Dutch elm disease. However the larvae will feed on Elm suckers and saplings, which can persist after felling for the disease.

10. The butterfly is not thought to be under particular threat in Brighton and Hove, provided the populations of mature English Elm can be maintained.

Conservation Objectives

National and Sussex

No target data are available for this species.

Brighton & Hove

1. Define the distribution and abundance of White Letter Hairstreak within the City by 2016. Establish local monitoring to contribute to national indicators

2. Improve public understanding of White Letter Hairstreak as a local 'flagship' species associated with the iconic Elms of Brighton and Hove.

3. Promote examples of butterfly friendly gardens, parkland areas and flower beds. Ensure butterfly-friendly planting is completed at least five sites by 2020.

4. Ensure Elm trees lost to Dutch Elm Disease are replaced with disease-resistant varieties.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Develop a clear understanding of the distribution of White Letter Hairstreak in Brighton and Hove from existing and new survey data as appropriate	BHCC Cityparks, Sussex Butterfly Conservation, volunteers	2013-2015	
5, 1	Public promotion to improve local understanding and to improve records of the butterfly	BHCC Cityparks, Sussex Butterfly Conservation, volunteers	2013-2015	
2, 4	Define any important gaps	BHCC Cityparks, Sussex	2015-2020	

	in the distribution of the butterfly in the city and address these through Elm planting and / or other habitat enhancement, including improving nectar sources	Butterfly Conservation, volunteers		
3	Replace trees lost to Dutch Elm Disease and maintain the cordon sanitaire	BHCC Arboriculture Team	ongoing	

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Fish

The Short-snouted Seahorse (*Hippocampus hippocampus)*

Ecology

1. The Short-snouted Seahorse is one of two seahorse species found around the British coastline, the other being Spiny Seahorse (*Hippocampus guttulatus*). The Short-snouted Seahorse is mostly confined to the south and south-east coasts of the UK and southern Ireland.

2. Seahorses are unusual fish in having an exoskeleton and no scales. They are the only group of species where the male has a true reversed pregnancy; the female transfers her eggs to the male which he self-fertilises and rears in his pouch.

3. Seahorses have long thin snouts through which they eat small crustacea. They are not able to chew and have to disintegrate the food as they eat it.

4. Seahorses live in shallow still water, normally in weedy areas especially eel grass beds, muddy waters; estuaries; amongst algae and sometimes rocky areas. In winter they move into deeper waters to escape rough weather. However they tend to have high breeding site fidelity. With their breeding sites, both sexes maintain small breeding territories of about $1m^2$ or less.

5. In recent years, fishermen out of Shoreham Harbour have regularly captured small numbers of the Short-snouted Seahorse. In June 2006 a live, adult fish was caught by a child at the entrance to Brighton Marina and in September 2006, a group of local marine biologists carried out a search for the species in the same area. About a dozen juvenile Seahorses were discovered over a period of a few hours, which suggests there may be a population breeding there. Since 2006, Sussex Inshore Fisheries and Conservation Authority (IFCA) inspection records show occurrence of seahorses has reduced and it is assumed that 2006 was a good year for recruitment, which may be attributable to environmental conditions.

Status

6. Short-snouted Seahorse is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

7. Short-snouted Seahorse is listed in Schedule 5 of the Wildlife and Countryside Act 1981. The protection prohibits intentional killing, taking or injury (s9(1)), possession (s9(2)) and damage or disturbance in a place of shelter 9(4a, b, c) and sale s9(5a, b).

Threats and Opportunities

8. Seahorses are threatened globally by collection for traditional Chinese Medicine, the curio and pet trades. In the UK this is not thought to be a serious threat at this time.

9. The species might also be threatened due to the vulnerability of its shallow habitats to human influence, including pollution and development.

Conservation Objectives

National and Sussex

No target data are available for this species.

Brighton & Hove

1. Improve understanding of the distribution and habitat requirements of Short-snouted Seahorse along the coast of Brighton and Hove by 2015

2. Protect Seahorse populations from damage.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Increase knowledge of Seahorse numbers, distribution and habitat requirements in Brighton Marina and environs through survey and monitoring	BHCC Cityparks, in partnership with IFCA, local divers and marine biologists.	2013 - 2015	
2	Ensure the findings of local research are fed into management and development decisions at the marina to ensure the population is conserved.	BHCC Cityparks, BHCC Planning Policy Team, BHCC Development Control, Brighton Marina Estate Company	2013 - ongoing	
4	Ensure the presence of seahorse and their conservation needs are included in relevant publicity, tourist promotion and interpretation	BHCC Cityparks, Brighton Marina Estate Company	2013 - ongoing	
4	Investigate the possibility of	BHCC Cityparks,	2015	

	'guided dives' at the Marina to view the Seahorses and other marine life	Brighton Marina Estate Company, volunteer dives		

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Reptiles

The Adder (*Vipera berus)*

Ecology

1. The adder (*Vipera berus*) is Britain's most widespread snake. It is easily recognisable, both sexes having a distinctive, dark zigzag pattern down the back, with a row of dark spots along both flanks. It is our only venomous snake but despite its fearsome reputation, the adder is shy of humans, and will normally move away if approached.

2. The Adder is diurnal, feeding on lizards, small mammals, amphibians and nestling birds.

3. The Adder hibernates, frequently communally, between late September and early October, emerging again from late February to April, depending on the weather conditions.

4. The active period of the Adder's life cycle has three phases. In the spring the adders emerge from their hibernation sites and spend much of their time basking in the close vicinity. During this phase the males shed their skins and search for females, and mating occurs. They then disperse more widely to feed over the summer. The third phase, in autumn is a return to their hibernation sites, the females entering hibernation following the birth of their live young in August/September.

5. Hibernation sites are usually on higher, dry ground, wherever the species can move easily underground. Overturned tree root systems, piles of old logs and the burrows of small mammals may all be favoured. The availability of suitable hibernacula can be the limiting factor to population size. Generations of Adder often favour the same hibernation site for many years.

6. It is found throughout the United Kingdom but its abundance varies greatly. Where there are large areas of rough, open habitat, with low levels of human disturbance, such as the New Forest and Exmoor, it can be locally common. However it is rare over much of central, eastern and north-west England.

7. In Brighton and Hove the adder is confined to the larger blocks of open, semi-natural grassland and scrub. It does not occur within the built-up area. There are confirmed recent records from Castle Hill in the east and Benfield Hill in the west, although the species is not considered common.

Status

8. The Adder is protected under Section 5 of the Wildlife and Countryside Act 1981 which prohibits the intentional killing, injuring or trade of the species.

9. The Adder is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

10. National surveys suggest the Adder has been in decline since the 1930s. In Brighton and Hove, the main threats to the Adder remain disturbance and persecution, habitat fragmentation, inappropriate habitat management and 'tidying' of the countryside. Pheasant rearing can be a particular threat to young Adders.

11. Adders are particularly vulnerable to loss of their hibernacula. Recreational activities in their basking areas, close to hibernacula can also be very damaging because of their faithfulness to hibernation sites and the fact that both sexes, but particularly breeding females, spend much time in their vicinity. These threats can be lessened by managing public access routes and recreation areas to take account of the effects of disturbance on this species.

12. Little is known about the populations of Adder in Brighton and Hove, the locations of their winter hibernacula or their main feeding areas.

Conservation Objectives

National and Sussex

No target data are available for this species

Brighton & Hove

1. Determine the distribution and status of adders in Brighton and Hove by 2016.

2. Ensure adder hibernacula are identified and conserved, including protection from disturbance and inappropriate management by 2020.

3. Monitor the main populations of Adder to determine changing population levels by 2020.

4. Reconnect isolated Adder populations through habitat creation (including artificial hibernacula) and appropriate management by 2020.

5. Ensure adder populations in Brighton and Hove are stable or increasing above 2013 levels by 2020.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
1,5	Recruit and train volunteer Adder recorders, to participate in a citywide adder monitoring and reporting scheme.	Sussex Amphibian and Reptile Group (SARG), the South East Regional Adder Project, BHCC	2013 - ongoing	
2,3	Ensure adder conservation requirements are written into site management plans, planning policy and other relevant land-use plans	BHCC Cityparks, Planning Policy	2013 - ongoing	
2, 3,	Liaise with tenant farmers and landowners to create new habitat and hibernacula connecting isolated Adder populations into continuous areas of habitat, as part of HLS and improved public access to the downland	BHCC Cityparks, FWAG, Natural England	2013-2020	
4	Ensure the importance and conservation needs of adders are promoted through the local media, including council publications and community newspapers	BHCC Cityparks, SARG, volunteers	2013 - ongoing	

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Birds

The Herring Gull *(Larus argentatus subsp. Argenteus)*

Ecology

1. The Herring Gull breeds mainly in the middle and high latitudes and is widely distributed around the coasts of the British Isles, preferring to nest on rocky coastlines. It is a large, long-lived bird, with a wingspan of 1.2 metres or more when fully grown and weighing 1.2 kg. It has a typical lifespan of 12 years, although it can live as long as 30 years.

2. The Herring Gull is an accomplished opportunist. While primarily a coastal species, it readily takes advantage of the feeding and nesting opportunities created indirectly from man. It is both a predator and scavenger and has moved inland to exploit

rubbish tips and other man-made food sources. It has also learned to nest on buildings, first developing the habit of nesting on roofs as recently as the 1920s.

3. There have been increasing conflicts with people as Herring Gulls have become more urbanised. They can be aggressive, particularly while rearing young or scavenging. Their droppings can cause hazards and cleaning costs, as well as health and safety concerns for bars, restaurants and outdoor dining. Herring Gulls regularly tear up bags, open bins and strew rubbish. Their early morning calls while nesting can also cause a nuisance.

4. Herring Gulls (and to a lesser extent, other gull species) are an intrinsic part of the culture of Brighton and Hove. Although no accurate data is available, populations are large and most suitable roof spaces in the city centre support nesting Herring Gulls in spring. The large population is due to the coastal location but particularly the presence of readily accessible food (including street litter and insecure refuse bags) and the availability of suitable habitats for roosting and breeding.

Status

5. The UK breeding populations of Herring Gulls have declined by 69% since 1969. The winter populations have declined by more than 50% in the past 25 years. The Herring Gull is now classified as a Red List species because of its population decline, although in urban areas the number of birds has increased since the 1960's.

6. The Herring Gull is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

7. The reasons for the UK population decline in Herring Gull are not fully understood. Botulism, contracted from refuse, may be a significant factor. Refuse tip management has changed, resulting in a decreases in the availability of food. Reductions in fishery waste may also have had an affect. The importance of the urban Herring Gull population is unknown but could become increasingly significant as food from other sources reduces.

8. Because of their opportunism and aggression, Herring Gulls are not popular with many householders and businesses. Various methods have been used to deter them from nesting and to reduce their numbers. Methods of control include egg oiling, which prevents chicks from developing in the egg and the proofing of buildings, including the use of nets and spikes.

9. In 2010 Natural England amended the general licences permitting the control of certain bird species and removed the Herring Gull from almost all general licences. However the destruction of nests and eggs is still permitted to preserve public health and safety. It is also still possible to apply for an individual licence to control Herring Gulls by culling birds where they are causing problems.

10. A change in human behaviour would be more likely to have an impact on bird numbers, than most direct control methods. Changes in commercial refuse storage

and collection could have a significant impact on the town centre populations particularly.

Conservation Objectives

National and Sussex
No target data are available for this species

Brighton & Hove
Despite severe declines elsewhere, Herring Gulls are still abundant in Brighton and Hove. Although an iconic part of the culture of the city, they also cause significant problems for residents and businesses. Understanding changes in the local population would be a useful tool for predicting future action.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Develop and implement a monitoring strategy to understand the population dynamics of the local Herring Gull population.	BHCC Cityparks, Sussex Ornithological Society, local volunteers	2014 - ongoing	
4	Improve public understanding of Seagull ecology to address negative public perceptions	RSPB, (Albion Football Club?)	2015 - ongoing	

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The Peregrine (*Falco peregrinus)*

Ecology

1. The Peregrine is possibly the fastest animal in the world, achieving speeds approaching 200mph during aerial dives to intercept other birds as prey. Both the male and female peregrine have distinctive slate blue upperparts and densely cross-striped cream and black underparts.

2. Favoured nest sites are holes or niches on cliffs or rocky outcrops, but increasingly they have started to colonise urban areas, roosting and nesting in a variety of tall, manmade structures. The clutch size is usually between 3-4 with a mean number of 2+ fledged young per pair. The diet consists of mainly small to medium sized bird species, with pigeons being the favoured prey item.

3. Peregrine numbers have increased since a disastrous national decline in the 1950s, which was caused by DDT and other organo-chloride pesticides affecting breeding success. In 1963 the national peregrine population was estimated to be 360 pairs, but organo-chlorides were banned in the mid-1960s which lead to a gradual increase in the population.

4. Peregrines began to recolonise Brighton and Hove during the 1990s when adult birds were observed in the vicinity of the West Pier and later along the cliffs from the Marina. A nest box was erected on Sussex Heights by the Sussex Ornithological Society in 1998 and Peregrines have successfully bred there almost every year since. Peregrines now also nest at other localities in the city and it is believed that they may have reached their maximum natural breeding density, beyond which intra-specific competition would begin to limit their breeding success.

Status

5. The peregrine is given special protection under Schedule 1 of the Wildlife and Countryside Act 1981.

Threats and Opportunities

6. Peregrine numbers have recovered well since the 1960s and the species now has green status in the national list of bird species of conservation concern. Nevertheless there is a risk of illegal persecution from pigeon fanciers, egg collectors and falconers, who will take both the eggs and young birds.

7. As a top predator at home in the urban environment, the Peregrine is a good indicator of emerging environmental issues, particularly pollutants or other chemicals which are concentrated through the food chain. They are also widely appreciated by local residents.

Conservation Objectives

National and Sussex
No target data are available for this species.

Brighton & Hove

1. To monitor the population density and breeding success of Peregrine Falcon in Brighton and Hove.

2. To maintain the 2012 breeding density of peregrine falcons in Brighton and Hove (a review of this action plan may be necessary to achieve this, based on the outcome of the monitoring exercise).

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	To locate and monitor the breeding success of all Peregrine nest sites in Brighton and Hove	BHCC Cityparks, in partnership with the Sussex Peregrine Study, Sussex Ornithological Society, local volunteers	2013 - ongoing	
2	Ensure Peregrine nest sites are conserved and protected from loss by development	BHCC Policy Planning, Cityparks	2013 - ongoing	

4	Produce interpretive material about peregrines for local people and visitors to the city	BHCC Cityparks	2013 - 2015	

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The Starling (*Sturnus vulgaris subsp. vulgaris)*

Ecology

1. Starlings are a familiar sight in most urban and suburban areas of Britain. In fact they prefer urban habitats, where artificial structures such as electricity pylons provide nesting and roosting sites and food can be abundant.

2. Starlings are hole-nesting birds and will exploit missing tiles, crevices in walls and other building faults as well as trees. Male Starlings use leaves and grass to make rough nests which are then completed by the females using feathers, wool and moss.

3. Starlings chatter while roosting and bathing, making a great deal of noise that can frustrate local human inhabitants. They are also quite aggressive, taking first choice of the available food when feeding in gardens. Starlings also commonly reside in grassy areas where foraging is easy, including farmland, grazing pastures, playing fields and golf courses, and airfields. In fact they are highly adaptable and will use a wide variety of habitats.

4. The Starling is preferentially insectivorous, and juvenile birds require insects for their development. However adult the Starling is omnivorous and can also eat grains, fruits and discarded food waste.

5. In the winter Starlings gather in to sometimes very large roosts. They tend to be loyal to these for many years. As the day ends the starlings return to the roost, forming the large, distinctive swirling flocks (murmurations).

6. In Brighton and Hove, Starlings have become almost synonymous with the ruined West Pier and their murmuration has become quite a tourist attraction. Prior to the West Pier fire of 2003, several thousands of Starlings would roost there over winter. The Pier now offers fewer roosting opportunities but a flock of sometimes thousands remains loyal to it and continues to attract and inspire (a photograph of the West Pier murmuration was Runner-up in the 1998 ''Wildlife Photographer of the Year' competition). Large flocks also roost at Brighton Marina and the Palace Pier.

Status

7. The number of breeding Starlings in the UK has fallen rapidly, with an 87% decline over 25 years. The trend continues to be strongly downward. Starlings are now included on the Red List of birds of high conservation concern.

8. The Startling is a ‘species of principal importance for the purpose of conserving biodiversity’ under section 41 (England) of the Natural Environment and Rural

Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

9. For such an adaptable and opportunist species, the rapid decline of Starlings since the 1980s is surprising. The reason for their decline is due to a drop in the survival rate of juvenile birds. In the past, one third of juveniles survived their first year of life, but this has reduced to only 15% today. Birds that survive to breeding age can expect to live a further two or three years.

10. The increased mortality of juvenile Starlings may be due to a reduction in availability of their invertebrate prey, particularly earthworms and leather jackets, which the young birds require for their survival. The cause of this is probably a reduction in mixed farming, and the increased use of pesticides on farms. Changing garden fashions and the use of more pesticides in urban gardens may also play an important role in urban populations. There is also a potential shortage of nesting sites as many older buildings are repaired and fewer birds can gain access to roof cavities and other building crevices to build their nests.

Conservation Objectives

National and Sussex

No target data are available for this species

Brighton & Hove

1. Protect the major winter Starling roosts from damage and disturbance by 2014

2. Ensure public open spaces are managed to enhance their value for feeding and nesting Starling.

3. Improve the connectivity of the urban green landscape to improve foraging opportunities for Starling.

4. Encourage gardeners and home owner / occupiers to provide food and nesting opportunities for Starling.

5. Encourage developers to ensure new buildings provide opportunities for nesting Starling.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
4, 5	Monitor Starling roosts and report on the changes in Starling numbers on the major roost sites in Brighton & Hove	Local trained volunteers, BHCC Cityparks, Sussex Ornithological Society, RSPB	2014 - ongoing	
4	Produce an information leaflet about gardening for	BHCC Cityparks, local gardening groups,	2015	

	birds and the use of nest boxes to improve understanding of the things local people can do to encourage Starlings. Distribute through local growing networks (see also the Parks and Gardens HAP)	Harvest Brighton and Hove, Sussex Ornithological Society		
2	Increase the take up of agri-environment schemes on council-owned downland which promote habitats suitable for feeding and nesting starlings.	BHCC Cityparks, Property Services, South Downs National Park Authority, Natural England	2013 - ongoing	
3	Consider designation of important Starling roost sites as Sites of Nature Conservation Importance, afforded protection through the Local Plan / LDF	BHCC Cityparks, BHCC Planning Policy, Local Sites Selection Panel.	2013	
2	Integrate wildlife-friendly features and management into open space design and management (see also the Parks and Gardens HAP)	BHCC Cityparks, Friends Groups	2013 - ongoing	
3	Strengthen a functioning network of semi-natural habitat through the city to benefit starlings, urban birds and other wildlife	BHCC Cityparks, BHCC Planning Policy.	By 2020.	

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Swifts, Swallows and House Martins Group

Ecology

1. The Hirundines are the Swallow family of birds. In Brighton and Hove this family is represented by the House Martin (*Delichon urbicum*), and Swallow (*Hirundo rustica*). The Swift (*Apus apus*) has morphological and behavioural similarities to the Hirundines but belongs to the Apodidae bird family.

2. Although each species has different precise habitat requirements, they are all closely associated with urban development and have sufficiently similar needs and threats to warrant being treated together in this group action plan.

House Martin

3. The House Martin is blue-black on the back and head and has a pure white underside. That, together with its rather 'dumpy' appearance, distinguishes it from the other Hirundines in Brighton and Hove. House Martin are summer migrants, arriving in April and leaving in October for their winter feeding grounds in tropical Africa, south of the Sahara.

4. Much of the time is spent on the wing, although House Martin readily settle on buildings and telephone wires. Their nests comprise mud bowls, fixed externally, under the eaves of buildings. Colonies return to the same nest site for many years. They feed on a wide variety of invertebrates caught while the bird is in flight.

Swallow

5. The Swallow is distinguished by its russet throat and tapering, forked tail. Their nests comprise shallow, mud cups which are built onto rafters or other projections inside rural buildings with easy access, particularly barns and other farm buildings. They tend to feed close to the ground, swooping over meadows and ponds in search of their invertebrate pray.

Swift

6. The Common Swift is entirely black, larger than the Swallow and House Martin and has a distinctive sickle shape to its wings in flight. The Swift spends almost its entire life on the wing, including both eating and mating. By sleeping with half of its brain at a time, the Swift is also able to sleep in flight. They land only for a short period each year to breed.

7. Like the Swallow and House Marin, Swift nest sites are almost exclusively associated with buildings in the UK. Swifts tend to nest inside the roof space of older houses, searching out gaps in the sofit board or brickwork to gain access. Swift nests are small cups built from a collection of feathers and plant debris collected from the air while the swift is in flight. These materials are bound together with saliva to form a shallow cup on the floor of a roof space or hole. Swift colonies tend to be loyal to nesting sites, returning annually for many generations.

Status

House Martin

8. There are believed to be 250,000 to 500,000 pairs of House Martin in Britain. Nationally the population is in slow decline, by 38% since 1970. The House Martin is included in the amber list of bird species of conservation concern.

9. The population of House Martin is a sparsely distributed breeding bird in Brighton and Hove and tends to be restricted to the suburbs and to the villages to the east of the main urban area.

Swallow

10. The UK Swallow population is estimated as about 726,000 territories in 2000. Swallow was originally amber-listed partly on the strength of a perceived decline and continues to qualify through its widespread decline across Europe. In the UK, the population of Swallow may have increased since 1994, although there have been population fluctuations. These fluctuations may be related to changing rainfall in the western Sahel prior to the birds' spring passage through West Africa.

11. The Swallow is sparsely distributed in Brighton and Hove, tending to be confined to the urban fringe, particularly east of the city.

Swift

12. There were believed to be 80,000 pairs of breeding Swift in the UK in 2008. This represents a 29% decline since 1995. Swift monitoring is difficult because occupied nests can be hard to locate, many UK birds are immature, non-mating juveniles and because Swifts can sometimes travel substantial distances from the nest to feed. The Swift is included in the amber list of bird species of conservation concern.

13. The Swift was once a common breeding bird in central Brighton and Hove but anecdotally it has suffered a marked decline as older buildings have been renovated, restricting their nesting opportunities.

Threats and Opportunities

House Martin

14. House Martin populations are affected by weather. They require rain to produce wet mud for nest building and for encouraging the abundance of invertebrate prey, but cold wet weather prevents them feeding.

15. Air pollution can be a serious threat to birds in urban areas. House Martins are rare or absent in areas of high air pollution.

16. Modern houses are often constructed in ways that exclude birds from potential nesting areas. Direct persecution by householders of active nests is also an issue, although it is illegal under the Wildlife and Countryside Act 1981.

17. Invertebrate populations have declined markedly due to a combination of pesticide use and increasing 'tidiness' in the countryside and this has reduced food availability.

18. Weather and food availability in the African wintering grounds may influence breeding populations arriving in the UK.

Swallow

19. Swallow population declines in eastern parts of the UK may be related to the loss of livestock farming and grazed grassland, together with arable intensification, but an increase in area of pasture in the west and north has promoted a population increase which has more than compensated for declines elsewhere.

20. Another possible reason for localised declines is diminishing availability of suitable nesting sites as farms are modernized and accessible, rural buildings are reduced.

Swift

21. The main cause of the decline in Swift populations in the UK appears to be a reduced availability of nest sites. Many older buildings have been refurbished and no longer offer access into the roof space. Most new buildings do not provide opportunities for Swifts to nest.

22. Swifts may also be suffering from a reduction in their insect prey, but their diet is similar to Swallow and House Martin, which have not suffered similar population declines, which suggests that nest site availability is the more important factor.

Conservation Objectives

National and Sussex
No target data are available for this species

Brighton & Hove

1. Determine the status of House Martin, Swallow and Swift in Brighton and Hove by 2015.

2. Monitor population changes of House Martin, Swallow and Swift to detect changes in numbers and possible causes.

3. Promote increased awareness of House Martin, Swallow and Swift.

4. To promote the creation of artificial nest sites to encourage Swift.

5. To protect existing nest sites from damage and loss.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	With the support of local volunteers, locate nest sites for House Martin, Swallow and Swift in Brighton and Hove	BHCC Cityparks, local volunteers	2013 - 2016	
5	Establish a monitoring programme with local volunteers to determine changes in the breeding populations of House Martin, Swallow and Swift in Brighton and Hove	BHCC Cityparks, local volunteers	2013 onwards	
4	Produce awareness material on the needs and ecology of House Martin, Swallow and Swift for householders and developers	BHCC Cityparks	2014	
2	Council owned buildings to incorporate new nesting opportunities, including housing and farm buildings at appropriate locations	BHCC Property Services, Housing	2014 onwards	
2	Ensure developing planning policy protects the nest sites of House Martin, Swallow and Swift and creates new nest sites as a part of development	BHCC Planning Policy	2013 - onwards	

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The Mammals

Bats Species Group

Ecology

1. The species of bat which are known to breed in Brighton and Hove are:

Serotine	*Eptesicus serotinus*	Brighton & Hove LBAP
Noctule	*Nyctalus noctula*	UK BAP priority species
Common Pipistrelle	*Pipistrellus pipistrellus*	Brighton & Hove LBAP
Brown Long-eared Bat	*Plecotus auritus*	UK BAP priority species

2. Bats are addressed here as a group because all bats are protected by an identical legal framework. Many of the conservation issues associated with bats are common to all the species (although it should not be assumed that a conservation measure to conserve one species of bat will be of benefit to all).
3. Bats are insectivorous flying mammals, requiring insect-rich habitats such as deciduous woodland, grazing land and species-rich grassland in which to feed. They also need breeding roosts in buildings and trees in summer, and cooler, secure hibernation sites in winter. Linear landscape features (tree lines, hedges) are thought to be particularly important for travel between roosts and feeding areas.
4. Brighton and Hove is not ideal habitat for most bat species, being urbanised and surrounded by a relatively treeless, open landscape. However the urban fringe does offer good habitat for bats, with its mix of insect-rich pastures, woodland and scrub, particularly at Wild Park, Stanmer Park and the Benfield Valley. Common Pipistrelle can be found throughout the urban area, with records as far south as Brighton Marina, although they tend to be found in the suburbs and larger parks.

Status

5. All bats in the UK are listed under Appendix II of The Bonn Convention and Annex IV of the EC Habitats Directive. All bats are also fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 and The Conservation of Habitats and Species Regulations 2010. Under this legislation it is on offense to:

    - Deliberately capture, injure or kill a bat.
    - Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats.
    - Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time).
    - Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat.
    - Intentionally or recklessly obstruct access to a bat roost.

6. There is evidence to indicate that all species of bat have reduced in numbers in recent years. The Joint Nature Conservation Committee states that there was a 21% decline in Noctule bat over 6 years (see the National Bat Monitoring Programme 2004

report). However more recent assessments (e.g. NBMP Species Populations Trends 2011) suggest the population is stable, within broad confidence limits.

7. The Noctule Bat and Brown Long-eared Bat are both 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

8. There are three main threats to all bat species in Brighton and Hove:

Restricted ability to forage

9. Bats may use several square kilometres for foraging. For example, Serotine bats from a colony at Hollingbury ranged up to 6km from their roost site with individual bats using up to seven foraging sites of a range of habitats, principally pasture with cattle and white street lights[8]. The further that bats have to travel for food, the less energy they have for preparing for hibernation, for breeding and for rearing young.

10. Bats reach good feeding areas by connected 'commuting' routes which enable them to fly across the landscape, sheltered from strong winds and protected from predators. The structural nature of the vegetation connecting foraging areas is important. In Brighton and Hove, the known bat roosts are associated with mature tree lines, such as railway and road corridors, leading to areas of green space. Fragmentation of these flight corridors can disrupt bat feeding patterns. This might be caused by the direct loss of trees and shrubs, or increased artificial lighting which can tend to deter bats.

11. Some Pipistrelle colonies occur in suburban areas where blocks of interconnected gardens provide feeding opportunities. Bat access to foraging areas can be restricted by direct loss or degradation of foraging habitat. In Brighton and Hove there are significant development pressures to increase the density of sub-urban housing with small scale housing developments. Decking and other hard surfaces are becoming increasingly popular which reduces the value of gardens to night flying insects. Collectively these factors are reducing the garden green space and structural diversity available to bats.

12. While certain street lights may attract insects and hence provide an easy foraging site for some bat species, particularly in late summer and autumn, generally lighting is a deterrent for bats and particularly for the less common species, including long-eared bats. Lighting can also delay bat emergence, affecting foraging efficiency[9].

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[8] Catto, C.M.C., Hutson, A.M., Racey, P.A. & Stephenson, P.J. 1996. Foraging behaviour and habitat use of the serotine bat (*Eptesicus serotinus*) in southern England. *Journal of Zoology, London* 238: 623-633.

[9] Stone et al., Street Lighting Disturbs Commuting Bats, Current Biology (2009), Boldogh et al 2007 Acta Chiropterologica

13. Other factors, such as the use of endectocides (e.g. Ivermectin) in animal husbandry and other pesticides can also substantially reduce the night flying insect populations available on the urban fringe.

Limited roosting opportunities

14. The tendency for bats to roost communally means that whole populations are vulnerable to the destruction of occupied roosts. This may happen through building alterations or remedial timber works in buildings, and pruning or felling works to trees.

15. Bats appear to have very exacting roost requirements, often not using what at first seem to be adequate roost sites. Some bat species may be limited by a lack of roosting opportunities, such as the Noctule, which is heavily dependent on old, hollow trees.

Direct losses

16. In urban areas such as Brighton and Hove, cats can be significant predators of bats. Bats are relatively long-lived and may produce only one or two young a year, so direct mortality by predation can quickly have a long-term effect on bat numbers.

17. Traffic collisions can be a major cause of mortality in some areas[10].

18. Despite the strong legislation, bats continue to be threatened by deliberate persecution from owners / occupiers unwilling to retain a bat roost in their house.

19. Despite the significant threats to bats locally, there are also a number of mechanisms available to encourage bat numbers in Brighton and Hove:

    - Agri-environment schemes can be used to encourage the council's tenant farmers to promote bat flight corridors, feeding areas and night flying insects.

    - Tree protection policy can be adapted to promote collaborative working between bat workers and arboriculturalists.

    - Public parks and green spaces can be managed to encourage bats and their night-flying insect prey by planting nectar-rich plants and wild flowers, creating longer grass 'meadow' areas and minimising park lighting.

    - Bat roosts (trees and buildings) can be identified and protected by good communication between bat workers and property owners / occupiers.

    - Planning policy can be used to promote and protect strategically important green wedges and corridors through urban areas.

    - Publications and interpretation can be used to promote an increased understanding of bat issues by the public.

Conservation Objectives

National and Sussex

[10] Gaisler J, Rehak Z, Bartonicka T. 2009. Bat casualties by road traffic (Brno-Vienna). Acta Theriologica 54

No national target data are available for the Noctule Bat or the Brown Long-eared Bat.

Although the Common Pipistrelle is not a UK BAP priority species, the following national objectives are still promoted through the UK Biodiversity Action Reporting System:

T1: Maintain *P. pipistrellus* population above 2005 baseline level (baseline available only at UK level at this time).

T3 Increase *P. pipistrellus* population index by 35% of the 2005 baseline level by 2020. Work should focus on enhancing roosting and foraging habitat e.g. through the implementation of environmentally beneficial farming practices, maintenance / restoration of traditional landscape and boundary features (including highways) and woodlands. Promote responsible roost ownership and positive publicity in both rural and urban areas.

Brighton & Hove

1. Identify the key roosts, flight lines and feeding areas for all bat species in Brighton and Hove by 2015.

2. Ensure key roost sites, flight lines and feeding areas are protected from damage and appropriately managed by 2017.

3. Raise awareness of the important sites and features for bats in Brighton and Hove by 2020.

4. Improve conservation opportunities for bats in Brighton and Hove by increasing roosting opportunities, strengthening flight lines and conserving feeding areas by 2020.

5. Reopen the only significant hibernation site for bats in the city and examine opportunities to enhance other potential sites.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5,	Through survey, collation of existing information and monitoring, establish a good understanding of the distribution and behaviour of bats in Brighton and Hove, particularly of important commuter routes, feeding areas and roosts	Sussex Bat Group, local volunteers, BHCC Cityparks	2013-2015	
2	Integrate the needs of bats into open space management plans and planning policy to ensure commuter routes, food sources and roosts are conserved	BHCC Cityparks, Property Services and Planning Policy	2013 - 2017	
3	Target key feeding and	BHCC Cityparks, BHCC	2015 - 2017	

	roosting areas for conservation action through advice, agri-environment schemes, etc.	Property Services, Sussex Bat Group		
3	Identify and implement suitable sites for roost enhancement and creation	BHCC Cityparks, BHCC Property Services, Sussex Bat Group	2015-2020	
4	Integrate bat awareness into public events and improve awareness of professional bodies whose activities may affect bats	BHCC Cityparks	2013 on	

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The Hazel Dormouse (*Muscardinus avellanarius)*

Ecology

1. The Hazel Dormouse has bright golden-brown fur, large eyes and a bushy, prehensile tail. They eat a variety of flowers, fruits and insects through the spring and summer, hibernating from first frosts right through the winter.

2. Females give birth to four or five young from early June until September (but mainly in July or August). The young remain with their mother for up to two months, delaying her production of a second litter. Consequently Dormice have a low reproductive rate compared to other rodents.

3. Dormice in the UK are on the northwest edge of their European range. In the UK, dormice are mainly found in southern England, with small populations in northern counties such as Cumbria and Northumberland.

4. Dormice were recently discovered in the Waterhall area of Brighton and Hove. Previously the city was considered to be isolated from the woodland populations on the north side of the Downs and Weald. However in 2009 Dormice were found to be using bird nest boxes in dense Hawthorn scrub within land managed by the Friends of Waterhall. Subsequently Dormice records have been made on the south side of the Brighton By-pass at Green Ridge and in ancient woodland at Stanmer Park. It is possible that shrub planting along the Brighton By-pass has allowed populations to colonise scrub blocks in many parts of the urban fringe of the city.

Status

5. The dormouse is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 and the Conservation of Species and Habitats Regulations 2010.

6. The Act and Regulations make it illegal to:

i. Intentionally or deliberately kill, injure or capture dormice
ii. Deliberately or recklessly disturb dormice (whether in nest or not)
iii. Damage or destroy dormouse breeding sites or resting places
iv. Possess or transport a dormouse or any part of a dormouse, unless acquired legally
v. Sell, barter or exchange dormice, or parts of dormice

7. A licence must be obtained from Natural England to undertake any work involving dormice.

8. The Dormouse is a 'species of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such species and every public authority must have regard to its conservation in the exercising of its functions.

Threats and Opportunities

9. National figures indicate the Dormouse has declined by 23% over 9 years. Dormice have also been lost from 7 counties since the turn of the century, which represents a 50% reduction in range. In Brighton and Hove, little is known about the health of Dormice populations or their distribution, outside the areas where recent discoveries have been made.

10. Dormice require a diverse, continuous shrub layer with a variety of food sources to enable them to feed throughout their active period. They are therefore vulnerable to habitat degradation through neglect (which can lead to a reduction in species diversity) or mismanagement.

11. Habitat fragmentation and isolation can occur through clearance of scrub and trees for development or other land uses. Dormice exist at low population densities and need large areas and interconnected blocks of trees and shrubs to enable then to move freely between different food sources.

12. Wet, cold summers, mild winters and early frost are unfavourable for Dormice. Their distribution corresponds to areas with less than 100mm annual rainfall and a mean July temperature of 16.5^{O}C.

Conservation Objectives

National
T1: Maintain the current range (376 occupied 10km squares) of Dormouse in UK.

T2: Re-establish self-sustaining Dormouse populations at 16 sites, in counties where they have been lost, by 2010.

T3: Ensure the Dormouse population index is at 100% of the 1991 level by 2015 and increase to 115% of the 1991 level by 2020. (Target involves converting the current (2005) negative population trend into a stable or positive population trend by 2010).

Sussex
There are no targets for the South East or Sussex

Brighton & Hove

1. Understand the distribution and abundance of Dormice in the city by 2016.
2. Ensure existing populations of Dormice are conserved by 2018.
3. Aim to increase Dormice populations in Brighton and Hove by 2020.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Engage with the National Dormouse Monitoring Scheme to locate existing populations of Dormice in Brighton and Hove and to obtain long term data on population changes	BHCC Cityparks, Sussex Mammal Group, local groups	2013-2016	
2	Provide advice to land managers on appropriate management of habitats known to support Dormice	BHCC Cityparks, Sussex Mammal Group, local groups	2013 - ongoing	
2	Ensure that policies to protect dormice and their habitats are included in planning policy and site management plans	Brighton and hove Strategic Partnership / Sustainability Partnership; BHCC Policy Planning, Cityparks	2013 - ongoing	
4	Establish a training programme to ensure key staff and volunteers are confident and qualified in Dormouse handling, monitoring and habitat management.	BHCC Cityparks	2013 - ongoing	
3	Attempt to connect 'missing links' between areas of Dormouse habitat through habitat creation and management to strengthen and extend Dormouse populations.	BHCC Cityparks, BHCC Planning Policy	2015 - 2020	

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Further Reading

Natural England species information note SIN005 available at:
http://publications.naturalengland.org.uk/publication/127008?category=41002

Peoples Trust for Endangered Species Hedgerows for Dormice project, at:
http://www.ptes.org/?page=286

Managing small woodlands for dormice: a guide for owners and managers. PTES available at: http://www.ptes.org/files/578_managing_woodlands_for_dormice_final.pdf

Others

The Lichen *Physcia clementei*

Ecology

1. *Physcia clementei* is mainly a southern UK species and can be found on nutrient-rich, well-lit trunks of wayside and parkland trees as well as steeply sloping, basic rock faces near the coast and inland in churchyards.

2. The lichen was last recorded in Brighton and Hove at Stanmer Churchyard.

Status

3. The lichen is classified as Nationally Scarce.

Threats and Opportunities

4. *Physcia clementei* is threatened by damage and loss through the repair and maintenance of wall surfaces and the management of graveyards, including the use of herbicides, the movement of gravestones from their original positions and the cleaning of headstones.

Conservation Objectives

National and Sussex

No target data are available for this species

Brighton & Hove

1. To determine if the species is still present in Brighton and Hove by 2015

2. To ensure sustainable populations of the species are conserved by 2018

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Establish the presence and distribution of the species in Brighton and Hove and to monitor any confirmed populations	BHCC Cityparks in partnership with specialist surveyors, Sussex Botanical Recording Society	2013 - 2015	
4	If *P. clementei* is	BHCC Cityparks	2015	

	discovered, to ensure all relevant land managers are informed of its habitat and management requirements through meetings and explanatory leaflets			
2	Ensure any conservation management needs for the species are introduced where it is known to exist	BHCC Cityparks	2016	
4	Ensure the species and its ecology is explained as part of site interpretation where it occurs.	BHCC Cityparks	2015 - ongoing	

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Part 3: The Habitats of Importance in Brighton and Hove

The 2009 Biodiversity Audit

1. An audit of all the habitats in Brighton and Hove was carried out between 2007 and 2009; the first time a complete audit of the city had been attempted[11]. The audit was based on remote sensing techniques, with some ground truthing. The audit assessed the extent of habitats over the administrative area, also taking account of habitat quality. The main findings of the audit were:

    - 89% of the total land surface of the city (equivalent to 7,414 ha) is divided between arable, improved grassland and built-up areas and gardens.

    - Built-up areas and gardens alone account for 1,463.01 ha (17%) of Brighton and Hove.

    - 11% (853ha) of Brighton and Hove is semi-natural habitat.

2. Not all the important habitats identified in this Biodiversity Action Plan were measured. For example, linear features such as hedgerows and cereal field margins could not be assessed with the method used. It also proved to be very difficult to define the extent of the 'Urban Commons' habitat category because of its transitory and fragmented nature.

3. The areas of the LBAP habitats which were assessed as part of the habitat audit are summarised below:

[11] The Brighton and Hove Habitat Audit 2007- 2009. Unpublished report

Coastal Vegetated Shingle	0.8 ha
Farmlands	-
Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats	
Hedgerows	-
Intertidal chalk	32.6 ha
Lowland calcareous grassland	299.0 ha
(of this, 101.3ha is in favourable conservation status)	
Lowland Mixed Deciduous Woodland	300.0 ha (excluding scrub)
Scrub Woodland	181.2 ha
Maritime cliff and slopes	4.2 ha
Parks and gardens	-
Ponds	-
Sheltered Muddy Gravels – subtidal sediments	
Subtidal chalk	-
Subtidal sands and gravels	-
Urban Commons	-

Coastal Vegetated Shingle

Ecology

1. Shingle is an accumulation of pebbles with a diameter of between 2 and 200mm. In Brighton and Hove, the shingle beaches are composed mainly of flint pebbles derived by marine or glacial erosion.

2. Shingle tends to be increasingly stable with distance from the shore. Specialised communities of flowering plants, grasses, mosses and lichens can develop, reflecting the changing conditions. These communities are adapted to a highly challenging combination of water stress (most of the water available is highly saline), nutrient impoverishment and extremes of temperature. Vegetated shingle is also a rare habitat in the UK and globally and some of the species it supports are restricted to this habitat alone.

3. Within Brighton and Hove most of the beaches are too disturbed by the effects of urbanisation and tourism to support vegetation. There are exceptions, at the extremities of the conurbation, where urban pressures are less. These include the small beach at Black Rock which has formed by the accretion of shingle against the western wall of the Brighton Marina. Close to this, areas of stable, vegetated shingle can also be found along the route of the Volks Railway. On the western boundary of the city, small areas of beach at Shoreham Harbour also support vegetated shingle. Together these areas total under 1 ha, making vegetated shingle the rarest of the internationally important habitats found in Brighton and Hove.

Associated species

4. The following Brighton and Hove LBAP species are associated with the vegetated shingle habitat in the city (excluding species with their own species action plans):

Ulopa trivia	Leafhopper	Nationally Notable b

Agrotis cinerea	Light Feathered Rustic	Locally notable
Calophasia lunula	Toadflax Brocade	UK BAP priority species
Atriplex laciniata	Frosted Orache	Locally notable
Calystegia soldanella	Sea Bindweed	Locally notable
Polygonum maritimum	Sea Knotgrass	W&C Act 1981 Sch 8; Nationally Rare
Cakile maritima	Sea Rocket	Locally notable

Management Needs of Particular Species

5. Vegetated Shingle is the most near-natural habitat surviving in Brighton and Hove. All the above species benefit from low levels of disturbance, to allow natural coastal processes to continue. Some invasive species control may also be required.

Status

6. Coastal vegetated shingle is an internationally rare habitat, occurring mainly in northern Europe, Japan and New Zealand. It is listed in Annex I of the EC Habitats Directive as a habitat requiring protection through Special Areas of Conservation.

7. 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

8. Shingle beaches are widely distributed around the UK coastline, but structures sufficiently stable to support perennial vegetation are comparatively rare, with around 5,800 hectares of vegetated shingle nationally.

Threats and Opportunities

9. The vegetated shingle habitat in Brighton and Hove is restricted to a narrow band along the coast which coincides with an area of high economic and social activity. Unsympathetic development along the coast can disrupt and displace vegetated shingle communities. Beach cleaning and other maintenance work can also damage and destroy them. However new areas of vegetated shingle can also be incorporated into development and leisure activities.

10. Coastal defence work can interrupt natural sediment movement which affects coastal habitats, including vegetated shingle.

11. Sea level rise, through Climate Change, threatens to squeeze the band of beach where suitable conditions exist for vegetated shingle, unless the sea defences are moved inland.

12. Vegetated shingle is vulnerable to recreation impacts such as beach cleaning and trampling.

13. Non-native plant species are a concern along the Volks Railway, where garden escapes such as Silver Ragwort (*Senecio cineraria*) now form a significant component of the flora.

Conservation Objectives

National

T1: Maintain total extent of coastal vegetated shingle habitat throughout the UK, and the structures, sediment and coastal processes that support them.

T2: Achieve favourable or recovering condition by appropriate management of XXha of coastal vegetated shingle systems currently in unfavourable condition by 2010. This should achieve the retention or enhancement of populations of BAP priority species associated with vegetated shingle.

T3: In key locations initiate restoration of shingle communities on arable land over shingle deposits by 2015.

Sussex

A Maintain the total extent of coastal vegetated shingle habitat in Sussex with no net loss, and the structures, sediment and coastal processes that support them.

B Achieve favourable or recovering condition by appropriate management of 353 ha of coastal vegetated shingle systems currently in unfavourable condition by 2015.

C Initiate restoration of shingle communities on arable land at Rye and Dungeness over shingle deposits by 2015.

D Create 5 ha of vegetated shingle in the urban environment by 2015 through new development or small-scale habitat creation schemes.

Brighton & Hove

1. Maintain the total extent of coastal vegetated shingle habitat in Brighton and Hove with no net loss.

2. By 2015, establish programmes to achieve favourable or recovering condition of any existing coastal vegetated shingle which is currently in unfavourable condition.

3. Increase the area of vegetated shingle in Brighton and Hove to 1.3 ha by 2020 through new development or habitat creation schemes (this target is based on local aspirations and opportunities and not on the national or Sussex-based targets).

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2, 3	Ensure all remaining areas of vegetated shingle are protected by a local designation and	BHCC Cityparks; Local Sites Selection Panel, BHCC Planning Policy	2013 - ongoing	

	appropriate planning policy			
3	Work with land owners / managers to develop and implement management plans for existing vegetated shingle areas to restore them to favourable condition	BHCC Cityparks, Volks Railway, Brighton Marina, Shoreham Harbour	2015 - 2020	
2	Ensure policy to extend vegetated shingle is included in planning policy and is implemented as part of suitable development proposals	BHCC Cityparks, BHCC Planning Policy, BHCC Development Control	2013 - ongoing	
2	Create new areas of vegetated shingle as part of landscaping and planting schemes in appropriate coastal locations	BHCC Cityparks	ongoing	
4	Establish on and off-site interpretation for vegetated coastal shingle sites to improve understanding of the habitat	BHCC Cityparks, Tourism and Leisure	ongoing	
4	Make available for sale to the public selected vegetated shingle plants, propagated from local stock.	BHCC Cityparks,	2014 - ongoing	

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Further Reading

Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. See http://jncc.defra.gov.uk/pdf/Article17/FCS2007-H1210-audit-Final.pdf

Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. See http://jncc.defra.gov.uk/pdf/Article17/FCS2007-H1220-audit-Final.pdf

Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats

Ecology

1. This community is found on hard substrates that are locally sheltered but close to tide-swept or wave exposed areas. They are dominated by large, slow growing species such as various sponges, anemones, tunicates and a mixture of other associated invertebrates and fish and an understory of bryozoans.

2. The environmental preferences of the habitat are fully marine salinity, below the zone of tidal influence with exposed to moderately exposed wave exposure (though with local shelter), moderately strong tidal streams (though with local shelter) and with a steeply sloping substratum. Under normal conditions the substratum would be inclined bedrock or large boulders, However in Brighton and Hove, a sub-form of the habitat is provided at Brighton Marina, where the environmental preferences of the habitat are met on the various floating structures. The subtidal communities which have colonised the floating pontoons in the Outer Harbour are unusual and rarely encountered elsewhere along the Sussex coast. The artificial nature of the habitats permits these communities (normally accessible for study by diving biologists only) to be studied from the safety and comfort of dry land.

3. The species found in the Outer Harbour of the Brighton Marina which are normally associated with Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats include:

Sponges: *Suberites ficus, Leucosolenia botyroides, Scypha ciliata, Halichondria bowerbanki, Halichondria panacea, hydroids (Tubularia indivisia, Plumularia catharina, Campanularia sp. Obelia Dichotoma)*

Anemones: *Anemones: Cereus pedunculatus, Metridium senile, Sagartiogeton undatus, Sagartiogeton lacerates*

Jellyfish: *Rhizostoma plumo*, *Aurelia aurita* and *Chrysaora hysoscella*

Tunicates: *Clavelina lepadiformis, Aplidium proliferum, Ciona intestinalis, Ascidiella aspersa, Aplidium proliferum, Diplosoma listerianum, Ascidia conchilega , A. mentula, Styela clava, Polycarpa scuba, Botrylus scholosseri and Molgula manhattensis.*

Bryozoans: *Aglaophenia pluma, Cellaria sinuosa, Bugula flabellata, Bugula plumosa and Bugula turbinata, and crisiids.*

Annelid worms: *Polynoidae Scale worm, Pomatoceros, Nephthys caecae, Eulaia viridis, Aglaophenia pluma*

Fish: mullet, eels, wrasse, bass, black goby, fifteen-spine stickleback, greater pipefish and importantly the Short-snouted Seahorse *Hippocampus hippocampus*,, a nationally rare species protected under the Wildlife and Countryside Act (1981).

Brighton & Hove LBAP species recorded in the Marina include:

European eel, *Anguilla anguilla*,
Native oyster *Ostrea edulis*,
Plaice *Pleuronectes platessa*,
Mackerel, *Scomber scombrus*
Sole, *Solea solea*
Cod, *Gadus morhua*
Whiting, *Merlangius merlangus*
Short-snouted Seahorse

Status

4. 'Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats' 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions. The Outer harbour at Brighton Marina is a sub-type of this habitat, occurring some distance from its normal, distribution along the coasts of Wales and south-west England.

Threats and opportunities

5. The habitat has developed naturally since completion of the Marina in 1978 and is therefore well suited to the existing environment. However the habitat is vulnerable to changes in water quality, (such as an increase in suspended sediments), solar radiation or pontoon use, as a result of changes in marina management practices, nearby dredging or construction / development.

6. The Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats is rare in Sussex. It is perhaps unique in the UK at Brighton Marina in being accessible without the need for diving equipment. With well-known and threatened species present, such as Seahorse, it offers an excellent opportunity for public education and involvement in the marine environment.

Conservation objectives

National and Sussex

No target data are available for this habitat

Brighton & Hove

Monitor the ecology of the habitat in the Outer Harbour of Brighton Marina in order to evaluate any changes which may be occurring. Review this action plan by 2017, based on the findings of monitoring.

Promote the importance of the habitat to a wider audience

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Develop and implement a monitoring programme for the Fragile Sponge and Anthozoan Communities on Subtidal Rocky Habitats habitat at Brighton Marina	IFCA, Seasearch/volunteer divers. BHCC Cityparks, BHCC Coastal Defence, Brighton Marina Estate Company	2015 - ongoing	
4	Develop and implement a promotional strategy for the habitat, involving on and off-site interpretation and viewing opportunities	Brighton Marina Estate Company, Seasearch / volunteer divers, BHCC Cityparks, IFCA	2015 - 2020	
2	Ensure development and management of the Marina	BHCC Cityparks, BHCC Planning Policy	2013 - ongoing	

	avoids damage to and where possible enhances and / or extends the habitat	Development Control, Brighton Marina Estate Company		

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Intertidal Underboulder Communities

Ecology

1. This habitat is found from the mid-shore down to the extreme lower shore, and encompasses areas of boulders (greater than 25 cm diameter) that support a diverse underboulder community. The underboulder habitat forms a series of microhabitats that can add greatly to the biodiversity of a shore. It provides an environment of shade, moisture and shelter which can therefore sustain a diverse collection of animals needing these conditions to survive on an otherwise hostile shore.

2. The underboulder habitat can occur on a range of substrates, wherever there is a sufficient gap on the underside of the boulder to support a species community. The richest examples of these communities are often found where there is running seawater, such as from tidal pools emptying.

3. In Brighton and Hove, intertidal underboulder communities occur within Brighton to Newhaven Cliffs Site of Special Scientific Interest, east of Brighton Marina.

Associated species

4. There are no Brighton and Hove LBAP species associated with the Intertidal Underboulder habitat in the city.

Status

5. The Intertidal Underboulder habitat 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). Under the Act, the Secretary of State must take ‘reasonably practicable’ steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

6. All the Intertidal Underboulder in Brighton and Hove is within Brighton to Newhaven Cliffs Site of Special Scientific Interest and is therefore protected under the Wildlife and Countryside Act 1981 (as amended).

7. At the time of writing, all the Intertidal Chalk in Brighton and Hove is included in the South Downs National Park and a draft Marine Conservation Zone.

Threats and Opportunities

- Boulder turning for species such as winkles and crabs can disrupt underboulder conditions where boulders are not replaced in their original position

- Sewage and nutrients can result in deoxygenation of underboulders, killing the species living there

Conservation Objectives

There are no conservation objectives for this habitat type

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2	Ensure Natural England is consulted on any coast protection works within the SSSI and their recommendations are fully implemented.	BHCC Coast Protection	ongoing	
5	Monitor the Intertidal Underboulder communities in Brighton and Hove	Natural England, IFCA	ongoing	
4	Raise the profile of the value of the habitat through appropriate interpretive material	IFCA, BHCC Cityparks, BHCC Tourism & Leisure	2014 - ongoing	

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Intertidal Chalk

Ecology

1. Intertidal chalk is formed from the erosion of coastal chalk cliffs which has resulted in gently-sloping intertidal platforms. These support a range of habitats which divide into bands parallel with the sea, each with characteristic creatures adapted to differing amounts of inundation. These chalk platforms are rare in Europe and the southern and eastern coasts of England account for 57% of the total European resource.

2. Intertidal chalk is the predominant habitat type seaward of the cliffs to the east of Brighton Marina, as far as the eastern boundary of Brighton and Hove. Here, the wave-cut platform is worn into a characteristic pattern of gullies and ridges at right angles to the sea, and supports a variety of typical invertebrates and algae. However the base of the cliff for its entire length to the Brighton and Hove border is protected from natural erosive processes by coast protection works.

Associated species

3. There are no Brighton and Hove LBAP species associated with the Intertidal Chalk habitat in the city.

Status

4. Intertidal Chalk 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

5. All the Intertidal Chalk in Brighton and Hove is within Brighton to Newhaven Cliffs Site of Special Scientific Interest and is therefore protected under the Wildlife and Countryside Act 1981 (as amended).

6. At the time of writing, all the Intertidal Chalk in Brighton and Hove is included in the South Downs National Park and is within a draft Marine Conservation Zone.

Threats and Opportunities

7. An important threat to intertidal chalk communities is coast protection work, which can damage habitats on the upper shore.

8. The deterioration of seawater quality due to pollutants and nutrient enrichment can cause substantial changes to the species composition of intertidal chalk. Pollutants lead to the replacement of plant communities dominated by the Fucus algal species group by mussel-dominated communities. Nutrient enrichment promotes blooms of the alga *Enteromorpha* spp. Oil spills can also have acute effects.

9. Human disturbance such as trampling, stone-turning, small-scale fishery and damage to rocks can have significant impacts to much frequented areas.

10. Invasion by non-native species is having a major impact on some Intertidal communities along the south and east coast of England. These threats are significant because of the restricted distribution and small area of this habitat type.

Conservation Objectives

National

T1: Retain the extent of littoral and sublittoral chalk habitats unaffected by coastal defence and other engineering works.

T2: Where possible increase the extent of littoral and sublittoral chalk habitats unaffected by coastal defence and other engineering works.

T3: Allow natural coastal processes to dictate, where possible, the geomorphology of the littoral and sublittoral environment.

Sussex

The Sussex HAP incorporates Intertidal Chalk into the 'Maritime Cliff and Slope' habitat. Only the targets which are applicable to the Intertidal Chalk community are reproduced here:

MCS A: Maintain the existing free-functioning maritime cliff and slope resource.

MCS B: Achieve favourable or recovering condition for 17 km of maritime cliff and slope by 2015.

Brighton & Hove

There are no opportunities to create or maintain areas of free-functioning maritime cliff and slope resource in Brighton and Hove, because of the necessity of protecting the settlements and infrastructure immediately above the cliff top. Moreover Natural England reports that 100% of Brighton to Newhaven Cliffs is in a favourable condition as of 1st February 2012.

1. Ensure the Intertidal Chalk element of the Brighton to Newhaven Cliffs SSSI is maintained in a favourable condition.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2	Ensure Natural England is consulted on any coast protection works within the SSSI and their recommendations are fully implemented.	BHCC Coast Protection	ongoing	
5	Continue ongoing monitoring of the Intertidal Chalk communities in Brighton and Hove	Natural England, IFCA	ongoing	
4	Raise the profile of the value of the habitat through appropriate interpretive material	BHCC Cityparks, BHCC Tourism & Leisure, IFCA	2014 - ongoing	
3	Support the conservation objectives of the rMCZ (should the site be designated)	BHCC, IFCA, SWT, NE	?	

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For further information see: http://www.biodiversitysussex.org/habitats/intertidal-chalk

Maritime cliff and slopes

Ecology

1. In Brighton and Hove, 'maritime cliffs and slopes' are vertical rock faces on the coastline where a break in slope is formed by slippage and/or coastal erosion. There is no generally accepted definition of the minimum height or angle of slope which constitutes a cliff, but in Brighton and Hove the zone is clearly distinguishable as the length of chalk cliffs which extend from the Brighton Marina to the eastern boundary of the city. To the north, the habitat includes a strip of species-rich grassland which extends for perhaps 15 metres to the A259 coast road. On the seaward side, the habitat extends to the limit of the spring high tide.

2. The species-rich grassland within the Maritime Cliff and Slopes habitat in Brighton and Hove is predominantly chalk grassland, but with a maritime element. These

include rare coastal species such as Hoary Stock (*Matthiola incana*), Rock Sea-lavender (*Limonium binervosum*) and Sea-heath (*Frankenia laevis*) as well as species which prefer a maritime influence but can be found further inland, such as Strawberry Clover (*Trifolium fragiferum*).

3. The supralittoral zone (directly above the spring high tide mark) represents the lowest belt of terrestrial vegetation on maritime cliffs and is usually exemplified by a zone of orange and grey maritime lichens. In Brighton and Hove this has been heavily modified or removed by sea defence works.

Associated species

4. The following Brighton and Hove LBAP species are associated with the Lowland calcareous grassland habitat in the city (excluding species with their own species action plans):

Halictus eurygnathus RDB1
Coastal chalk grassland with abundant Greater Knapweed. Requires areas of bare soil, sparsely vegetated or short-turf and dead wood, *Rubus* clumps and pithy dead plant stems.

Lasiommata megera *Wall* *UK BAP Priority*
Breeds in short, open grassland where the turf is broken or stony. Found in coastal habitats, including vegetated undercliffs and rocky foreshores

Status

5. All the Maritime Cliff and Slope habitat in Brighton and Hove is within the statutorily designated Brighton to Newhaven Cliffs Site of Special Scientific Interest. In 2012 the Natural England monitoring report for the SSSI states that it is in good condition.

6. Maritime Cliff and Slope 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

Threats and Opportunities

7. In Brighton and Hove, the extensive development along the A259 has necessitated the construction of extensive sea defence works. These have included the re-profiling of cliff faces and cliff protection at the cliff base, and other works which have all had damaging affects on the habitat.

8. Recreation can cause trampling and eutrophication of cliff top plant communities

9. The location of the cliffs in Brighton and Hove requires annual mowing of the cliff top, rather than grazing, which may lead to species changes in the long term.

10. The cliffs in Brighton and Hove are widely appreciated by the public and therefore represent a unique opportunity to explain nature conservation issues to the public.

Conservation Objectives

National

T1: Maintain the existing free-functioning maritime cliff & slope resource (including of cliff-top and slope habitat), estimated to be have a length of about 4500 km. This is essentially a 'no net loss' target that should take account of the balance between the extent of coast protection works and free-functioning cliff systems (all the cliffs in Brighton and Hove are already protected).

T2: No overall net loss of cliff and slope functionality as a result of coast protection or engineering works.

T3: Increase the extent of Maritime Cliff and Slope unaffected by coastal engineering/coast protection from 250km to 275km by 2020 (unlikely to be achievable in Brighton and Hove die to the high value of assets behind the cliff).

T4: Increase the area of cliff-top semi-natural habitats by at least 500 ha (minimum) by 2015. (very unlikely to be addressed in Brighton and Hove because all available land for expansion is occupied by built development).

T5: Achieve favourable or recovering condition for 1,500 km/30% of maritime cliff and slope including cliff-top vegetation, by 2010 (attained in Brighton and Hove).

Sussex

A Maintain the existing free-functioning maritime cliff and slope resource (including cliff top
and slope habitat).

B Achieve favourable or recovering condition for 17 km of maritime cliff and slope including cliff-top vegetation, by 2015.

C Increase the area of cliff-top semi-natural habitats by 211 ha by 2015.

Brighton & Hove

In Brighton and Hove there are no opportunities to increase the area of cliff-top habitat and the cliffs are already in favourable condition. The local target therefore focus on maintaining habitat quality.

1. Ensure the Maritime Cliff and Slope habitat in Brighton and Hove is maintained in favourable condition.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2	Ensure coast protection works in the vicinity of	BHCC Coast Protection; Natural England; BHCC	ongoing	

	Brighton to Newhaven Cliffs SSSI are carried out in accordance with professional ecological advice to conserve the habitat and avoid unnecessary damage to biodiversity	Cityparks		
3	Ensure management of the cliff top grassland is carried out to conserve its biodiversity importance	BHCC Cityparks	ongoing	
5	Monitor the nature conservation value of the SSSI and ensure the council is advised of the results and of any action which needs to be taken to conserve the biodiversity of the cliffs	Natural England	ongoing	
4	Promote the nature conservation value of the cliffs through a programme of interpretation	BHCC Cityparks, Natural England	2014 – 2020	
2	Ensure the cliffs are protected from inappropriate development through planning policy	BHCC Planning Policy	2013 - ongoing	

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Sheltered Muddy Gravels – subtidal sediments

Ecology

1. Sheltered muddy gravel habitats naturally occur in areas protected from wave action and strong tidal streams, such as estuaries, rias and sea lochs. Marinas provide very similar conditions but these are not included in the national definition because of a lack of data.

2. Good quality examples of this habitat are very scarce. The group associated with the UK Marine BAP review agreed in 2007 that this habitat would benefit from being split into two subcategories; ‘Intertidal mixed sediments’ and ‘Subtidal mixed sediments’. The latter category closely applies to the Brighton Marina.

3. The Marina has an outer and inner seabed. The outer Marina seabed mostly consists of settled silt on top of soft mud, both of which are very easily disturbed. Juvenile flatfish are often seen here – in fact the Marina is a nursery for several species of fish. The enclosed water of the Marina is often a degree or two warmer than the open water outside, and this, together with the shelter provided, makes it conducive to many species of fish and other open water species.

4. Three biotopes are associated with the Sheltered Muddy Gravels habitat but a lack of data makes it impossible to determine the precise biotope found in the Marina. In fact, relatively little in known about the ecology of the Harbour bed. It is likely that there are molluscs and annelids, typical of this habitat, but survey work is required.

Associated species

Hydroids:	*Tubularia indivisia, Plumularia catharina, Campanularia sp., Obelia dichotoma*
Molluscs:	*Mya truncate, Venerupis senegalens*
Annelid worms:	*Notomastus latericeus, Aphelochaeta marioni, Melinna palmate, Neanthes virens and Cirriformia tentaculata, Lanice conchilega*
Fish:	Eels, juvenile plaice, dab, sole

Status

5. All the Sheltered Muddy Gravel habitat in Brighton and Hove is within the Brighton Marina.

6. Sheltered Muddy Gravel 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

Threats and opportunities

- *Physical disturbance*: Marine developments including construction and the widening and dredging of channels may permanently affect the sedimentary conditions.

- *Organic enrichment*, especially sewage pollution stress: Severe pollution can lead to anoxic conditions and a decrease in macrobenthic populations and species diversity.

- *Persistent bio-accumulating chemicals* (e.g. polychlorinated biphenyls and tri-butyl tin), waste discharges containing heavy metals and chemicals.

- *Introduction of non-native species*: The Slipper Limpet, *Crepidula fornicata* can dominate the fauna resulting in the smothering of the sediment surface leading to anoxia in the sediment. They are also considered a pest of oyster beds.

Conservation objectives

National & Sussex

No target data are available for this habitat

Brighton & Hove

Survey the habitat to determine its species composition and ecological characteristics

Monitor the ecology of the habitat in the in order to evaluate any changes which may be occurring. Review this action plan by 2018, based on the findings of monitoring.

Promote the importance of the habitat to a wider audience

Principle*	Action	Lead Partners	Start / end date	Progress
5	Develop and implement a monitoring programme for the Sheltered Muddy Gravels habitat at Brighton Marina	Seasearch/volunteer divers. BHCC Cityparks, BHCC Coastal Defence, Brighton Marina Estate Company	2015 on	
4	Develop and implement a promotional strategy for the habitat, involving on and off-site interpretation	Brighton Marina Estate Company, Seasearch / volunteer divers, BHCC Cityparks.	2015	
	Review this action plan following the outcomes of the proposed monitoring programme.	BHCC Cityparks, , BHCC Coastal Defence, Brighton Marina Estate Company	By 2018	

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Subtidal chalk

Ecology

1. Beyond the extensive wave-cut platforms of the chalk cliffs east of Brighton Marina, the chalk continues below the low water mark, where subtidal sea caves and reef habitats can form. Turbidity and exposure determine the species found, but these areas can be rich in sessile species such as sea squirts and burrowing species such as piddocks. These subtidal chalk ‘reefs’ can also provide important feeding and nursery areas for crustaceans and fish.

Associated species

2. There are no Brighton and Hove LBAP species associated with the Subtidal Chalk habitat in the city (excluding species with their own species action plans).

Status

3. Subtidal Chalk 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). Under the Act, the Secretary of State must take ‘reasonably practicable’ steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

4. Currently the Subtidal Chalk in Brighton and Hove has no specific legal protection (it is beyond the low water mark and therefore outside Brighton to Newhaven Cliffs Site of Special Scientific Interest). However, the reef complex has three components that have been designated Marine Sites of Nature Conservation Importance. At the time of writing all the Subtidal chalk east of Brighton Marina is included in a draft Marine Conservation Zone.

Threats and Opportunities

5. Coastal defence work has potential to damage Subtidal Chalk communities. However it is not considered likely that coastal defence will damage this habitat in Brighton and Hove in the foreseeable future. Damage can be further caused by anchoring and the use of bottom trawls. This can be mitigated by controlling these activities in the area.

6. The eutrophication of seawater by pollutants, particularly sewage, has caused biotopes dominated by the algae *Fucus* spp to be replaced by mussel-dominated biotopes. The nutrient demanding *Enteromorpha* spp can also become dominant.

7. Non-native species, such as *Sargassum muticum* can displace native species.

Conservation Objectives

National

No target data are available for this habitat

Sussex

No target data are available for this habitat

Brighton & Hove

Evaluate the possibility of monitoring the ecology of the Subtidal Chalk east of Brighton Marina in order to evaluate any changes which may be occurring. Subtidal Chalk has high levels of turbidity which creates difficult conditions for subtidal surveys. The extent of this habitat and its associated communities are not well documented at present.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Develop a monitoring programme for the ecology of the Subtidal Chalk community in Brighton and Hove.	IFCA, Seasearch/volunteer divers. BHCC Cityparks, BHCC Coastal Defence	2014 – 2016	
	Review this action plan following the outcomes of the proposed monitoring programme report.	IFCA, BHCC Cityparks, , BHCC Coastal Defence	2016	
3	Support the conservation objectives of the rMCZ (should the site be designated)	IFCA, BHCC Cityparks, BHCC Coastal Defence	?	

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Fir further information see: http://www.biodiversitysussex.org/habitats/subtidal-chalk

Subtidal sands and gravels

Ecology

1. Subtidal sands and gravel sediments are the most common habitats found below the level of the lowest low tide around the coast of the United Kingdom. They are found along the entire coast of Brighton and Hove.

2. The sand and gravel habitats close to the shore of Brighton and Hove are exposed to strong tidal currents and wave action. Few species are able to survive these harsh conditions, and consequently the habitat tends to have low species diversity. The main exceptions are the small or rapidly burrowing bivalves and amphipods.

3. Beyond the zone of tidal influence, gravels have communities of high diversity. These habitats are dominated by thick-shelled bivalve and echinoderms species, sessile sea cucumbers and sea urchins.

4. Many of the inshore habitats are important nursery grounds for juvenile commercial species such as flatfishes and bass. Offshore, sand and gravel habitats support internationally important fish and shellfish fisheries.

Associated species

5. There are no Brighton and Hove LBAP species associated with the Subtidal Sands and Gravels habitat in the city (excluding species with their own species action plans):

Status

6. Subtidal Sands and Gravels 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). Under the Act, the Secretary of State must take ‘reasonably practicable’ steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

Threats and Opportunities

7. Although there is little systematic monitoring information available for this habitat, trawling and aggregate dredging activities are believed to be a threat. Gravels, which support important fish nurseries, are disturbed by scallop dredging as are slow growing fauna such as bivalves, although scallop dredging is prohibited within 3 nautical miles from territorial baselines. Other construction activities, such as gravel

extraction for construction and other off-shore developments could have similar effects.

8. Organic pollution from sewage discharge can reduce Oxygen availability, leading to a reduction in diversity in the water column. Other sewage pollutants, such as heavy metals, can have direct affects on species.

Conservation Objectives

National and Sussex

No target data are available for this habitat

Brighton & Hove

No action proposed at this time. Review if circumstances change.

For further information see: http://www.biodiversitysussex.org/habitats/subtidal-sands-and-gravels

The Urban Area

Parks and gardens

Ecology

1. The Parks and Gardens habitat incorporates all private gardens in the city, as well as the publically managed parks, squares and other green spaces managed by Brighton and Hove City Council and others. Public green spaces include public housing land, school grounds, allotments, road verges and other green space which is used by the public for recreation and food growing.

2. This habitat amounts to a substantial proportion of the urban area of Brighton and Hove. A recent study has identified 232 hectares of parks and public gardens alone[12] and there may be as much as 7,000 hectares of private gardens[13] in the city, although no precise figures are available.

3. Much of the public green space in the city has been incorporated into the South Downs Way Ahead Nature Improvement Area and is therefore a national target for conservation action on a landscape scale.

4. Although all of the parks and gardens in Brighton and Hove have other primary uses, they nevertheless offer a substantial opportunity to improve biodiversity and enrich people's daily experience of their local environment by integrating biodiversity conservation into their design and management. This can be achieved by a variety of means, such as adapting existing planting to attract birds and invertebrates. There

[12] Brighton and Hove Open Space, Sport and Recreation Study. PMP. October 2008.
[13] The Brighton and Hove Habitat Audit 2007- 2009 (unpublished report).

are also opportunities for more ambitious programmes within parks, gardens and private gardens to create entirely new habitats.

5. Brighton and Hove has a thriving food growing sector with strong community involvement. Organisations such as the Brighton Permaculture Trust, the Moulsecoomb Forest Garden and Wildlife Project and Harvest and events such as 'Seedy Sunday' promote the conservation of rare and threatened cultivated plants. These initiatives promote contribute to biodiversity conservation and engage local communities in the environment.

6. The Dorothy Stringer Butterfly Haven, in Dorothy Stringer School, is a good example of entirely new habitat, created from former species-poor amenity grassland. The small site is full of attractive flowers in spring and summer and is popular with school children as an 'outdoor classroom'. It has also been colonised by a number of rare species and offers genuine and significant benefits to biodiversity.

Associated species

7. The following Brighton and Hove LBAP species are associated with the parks and gardens habitat in the city (excluding species with their own species action plans):

Prunella modularis subsp. cccidentalis	Dunnock (Hedge Accentor)	UK BAP priority species
Natrix natrix	Grass Snake	UK BAP priority species
Erinaceus europaeus	Hedgehog	UK BAP priority species
Passer domesticus	House Sparrow	UK BAP priority species
Anguis fragilis	Slow-worm	UK BAP priority species
Turdus philomelos subsp. Clarkei	Song Thrush	UK BAP priority species

Status

8. Parks and gardens are protected from development by national and local planning policy. In 2010 the Government announced that private gardens should no longer be classified as 'brownfield land', helping to prevent their piecemeal loss to development.

Threats and Opportunities

9. Fashions in gardening have tended to move towards more hard surfacing, patios and decking which reduces the proportion of a garden available for wildlife to use. Features such as 'old fashioned' perennial borders, with their wide range of nectar producing plants, old fruit trees and open compost heaps are becoming less common.

10. 'Backland development', whereby houses are constructed on the back gardens of existing properties, has been a significant cause of private garden loss in Brighton and Hove. Backland development tends to happen in the larger gardens, which are often those with greatest nature conservation value.

11. Due to financial restraints, many public parks and gardens have been managed with increasingly uniform landscapes which are quick and easy to maintain, but which offer few opportunities for biodiversity.

12. Public perception can prevent habitat creation in public parks and private gardens. Often people associate wildlife with untidiness and unkempt spaces, although this can be avoided with careful site planning and management.

13. Private gardens are difficult to affect ecologically because they are divided over multiple ownerships.

14. Parks and gardens are a unique opportunity to bring people into close contact with biodiversity, with all its associated benefits to human health and well being. In the case of private gardens, people can actually contribute directly to LBAP targets through their own habitat creation schemes. Similar opportunities are available in some public parks, school grounds and other spaces, where local friends groups can be enabled to conserve and enhance public green space.

15. Many of the successful food growing initiatives in Brighton and Hove exist on low or short term funding and rely on the commitment of a few, dedicated individuals.

Conservation Objectives

National, South East and Sussex
No target data are available for this habitat.

Brighton & Hove

1. By 2014, launch a 'wildlife garden challenge' initiative, to popularise wildlife gardening.

2. Raise the profile and influence of the Brighton and Hove in Bloom Wildlife Garden competition by 2014

3. Work with local garden centres to promote wildlife-friendly features in their stores by 2016.

4. Ensure biodiversity objectives are integrated into management plans of all public open spaces in the city by 2020.

5. Ensure all council parks maintenance staff are aware of good practice in encouraging biodiversity in parks and other public spaces by 2016

6. Create at least 15 new 'butterfly havens' on public green space in Brighton and Hove by 2015.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
4	Launch a 'wildlife garden challenge' aimed at encouraging biodiversity in private gardens, supported by leaflet / poster on local wildlife gardening opportunities	BHCC Cityparks, local community groups, corporate sponsor	2014 - ongoing	

4	Biodiversity exhibition to encourage wildlife-friendly gardening	BHCC Cityparks, local garden centres	2014 - 2015	
2	Review all existing parks management plans and create new plans to make the most of opportunities to integrate biodiversity across public open space in the city	BHCC Cityparks	2013 - 2020	
2,4	Develop and implement a 'hands on' biodiversity training programme for Cityparks staff	BHCC Cityparks	2013 - 2014	
3	Create new 'butterfly havens' across the city, following the Dorothy Stringer model	BHCC Cityparks	2013 -2020	
4	Develop a local scoring system for evaluating the nature conservation value of parks, gardens and green spaces and use it to report on the quality of spaces for biodiversity conservation	BHCC Cityparks	2014	
4	Propagate and make available for sale a selection of locally native wild plants	BHCC Cityparks	2013	
1, 2, 3, 4,	Strengthen community involvement in community food growing through a city-wide programme which supports this already thriving sector	Harvest Brighton & Hove, BHCC Cityparks	2013 - ongoing	
2	Ensure important road verges are enhanced and managed for wildlife, particularly where they occur within the Nature Improvement Area.	BHCC Cityparks; local volunteers	2013 - ongoing	

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Urban Commons

Ecology

1. The 'urban commons' habitat does not have a corresponding habitat at national or regional level, but it incorporates the 'Open Mosaic Habitats on Previously Developed Land' UK BAP Priority habitat.

2. Urban commons include areas of disturbed ground and 'brownfield' land, often with an uneven topography through development, recreational or historical use. They tend to have free-draining, infertile soils with very short vegetation, perhaps kept short by rabbits or trampling. They may also have areas of poorly drained, compacted soil with exposed mud and wet hollows.

3. Urban commons can be very diverse ecologically, supporting rare plants and species groups such as the nests of solitary bees and wasps which are adapted to dry, sparsely vegetated soil. This is a very rare habitat in Brighton and Hove, which may be on the verge of local extinction through a combination of development, negelect and nutrient enrichment. Potential sites for the urban commons habitat include:

    - The old BMX track, the old tip surface and an associated trackway at Sheepcote Valley. This area has been subject to regular disturbance in the past and now has significant exposures of thin, nutrient poor soils with various aspects. Oak-leaved Goosefoot and Pennyroyal have been found on the poorly draining areas around the dew pond here. Both these species are rare and require damp, boggy grassland habitats. Suitable conditions exist here, either because of the underground, waterproof tip membrane or because of soil compaction during the landscaping of the tip. The Goosefoot is an annual and therefore needs areas of exposed, muddy soil to persist. These areas are often rich in invertebrates and are also used by birds for feeding.

    - The northern end of Whitehawk Hill. Here, abandoned allotments on thin, free draining soil have created conditions suitable for a range of open habitat species, including Bulbous Meadow –Grass (*Poa bulbosa) and* Yellow Vetchling (*Lathyrus aphaca).*

    - Abandoned arable fields north of Mile Oak, where a range of plants and invertebrates have begun to recolonise.

    - Hollingbury Hill Fort, where, free draining soils overlaying chalk have promoted gorse thickets and patches of bare soil on south facing slopes.

    - Possibly green and brown roofs created on developments such as those at the Brighton New England Quarter.

    - Railway sidings may support small areas of this habitat, for example north of New England Road.

Associated species

4. The following Brighton and Hove LBAP species are associated with the Urban Commons habitat in the city (excluding species with their own species action plans):

Poa bulbosa	Bulbous Meadow –Grass	Locally notable
Zootoca vivipara	Common Lizard	UK BAP priority species
Poa infirma	Early Meadow-grass	Locally notable
Hyoscyamus niger	Henbane	Locally notable
Chenopodium murale	Nettle-leaved Goosefoot	Locally notable
Calophasia lunula	Toadflax Brocade	Locally notable
Lasiommata megera	Wall	UK BAP priority species
Vicia lutea	Yellow Vetch	Locally notable

Lathyrus aphaca	Yellow Vetchling	Locally notable

Status

5. 'Open Mosaic Habitats on Previously Developed Land' 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions. However it is unlikely that any of the 'urban commons' land remaining in Brighton and Hove qualifies under the national habitat description.

6. Most of this habitat is believed to be within locally designated sites (Local Nature Reserves, proposed Local Nature Reserves or Sites of Nature Conservation Importance).

Threats and Opportunities

7. Nutrient enrichment, leading to colonisation by competitive plants, scrub and woodland is an important threat to areas of Urban Common on the urban fringe.

8. Many of the species associated with this habitat need bare ground to complete their life cycles and are therefore dependent on disturbance, through trampling, etc. for survival.

9. Development has removed virtually all of this habitat type from the urban area.

10. Track maintenance and herbicide treatments threaten areas of line side Urban Commons.

11. North Whitehawk presents a potential opportunity to promote the Urban Commons habitat through vegetation and topsoil removal.

Conservation Objectives

National and Sussex
No target data are available for this habitat

Brighton & Hove

1. Collate survey information for any remaining or potential 'Urban Commons' land and develop management programmes to conserve any remaining habitat by 2016.

2. Investigate opportunities for selective topsoil removal on the block of land between Swanborough Drive, Vines Cross Road and Wilson Avenue, to create new habitat by 2017.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress

5	Collate survey information for potential 'Urban Commons' land to identify any remaining habitat	BHCC Cityparks	2016	
3	Develop management prescriptions, in partnership with local communities, for identified Urban Commons land to conserve and expand the habitat	BHCC Cityparks	2017	
4	Develop interpretation material to raise awareness of the habitat	BHCC Cityparks	2017	
2	Protect identified Urban Commons land through appropriate policy	BHCC Planning Policy, BHCC Property Services	2017	

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Principle 5: Establish a strong evidence base

Downland

Farmland

Ecology

1. Brighton and Hove Council owns approximately 4,000 ha of farmland to the north and east of the built-up area. Almost all of this is within the South Downs National Park. Most is leased to tenant farmers.

2. The traditional farming method on the Brighton and Hove Downs has been mixed farming, whereby the steeper slopes and higher land were grazed as permanent pasture and the valley bottoms cultivated for cereals and other crops. This farming method promoted a remarkably rich ecology. Grazing conserved the species-rich chalk pastures which are probably the UK's most floristically diverse habitat. The low input arable farming co-existed with a diversity of specialist farm birds and arable annual plants. The juxtaposition of the two favoured the life cycle of species such as Brown Hare.

3. Modern farming methods, with increasing use of pesticides and fertilizer and more intensive cultivation techniques have impoverished the ecology of the downland farms. Nutrient enrichment and ploughing have degraded the chalk grasslands, modern arable methods have caused the rapid decline of farmland birds and arable plants. Concerted action is now needed to reverse the decline and ensure the Downs remain a rich natural environment, in accordance with the objectives of the National Park, as well as a food producing area.

4. Although small areas of species-rich chalk grassland are addressed through this Action Plan, the Brighton and Hove LBAP also includes the Chalk Grassland Habitat

Action Plan, which specifically addresses the chalk grassland habitat. The Dew pond, a traditional downland farm feature, is also addressed separately through the Ponds Action Plan (see Below)

Associated species

5. The following Brighton and Hove LBAP species are associated with the farmland habitat in the city (excluding species with their own species action plans):

Alauda arvensis subsp. Arvensis	Sky Lark	UK BAP priority species
Pyrrhula pyrrhula subsp. Pileata	Bullfinch	UK BAP priority species
Eberiza calandra subsp. Calandra	Corn Bunting	UK BAP priority species
Perdix perdix	Grey Partridge	UK BAP priority species
Vanellus vanellus	Lapwing	UK BAP priority species
Carduelis cannabina subsp. autochthona/cannabina	Linnet	UK BAP priority species
Sturnus vulgaris subsp. Vulgaris	Starling	UK BAP priority species
Passer montanus	Tree Sparrow	UK BAP priority species
Streptopelia turtur	Turtle Dove	UK BAP priority species
Emberiza citronella	Yellowhammer	UK BAP priority species
Thecla betulae	Brown Hairstreak	UK BAP priority species
Lepus europaeus	Brown Hare	UK BAP priority species
Micromys minutus	Harvest Mouse	UK BAP priority species
Euphorbia platyphyllos	Broadleaved Spurge	Locally notable
Lithospermum arvense	Corn Gromwell	Locally notable
Petroselinum segetum	Corn Parsley	Locally notable
Centaurea cyanus	Cornflower	UK BAP priority species
Fumaria densiflora	Dense-flowered Fumitory	Nationally scarce
Fumaria parviflora	Fine-leaved Fumitory	Locally notable
Valerianella dentata	Narrow-fruited Cornsalad	Locally notable
Adonis annua	Pheasant's-eye	UK BAP priority species – i. IUCN (1994) Vulnerable
Scandix pecten-veneris	Shepherd's-needle	UK BAP priority species
Torilis arvensis	Spreading Hedge-parsley	UK BAP priority species
Misopates orontium	Weasel's Snout	Locally notable

Management Needs of Particular Species

6. ***Sky Lark, Bullfinch, Corn Bunting, Grey Partridge, Starling, Tree Sparrow, Turtle Dove, Yellowhammer, Brown Hare, Harvest Mouse and all arable plants*:** weedy stubble fields for winter feeding habitat; spring sown cropping; winter fallowed fields; increase insect availability through conservation headlands, beetle banks and spray-free field margins; small blocks of diverse scrub with small trees within farmed landscape, lapwing scrapes in suitable fields.

7. ***Brown Hairstreak***: farm scrub blocks with blackthorn and 'master or assembly trees', no extensive winter flailing

8. ***Brown Hare***: A diversity of cropped areas, grass leys and weedy field margins at the landscape scale.

Status

9. The Farmland habitat includes 'Arable Field Margins' which 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

10. Almost all the farmed downland around Brighton and Hove is designated National Park under the National Parks and Access to the Countryside Act 1949. One of the two statutory purposes of the National Park is to conserve and enhance the natural beauty, fauna, flora and cultural heritage of the area.

11. The Brighton and Hove downland also includes several local wildlife non-statutory policy designations (currently under review).

Threats and Opportunities

12. The main threat to downland wildlife is agricultural intensification. Direct damage to chalk grassland, dew ponds and other downland habitats has occurred as a result of enlarging arable fields and fertilizer application has damaged ancient chalk grassland. Many blocks of habitat are now isolated in an intensively managed landscape which makes them prone to 'edge effects' and species loss. Nitrate and pesticide pollution have had indirect, but substantial effects on wildlife. Changing agricultural practices have also meant that many arable fields are no longer suitable for ground nesting birds and insecticides have reduced the insects essential of the development of fledgling birds.

13. Neglect and inappropriate management have also had important affects on wildlife. Ground surveys for the Brighton and Hove Local Sites review (taking place at the time of writing) are finding that many of the known former dew ponds on the Downs are dry. Grazing animals fed on nutrient supplements are grazed on ancient chalk pasture, inadvertently causing nutrient enrichment of the sward and species loss.

14. Countryside recreation has had a damaging effect on some downland habitats, but benefitted others. For example, several Brighton and Hove golf courses encapsulate significant areas of chalk grassland in their roughs. In most cases these tend to be neglected or mismanaged, but at some golf courses, such as Waterhall, important areas of habitat have been preserved. Horse-culture is popular in some parts of the urban fringe and although it can benefit wildlife, in some cases chalk grassland areas are overgrazed and species are lost.

15. All of the Downs around Brighton and Hove qualify for Higher Level Stewardship payments. HLS marks an important opportunity to reintroduce sympathetic management on a landscape scale. Rental agreements between the council and the tenant farmers are another opportunity to encourage framing practices which promote downland biodiversity.

Conservation Objectives

National and Sussex

This Farmland HAP is a local action plan and does not correspond directly with the national or Sussex action plans.

Brighton & Hove

1. Ensure all the habitats of value on the Brighton and Hove farmed estate are accurately mapped and their condition assessed and monitored by 2015.

2. Promote partnership working between farming and conservation interests to achieve agreement on the land management goals for the Brighton and Hove farmland by 2018.

3. Ensure the existing habitats on the Brighton and Hove farmland are maintained in favourable condition by 2020.

4. Improve the connectivity between patches of important habitat on the Brighton and Hove farmland by creating new habitat to establish strategic links within the Nature Improvement Area.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Compile existing survey data to plot accurately the habitats and features of biodiversity value and their conservation status across the Brighton and Hove downland. Supplement with further survey as necessary.	Downland Initiative	2013 - 2015	
2	Develop detailed management objectives which accord with the appropriate agri-environment incentives, to ensure the farmland habitats and features of biodiversity value achieve favourable conservation status	Downland Initiative, tenant farmers, Natural England	2015 - 2018	
3	Determine the areas of land, the actions needed and the funding available to reconnect important areas of habitat into sustainable blocks	Downland Initiative, working closely with tenant farmers	2015 - 2018	
1	Involve local volunteers in monitoring farmland wildlife through partnership programmes with farmers, similar to the RSPB's Volunteer & Farmer Alliance	Downland Initiative, tenant farmers	2015 - ongoing	

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Hedgerows

Ecology

1. A hedgerow is any boundary line of trees or shrubs over 20m long and less than 5m wide at the base, provided that at one time, the trees or shrubs were more or less continuous[14]. All hedgerows, consisting predominantly (80% or more cover) of at least one woody UK native species are addressed by this action plan.

2. Hedgerows have an important function in connecting otherwise isolated areas of habitat in the landscape, for example being used by foraging bats as commuter routes. Hedgerows also model 'woodland edge' habitat and can therefore be important in themselves for a wide range of scarce species which favour the transition zone between shrubs, trees and grassland or arable land.

3. Hedgerows do not form a typical part of the landscape in Brighton and Hove. The downland which surrounds the city is historically open, with very few trees and has probably never been enclosed by hedges. However there are a few ancient hedges, some of them now within the urban area. One if the most well known is at Green Ridge, where old Hawthorn and other bushes mark an ancient boundary line. There are other hedges at Benfield Valley (with a high proportion of Elm) and south Woodingdean. Perhaps the most recent edition has been the species-rich hedge which was planted along the eastern side of Wilson Avenue in the 1990s.

Associated Species

4. The following Brighton and Hove LBAP species are particularly associated with the hedgerow habitat in the city (excluding species with their own species action plans):

Pyrrhula pyrrhula subsp. Pileata	Bullfinch	UK BAP priority species
Cuculus canorus	Cuckoo	UK BAP priority species
Prunella modularis	Dunnock (Hedge Accentor)	UK BAP priority species
Turdus philomelos subsp. Clarkei	Song Thrush	UK BAP priority species
Muscicapa striata	Spotted Flycatcher	UK BAP priority species
Passer montanus	Tree Sparrow	UK BAP priority species
Streptopelia turtur	Turtle Dove	UK BAP priority species
Emberiza citronella	Yellowhammer	UK BAP priority species
Satyrium w-album	White-letter Hairstreak	UK BAP priority species
Thecla betulae	Brown Hairstreak	UK BAP priority species

Management Needs of Particular Species

5. All of the above species benefit from similar hedgerow management practices. These comprise:

   - Trim hedge to an 'A' shape;
   - Adopt a rotational cutting regime so no more than one third of the hedgerow length is trimmed in the same year;
   - Trim any one length of hedge every 3 years;

[14] Defra Hedgerow Survey Handbook 2nd edition 2007

- On agricultural land, combine hedges with set-aside headlands or grass buffer strips.

Status

6. Hedgerows are a 'habitat of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

7. There are not believed to be any important hedgerows in Brighton and Hove (as defined by the Hedgerow Regulations 1997).

Threats and Opportunities

8. Most of the hedges in Brighton and Hove are on the urban fringe and are vulnerable to a range of urban related threats, including garden and other rubbish dumping, section removal (for development or amenity), excessive 'tidying' (mowing around the base, pruning) and neglect.

Conservation Objectives

National

T1 Maintain the net extent of hedgerows across the UK.

T2 Maintain the overall number of individual, isolated hedgerow trees (estimated by CS 2000 to be 1.8 million in Great Britain in 1998) and the net number of isolated veteran trees (to be estimated for the first time by CS 2007).

T3 Ensure that between 2005 and 2010 hedgerows remain, on average, at least as rich in native woody species.

T4 Achieve favourable condition of 243,000 km (35%) of hedgerows by 2010 and 348,000 km (50%) by 2015. (Target does not include Northern Ireland.)

T5 Reverse the unfavourable condition of over-managed hedgerows across the UK by reducing the proportion of land managers who trim most of their hedges annually to 60% by 2010 (applicable to England only).

T6 Halt further decline in the condition of herbaceous hedgerow flora in Great Britain by 2010 (and improve their condition by 2015). (Target does not include Northern Ireland.)

T7 Improve the condition of the hedgerow tree population by increasing numbers of young trees (1-4 years) in Great Britain to 40,000 by 2010 and 80,000 by 2015. (Target does not include Northern Ireland.)

T8 Achieve a net increase in the length of hedgerows of an average of 800 km per year in Great Britain to 2010 and 2015 (Target does include Northern Ireland.)

Sussex

- Continue to augment the Sussex hedgerows database on current extent of native species-rich hedgerows and continue to digitise all Sussex hedgerow data.
- Encourage the favourable management of hedgerows and hedgerow trees. Halt the net loss of species rich hedgerows through neglect, removal or inappropriate management
- Support Local Authorities in their execution of the Hedgerows Regulations 1997.
- Seek to increase the numbers of native, species-rich hedgerows in favourable condition in Sussex.
- Maintain overall numbers of hedgerow trees at least at current levels by marking existing trees to allow to grow on as standards and encouraging new planting, in line with landscape guidelines.
- Encourage planting of native, mixed hedgerows where compatible with landscape guidelines, particularly where they will help provide connectivity on a landscape-scale. Species used should be compatible with that Character Area.

Brighton & Hove

1. Improve understanding of the hedgerows of importance in the Brighton and Hove context by 2013
2. Ensure all locally important hedges are conserved by 2018
3. Extend the length of locally important hedgerow in Brighton and Hove by at least 1% (to reflect the national proposed rate of increase) at appropriate locations by 2020.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Complete a detailed survey of all the hedges (other than garden hedges) in Brighton and Hove, to include their location, extent, management issues and species composition.	BHCC Cityparks, volunteers	2015-2016	
3	Define the hedges of local importance and seek designation as Local Wildlife Sites. Draw up conservation management	BHCC Cityparks, Local Sites Selection Panel, BHCC Planning Policy,	2016 - 2018	

	plans for each hedge and work with land managers to achieve implementation.			
3	Identify lengths of new hedgerow at suitable locations to achieve maximum biodiversity benefit and to complement the landscape. Delivery through farm grants, development, community projects	BHCC Cityparks, BHCC Property Services, BHCC Planning Policy, BHCC Development Control, Friends Groups	2016 - 2020	

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Lowland calcareous grassland (including chalk scrub and waxcap colonies)

Ecology

1. Lowland calcareous grasslands develop on shallow, lime-rich rendzina soils, generally overlying limestone rocks, including chalk. The high lime content of the soil fixes phosphates, limiting their availability to plants. Nitrates are leached out of the free draining soil, particularly on steep downland slopes. This, combined with grazing pressure, restricts plant growth and favours slow growing calcicole species. These specialised conditions promote an extraordinary plant diversity; up to 50 species of plant can be found in one square metre.

2. Lowland calcareous grassland is one of the richest habitats of Western Europe, containing a great diversity of plants and animals, many of which are nationally or internationally threatened. This habitat is now rare and fragmented, and is of international conservation concern.

3. Some ancient grassland supports waxcap fungi communities. These are of particular nature conservation interest because of their rarity and because they are normally confined to grassland with a long historical continuity. Some of these grasslands may not be particularly rich in vascular plants, but are nevertheless of biodiversity importance.

4. This action plan includes the chalk scrub habitat, since many important species associated with chalk grassland are dependent on the interface between chalk grassland and scrub and because both habitats very often occur together in Brighton and Hove. Chalk scrub includes recently establishing scrub, which can support a variety of species such as Wayfaring Tree (*Viburnum lantana*), Dogwood (*Cornus sanguinea*), Wild Privet (*Ligustrum vulgare*), Elder (*Sambucus nigra*) and Hawthorn (*Crataegus monogyna*) in a complex structural mosaic. It also includes senescent scrub, which tends to be dominated by mature Hawthorn.

Associated species

5. The following Brighton and Hove LBAP species are associated with the Lowland calcareous grassland habitat in the city (excluding species with their own species action plans):

Abida secale	Large Chrysalis Snail	Nationally notable
Adscita geryon	Cistus Forester	Locally notable
Adscita globulaiae	Scarce Forester	Nationally Scarce
Adscita statices	Forester	UK BAP priority species
Agrotis cinerea	Light Feathered Rustic	Locally notable
Alauda arvensis subsp. Arvensis	Sky Lark	UK BAP priority species
Anguis fragilis	Slow-worm	UK BAP Priority Sp., W&C Act S.5
Atypus affinis	Purseweb spider	Locally notable
Bombylius discolour	Dotted bee-fly	Nationally Scarce
Clinopodium acinos	Basil Thyme	UK BAP priority species
Coeloglossum viride	Frog Orchid	UK BAP priority species
Decticus verrucivorus	Wart-biter	UK BAP priority species
Doros profuges	Phantom Hoverfly	UK BAP priority species
Drilus flavescens	Yellowish Drile	Nationally Notable A
Euphrasia pseudokerneri	Chalk Eyebright	UK BAP priority species
Eurysa douglasi	Chalk Planthopper	UK BAP priority species
Gentianella anglica	Early Gentian	UK BAP priority species
Halictus eurygnathus	*a bee*	RDB1
Helica itala	Heath Snail	Locally notable
Hipparchia semele	Grayling	UK BAP priority species
Lampyris noctiluca	Glow-worm	Locally notable
Lasiommata megera	Wall	UK BAP priority species
Lysandra bellargus	Adonis Blue	W&C Act 1981 (Sch 5. 9.5a,b)
Lysandra coridon	Chalkhill Blue	Locally notable
Monacha cartusiana	Carthusian Snail	Locally notable
Mutilla europaea	Large Velvet Ant	Nationally Scarce
Ophrys sphegodes	Early Spider Orchid	Sch. 8, W&C Act 1981
Orchis ustulata	Burnt Orchid	UK BAP priority species
Phyteuma orbiculare	Round-headed Rampion	Locally notable
Pupilla muscorum	Moss Snail	Locally notable
Pyrgus malvae	Grizzled Skipper	UK BAP priority species
Ribautodelphax imitans	Tall Fescue Planthopper	UK BAP priority species
Scotopteryx bipunctaria	Chalk Carpet	UK BAP priority species
Silene nutans	Nottingham Catchfly	Locally notable
Tephroseris integrifolia	Field Fleawort	UK BAP priority species
Thesium humifusum	Bastard Toadflax	Locally notable
Ulopa trivia	Leafhopper	Nationally Notable b
Vallonia costata	Ribbed Vallonia	Locally notable
Vertigo pygmaea	Pygmy Snail	Locally notable
Weissia sterilis	Sterile Beardless-moss	UK BAP priority species

Management Needs of Particular Species

6. ***Halictus eurygnathus, Dotted bee-fly, Large Velvet Ant*:** Require ecological heterogeneity and flower richness in calcareous grasslands. Structural diversity is favoured, with patches of bare soil, sparsely vegetated or short-turf, *Rubus* clumps and pithy dead plant stems and occasional flowering shrubs. Scrubby and coarse vegetation areas should be retained in places.

7. **Glow-worm, Grizzled Skipper, Phantom Hoverfly, Slow-worm**: These species favour areas of longer grass adjacent to scrub, particularly on south and west facing banks

8. **Sky Lark:** Benefit from minimal disturbance from walkers during spring; vegetation between 20 and 50cm high and low grazing stock densities.

9. **Sterile Beardless-moss, Grayling, Wall**, **Chalk Carpet**, **Light Feathered Rustic**, **Bastard Toadflax**: These species require bare patches of chalky soil in short chalk grassland on south facing slopes, or short, sunny, open grassland where the turf is broken or stony.

10. **Adonis Blue**, **Chalkhill Blue Carthusian Snail, Large Chrysalis Snail, Moss Snail**, **Cistus Forester** require short chalk grassland swards (particularly rabbit-grazed) with Horse-Shoe Vetch on sheltered, south-facing slopes.

11. **Wart Biter** is restricted to mosaics of bare ground and short turf, combined with taller tussocks of vegetation.

12. **Tall Fescue Planthopper** appears to be restricted to chalk grassland with variable sward height but including some longer tussocks.

13. **Frog Orchid** occurs on north and east facing (slightly damper than south and west facing) chalk grassland slopes with very short swards.

14. **Summary**: The important species associated with chalk grassland in Brighton and Hove would particularly benefit from wide habitat heterogeneity. Areas of bare ground and very short turf should be promoted on all slopes, in mosaics with longer grassland and scrub.

Status

15. Lowland calcareous grassland 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

16. Lowland calcareous grassland is included within the *Festuco-Brometalia* grassland identified in Annex 1 of the EC Habitats Directive as of Community interest. The habitat is a priority type if important orchid populations are present.

17. The cover of lowland calcareous grassland has declined sharply over the last 50 years; current estimates put the amount remaining in the UK at 33,000 to 41,000 hectares. The bulk of the resource is found on chalk (25,000 to 32,000 hectares). Chalk grassland, once widespread on the South Downs, now covers only an estimated 3% of the area and is a tiny relic of a once extensive open landscape, created thousands of years ago.

18. Within Brighton and Hove, lowland calcareous grassland covers 299 ha (3.6% of the city), fragmented over many small sites. Of this, about a third could be described as having a favourable conservation status. This includes 71 ha at Castle Hill (a Site of

Special Scientific Interest, National Nature Reserve and Special Area of Conservation). The remaining two thirds are in decline through nutrient enrichment, invasion by coarse grasses and scrub, species loss and inappropriate management.

19. In addition to species-rich chalk grassland, there is a further 181 hectares of chalk scrub within Brighton and Hove.

Threats and Opportunities

20. The intensification of agriculture since the 1940's has led to the widespread fragmentation of lowland calcareous grassland on the Downs. The surviving blocks of habitat are much more vulnerable to damage through 'edge effects' and random events. Sedentary species may not be able to re-colonise if lost and small blocks of isolated habitat are difficult to manage for conservation purposes.

21. Inappropriate management, including lack of grazing, overgrazing, herbicide treatment, fertilizer drift and dumping of straw bales has caused damage to calcareous grassland in Brighton and Hove. Where chalk grassland fragments are included in larger grazing blocks of improved grassland, insidious fertilization of the sward can occur by grazing animals dunging on species-rich areas, particularly if supplementary feeding also occurs.

22. Lack of management can also tip the balance in favour of chalk scrub, on sites where a mosaic of scrub and grassland occurs. Scrub which is structurally diverse and supports a range of species can also be replaced by a monoculture of even-aged, over-mature Hawthorn scrub which is of lesser nature conservation value.

23. Lack of grazing also promotes nutrient accumulation in the soil which leads to the invasion of of dominant, coarse grasses such as Tor Grass *Brachypodium pinnatum*, False Oat Grass *Arrhenatherum elatius* and Upright Brome (*Bromus erectus*). These species are later displaced by scrub and eventually woodland.

24. At some sites, invasion by non-native plants, particularly *Cotoneaster horizontalis* has displaced native calcareous grassland communities.

25. Atmospheric pollution, particularly by Nitrates and Ozone, may be having a damaging effect on calcareous plant communities.

26. All of the Brighton and Hove Downs are within a target area payments under the Higher Level Stewardship Scheme, which has the potential to introduce good management practice to the surviving fragments of calcareous grassland and to reconnect them into more sustainable habitat blocks.

27. Ancient lowland calcareous grassland cannot be recreated. However, the butterfly haven project at Dorothy Stringer School has demonstrated that it is possible to create a surrogate calcareous grassland habitat, suitable for a variety of downland species, using an ecological engineering approach.

Conservation Objectives

National

T1: Maintain the current extent of Lowland Calcareous Grassland in the UK. (Target represents no loss of BAP habitat).

T2: Maintain at least the current condition of Lowland Calcareous Grassland

T3: Achieve favourable or recovering condition for 30,421ha (74 – 92%) of Lowland Calcareous Grassland by 2010.

T4 Restore 399ha *[approx. 1% of the UK total resource]* of Lowland Calcareous Grassland from semi-improved or neglected grassland, which no longer meets the priority habitat definition by 2010.

T5 Re-establish 8,424ha *[20 - 25% of the UK total resource]* of grassland of wildlife value from arable or improved grassland by 2010.

T6 6,320 ha (75%) of re-established area to be adjacent to existing Lowland Calcareous Grassland or other semi-natural habitat by 2010. (Refer to T5)

T7 4,200 ha (50%) of re-established area to contribute to resultant habitat patches of 2 ha or more of Lowland Calcareous Grassland by 2010. Where ever practicable bigger patches should be created. (Refer to T5)

Sussex

A Maintain the current extent (2630 ha) of lowland calcareous grassland in Sussex.

B Achieve favourable or recovering condition for 2104 ha *[80% of total Sussex resource]* of lowland calcareous grassland by 2015.

C Restore 26 ha *[1% of total Sussex resource]* of lowland calcareous grassland from semi-improved or neglected grassland by 2015.

D Re-establish 526 ha *[20% of total Sussex resource]* of grassland of wildlife value from arable or improved grassland by 2015.

Brighton & Hove

The following targets take account of national and Sussex targets but also consider local aspirations and realistic opportunities:

1. Maintain the current extent (299 ha) of lowland calcareous grassland in Brighton and Hove.

2. Achieve favourable or recovering condition for 100 ha *[33% of total Brighton and Hove resource]* of lowland calcareous grassland by 2017.

3. Restore 2.5 ha *[approx. 1% of total Brighton and Hove resource]* of lowland calcareous grassland from semi-improved or neglected grassland by 2020.

4. Re-establish 52 ha *[17% of total Brighton and Hove resource]* of grassland of wildlife value from arable or improved grassland by 2020.

5. 50 ha (approx. 95%) of re-established area to be within the NIA. (Refer to 4).

6. 26 ha (50%) of re-established area to contribute to resultant habitat patches of 2 ha or more of Lowland Calcareous Grassland. Where ever practicable bigger patches should be created (Refer to 4).

7. Encourage the restoration of structurally diverse, species–rich chalk scrub wherever possible within chalk grassland sites, to promote habitat diversity.

8. Seek to manage chalk grassland sites to maximise their structural diversity, including areas of very short sward or bare soil on slopes, longer grassland, grassland tussocks and species-rich scrub in habitat mosaics.

9. Ensure important waxcap fungi colonies in the city are conserved.

10. Ensure a common understanding is established of the value and management needs of the remaining chalk grassland resource.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2	Ensure land owners and managers have up-to-date records, of all the important chalk grassland under their control with the information and resources they need to conserve it	BHCC Cityparks, Property Services, Natural England, FWAG, South Downs National Park Authority	2013 - 2018	
3	Ensure management plans are prepared for at least 100 ha of calcareous grassland in unfavourable condition and that these are funded and implemented.	BHCC Cityparks, Property Services, Natural England, FWAG, South Downs National Park Authority	2014 - 2016	
2	Define 25ha of semi-improved grassland which would most benefit the conservation of calcareous grassland and target for habitat restoration through agri-environment schemes and tenancy agreements	BHCC Cityparks, Property Services, Natural England, FWAG, South Downs National Park Authority	2014 - 2016	
2	Define 26ha of improved grassland or arable which would most benefit the conservation of calcareous grassland and target for habitat restoration through agri-environment schemes, tenancy agreements and in accessible, urban locations.	BHCC Cityparks, Property Services, Natural England, FWAG, South Downs National Park Authority	2013 - 2016	
5	Ensure important waxcap colonies in the city are defined and mapped	BHCC Cityparks; BHCC Planning Policy, local naturalists	2013 - 2016	

3	Ensure all important waxcap sites are protected through designations Local Wildlife Sites	Local Sites Selection Panel, BHCC Cityparks	2013-2014	
3	Ensure site management plans are prepared and implemented for all important waxcap sites	BHCC Cityparks, Property Services, Natural England, FWAG, South Downs National Park Authority	2014	
4	Increase awareness of the value and management needs of chalk grassland through on and off-site interpretation	BHCC Cityparks	2013 - ongoing	

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Lowland Mixed Deciduous Woodland

Ecology

1. Lowland Mixed Deciduous Woodland is the predominant woodland type in Brighton and Hove. Woodland is land under trees with a canopy cover of at least 20%, including clearings and felled areas that can be replanted. At least 80% of the tree canopy of lowland mixed deciduous woodland should comprise species that are suited to the site and are within their natural range, taking into account both history and future climate change. There is no minimum size for woodland; the Forestry Commission for example takes account of woodlands to 0.1 hectares in size.

2. Lowland mixed deciduous woodland is not a common habitat in Brighton and Hove. The total area is approximately 300 ha (3.6% of the city). Most of this is relatively recently developed ('secondary') woodland, dominated by a few canopy trees (normally Sycamore, *Acer pseudoplatanus* and/or Ash, *Fraxinus excelsior*) and scattered into woodland blocks of under one hectare.

3. Of particular value is the 94ha of ancient woodland in the city. Ancient woodland is woodland which as existed since at least 1600 AD. Almost all the ancient woodland in Brighton and Hove is concentrated at Stanmer Park, with small outliers off Village Way, near the University of Brighton and south of Falmer High School. There is also a block of semi-natural ancient woodland at Withdean Woods, immediately south of Withdean Stadium.

Associated species

4. The following Brighton and Hove LBAP species are associated with woodland in the city (excluding species with their own species action plans):

Pyrochroa coccinea Black-headed Cardinal Beetle Nationally Notable b
On flowers at the edges of woodland.

Cuculus canorus Cuckoo UK BAP priority species
Reasons for decline unclear or probably cannot be addressed at the local authority level

Ophrys insectifera Fly Orchid UK BAP priority species
Requires open, woodland glades

Muscicapa striata Spotted Flycatcher UK BAP priority species
Woodland edges, parks and gardens. 81% decline over 25 years – reasons unclear but may include lack of nesting.

Hericium erinaceum Tree Hedgehog fungus UK BAP priority species
Dependent on the dead wood, normally of veteran trees

Status

5. Lowland Mixed Deciduous Woodland 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). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

6. Most of the larger blocks of woodland are protected, either within statutory Local Nature Reserves or Sites of Nature Conservation Importance. Ancient woodland is specifically protected from damage as a part of the development control process, through Planning Policy Statement 9. Lowland Mixed Deciduous Woodland is a UK BAP priority habitat and as such is also protected under national planning policy.

Threats and Opportunities

7. The woodland in Brighton and Hove are under particular threat from various pressures associated with urbanisation, including rubbish dumping, inappropriate recreational activity, illicit 'gardenisation' and the introduction of invasive non-native species.

8. Most of the woodland in the city is unmanaged and this tends to lead to reduced species diversity, particularly in recently established woodland.

9. Climate change could result in changes in vegetation communities and put certain species, such as Beech at risk.

10. Small areas of woodland continue to be lost and fragmented due to development.

Conservation Objectives

National

T1 Maintain the net extent of native woodland in the UK, (no net loss)
T2 Maintain the current extent and distribution of ancient semi-natural woodland, which qualifies as native woodland in the UK, (no change in the existing area).

T3 Achieve favourable or recovering condition of 565.7 kha (53%) of native woodland resource in the UK, by 2015.

T4 Restore 50.3 kha of non-native plantations on ancient woodland sites (PAWS) to native woodland in the UK by 2015.

T5 Expand the current native woodland resource in the UK by 134.5 kha, by 2015.

Sussex

A No net loss of native woodland.

B Achieve favourable or recovering condition of 20,570 ha of native broadleaved woodland
by 2015.

C Restore 5,433 ha of non-native plantations on ancient woodland sites in Sussex by 2015.

D Expand the current native woodland resource in Sussex by 3,881 ha by 2015.

Brighton & Hove
Land within Brighton and Hove is predominantly downland which, in East Sussex has traditionally supported a comparatively small amount of woodland. Local targets are therefore tailored to the local landscape and do not necessarily reflect national and pan-Sussex objectives.

1. No net loss of native woodland.

2. Achieve favourable or recovering condition of 94 ha of ancient broadleaved woodland by 2020.

3. Expand the current native woodland resource in Brighton and Hove by 5 ha by 2020, with the priority being to connect areas of remaining ancient woodland.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
2	Ensure all native woodland larger than 0.1 ha is mapped, identified in relevant development plans and given appropriate planning policy protection	BHCC Cityparks; BHCC Planning Policy	2013 - ongoing	
3	Ensure up-to-date management plans are available and being implemented for at least 159 ha of native woodland in the city. Management plans to incorporate woodland edge and woodland ride creation and management to achieve favourable conservation status	BHCC Cityparks	2013 - 2019	
3	Identify 5 ha of woodland	BHCC Cityparks; BHCC	2013 -2015	

	creation sites in relevant development plans to wherever possible connect remaining ancient woodland and provide wider community benefits	Planning Policy		
3, 4	Introduce coppice management and clearing creation in selected woods to promote habitat and species diversity. Local groups involved in this work could be 'rewarded' with the products generated from this sustainable management	BHCC Cityparks; local community groups.	2013 - ongoing	
4	Propagate locally sourced ground flora of woodland for use in new woods and (for selected species) to make available for sale to the public	BHCC Cityparks	2014 - ongoing	

Principle 1 : Mainstream biodiversity in society
Principle 2 : Integrate the conservation of biodiversity across other land uses
Principle 3: Conserve Important habitats and species on a landscape scale
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Ponds

Ecology

1. Ponds, for the purpose of UK BAP priority habitat classification, are defined as permanent and seasonal standing water bodies up to 2 ha in extent, which meet one or more of the following criteria:

    - Habitats of international importance: Ponds that meet criteria under Annex I of the Habitats Directive.

    - Species of high conservation importance: Ponds supporting Red Data Book species, UK BAP species, species fully protected under the Wildlife and Countryside Act Schedule 5 and 8, Habitats Directive Annex II species, a Nationally Scarce wetland plant species, or three Nationally Scarce aquatic invertebrate species.

    - Exceptional assemblages of key biotic groups: Ponds supporting exceptional populations or numbers of key species. Based on (i) criteria specified in guidelines for the selection of biological SSSIs (currently amphibians and dragonflies only), and (ii) exceptionally rich sites for plants or invertebrates (i.e. supporting ≥30 wetland plant species or ≥50 aquatic macroinvertebrate species).

    - Ponds of high ecological quality: Ponds classified in the top PSYM category ("high") for ecological quality (i.e. having a PSYM score ≥75%). [PSYM (the Predictive SYstem for Multimetrics) is a method for assessing the biological quality of still waters in England and Wales; plant species and / or invertebrate families are surveyed using a standard method; the PSYM model makes

predictions for the site based on environmental data and using a minimally impaired pond dataset; comparison of the prediction and observed data gives a % score for ponds quality].

- Other important ponds: Individual ponds or groups of ponds with a limited geographic distribution recognised as important because of their age, rarity of type or landscape context e.g. pingos, duneslack ponds, machair ponds.

2. Ponds are widespread throughout the UK, but high-quality examples are now highly localised, especially in the lowlands. It is estimated that around 20% of the 400,000 or so ponds in the UK (excluding garden ponds) meet one or more of the UK priority criteria.

3. In addition to the UK '***Priority Ponds***' the national action plan for ponds also identifies '**flagship pond sites**' which are the top 1% of Priority Ponds. These are of particular value because they support BAP species, very rich assemblages and/or are important pond types.

4. The national charity Pond Conservation has identified '**Important Areas for Ponds**' to raise awareness of geographic regions that support ponds of national or international biodiversity importance.

5. Data on Priority Ponds, Flagship Ponds and Important Areas for Ponds is collated in the National Pond Monitoring Network database. For more information see www.pondconservation.org.uk.

6. There are three types of pond in Brighton and Hove:

   - Dew ponds, which were originally constructed to water grazing animals on the Downs. These are saucer shaped, with a diameter of approximately 10 metres or more. Traditionally these were lined with straw and 'puddled' clay to create an impervious lining to trap rainwater. Modern farming methods have rendered dew ponds commercially obsolete, but several survive as relicts of traditional farming practice.. In recent years, some dew ponds have been renovated and new ones created, specifically for conservation purposes. These are usually lined with concrete, polythene or other artificial means. All dew ponds are prone to drying up during dry summers.

   - Garden ponds are almost always artificially lined. They are very variable but tend to be small (3 metres in diameter or less) and steep sided. Garden ponds tend to have water all year round (due to artificial topping up by the home owners).

   - Ponds in public parks which vary considerably in size and shape but are usually concrete lined.

7. This action plan addresses all ponds in Brighton and Hove, irrespective of whether they meet the national BAP criteria.

8. All ponds are ephemeral and will gradually silt up through a combination of vegetation encroachment and the deposition of organic matter, if not managed periodically.

Associated species

9. The following Brighton and Hove LBAP species are associated with the pond habitat in the city (excluding species with their own species action plans):

Bufo bufo	Common Toad	UKBAP priority species
Chirocephalus diaphanous	Fairy Shrimp	UKBAP priority species; IUCN Pre 1994 RED Vulnerable; W&C Act 1981 Sch 5
Natrix natrix	Grass Snake	UK BAP priority species
Triturus cristatus	Great Crested Newt	UKBAP priority species; W&C Act Sch 5

10. The Fairy Shrimp inhabits temporary pools which are prone to periodic drying, because it cannot co-exist with fish. It also shows a preference for sites that are subject to regular disturbance by livestock.

11. The Common Toad, Grass Snake and Great Crested Newt are all dependent on terrestrial habitat adjacent to the pond which has plenty of cover and feeding opportunities. Common Toad prefers larger ponds with stretches of deep, open water, although it will also breed in small garden ponds. Common Toad and Great Crested Newt require good water quality and aquatic vegetation. Grass Snake is a terrestrial reptile but it frequents ponds to hunt for its prey.

Status

12. Some ponds (those which meet or exceed the national criteria) are a 'habitat of principal importance for the purpose of conserving biodiversity' under section 41 (England) of the Natural Environment and Rural Communities Act (2006). Under the Act, the Secretary of State must take 'reasonably practicable' steps to further the conservation of such habitats and every public authority must have regard to their conservation in the exercising of its functions.

13. Brighton and Hove has one UK BAP Flagship Pond site, at Bullock Hill, just north of Woodingdean, where Fairy Shrimp has been recorded. However both the dewponds at Bullock Hill have been dry for some years and are surrounded by arable land.

14. Newhaven Important Area for Ponds covers eastern Brighton and Hove, including Whitehawk, Bevendean, Woodingdean, Rottingdean and Saltdean. The reasons for the designation of the Newhaven IAP include older records of the marginal plant Pennyroyal *Mentha pulegium* (Red Data Book Endangered; UK BAP priority species; included in Schedule 8 of the Wildlife and Countryside Act, 1981) but most of these sites have now been lost. One of the last was Falmer Pond, where there are records until 1996. Recently, two new
15. Pennyroyal populations have been recorded from seasonally inundated grassland areas in the Sheepcote Valley, Brighton, although these are probably introductions. Another notable record is of the RDB Vulnerable aquatic plant Whorled Water-milfoil *Myriophyllum verticillatum*, a species usually associated with clean calcarious waters, which was recorded from Lots Pond in Stanmer Park in 2003, although this species may no longer be present there.

Threats and Opportunities

16. The greatest threat to downland dewponds is neglect. Land managers no longer have a farming incentive to maintain dewponds and casual observation suggests a substantial proportion of the dewponds around Brighton and Hove are now dry

throughout the year. The Higher Level Stewardship Scheme has created an opportunity to restore old dewponds. It is possible that some species, such as Fairy Shrimp, could reappear in these ponds, if they are sensitively restored.

17. Inappropriate management is another important threat to dew ponds. Several popular dew ponds on the downs support fish because of artificial introductions. Fish predate a variety of aquatic organisms and are very damaging to populations of some species, such as Fairy Shrimp. Non-native invasive aquatics have been introduced to other ponds. Inappropriate pond clearance works have also led to the local extinction of important populations of some scarce species.

18. Inappropriate management of the land surrounding dew ponds can also have a very damaging effect on pond ecology. Many old dewponds are surrounded by arable land which is not suitable for the terrestrial stages of most aquatic animals. Spray drift and nutrient pollution for adjacent arable fields can also have a very damaging effect on aquatic wildlife.

19. The main threat effecting wildlife in garden ponds is a lack of public awareness of the needs of wildlife. Invasive alien plant species and fish may be added to ponds in the mistaken belief that these will promote wildlife. Ponds can be constructed in the wrong place and with a profile that will not encourage colonisation by native aquatic species.

20. Wildlife in ponds in parks and open spaces suffers from a range of threats including vandalism, the introduction of invasive alien plants and fish and colonisation by ducks and geese (which cause eutrophication of the water through their dung and through artificial feeding).

21. Concerns about health and safety have led to the infilling of ponds in urban areas, although in many cases alternative ways of making ponds safe are available.

22. People value ponds and sources of funding such as Higher Level Stewardship and the Million Ponds project by Pond Conservation have created opportunities to restore an extend ponds in the UK. Much of east Brighton is within an Important Area for Ponds and should therefore benefit from any funding bid to conserve ponds.

Conservation Objectives

National

Pond Conservation has produced the following draft targets for the UK BAP:

Target 1: Maintain the number of Priority Pond sites.

Target 2: Maintain the quality of Flagship Pond sites.

Target 3: Restore pond sites to deliver priority species targets.

Target 4: Create new pond sites of high quality potential.

Sussex
No net loss of ponds.

Increase our understanding of standing fresh water distribution and biodiversity value.

Maintain and enhance the quality of our standing fresh water resource through appropriate management.

Brighton & Hove

1. Implement a survey and monitoring strategy to gain a clear understanding of the changing condition of dew ponds, garden ponds and public ponds in Brighton and Hove by 2015

2. Promote good practice in pond management to key landowners, land managers and the public by 2017.

3. Ensure existing Priority Ponds in Brighton and Hove are in favourable condition, including the Flagship ponds at Bullock Hill by 2020.

4. Ensure a network of well maintained ponds exists within the Newhaven Important Area for Ponds by 2020.

Work Programme

Principle*	Action	Lead Partners	Start / end date	Progress
5	Ground survey all known dewponds in the city and report on their ecological condition every 10 years	BHCC Cityparks	2015	
3	Offer management advice and if possible funding to landowner / occupiers of key sites to restore and maintain their dewponds. Particular focus on Priority Pond and Fagship Pond sites	BHCC Cityparks; BHCC Estates	2015 onwards	
5	Launch a garden pond survey project, asking people to report on important features of their garden pond. Promote good wildlife ponds in gardens as part of the 'wildlife garden challenge' (see Parks and Gardens HAP)	BHCC Cityparks, BHCC Communications Team, community groups, corporate sponsor	2013 - 2017	
3	Promote the management of all dew ponds and the creation of new dewponds in the Newhaven IAP area	BHCC Cityparks; BHCC Property Services, South Downs National Park Authority, Pond Conservation (?)	2017 onwards	
2,	Survey all ponds in public parks and gardens in the city and report on their condition. Develop management plans to improve the nature conservation value of these	BHCC Cityparks	2017 onwards	

	ponds			
4	Promote good pond practice to the public through targeted material – e.g. the use of native aquatic plants in garden ponds, not to introduce species to ponds in the countryside	BHCC Cityparks, corporate sponsor	2017 onwards	

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References and Further Reading

‘Guidance for Local Authorities on Implementing the Biodiversity Duty ' (DEFRA, 2007).

‘The natural choice: securing the value of nature’ (DEFRA, 2011). The Natural Environment White Paper is described by DEFRA as ‘a bold and ambitious statement outlining the Government’s vision for the natural environment over the next 50 years’

‘Biodiversity 2020: A strategy for England’s wildlife and ecosystem services’ (DEFRA, 2011). Sets out the Government’s approach to halting the decline in biodiversity over the next decade.

‘Making Space for Nature: A review of England’s Wildlife Sites and Ecological Network’ (DEFRA 2010). Sets out the action needed to establish a coherent and resilient ecological network in England.