South Downs Green Infrastructure Framework

A Roadmap for Green Infrastructure

Evidence Report

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Produced for the South Downs National Park Authority and Partners by Blackwood Bayne Ltd.

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Introduction

Green infrastructure planning presents a co-ordinated and cross-sectoral approach to environmental planning and regeneration and delivers benefits not only to the environment but also to the development of better places in which to live, work and invest. At its best it is proactive and can be used to plan at a range of scales from single sites to sub-regional and incorporate many different sectors.

This Framework approach to strategic green infrastructure planning has been developed through a partnership approach, led by the South Downs National Park Authority.

The partners recognised that there is a need for greater understanding of the pressures, needs and opportunities relating to green infrastructure in order to support economic growth across the area. It is essential that the area retains and, ideally, enhances the environmental quality which underpins economic growth in the area and also brings about quality of life improvements for residents.

The partners also recognised that to do this required working more collaboratively, working across administrative boundaries and bringing together partners from a range of different sectors.

The area covered by this Framework is shown in Plan 1. It includes all the district local authorities which have some area within the South Downs National Park,[1] Hampshire, West Sussex and East Sussex County Councils and Brighton and Hove Unitary Authority as well as Waverley district that abuts the South Downs National Park. The PUSH area is included as a buffer area, but is not a member of the partnership.

Aim of the Framework

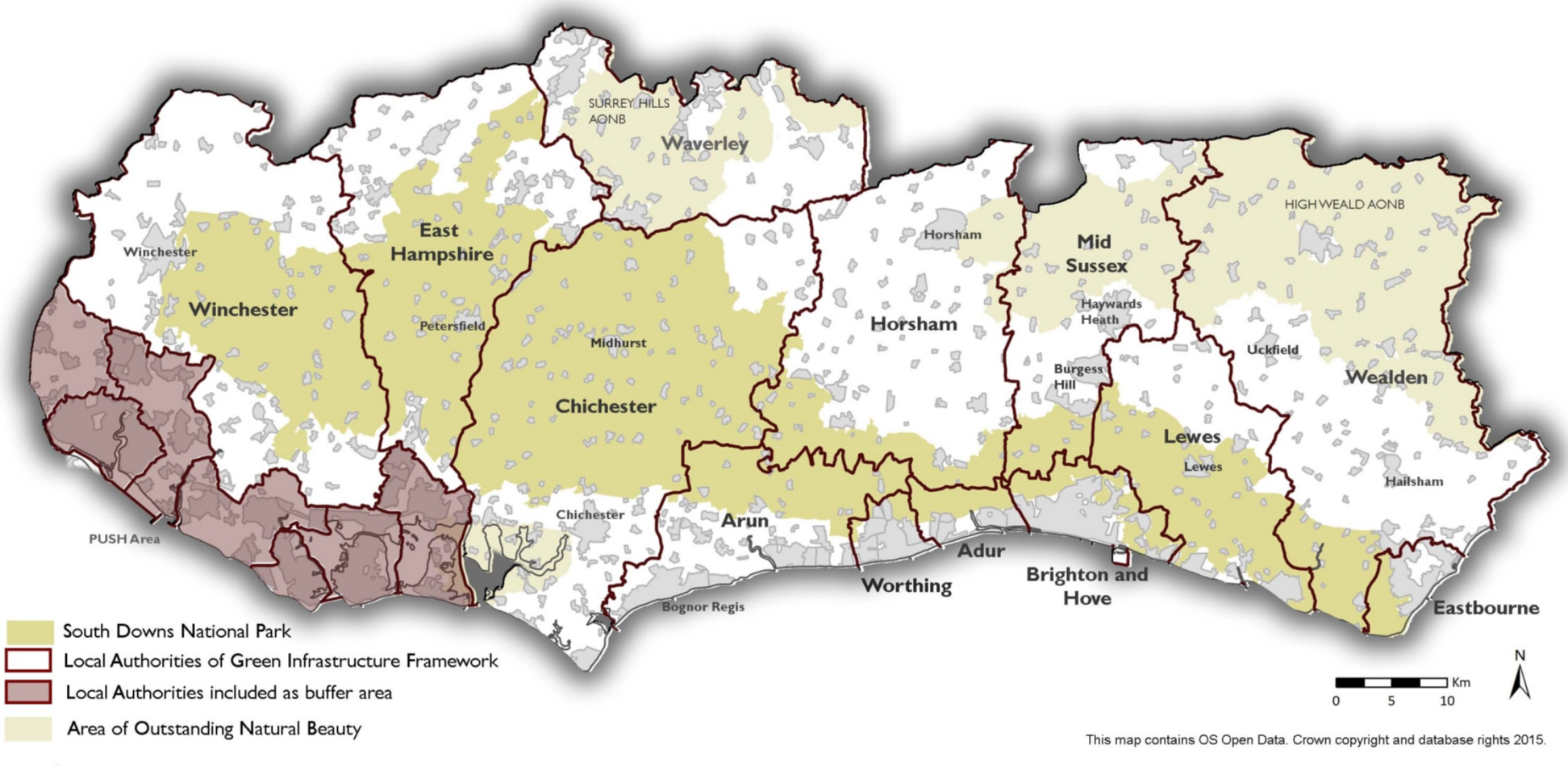
To create, protect and enhance a connected network of green and blue spaces; which sustainably meet the needs of local communities and support the special qualities of the South Downs National Park; by achieving a consensus about the strategic principles for planning, delivery and management of green infrastructure.

The intention of this Framework is to support, over the long-term, the planning of green infrastructure. The overall Aim for the Framework has proposed by the Technical Working Group which is supporting the partnership (see above).

Although this Framework is clearly at a strategic scale, the principles and priorities, along with the evaluation it provides, will support the planning and delivery of green infrastructure at different spatial scales; sub-regional, district, town scale and at the local scale.

[1] Winchester, East Hampshire, Chichester, Horsham, Mid Sussex, Wealden, Eastbourne, Lewes, Adur, Worthing and Arun.

Plan 1: Framework Area



The Framework brings together the existing strategies and plans of the partners and places these alongside additional evidence to add depth to the understanding of the area. It is not prescriptive in the specific actions which partners need to take to further green infrastructure planning and delivery but rather provides, as the name suggests, an over-arching framework of priorities and principles onto which plans, strategies and most importantly, delivery, can fit. In this way the whole becomes greater than the sum of the parts.

Green infrastructure planning at the district, scale is more common than on this sub-regional scale. Green infrastructure has, perhaps, been more associated with urban settings and concepts of ecological networks with rural settings. This Framework sets out to bridge this divide, by drawing the urban and rural areas together and bringing greater understanding of the synergies and interactions between them.

To effectively capture the interactions between towns and the countryside; between people and the natural environment the Framework has adopted an ecosystems approach. These are the benefits provided by the natural environment that contribute to making human life both possible and worth living. Examples include food, timber and water, regulation of air quality and pollination, alongside a range of services which contribute to quality of life, including recreation and the inspiration of the natural world.

This Framework begins to take an ecosystems approach, based on the recognition of the importance of enhancing these services to meet present and future needs and reflecting the approach taken by the South Downs National Park in its plans and policies[2].

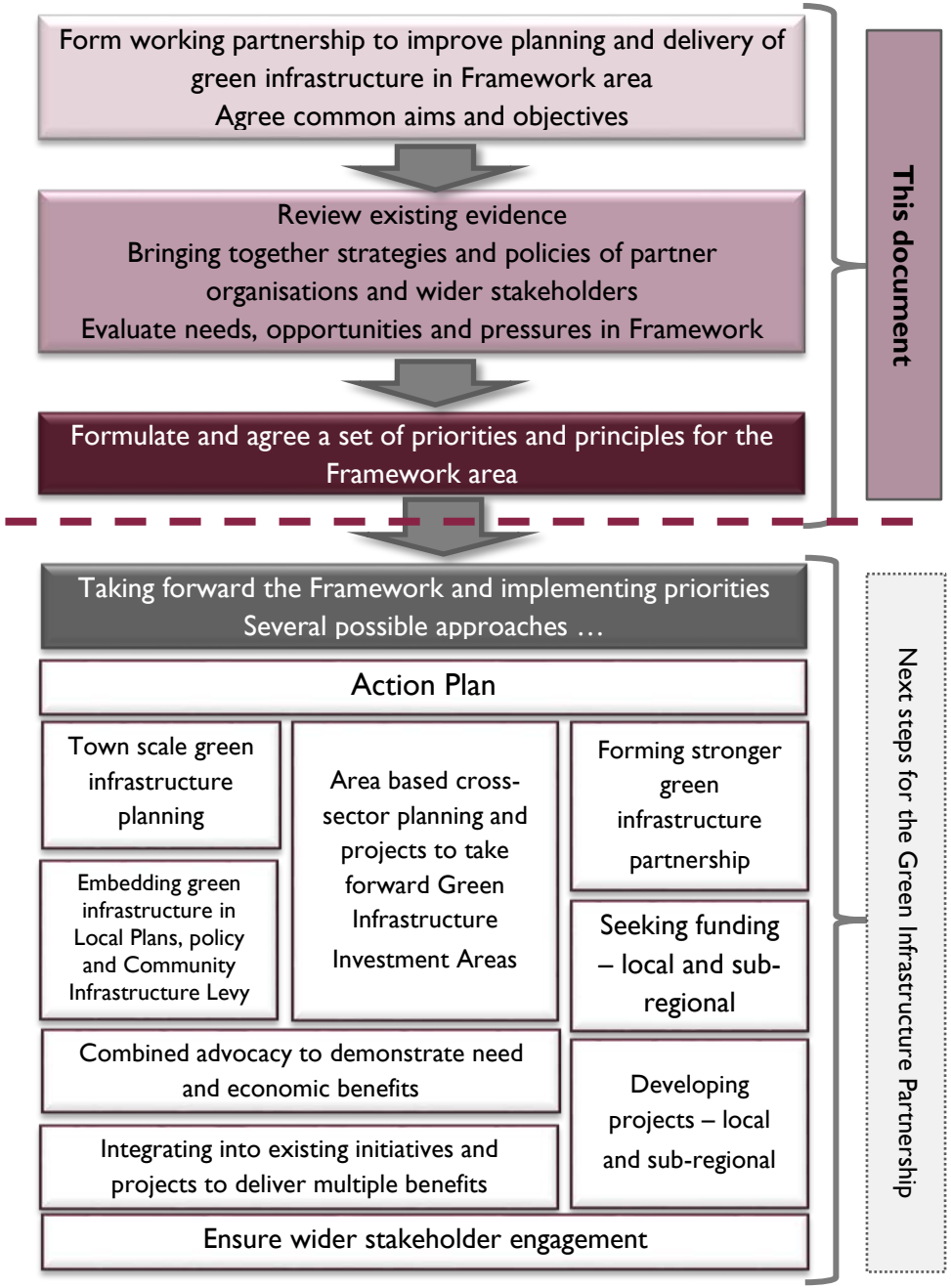
The UK National Ecosystem Assessment recognises the importance of integrated spatial approaches, such as that taken in this Framework, in delivering ecosystem services.[3] These approaches have the capacity to deliver multiple ecosystem services and are adaptable enough to meet different future challenges.

> Whether we live in the city or the countryside, natural systems support us. The natural environment becomes degraded when people lose their sense of contact with it. Human health and happiness also suffer. This White Paper aims to strengthen connections between people and nature, to the benefit of both.
>
> *Foreword, Natural Environment White Paper (HM Government 2011)*

[2] Conservation and enhancement of natural capital is embodied in Purpose 1 of the South Downs National Park Authority and in the ecosystems approach that underpins its plans and policies

[3] UK National Ecosystem Assessment Follow-on (2014), Work Package Report 8.

This Framework and Next Steps



This Framework is a first step in more formalised collaborative working for green infrastructure across the Framework area. It sets out to improve understanding of green infrastructure and to be a catalyst for future collaboration, building upon existing partnership working bringing partners together around a shared agenda.

It provides a signpost towards the next steps which the partners need to take. These may be in any number of ways, as shown in the figure to the right. However, to maximise the benefits provided by the Framework it is essential that partners continue to work together.

Green Infrastructure and Ecosystem Services

What is Green Infrastructure?

Green Infrastructure Assets

- Natural and semi-natural rural and urban green spaces – including woodland and scrub, grassland (for example downland and meadow), hedgerows, heath and moor, wetlands, open and running water, brownfield sites, bare rock habitats (for example cliffs and quarries), coasts, beaches and community forests;
- Parks and gardens – urban parks, country and regional parks, formal and private gardens and institutional grounds (for example at schools and hospitals);
- Amenity green space – informal recreation spaces, play areas, outdoor sports facilities, housing green spaces, domestic gardens, community gardens, roof gardens, village greens, commons, living roofs and walls, hedges, civic spaces and highway trees and verges;
- Allotments, city farms, orchards and suburban and rural farmland;
- Cemeteries and churchyards;
- Green corridors – rivers and canals (including their banks), road verges and rail embankments, cycling routes and rights of way;
- Sites selected for their substantive nature conservation value – Sites of Special Scientific Interest and Local Sites (Local Wildlife Sites and Local Geological Sites);
- Nature Reserves (statutory and non-statutory);
- Green space designations (selected for historic significance, beauty, recreation, wildlife, or tranquillity);
- Archaeological and historic sites;
- Functional green space such as sustainable drainage schemes (SuDS) and flood storage areas;
- Built structures – living roofs and walls, bird and bat boxes and roost sites within existing and new-build developments.

Town & Country Planning Association and The Wildlife Trusts (2012), *Planning for a Healthy Environment – Good Practice Guidance for Green Infrastructure and Biodiversity*.

The precise definition of green infrastructure varies, but there are common and essential, elements:

- The spaces/sites include the broadest range of green spaces and environmental features, including the water environment ('blue infrastructure') – these are green infrastructure assets;
- The infrastructure network is strategically planned and that there is connectivity between assets;
- Each green infrastructure asset has the potential to deliver a range of benefits, for example recreational, ecological, health or water quality, flood risk management – these are green infrastructure functions.

When appropriately planned, designed and managed at a network scale, the range of functions green infrastructure can bring is maximised, bringing a wide range of benefits including, amongst others, sustainable transport, ecological connectivity and adaptation and mitigation to climate change, in turn, supporting sustainable economic growth (a concept termed 'multi-functionality').

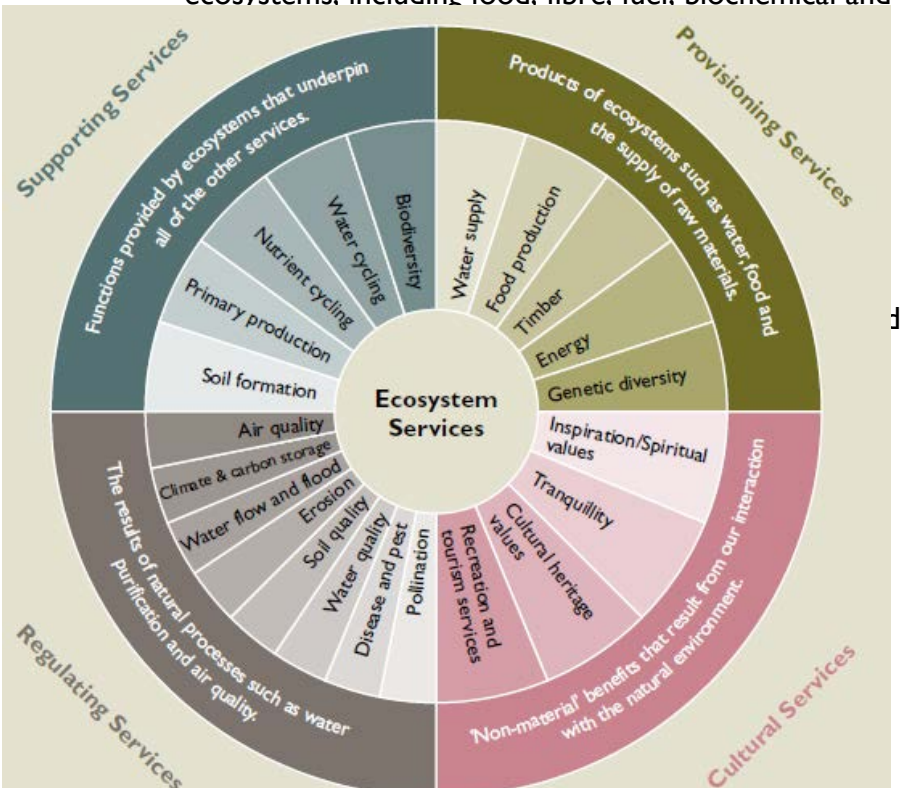
The multiple societal and ecological benefits which can be secured through green infrastructure make this an important route to delivering improvements to ecosystem services. Spatial planning at the scale of this Framework, carried out in an integrated and cross-sectoral approach and incorporating evidence on ecosystem services, can make a positive contribution to all categories of ecosystem services, as well as setting out how these can be delivered spatially.[4]

What are Ecosystem Services?

Ecosystem services are the benefits provided by the natural environment that contribute to making human life both possible and worth living. Examples include the provision of food, timber and water, soil formation, regulation of water and air quality and pollination, alongside a range of services which contribute to quality of life, including recreation and the inspiration of the natural world.

The term 'services' encompasses these benefits and are categorised into four types:

- Supporting services – are necessary for producing all other ecosystem services including soil formation, photosynthesis, primary production, nutrient cycling and water cycling;
- Provisioning services – are the products from ecosystems, including food, fibre, fuel, biochemical and



[4] UK National Ecosystem Assessment Follow-on (2014), Work Package Report 8.

There is great interaction between the ecosystem services, for example provisioning services are heavily reliant on supporting and regulating services.

Taking an Ecosystems Approach to Green Infrastructure Planning

The services we get from nature underpin both economic prosperity and social well-being. Many decisions and policies have an impact on the provision of these services and these decisions are not confined only to land management.

These decisions can, individually or cumulatively, lead to the degradation of ecosystem services. Such degradation incurs both economic and social costs. Taking an ecosystems approach helps to properly understand the impact of policies on the capacity of natural systems to function and helps to avoid significant future risks and associated costs.

The goal of an ecosystems approach is to foster the sustainable use of ecosystems and the equitable distribution of their benefits. To be successful, an ecosystems approach should preserve or increase the capacity of an ecosystem to produce benefits in the future and increase the ability of society to fairly apportion benefits and costs.

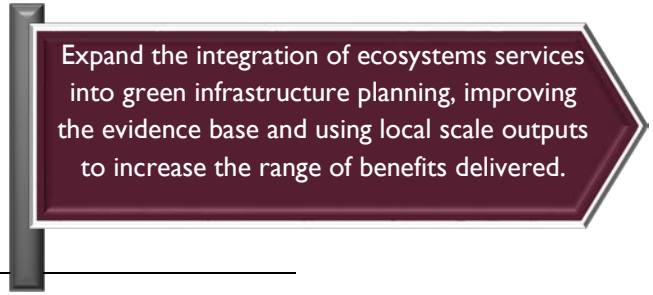
Key Messages of the UK National Ecosystem Assessment (2011)

- The natural world, its biodiversity and ecosystems are critically important to our well-being and economic prosperity, but are consistently undervalued in conventional economic analyses and decision-making;
- Ecosystems and ecosystem services, and the ways people benefit from them, have changed markedly in the past 60 years, driven by changes in society;
- The UK's ecosystems are currently delivering some services well, but others are still in long-term decline;
- The UK population will continue to grow, and its demands and expectations continue to evolve. This is likely to increase pressures on ecosystem services in a future where climate change will have an accelerating impact both here and in the world at large;
- Actions taken and decisions made now will have consequences far into the future for ecosystems, ecosystem services and human well-being. It is important that these consequences are understood, so that we can make the best possible choices, not just for society now, but also for future generations;
- A move to sustainable development will require an appropriate mix of regulations, technology, financial investment and education, as well as changes in individual and societal behaviour and adoption of a more integrated, rather than the conventional sectoral, approach to ecosystem management.

Green Infrastructure is being increasingly adopted as an approach that seeks to promote natural solutions and strategic investment in the natural environment to deliver ecosystem services that will help address a range of locally identified issues, commonly being:

- Water and flood risk management.
- Local economy (including rural economy), economic development and housing growth.
- Biodiversity and ecological networks.
- Health and well-being.
- Access, recreation and access to nature.
- Community engagement, action and ownership.

Green infrastructure planning can provide for the ecosystem service needs of business and communities, provide ecological network support and improve the sustainability of existing and new settlements. In essence Green Infrastructure is our only living infrastructure and the green infrastructure agenda seeks to ensure it receives proper consideration, planning, investment, delivery and long term management and is appropriately valued by society.



There are different ways in which the ecosystem services approach can be applied. The Convention on Biological Diversity identified 12 principles for its application, as outlined by the National Ecosystem Approach Toolkit (NEAT):[5]

- Promote societal choice using transparent and equitable processes and tools;
- Delegate decisions to the most suitable scale;
- Assess adjacent effects;
- Incorporate economic and social drivers;
- Encourage ecosystem resilience;
- Respond to uncertainty in environmental limits;
- Operate at and across multiple spatial and temporal scales;
- Champion a long term approach;
- Manage change to best advantage;
- Champion biological diversity;
- Optimise evidence from multiple sources;
- Maximise and maintain stakeholder engagement.

Green infrastructure is a key mechanism in delivering ecosystem services.

[5] NEAT http://neat.ecosystemsknowledge.net/index.html

This Framework seeks to encourage the adoption of an ecosystems approach to planning green infrastructure, through the application of these principles, both to the architecture of collective decision making and to delivery of green infrastructure across the Framework area.

Ecosystems Services Modelling - EcoServ-GIS

Decision makers need to have the tools and evidence to incorporate ecosystem services into plans and policies. To begin this for the Framework area, outputs from the Geographic Information Systems (GIS) EcoServ-GIS model have been used in the evidence base. EcoServ-GIS has been developed by The Wildlife Trusts.[6] It uses spatial data, such as greenspaces, habitats, landscape character, along with socio-economic data to show where ecosystem services occur and to indicate levels of demand (need) for a given ecosystem service and the capacity of the ecosystem to deliver that service.

There are a range of potential outputs available, but for this Framework four were specifically created: carbon storage, local climate regulation, local noise regulation and pollination. Difficulties in running the model for the large area of this Framework limited the range of outputs which could be included in this report.[7] It was also not possible to run the model for the entire Framework area due to the vast amount of data and processing required and the unavailability and poor quality of some data, issues which could not be resolved within the resources available for this Framework.

Despite this, EcoServ-GIS has provided useful insight for this Framework and use of the additional models and an extended project area will provide valuable evidence in the future work of the partnership developing this Framework. Some of the models will provide

Defra has distilled the Convention on Biological Diversity into six principles for England:

- Taking a more holistic approach to policy-making and delivery with the focus on maintaining healthy ecosystems and ecosystem services;
- Ensuring that the value of ecosystem services is fully reflected in decision-making;
- Ensuring environmental limits are respected in the context of sustainable development, taking into account ecosystem functioning;
- Taking decisions at the appropriate spatial scale while recognising the cumulative impacts of decisions;
- Applying adaptive management of the natural environment to respond to changing pressures, including climate change;
- Identifying and involving all relevant stakeholders in the decision and plan making process.

Defra (2015), *What nature can do for you (A practical introduction to making the most of natural services, assets and resources in policy and decision making).*

[6] Durham and Scottish Wildlife Trusts.

[7] The Models which failed to run to completion where water purification, aesthetics and access to nature.

invaluable evidence particularly at the town or district scale of green infrastructure planning (see Plan 2 and also 14, 15, 23 and 24).

Sources

Defra (2010), *Delivering a Healthy Natural Environment* (Update to 'Securing a healthy environment: An action plan for embedding an ecosystem approach').

Defra (2015), *What Nature Can do for You* (A practical introduction to making the most of natural services, assets and resources in policy and decision making).

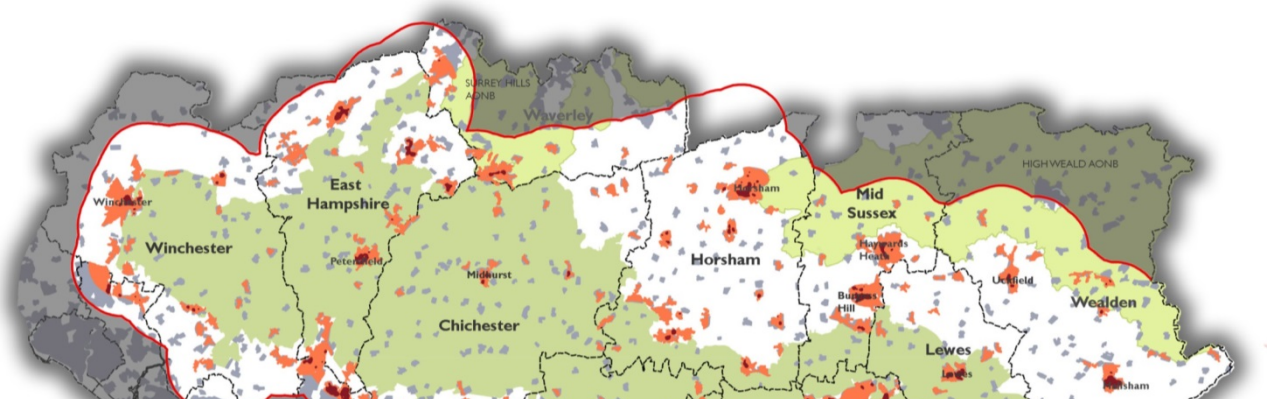
Landscape Institute (2013), *Green Infrastructure, An Integrated Approach To Land Use.*

Natural England (2009), *Green Infrastructure Guidance* (NE176[1]).

UK National Ecosystem Assessment (2011) and National Ecosystem Assessment Follow-On (2014).

National Ecosystems Approach Toolkit http://neat.ecosystemsknowledge.net/index.html

Plan 2: EcoServ-GIS – Local Climate Regulation



Why a Sub-Regional Framework Approach?

Sub-regional green infrastructure frameworks are developed at a strategic scale to provide a guide for green infrastructure planning, investment and delivery. A framework highlights where the existing green infrastructure assets are, locates the weaker areas and guides priorities for future investment. This Framework has been produced to assist with and guide actions for, the delivery of green infrastructure across the South Downs and surrounding areas.

Specifically, sub-regional green infrastructure frameworks are utilised to:

- Provide a common cross-border agenda for action and supporting evidence base;
- Ensure that strategic issues are considered at their appropriate scale;
- Promote the consistent and joined up management of larger scale assets, especially those that cross administrative boundaries;
- Support and guide partnership working and provide a platform for bringing partners together;
- Provide a common framework to attract and guide investment in green infrastructure.

Enabling Sustainable Development

One of the primary reasons for a sub-regional approach to green infrastructure is to support sustainable economic growth across the Framework area, as defined in the principle of sustainable development.[8]

Green infrastructure planning can uphold the environmental and social 'pillars' of sustainable development. This helps to ensure that economic growth does not have a negative impact on the environment and society and, ideally, results in improvements. This also relates to the need to preserve the 'Special Qualities' of the South Downs National Park as demands on it increase.

Decisions which have an impact on environmental quality can create 'winners' and 'losers'. Working at a Framework level and through the application of an ecosystem services approach, this imbalance can be highlighted. For example, for the distribution of social impacts to be fair, decisions and policies should avoid creating further adverse effects for those who are already the most vulnerable. Ideally these

[8] The National Planning Policy Framework (NPPF) notes that to achieve sustainable development, economic, social and environmental gains should be sought jointly (para 8) and, in pursuit of this, that net gains for nature should be achieved (para 9).

decisions and policies should begin to redress existing inequalities. For example, clear links have been shown between green infrastructure and health inequalities; therefore policies should not further disadvantage communities with existing health inequalities.

Inequalities and policy implications are revealed at a framework scale and this can enable a more equitable distribution of impacts and benefits. It can also highlight solutions which enhance all three pillars of sustainable development – 'win-win-win' approaches.

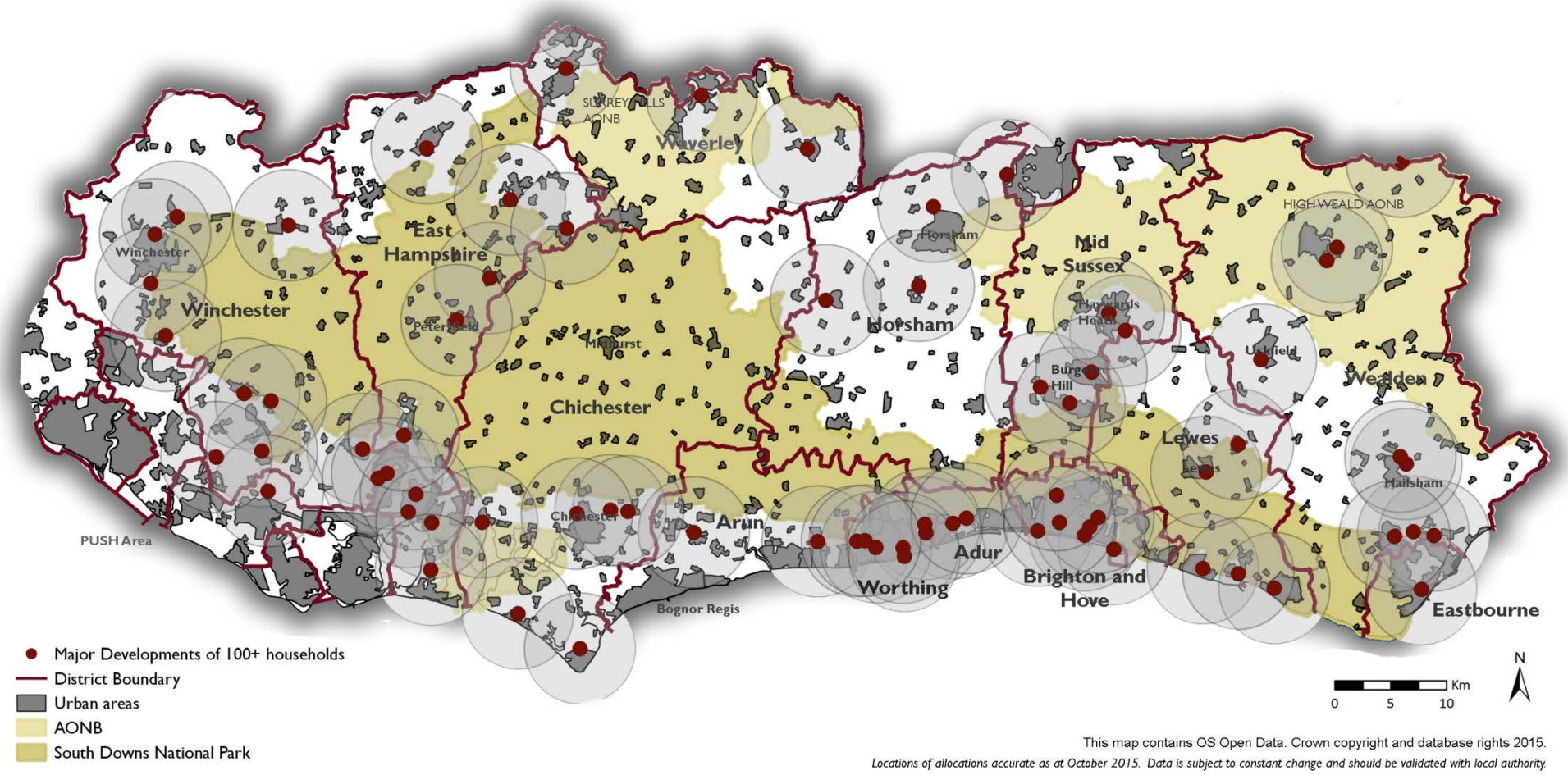
Plan 3 clearly shows at the time of writing the planned strategic housing sites mostly concentrated in areas outside and close to the boundaries of the National Park and AONB areas.

A strategic view at this sub-regional scale is helpful in revealing the clustering and cumulative effects of developments in relation to designated landscapes. It is an indicator of the development pressures on the edges of these landscapes; and it can provide a reference against which changes can be monitored over time. Given the significant scale of housing development which is planned across the Framework area, co-ordinated approaches are required to ensure that the sustainable development is achieved and that high quality green infrastructure is secured for all communities.

South Downs National Park - Seven Special Qualities

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

Plan 3: Housing Allocations - greater than 100 houses



This map contains OS Open Data. Crown copyright and database rights 2015.

Locations of allocations accurate as at October 2015. Data is subject to constant change and should be validated with local authority.

The Requirement to Work in Partnership - National Planning Policy Framework and Duty to Cooperate

The National Planning Policy Framework (NPPF) requires that local planning authorities should set out a strategic approach in their Local Plans to plan positively for the creation, protection, enhancement and management of green infrastructure and biodiversity networks.[9] Local Plans should also include policies which plan for biodiversity at a landscape scale across local authority boundaries and identify and map local ecological networks.[10]

The duty to cooperate created by the Localism Act 2011 places a legal duty on local planning authorities, county councils and public bodies to engage constructively, effectively and on an ongoing basis on strategic cross-boundary issues.

The duty seeks to ensure that strategic planning is delivered effectively through Local Plans and recognises that climate change mitigation and adaptation, biodiversity and ecological networks and flood risk management, for example, are better planned at a strategic scale.

The conservation of the natural environment and landscape is a strategic priority within the NPPF and Local Plans should contain a clear strategy for achieving this.[11] Under the duty to cooperate, public bodies must also cooperate with Local Nature Partnerships. The Environment Act 1995[12] also places a Duty of Regard on Local Authorities towards the purposes of the National Park.

To Strengthen Strategic, Cross-Boundary and Cross-Sector Working

Working at a sub-regional scale reveals connections, synergies, pressures and opportunities which may not be apparent at a local level.

Many features of the environment operate across a much wider geographic scale than those imposed by governmental structures. River catchments, ecosystem services and ecological connectivity are some of the most obvious in environmental terms, but people also travel to different areas for recreation, for example. Yet governmental boundaries, such as local authorities, are the geographic scale at which policies are formulated and delivered, with a drive towards greater localism.

The establishment of the South Downs National Park Authority offers a rare opportunity to create a truly multifunctional green infrastructure network capable of delivering a broad range of ecosystem services on a landscape scale. For this potential to be realised, however, green infrastructure must be considered spatially

[9] NPPF paragraph 114.
[10] NPPF paragraph 117.
[11] NPPF paragraphs 156, 157 and 178-181.
[12] Section 62.

in an overarching framework. This must be strategic in nature with the ability to reach beyond the National Park Boundary.

There are also many different approaches to green infrastructure delivery across all of the local authority partners. Some have green infrastructure strategies in place, others do not. This strategic approach will help partners to work together towards high quality green infrastructure policy, strategies and delivery, through sharing approaches and knowledge and enabling decisions to be made with greater appreciation for the effect on neighbours.

Green infrastructure planning and delivery also crosses many different sectors and partner organisations. The cross-sector and strategic approach taken in this Framework highlights opportunities for cross-sectoral integration, which will play an important role in securing landscape scale green infrastructure and ecosystem service benefits. There is also more than one 'answer' for any given piece of land and this Framework begins the dialogue for decision making moving from single interest to multi-functionality.

More Efficient and Effective use of Resources

Resources are and will continue to be, in short supply. There are many pressures on local authority resources (both people and money), with the third sector also facing resource pressures.

There is a need to deliver more to meet the environmental element of sustainable development, but at a time when the ability to do so is becoming more compromised. This requires smarter and more efficient working, reducing duplication and wasted resources.

There are limited resources for project delivery; these projects need to be delivered where there is the greatest need and where the greatest benefit can be secured. There is also a need to maximise the number of benefits secured by projects.

Co-operation also saves resources in building the evidence base and finding 'future-proof' interventions; for example through evidence sharing rather than duplication of effort, through understanding where there are true gaps in knowledge and addressing these and through co-ordinated methodologies to ensure that findings can be shared.

Co-ordinated approaches and robust and compelling evidence at the sub-regional scale is also more likely to unlock larger funding sources which may not be available at a more local level. Funding for local-scale delivery can be secured using evidence that the project fits with the strategic needs and priorities of the Framework area.

Co-ordinated Advocacy

There are many organisations and existing partnerships working to further green infrastructure, either as integrated green infrastructure approaches or dealing with one aspect of green infrastructure, such as biodiversity, water or recreation.

As well as benefitting cross-sectoral working, as previously outlined, there are greater gains to be secured through presenting a united and agreed position on the needs, priorities and ambitions of the area as a whole. Advocacy to government, Local Enterprise Partnerships, funding bodies and others is more powerful and influential when robustly evidenced and presented in co-ordination. A sub-regional green infrastructure partnership would be in a position to take on this role.

The Economy and Green Infrastructure

In most cases there is little doubt that returns on green infrastructure investment are high. Investments in green space have been shown to improve a region's image; helping to attract and retain high value industries, new business start-ups, entrepreneurs and workers. This in turn increases the scope for levering in private sector investment, reducing unemployment and increasing 'Gross Value Added' (GVA)
Natural Economy North West (2008)

How Green Infrastructure Benefits the Economy

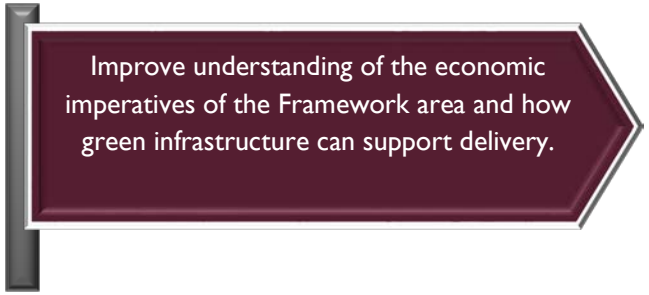
The economic benefits of green infrastructure are becoming increasingly known and evidenced, with a growing body of evidence demonstrating the links between sustained economic growth and green infrastructure.

Effective green infrastructure planning and delivery has an essential role in underpinning sustainable economic growth and should no longer be viewed as a 'nice to have' option. There is strong economic evidence to support the role of green infrastructure as an essential component of building communities where people want to live, in attracting and retaining businesses, in tackling obstacles to economic growth in ways which enhance the environment and quality of life and in supporting improvements in health and well-being.

A report for Defra and Natural England[13] investigated the links between green infrastructure and increased economic growth (specifically related to an increase in UK GDP) and found strong evidence of connections between green infrastructure investment and economic growth.

New areas including 'Payment for Ecosystem Services' seek to build more direct relationships between green infrastructure and economic activity. Green infrastructure should thus be recognised as a provider of goods, services and materials; and through such provision support economic prospects and employment, some of which might be considered a green infrastructure jobs sector.

[13] Eftec and Sheffield Hallam University for Defra and Natural England (2013), *Green Infrastructure's contribution to economic growth: A review.*


Improve understanding of the economic imperatives of the Framework area and how green infrastructure can support delivery.

In terms of a marginal change, a 1% increase in the amount of green space in an area is associated with up to 0.5% increase in the average house price (GLA Economics, 2003).

Inward Investment and Regeneration

Green infrastructure increases the attractiveness and distinctiveness, of local areas which attracts inward investment, as well as attracting employees and customers. Economic growth as a result of investment in green infrastructure can lead to higher levels of employment and tourism and to lower levels of crime.

Investment in green infrastructure can be the catalyst for and supporting factor in the wider regeneration of an area. There is evidence that green infrastructure projects that are integrated with other projects or strategies, such as urban regeneration, are likely to provide more benefits, faster.

Visitor Economy

The attractiveness of an area and the quality of the green infrastructure has an impact on the number of visitors drawn to and spending in a particular area. Within the Framework area the South Downs National Park is a strong visitor attraction. Partner authorities need to both attract spend from these visitors and attract their own visitors. A quality environment is a key factor in areas outside of the National Park succeeding in this.

Visitors to the South Downs National Park spend around £464m annually, supporting 8,200 jobs. 6.8 million visitor stay overnight outside the National Park. *(South Downs Visitor and Tourism Economic Impact Study, 2013).*

Health Improvement

There is strong evidence that the quality of the outdoor environment is an important factor in encouraging daily exercise, which improves health and reduces the cost burden. There is strong evidence that access to green space has a positive impact on mental health and stress. Such health improvements feed into increased productivity as well as allowing expenditure on health interventions to be invested elsewhere to support economic growth.

Increasing physical activity through improved access to high quality green spaces could save the NHS £2.1 billion a year. *(Defra, 2010).*

Environmental Cost Savings

Green infrastructure contributes to the resilience and sustainability, of economic growth in a particular place, through reducing important risks, such as flooding and temperature extremes. There is good evidence that green infrastructure can reduce damage costs (allowing greater investment in productive activities), often providing a more cost-effective way to meet environmental targets than mechanical solutions. In Hampshire there are some excellent examples of how

restored landscapes have made space for water. Winnall Moors,[14] a nature reserve and part of the Itchen Valley Special Area of Conservation, has played a vital role in reducing the level of flooding currently affecting Winchester. Allowing the water meadows to flood using traditional water management systems such as sluices and carriers to direct excess water into the meadows and away from the city, there has been a dramatic reduction in the speed by which flood water has entered the city[15].

There is also compelling evidence that green infrastructure solutions, for example Sustainable Drainage Systems (SuDS) and green roofs, bring economic as well as environmental benefits.

Green infrastructure planning can help to identify and resolve those issues which will directly impede the delivery of sustainable development and economic growth. Green infrastructure can have a positive role in improving several real issues facing the Framework area. Examples include traffic congestion or poor transport connections, which costs business, reduces quality of life and causes air quality issues; or water quantity (too little to meet growing demand or too much in the form of flooding). Some of these may be legislative, requiring costly mitigation if not resolved.

[14] Managed by Hants and Isle of Wight Wildlife Trust and Winchester City Council.
[15] http://www.hiwwt.org.uk/news/2014/02/13/restoring-nature%E2%80%99s-flood-defences

Climate Change

Climate change is a major long-term threat to the economy. The Stern Review[16] estimated that the impacts of climate change were equivalent to losing at least 5% of global GDP each year, indefinitely. Other areas vulnerable to the effects of climate change include real estate, infrastructure, timber, agriculture and tourism.

Green infrastructure can support climate change mitigation and adaptation, for example:

- Differing land uses can either reduce or increase the rate of carbon emissions and the land's ability to sequester carbon. Planned green infrastructure can maximise land uses which provide carbon mitigation;
- Trees and plants can improve energy efficiency by reducing the need for heating and cooling of buildings;
- Climate change will increase the threat of flooding. Natural environmental interventions can help to reduce this risk and at less cost than some more 'engineered' solutions;
- Urban centres in particular may in future suffer from dangerous heat and air pollution. Some of the impact may be reduced by investment in the natural environment (particularly trees);

[16] Nicholas Stern (2006), *Stern Review on the Economics of Climate, Executive Summary*, UK Government.

Making the Case

Funding and delivery of green infrastructure is becoming increasingly difficult to secure and the case for green infrastructure continues to require re-stating.

Increasingly local authorities are looking to developers to fund green infrastructure through development-related contributions. Green infrastructure must compete with a range of other public goods for developer funding, including roads, education and health provision. It is not always easy to justify the provision of green infrastructure when compared to other more pressing needs.

The economic benefits of green infrastructure are not easy to measure. Economic impact measures the effect on Gross Domestic Product (GDP). Economic value captures the effect on the welfare of people, whether through changes to consumption of traded goods, or more intangible things such as the beauty of a landscape. This approach forms the basis of cost benefit analysis. In making a case for green infrastructure it is therefore important to present the benefits in terms that can be readily understood by decision-makers and in a language that makes green infrastructure more easily comparable with other public goods or infrastructure.

Sources

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http://publications.naturalengland.org.uk/publication/6692039286587392

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Local Economic Partnerships covering the Framework area

Coast to Capital – includes Brighton and Hove, Gatwick Diamond, Lewes and West Sussex. www.coast2capital.org.uk

Solent LEP – includes Winchester and East Hants outside the National Park, Havant, Portsmouth and the PUSH area. www.solentlep.org.uk

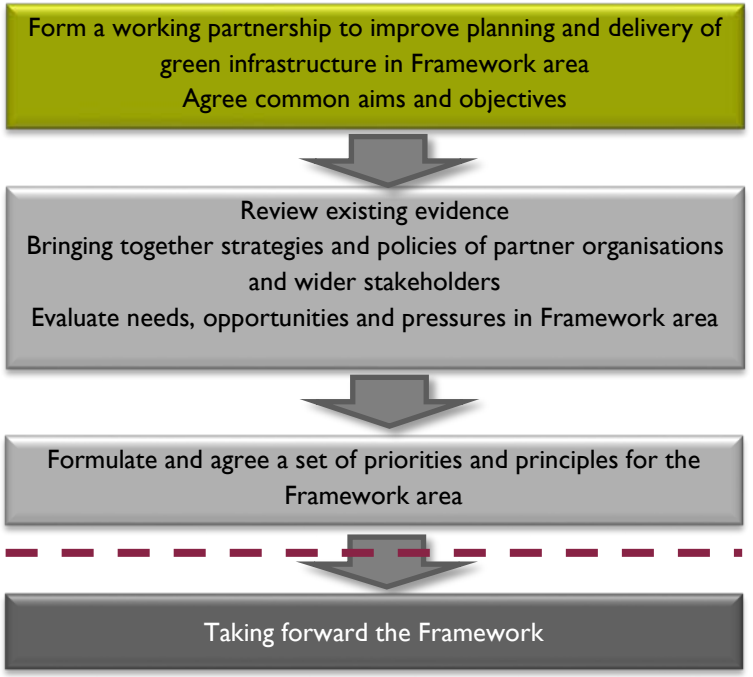
South East LEP – includes East Sussex. www.southeastlep.com

Developing the Framework

A Partnership Approach

This Framework has been developed in a partnership approach between many organisations.

In January 2014, as part of the consultation of stakeholders for the Access Network and Accessible Natural Greenspace Study,[17] consultees were asked whether a sub-regional approach to green infrastructure planning should be developed and, if so, what form this should take. This consultation revealed a high level of support; around 80% of respondents supported a sub-regional approach.



In October 2014 a workshop hosted by the South Downs National Park Authority launched the process of developing the Framework to a wide range of invited stakeholders. The workshop generated discussion, ideas and agreement on taking the Framework forward.

[17] Access Network and Accessible Greenspace Study (2013)

Following the workshop, a Technical Working Group and smaller Steering Group were formed from representatives of partner organisations. The members were self-selected and, together, they represented a cross-section of interests. These groups met in March, June and September 2015 to agree the Aim and Objectives (see next section) and to guide the development and scope of the Framework.

Technical Working Group Member Organisations

South Downs National Park – officers and members
East Sussex, West Sussex, Hampshire and Surrey County Councils and Brighton and Hove unitary authority
Wealden, East Hampshire, Havant, Mid Sussex, Adur and Worthing representing local authorities
Environment Agency, Natural England, Historic England, Forestry Commission
Woodland Trust
Country Land and Business Association, National Farmers Union
Brighton and Lewes Downs Biosphere, Arun and Rother Rivers Trust

Aim of the Framework

To create, protect and enhance a connected network of green and blue spaces; which sustainably meet the needs of local communities and supports the special qualities of the South Downs National Park; by achieving a consensus about the strategic principles for planning, delivery and management of green infrastructure.

Aim and Objectives of the Framework

How does the Framework propose to achieve the Aim and Objectives?

1. By engagement with those authorities within or bordering the National Park under the Duty to Cooperate regarding the delivery of the Framework;
2. By establishment of a common understanding of green infrastructure amongst stakeholders;
3. Through integrating and building upon existing knowledge, partnerships, initiatives and best practice;
4. Through supporting decision making and delivery at the most appropriate spatial scale and encouraging local input;
5. By drawing together an evidence base, at a scale appropriate to the Framework area, to maximise economies of scale, improve the quality of the evidence and ensure consistency across the region;

Objectives

- Use green infrastructure Assets to support health and well-being of people and businesses in the Framework area;
- Demonstrate and deliver economic benefits through the green infrastructure Framework;
- Protect and enhance biodiversity and improve habitat connectivity to maintain and improve the health of the environment;
- Protect and enhance the natural beauty of the landscape in the Framework area;
- Improve resilience to the effects of climate change;
- Improve the sustainability of communities across the Framework area;
- Improve opportunities for enjoyment and understanding of the wildlife, natural beauty, cultural heritage and the special qualities of the National Park;
- Use green infrastructure to support the delivery of ecosystem services;
- Integrate cultural heritage into the green infrastructure network;
- Improve access opportunities to natural greenspace in the Framework area for all sectors of society;
- Identify and prioritise opportunities to enhance and deliver optimum benefits from strategic green infrastructure;
- Encourage the enhancement and delivery of strategic green infrastructure through contributions from new development;
- Plan, deliver and manage green infrastructure assets to re-naturalise river catchments and reduce local flood risk.

6. Through identifying and prioritising those issues which are best addressed at a sub-regional scale and across administrative boundaries;

7. Through supporting plan-making processes by developing proposals for strategic green infrastructure interventions that may be included in the evidence base for emerging Local Plans and in the appropriate Infrastructure Delivery Plans;
8. By periodically reviewing the framework and its priorities against the Aim and Objectives to ascertain if these are being met and if the basis for partnership working is delivering continuous improvement in strategic green infrastructure.

Understanding the Framework Area and Evaluating the Evidence

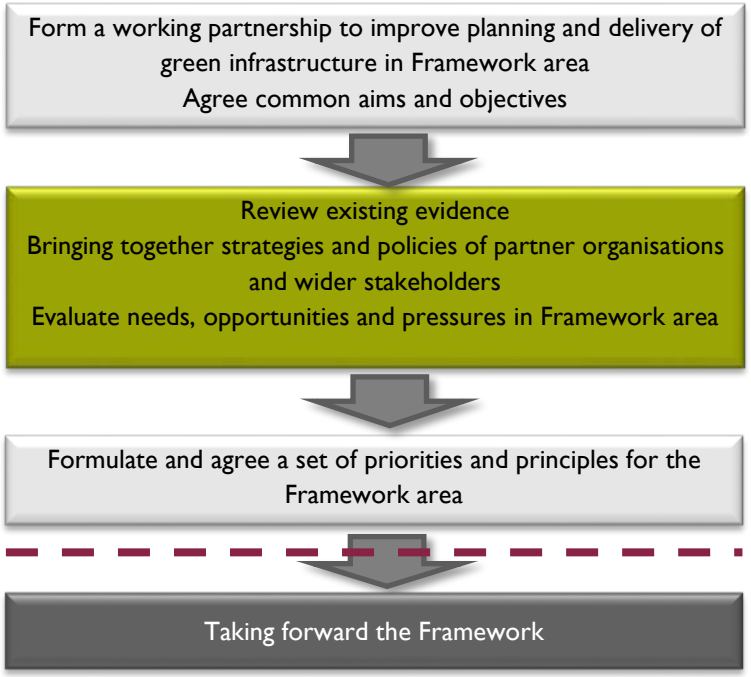
The Approach Taken to Evaluation

Green infrastructure encompasses many topic areas, for example biodiversity, landscape and recreation. It also provides social and economic benefits, such as improvements in health and well-being. Each of these are 'traditionally' separate professional areas, but the Partnership recognised the need to take a cross-sectoral approach so that the multiple benefits of green infrastructure can be secured.

This complexity of green infrastructure and the linkages with many areas presented a particular challenge in devising the approach to evaluating the needs, pressures and opportunities operating in the Framework area and in presenting these findings.

There are also issues which exert pressure or which need to be planned for, such as climate change, along with the aspiration of the Partnership to incorporate ecosystem service thinking into the Framework.

The Framework area itself is also highly varied, with many different landscapes, large towns and small villages, areas of economic strength and of social deprivation. The Partnership is formed of 16 core local authorities, with a number of additional stakeholder organisations, each with their own priorities and policies.


Form a working partnership to improve planning and delivery of green infrastructure in Framework area
Agree common aims and objectives
Review existing evidence
Bringing together strategies and policies of partner organisations and wider stakeholders
Evaluate needs, opportunities and pressures in Framework area
Formulate and agree a set of priorities and principles for the Framework area
Taking forward the Framework

Evidence and Analysis

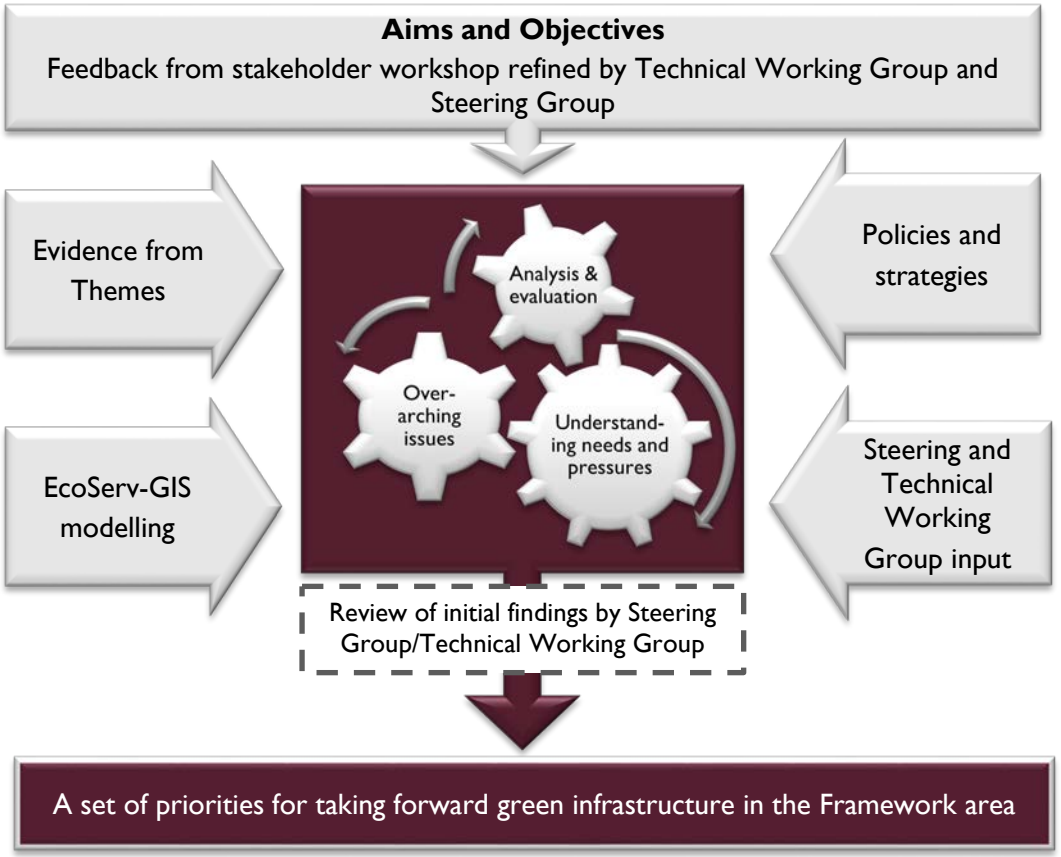
Evidence was taken from a range of sources:

- National and international legislation, policy and guidance;
- Strategies, Local Plan documents and evidence documents from all local authorities;
- Feedback from questionnaire to local authority partners;
- Strategies and evidence from stakeholder organisations;
- Review of primary datasets;
- Modelling outputs from EcoServ-GIS;
- Input and comment from Technical Working Group, Steering Group and from the Stakeholder Workshop of October 2014.

It was decided that, while there was a risk of losing the cross-sectoral approach needed, the most pragmatic solution to evaluating the evidence base and presenting this was to split the evidence into 'Themes'. The choice of these was based on feedback from the stakeholder group workshop of October 2014 and existing understanding of the priority issues of the Framework area raised by the Technical Working Group. The Themes are:

- Landscape and Cultural Heritage;
- Biodiversity and Woodlands;
- Health and Well-Being;
- Recreation and Access;
- Water Resources.

Figure 1: Evidence and evaluation to arrive at priorities for the Framework area



There were also a number of important topics which were relevant to all the Themes and to the Framework area as a whole. All of these were considered in the evaluation process. These are:

- Housing growth;
- Cross-boundary influences and opportunities;
- Links between the Themes and opportunities to deliver multiple benefits;
- Opportunities for partnership approaches;
- Securing and improving economic and social benefits;
- Ecosystem services;
- Climate change.

All of this evidence was reviewed and evaluated to gain a better understanding of the needs, opportunities, threats and pressures across the Framework area.

This work informed the headline findings and strategic priorities for the Framework area, which are described in the following sections.

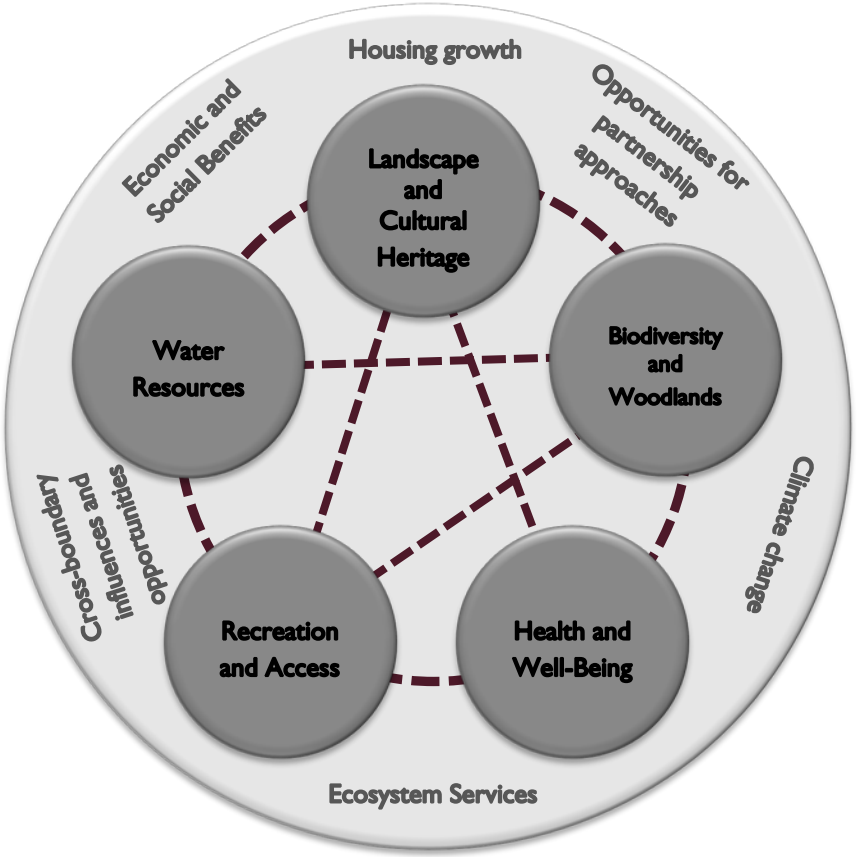


Figure 2: Interconnected Themes, evaluated in the context of over-arching topics

Headline Findings

Evaluation of the evidence highlighted some key issues across the Framework area. These findings strongly reconfirm the need for the Framework partners to continue to work together and to build on the approach developed to date.

The National Park at the Centre

The National Park, geographically, forms the heart of the Framework area. The Park provides many benefits to the sub-region, both for its residents and for surrounding communities; for recreation, biodiversity, farming and heritage amongst others, as captured in the National Park's Special Qualities.

The designation of the National Park creates a new dynamic for the Framework area. The choice must be taken to ensure this is a positive force for change; rather than a driver for fragmentation. With strong partnership working, the National Park could serve to bring partners together to provide benefits for all of them.

A Fundamentally Inter-related Area

The process of developing this Framework has revealed very clearly how inter-related the area is. Exert pressure in one area and the effect will also manifest itself in another area. Lack of greenspace in one area, for example, can result in more pressure on greenspaces in other areas, perhaps with unforeseen consequences such as a reduction in biodiversity. There are many more examples which have been highlighted through this document.

It is in the interests of all partners to acknowledge this – and then understand it better and plan to address it. The National Park must manage and adapt to the increased pressures placed on it by a growing population in order to protect its Special Qualities. The areas outside the National Park must also accommodate this growth while building vibrant, healthy and sustainable communities. Working to deliver these in tandem will bring benefits to all partners, to the landscapes and natural assets across the Framework area and, importantly, all residents.

This raises particular issues and needs for all partners, with a direct synergy between these needs. This synergy reveals itself in several key areas.

The Need for Connectivity

The need to make links is a common thread running through a range of green infrastructure-related issues:

- There is a need to join up fragmented areas of habitat to improve biodiversity and support landscape resilience;
- Addressing gaps in the access network;
- Working across landscapes and not local authority boundaries, necessitating cross-boundary and cross-sectoral working for mutual benefit;
- Planning green infrastructure at river catchment scale and identifying a range of multi-functional benefits including improvements to water quality and riverside landscapes.

Addressing Deficits in Existing Green Infrastructure Provision

Based upon the Accessible Natural Greenspace (ANG) standards,[18] the provision of accessible greenspace and green areas is insufficient for the identified need in many places, particularly outside the National Park. In addition many partner local authorities are facing increasing pressures on their ability to both retain these sites and to manage them.

The provision of green infrastructure associated with new development is a key opportunity to provide new greenspace and help redress the deficiency. However, without a policy framework and local political support, this opportunity will be missed.

Social Equality

There is a link between communities in poor health, high levels of social or economic deprivation and lack of greenspace. This is the situation for a number of places in the Framework area where significant levels of growth are planned, bringing the pressures of development and its associated infrastructure, pollution and noise. Unless the issues affecting the communities in these places are addressed, including raising the standard and provision of greenspace and green infrastructure, the effect of new development will be to make the situation worse for these communities.

Building Resilience

The environment is facing a number of pressures including climate change, built development and urbanisation, recreation demand and intensification of agriculture.

The effects of climate change are already apparent and include more storms and flooding, periods of drought and more pests and diseases (e.g. the implications of ash dieback on the green infrastructure of the South Downs area is significant).

[18] LUC, May 2008. Understanding the relevance and application of the Access to Natural Green Space Standard

Green infrastructure planning at the framework area scale is needed to identify areas under pressure, the factors involved and actions required to strengthen the landscape, restore key features and join up fragmented habitats.

Urban Edge Pressures

Across the Framework area there are examples of urban-edge landscapes under pressure. This is particularly evident along the southern boundary of the National Park. The causes vary, but include:

- Recreation pressure as a result of lack of alternative greenspace;
- Changes in the farmed landscape (e.g. fragmentation of farmsteads and conversion to residential uses, with associated gardens and paddocks);
- Gaps in the access network;
- Loss of strategic gaps;
- Poor or fragmented management and uncertain ownership;
- Encroachment of built development;
- Barriers to access e.g. major roads and railways severing the landscape and isolating pockets of land;

The pressures manifest themselves as:

- Declining biodiversity condition;
- Urbanisation of the landscape including an increase in 'horsiculture' (i.e. the keeping of horses on the urban edge in a network of open paddocks, usually with little boundary definition);
- Urban edge anti-social issues (such as fly-tipping);
- The gradual degradation of landscape quality; in particular along the boundary of the National Park.

The Need to Work Together

Green infrastructure needs to be planned at the strategic level and delivered locally. At present there is no strategic approach to green infrastructure across the Framework area, although priorities are identified by the SDNPA at the National Park scale, albeit for initiatives within the National Park boundary.

The Framework presents an opportunity for partners to work together to agree their priorities and shared objectives. Working across boundaries will enable the pooling and sharing of knowledge and joint approaches to securing resources.

Another key area where the partners need to work together is in advocacy. The significance and value of green infrastructure will not be fully recognised or appreciated by decision-makers unless and until it attracts champions who can make the case at senior levels,

There are many existing partnerships and initiatives developing projects that support green infrastructure. These partnerships, with their established networks and local knowledge, are ideally placed to deliver on other local green infrastructure initiatives. The potential value of locally based schemes could clearly be enhanced if they can also contribute to a network of green infrastructure planning at a strategic scale.

Green Infrastructure and Planning

Local Planning and Green Infrastructure Policy

Local Plans are crucial to the successful development of green infrastructure. Of the 14 planning authorities across the Framework area, currently only four have complete, up-to-date and adopted Plans, with many others being developed.

A specific green infrastructure policy and Supplementary Planning Document (SPD) informed by up-to-date evidence are essential components of a planned green infrastructure approach. There are some good examples of elements of this approach across the authorities in the Framework area, but the general picture is piecemeal.

While it is the prerogative of each local authority to progress green infrastructure planning in a way which suits their needs, the variation in approaches to green infrastructure in local planning is not helpful in promoting and resourcing green infrastructure. If there is a lack of a sound evidence base, this does not encourage local contributions to the development of strategic green infrastructure assets.

Accommodating Growth

The National Park and the surrounding Areas of Outstanding Natural Beauty cover half (49%) of the Framework area. It is clear from the locations of planned major development sites shown in Plan 3 that significant housing growth will, necessarily, be focused in the areas outside of these designated landscapes. There are further constraints in the Framework area due to potential recreational pressure on Natura 2000 Sites (Ashdown Forest, Solent, Chichester and Langstone Harbours and Pagham Harbour).

However, the apparent protection of designated landscapes is compromised by the number and concentration of development sites close to their boundaries. This not only creates impacts on the areas where development is taking place, but also threatens the qualities of the designated landscapes close by.

New developments and strategic sites in particular, provide the opportunity to use green infrastructure planning to better integrate sites within the landscapes in which they are situated; to develop landscape settings that are locally distinctive and which recognise and celebrate local heritage. The Framework could help to provide the context and rationale for planning these new landscape settings.

Over-reliance on Development to Deliver Green Infrastructure

Over the last few years the limited availability of public funding has severely restricted the development of green infrastructure initiatives and projects. Increasingly the focus has turned towards development as the main method of developing and funding green infrastructure. While development cannot be relied on to provide all the much-needed green infrastructure assets, the preparation of green infrastructure strategies and plans can help by identifying priorities and targeting resources to areas of greatest need. In addition, other methods of resourcing need to be explored, including the identification of benefits to other sectors (e.g. health) and green infrastructure as a component of larger, multi-disciplinary projects that might attract larger pots of external funding e.g. HLF or EU funding.

Green Infrastructure Priorities

This Framework aims to provide the catalyst to improve green infrastructure planning and delivery across the entire Framework area. It aims to raise ambition so that benefits are secured for all communities now and into the future, as captured in the Aim and Objectives agreed by the Technical Working Group acting on behalf of the Framework partners (see right and page 20).

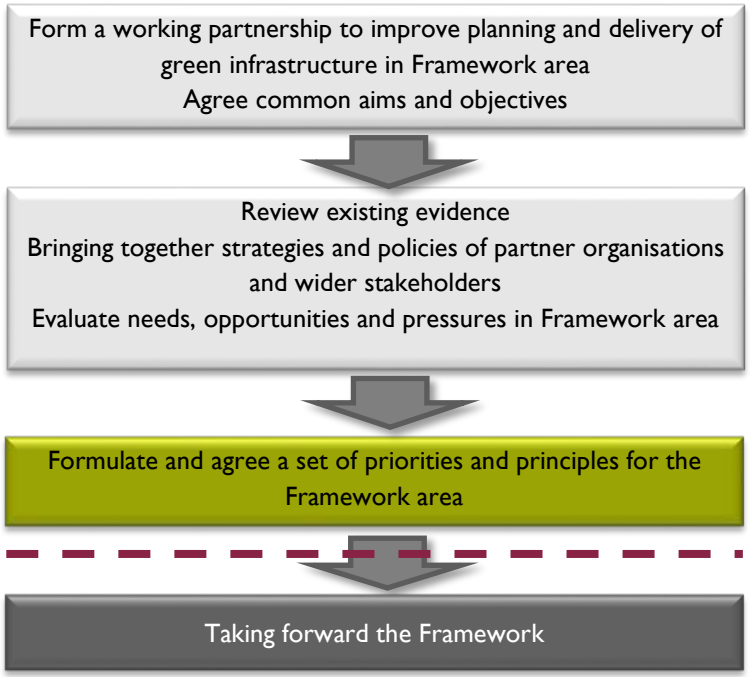
To do this requires a twin-track approach; firstly to develop Strategic Principles that will help raise the status and understanding of green infrastructure across the whole Framework area; and secondly by identifying specific targeted investment in areas of particular need.

Green Infrastructure Strategic Principles

The adoption of Strategic Principles (as set out in the over-arching Aim) addresses this first need and is considered in this section. The second, spatial targeting in specific priority areas is covered in the following section.

Green Infrastructure Strategic Principles

These encompass the actions which need to be taken across the whole Framework Area to improve, embed and secure green infrastructure planning and delivery.



Aim of the Framework

To create, protect and enhance a connected network of green and blue spaces; which sustainably meet the needs of local communities and supports the special qualities of the South Downs National Park; by achieving a consensus about the strategic principles for planning, delivery and management of green infrastructure.

The principles are derived from a synthesis of:

- The findings and needs emerging from analyses of the evidence themes;
- From the review of partners' policies, strategies and evidence;
- Consideration of how best to deliver the Aim and Objectives, also taking into account the 'headline findings' (previous section).

The Technical Working Group and Steering Group strongly advocated a cross-sectoral approach to these Principles to break down traditional professional boundaries and to demonstrate and secure the multiple benefits that are central to green infrastructure.

More detail on each of the Principles is provided in the next section. During the evaluation of evidence some potential actions emerged. These do not form a definitive list, but could form the basis of any future Action Plan for the Framework Partnership. These are listed in the section 'Potential Strategic Actions', from page 49.

The Strategic Principles

Make Strong Connections

The need for better connections crosses many areas – biodiversity networks and sustainable transport, as well as planning and delivering green infrastructure across boundaries and across sectors.

A Natural and Cultural Canvas

The well-being of the area fundamentally relies on the quality of the landscape, its ecosystems and the services they provide. The natural landscape and cultural heritage should be strengthened and celebrated, providing distinctive settings for its cities, towns and villages and underpinning the future prosperity of the area.

Support Sustainable and Healthy Communities

The health and well-being of people living in the Framework area is linked to the quality of their environment. People need access to nature and the benefits of a green environment. New development must build communities, not just housing. This is vital for the health of the towns and villages and contributes to the economic prosperity of the area.

Become Fit for the Future

The Framework area needs to build resilience to help it adapt to change. Housing growth and transport will continue to make demands on the landscape and natural resources, particularly water. Climate change will create pressures and challenges which will require adaptation. Economic forces will test farming and forestry. The management of these complex challenges requires forward planning into the medium and long term horizons.

Better Through Working Together

Partnership working, shared objectives, pooling knowledge, securing resources and advocacy will be the keys to success for the Framework and its ambitions.

Green Infrastructure Strategic Principles in Detail

Make Strong Connections

The need for better connections crosses many areas – biodiversity networks and sustainable transport, as well as planning and delivering green infrastructure across boundaries and across sectors.

Green infrastructure, appropriately planned, can create a connected network which is essential for both people and wildlife.

Access routes are used for both travel and for recreation. A 'green travel' network, prioritising pedestrians and cyclists at the human scale, reduces congestion and has a positive economic impact (an issue, for example, in the south coast towns). Properly planned access networks can provide primary routes connected to secondary networks, linking into local communities, to railway stations and 'visitor hubs'. Local networks connect people to the places they need to get to, be it parks, schools or shops; and attractive and safe routes can encourage a modal shift from cars to more sustainable and healthy forms of transport.

Strategic planning for nature conservation at the landscape scale is essential to manage pressures on biodiversity to restore ecological networks. The Natural Environment White Paper (2011), taking the conclusions from '*Making Space for Nature*',[19] advocates that high quality wildlife reservoirs, such as designated nature conservation sites, should be linked at a landscape scale. The multiple benefits from green infrastructure offer opportunities to increase biodiversity value in a planned manner to support the creation of such landscape scale networks.

Green infrastructure also offers particular opportunities to bring nature into urban centres, not only making urban areas better for wildlife, but also allowing people to come into contact with nature.

Rivers and watercourses are themselves natural connectors across the landscape, providing routes for nature and people. These can be on a strategic scale, as in the major river corridors highlighted in the Green Infrastructure Investment Areas, or on a more local scale e.g. the planning of swales and attenuation ponds in a sustainable drainage scheme.

To deliver these networks properly requires co-ordinated working and planning at both the local and the strategic scale, understanding

[19] J. H. Lawton et al (2010), Making Space for Nature: a review of England's wildlife sites and ecological network.

the needs and assessing the opportunities and embedding this into delivery plans and policy.

What is Needed

- Strategic planning and delivery - Assess the needs and opportunities, planning and delivering these across administrative boundaries;
- A cross-sector approach to connections between towns and villages and the countryside – considering access, landscape, wildlife and rivers, not just one aspect in isolation;
- Better access connections around towns and from the towns to the countryside. These need to be planned to deliver maximum benefits and using the opportunities provided by new development to improve local networks;
- Better connection between access and biodiversity to ensure that recreation can be managed without causing undue pressure to the biodiversity resource;
- Breaking down access barriers – main roads (e.g. A27), rivers and railway lines all disconnect the network;
- Improve ecological connectivity – Improvement of this key underpinning ecosystem service needs to be 'mainstreamed' and incorporated into all other areas and at all scales. There is connectivity modelling evidence, but this is not co-ordinated and duplicates effort;
- Working together – Fundamentally these networks do not operate within current administrative boundaries. Developing this will require local authorities to look beyond their boundaries.

A Natural and Cultural Canvas

The well-being of the area fundamentally relies on the quality of the landscape, its ecosystems and the services they provide. The natural landscape and cultural heritage should be strengthened and celebrated, providing distinctive settings for its cities, towns and villages and underpinning the future prosperity of the area.

Landscape, heritage and biodiversity form the canvas upon which everything else is laid. Encapsulated in each of these are our past uses of the land and this, in turn, shapes the current landscape.

The South Downs National Park and AONBs are afforded protection for their high landscape value, but there are pressures acting on them. The views from and to the Downs, areas of tranquillity unaffected by the intrusion of noise and the experience of viewing the dark night skies are all qualities which need to be retained. Urban areas and the edges of the protected landscapes are under pressure from incremental degradation; and small pockets of tranquillity close to urban areas are precious local assets which need to be identified and retained.

The prosperity of the region also lies in the quality of its natural capital and the functioning of ecosystem services. Integrated spatial

planning can help to deliver multiple ecosystem services. While this Framework references ecosystem services, more needs to be done to implement the ecosystem service approach and integrate this into green infrastructure planning across the Framework area.

Woodlands can provide many functions and are integral to the landscape character of many part of the Framework area. They provide ecosystem services including timber, carbon storage, heat, air pollution and noise regulation. They soften the landscape intrusion at the edge of urban areas and make the urban centre more liveable.

What is Needed

- Maintain and strengthen landscape character by the consideration of the landscape setting in proposals for new developments and associated infrastructure, in order to support the integration of new development within its landscape; in particular in the areas outside the National Park where small-scale and gradual changes may be altering the landscape.
- Making more extensive use of tools including Viewshed to ensure the visual impacts on the landscape of developments are considered;
- New woodland landscapes and improved woodland management; to address the fragmentation of ancient woodlands and historic landscapes, to provide new landscapes and recreation opportunities and to develop co-operative schemes that make the use of timber products more viable through pooled resources and markets[20] and urban tree-planting programmes to improve green infrastructure in urban areas;
- A better understanding of ecosystem services and the role of both natural and urban landscapes in providing and demanding services;
- Keeping special places in the landscape; by identifying tranquil areas and places where dark skies and stars can be seen; and mapping key viewpoints (see below);
- Recognising and celebrating the rich cultural heritage of the landscape through the development and delivery of green infrastructure;

[20] As set out in policies 17 to 22 of the National Park Management Plan: *There is significant potential to increase the economic value of forestry within the National Park … Wood for construction in particular, would bring many benefits for biodiversity, a sustainable construction industry, and support the local vernacular. This could increase demand for wood and reduce the demand for minerals for construction….. aim to improve the viability of the forestry sector by creating business clusters, developing supply chains and improving networks including links to universities and centres of expertise, especially within the renewables sector.*

The National Park Authority has completed a View Characterisation and Analysis Study[1] to map and analyse the views to, from and within the National Park. This work sits alongside the SDILCA[1] to provide evidence on views and provides a visual way into understanding the SDILCA, making it more accessible to more people.

Support Sustainable and Healthy Communities

The health and well-being of people living in the Framework area is linked to the quality of their environment. People need access to nature and the benefits of a green environment. New development must build communities, not just housing. This is vital for the health of the towns and villages and contributes to the economic prosperity of the area.

The natural environment provides physical, mental and social well-being benefits; and this is now well-evidenced and documented. Not only does access to greenspace improve people's quality of life, it reduces economic burdens through improving health. Bringing nature into towns and villages also helps people feel more connected to their environment.

The idea of creating greener environments in our towns and cities is not new. People prefer to live in greener, healthy towns and villages and this is reflected in increased house prices. However, everyone should have access to greenspaces, but it is those who suffer most deprivation who may have the greatest need and have the lowest levels of greenspace available to them.

The natural environment can also provide health benefits through improving air quality and regulating noise and temperature, as well as reducing the impacts of extreme events such as flooding, which negatively impact on people's welfare.

Development pressures and scarcity of land have resulted in the fragmentation of green infrastructure in some of our towns and villages; and plans for the creation of new greenspace in existing areas can be difficult to achieve. The quantity and quality of green space is often insufficient for local needs, or inaccessible due to physical barriers, distance to travel or for cultural reasons. For people in poor health or with disabilities the difficulties of accessing open space can be even greater; and local greenspace within easy reach can be even more important.

What is Needed

- Provide more greenspace in areas of deficit, especially those areas which are also suffering from poor health or deprivation;
- As an absolute, do not create further disadvantage in areas already lacking in greenspace where there is also social and economic need;
- Ensure that new housing development adequately contributes to the provision of greenspace (at a scale appropriate to the development) in order to build communities not just housing;
- Increase the benefits and quality of existing greenspaces in areas of deficit, for example by allowing access to additional land to make better use of strategic gaps and urban fringe land, incorporating more wildlife interest, improving paths and increasing play space and ensuring high levels of maintenance;

- Bring nature into the urban areas – more wildlife in existing parks and greenspaces, better urban connections, naturalising and de-culverting rivers and streams;[21]
- Use green infrastructure in a planned way to combat environmental detractors – to reduce noise pollution and improve air quality.

Become Fit for the Future

The Framework area needs to build resilience to help it adapt to change. Housing growth and transport will continue to make demands on the landscape. Climate change will create pressures and challenges which will require adaptation. Economic forces will test farming and forestry. Greater demands will be placed on water resources, which will need to be in good condition and well-managed for future generations. The management of this complex list of challenges requires forward planning to view the medium and long term horizons.

Climate change will bring challenges and apply pressures on the landscape in the coming decades, with the potential to change coastal land, habitats and land uses. The changing conditions and demands may provide opportunities as well as challenges, such as a move to renewable energy resources and new crops.

Species and habitats are sensitive to changes in temperature and rainfall, requiring actions to conserve existing biodiversity, reduce sources of harm not linked to climate change and strengthen ecological networks. In addition, pests and diseases will have an effect on trees and other species and it will be important to plant resilient tree species as part of a plan to re-stock in the face of decline of particular species.

The increase in temperatures in larger urban areas will exacerbate respiratory and cardiovascular conditions, compounded through the interaction with air pollution. However, the natural environment can make an important contribution to regulating the local climate and reducing impacts.

For the water environment, despite some uncertainties, climate change is likely to lead to increases in the amount of winter rain falling in heavy downpours, along with a decrease in summer rainfall. This will necessitate flood water storage and methods to slow down run-off. Green infrastructure techniques (such as SUDS) and the development of multi-functional landscapes can play an important role in managing water flows.

[21] Also known as 'daylighting'; http://daylighting.org.uk/Daylighting/ and http://www.ciwem.org/knowledge-networks/networks/natural-capital/de-culverting-of-watercourses.aspx

Natural England's report on the potential consequences of climate change on the South Downs National Park[22] reinforces the role of green infrastructure in adapting to the effects of climate change.

Aside from climate change, water resources are also under pressure from abstraction and suffering from declining quality; 24% of river and 81% of groundwater is at/probably at risk from abstraction and flow regulation.[23] Demand for water will increase due to housing growth, aside from rising demand from climate change. Green infrastructure has an important role to play in reducing water demand, in preserving quality of water resources, both in watercourses and aquifers and in helping to regulate extreme flows through re-naturalising watercourses and catchment measures such as upstream planting.

What is Needed

- Address future urban heating by action now to plant trees to reduce heating effects and provide shade – in parks, streets, public areas and schools and as an essential part of new commercial developments;
- Ensure that water resources can support the growing population by reducing demand and improving quality;
- Use natural solutions to regulate water flow, through catchment planting, creation of wetlands and re-naturalising watercourses;
- Improve habitat and species connectivity to adapt to climate change (through implementing actions contained under other principles).

Better Working Together

Partnership working, shared objectives, pooling knowledge, securing resources and advocacy will be the keys to success for the Framework and its ambitions.

Green infrastructure needs champions; advocates who can make case for green infrastructure, who understand the local and wider benefits and the implications of not putting this essential infrastructure in place. This is particularly important now, as cuts in local government funding have badly affected the resourcing of green infrastructure for both capital projects and grounds maintenance. There is a growing reliance on new development to provide green infrastructure; either directly on-site, or by development contributions for off-site enhancements. Scarce resources mean that green infrastructure has to take its place on a list of other infrastructure requirements associated with new development; and the case for green

[22] Assessing the potential consequences of climate change for England's landscapes: the South Downs National Park – Natural England – September 2013 External Link

[23] Environment Agency (2009), South East River Basin Management Plan, Annex H: Adapting to Climate Change.

infrastructure may be out-weighed by others and the opportunities to develop green infrastructure are lost.

Local green infrastructure planning may relate to specific developments or single issues, but the beauty of green infrastructure is how it can inter-connect with a range of issues and provide a much wider range of benefits than may be initially apparent. This is one of the reasons why green infrastructure planning is best done at a strategic level and across administrative boundaries. A strategic approach requires partners from across authorities and from different sectors and organisations to come together to share knowledge and to plan a way forward around common goals.

Local planning authorities are key decision-makers in the development of green infrastructure. A good understanding of green infrastructure and an appreciation of its many benefits are vital for green infrastructure to be prioritised in planning decisions. Some work may be required to support Planning Officers and Councillors in their knowledge and understanding of green infrastructure.

Green infrastructure also needs resources. It is clear that government funding at all levels is diminishing and the reliance on new development to bring green infrastructure plans forward is not fool-proof. Work is needed to develop funding strategies for green infrastructure - to look in different areas, in different sectors and at different scales.

What is Needed:

- Bringing together coalitions of organisations based around common needs e.g. coastal communities;
- To identify potential advocates who can make the case for green infrastructure at all levels and to different – and influential – audiences;
- Pilot projects to take green infrastructure planning, development and/or delivery projects forward to demonstrate the approach and its benefits, not least in economic terms;
- Opportunities for Planners and local politicians to better understand green infrastructure and its role in sustainable development;
- An assessment of the potential for working with new sectors and sourcing new funds.

Targeted Investment of Green Infrastructure

Green Infrastructure Investment Areas
These are spatial areas which the analysis of evidence has revealed to be of particular priority.

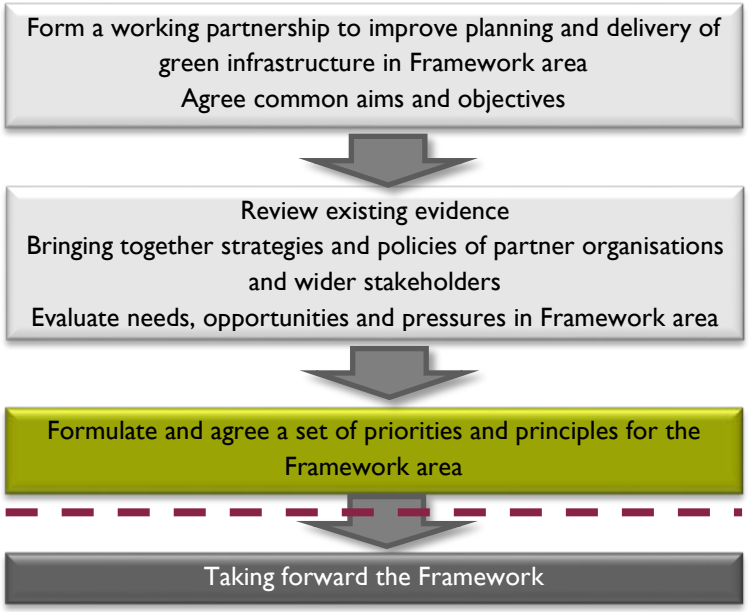
Green Infrastructure Investment Areas

The second element of the twin-track approach to improving green infrastructure planning and delivery is through identifying spatial areas of particular need. These areas are termed Green Infrastructure Investment Areas (GIIAs).

The GIIAs are areas which, during the evaluation process, emerged as areas in which the coalescence of a number of issues indicated the need for more targeted, strategic and cross-cutting intervention. Each of the GIIAs, while unique in their particular set of issues, needs and opportunities, shared this feature.

The evaluation process included a review of the green infrastructure provision in an area, its current green infrastructure functionality, potential pressures on the area and current interventions or planned activity (where known). Accordingly where activities or interventions are already taking place in an area of potential need, these areas have not been included as GIIAs.

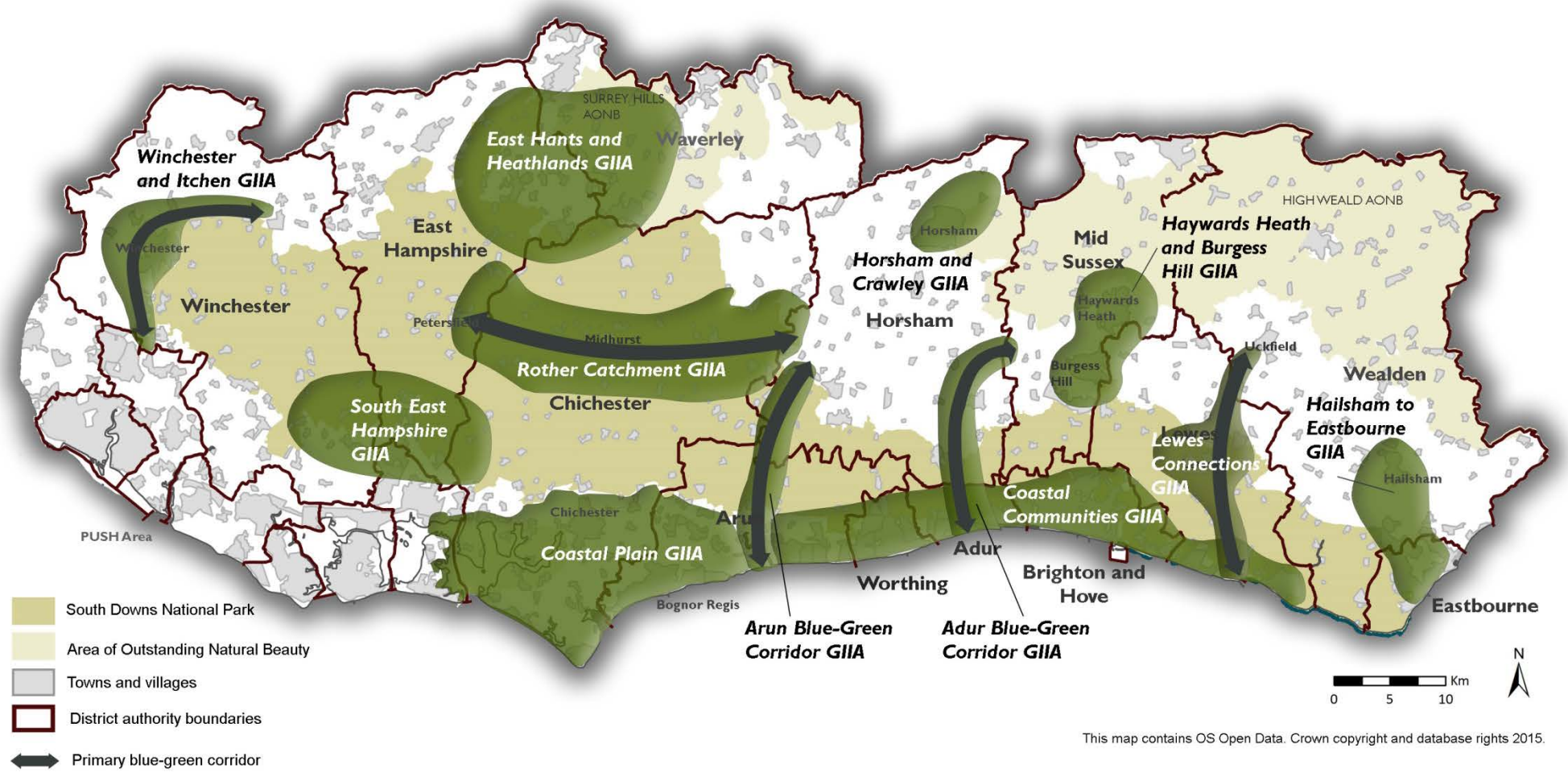
While in many of the GIIAs there are organisations and projects operating and policies in place, the scope for more joined-up approaches to deal with cross-sectoral and cross-boundary issues is universally applicable. As the GIIAs have been developed from a sub-regional scale review, they provide the opportunity for local level planning within a wider context.



The GIIAs

• Winchester and Itchen •
• East Hants and Heathlands • Rother Catchment •
• South East Hampshire • Horsham and Crawley •
• Arun Blue-Green Corridor • Coastal Plain •
• Coastal Communities •
• Adur Blue-Green Corridor •
• Haywards Heath and Burgess Hill •
• Lewes Connections • Hailsham and Eastbourne •

Plan 4: Strategic Green Infrastructure Investment Areas (GIIAs)



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Winchester and Itchen		South East Hampshire	
This GIIA follows the River Itchen from south of Winchester city and in an arc to the north. The River Itchen, itself a Special Area of Conservation, and the adjoining land which is a Site of Special Scientific Interest, also form one of the Framework's Blue-Green Corridors, linking villages to the north, through Winchester City and to the south to Eastleigh/ Southampton. Winchester lies on the edge of the South Downs National Park and is an important interface area with the National Park.		This GIIA lies across the northern PUSH area and the southern part of Winchester and East Hampshire districts. There is a need for a strong partnership approach between the four local authorities, two counties, National Park and PUSH. Alongside a large existing population, significant new housing is planned. The PUSH Green Infrastructure partners have plans and policy in place to provide green infrastructure within PUSH. Investment and co-ordinated planning needs to extend to the southern area of the National Park to protect the edge of the South Downs National Park.	
Strengths • *Natural blue-green corridor offering potential for multifunctional improvements – water quality, flood management, habitat connectivity and recreation;* • *Gateway to the South Downs National Park.*	***Weaknesses*** • *River Itchen SSSI and SAC as requires quality improvements;* • *Fragmented rights of way network;* • *The M3 forms a barrier between Winchester and the National Park.*	***Strengths*** • *PUSH strategy in place;* • *Backbone of accessible sites and access routes.* • *Queen Elizabeth Country Park (QECP) is one of the most visited countryside sites in the Framework area.*	***Weaknesses*** • *Fragmented network of green spaces which are poorly linked;* • *Noise regulation & Air Quality considerations along main roads.*
Opportunities • *River Itchen Site of Special Scientific Interest is 66% favourable/unfavourable recovering;* • *Improve western links from Winchester to Farley Mount Country Park;* • *The lack of overall recreation resource, especially in the city, creates a need to link biodiversity and recreation approaches to reduce pressure on biodiversity sites;* • *Explore potential to include isolated heritage assets, including Registered Parks to the north/south of city and the Scheduled Ancient Monuments to the south-east;* • *Opportunities for habitat connectivity – chalk downland east of Winchester, River Itchen valley;* • *Naturalise watercourses, remove barriers to fish movement;* • *Utilise natural water management, e.g.Winnall Moors;* • *Blue-Green corridor links to PUSH area, scope for joint approaches;* • *Areas of high demand for noise regulation around M3 along with areas in town centre;* • *'Keeping Rivers Cool' programme, particularly trout species.*	***Threats*** • *The high biodiversity value sites of the river valley in central Winchester provide accessible greenspace for the city but have been highlighted as sensitive to recreation;* • *The River Itchen Special Area of Conservation and SSSI are 'recovering' and rich in biodiversity; it is therefore more vulnerable to changes in both water quantity and quality (nutrient enrichment from waste water, road runoff) along with physical modification and siltation;* • *Policies allowing development adjacent to or in close proximity to the River Itchen have potential impact on both water quality and water quantity;* • *Inappropriate management by landowners along the River Itchen could affect its quality.*	***Opportunities*** • *Integrated recreation management to address pressure, especially around QECP/ Butser Hill SAC;* • *Extend woodland, provide more areas for recreation;* • *Link sites with access routes;* • *Link with PUSH partners;* *Forest of Bere - potential for landscape-scale project incorporating biodiversity, access, cultural heritage and landscape. Work with partners to develop this sub-regional project;* • *Access connectivity between New Forest National Park and South Downs National Park.*	***Threats*** • *Pressured edge of National Park, need to protect landscape quality;* • *Likely visitor pressure increase;* • *c16,000 new houses (at time of report) in the vicinity with potential to increase pressure on greenspace sites;* • *Loss of Strategic Gaps and views south from the South Downs ridge. Easy access from PUSH to southern East Hants sites may lead to recreational pressure.*

Rother Catchment		East Hants and Heathlands	
This GIIA follows the wider catchment of the River Rother from Liss, through Petersfield and Midhurst, to join the River Arun at Pulborough Brooks. This GIIA is wholly within the National Park and crosses three local authority boundaries; East Hampshire, Chichester and Horsham and Hampshire and West Sussex County Councils.		This GIIA lies includes many heathland sites, many of which are of international importance and in several administrative boundaries (National Park, East Hampshire and Waverley District Councils, Surrey, Hampshire and West Sussex County Councils and Surrey Hills AONB). Several European sites are recognised as being sensitive to recreation, for which mitigation measures are required, but many more have been highlighted as sensitive by land managers, for which mitigation of impacts is very challenging.	
Strengths • *Wholly in National Park;* • *Co-ordinated management and people engagement being developed through Heathlands Reunited Project;* • *Several active projects – potential for added-value in combined approaches.*	***Weaknesses*** • *Across three local authorities;* • *String of heathland sites, some SSSI's but also undesignated sites potentially sensitive to recreational pressure.*	***Strengths*** • *A co-ordinated approach to management and people engagement is being developed through Heathlands Reunited Heritage Lottery Fund Project (which also extends south into the Rother Catchment GIIA);* • *Greensand Heaths Living Landscape Project operating in this area.*	***Weaknesses*** • *Protection of European designated sites is secured through development contribution, but other non-European sites are currently under-resourced.*
Opportunities • *Heathland enhancement;* • *Pulborough Brooks key site for biodiversity and access;* • *Blue-green towns and villages, make water quality, biodiversity and appreciation of water central to communities of Petersfield, Liss, Midhurst, Pulborough;* • *Heathland, woodland and chalk grassland connectivity;* • *Bat conservation around Ebernoe Common and The Mens SAC's; strategic planning to protect flightlines and routes to SAC;* • *River catchment green infrastructure initiatives, diffuse pollution and sediment management;* • *Cultural landscape projects: parks and gardens;* • *Disused railway lines providing access routes.*	***Threats*** • *Potential recreation pressure as a result of housing growth at boundary of National Park around Petersfield and Liss.*	***Opportunities*** • *Continue good work of Heathlands Reunited project to fully integrate landscape-scale habitat conservation and green infrastructure;* • *Further partners need to be engaged to link strategic development planning and provision of green infrastructure on development sites to ensure that recreational space is provided not just as mitigation for European designated sites but to protect the other heathland sites and to improve habitat connectivity;* • *Identify heritage assets for including in green infrastructure projects to protect isolated heritage features.* • *Management approaches developed through Heathlands Reunited project embedded and continued after the project to fully secure the legacy.*	***Threats*** • *Continued disconnect of habitat, green infrastructure and development planning – protection of 'the best' and less robust approaches for 'the rest'.*

Coastal Communities

This extensive GIIA stretches from Littlehampton in the west to Newhaven and Seaford in the east and includes Brighton and Hove, Worthing and Shoreham-by-Sea and includes two rivers, the Arun and the Ouse that connect the coast with the south Downs and Weald. There are multiple issues in this GIIA, with a commonality of needs, requiring co-ordinated action on many fronts.

Strengths

- *The economic and cultural prominence of Brighton that has, along with Southampton, the highest property price rate of increase in the country;*
- *Excellent examples of cross-boundary strategies in the Brighton and Hove Lewes Downs Biosphere and Joint Area Action Plan for Shoreham Harbour;*
- *The geography provided by the Arun and Adur connecting the coast to the National Park;*
- *The proximity of the SDNP – Downs to the north and Sussex Heritage Coast to the east;*
- *Some good public transport links: Brighton Downs Link buses and Coastway rail route.*

Weaknesses

- *High deprivation in some areas combined with poor health;*
- *Barrier effect of A27;*
- *Development constrained between the National Park and coast, concentrating development and pressure within a smaller area;*
- *Existing accessible natural greenspace deficit and very low levels of other urban green infrastructure in many of the towns (a situation which could worsen with additional development growth).*

Opportunities

- *Potential for local authorities to join forces to position this GIIA as a green infrastructure exemplar area – making the case that investment is essential to halt further deprivation and the loss of quality of life in already disadvantaged areas and that it fundamentally underpins economic prospects for these towns;*
- *Foundations to build upon Joint Area Action Plan (JAAP) for Shoreham Harbour and the Brighton and Hove Lewes Downs Biosphere - learning can be extended to other coastal towns in need of similar approaches;*
- *The South Downs NPA also has an interest to halt degradation in this pressurised part of the National Park;*
- *Potential to improve capacity to regulate local climate, to meet high demand;*
- *Capacity to regulate noise in areas of high demand through improving green infrastructure. Particular need in areas of high population density and poorer health - western Littlehampton, near A27 and A259 and around all main roads into town centres;*
- *Capacity to improve pollination services in high demand areas along the urban edge with green infrastructure especially future urban edge greenspace;*
- *Strategic cross-boundary approach provides opportunity to develop joint strategies. This will help in understanding interactions, needs and opportunities – and potential solutions (i.e. Arun, Worthing, Adur, Brighton and Hove and South Downs NPA);*
- *More multifunctional use of strategic gaps to maximise this valuable, retained greenspace;*
- *Address traffic congestion and difficulty in east-west movement with strategic investment in sustainable transport across the entire GIIA;*
- *Develop strategic visitor management approach in highly visited area along southern boundary of National Park - to address visitor pressure on sites potentially vulnerable to recreation pressure and damage.*

Threats

- *Development pressure across the area with high levels of housing planned;*
- *Coastal flooding issues;*
- *Greenspace and strategic gaps are under pressure in all authorities;*
- *Ecological climate change vulnerability – areas of priority habitats within the coastal communities GIIA are highly vulnerable;*
- *Noise Regulation – all communities have large areas of high demand, likely due to high population density and poorer health. Some areas showing high capacity to deliver this need already and large areas where there is some capacity to regulate noise which could be improved through vegetation;*
- *Local climate regulation – extensive areas of high demand (need) across all coastal towns, but with capacity to improve through green infrastructure.*

Horsham and Crawley		Haywards Heath and Burgess Hill	
Growth of these towns is ongoing with more planned. This includes an extension to Crawley[24] on the boundaries of both Horsham and Mid-Sussex districts. As these towns continue to grow, landscape, communities and access could come under increasing pressure unless green infrastructure is planned to develop access connections, greenspace provision and protect the edge of the High Weald AONB.		This GIIA includes Haywards Heath, Burgess Hill and Hassocks/ Hurstpierpoint, all within Mid Sussex but adjacent to the Lewes District and National Park borders and close to the boundaries of Wealden district and the High Weald AONB; requiring a cross-boundary approach. One of the largest housing allocations in the Framework area is planned for Burgess Hill. This area will remain the focus of development pressure, lying between two protected landscapes, necessitating an integrated 'future-proofing' approach.	
Strengths • *Good railway connection between the urban areas;* • *Sustrans Regional Cycle Route 20 links to the National Park and to the coast at Brighton.*	***Weaknesses*** • *Some areas lack greenspace and have fragmented rights of way access;* • *St Leonards Watershed Biodiversity Opportunity Area (BOA) requires sensitive management.*	***Strengths*** • *Burgess Hill Green Circle – key green infrastructure for this expanding town;* • *Proximity to protected landscapes provides access resource for residents;* • *Several nature conservation sites including Local Nature Reserves;* • *Green infrastructure included in developing Neighbourhood Plans.*	***Weaknesses*** • *Neither Mid Sussex nor Wealden have green infrastructure strategies;* • *Mid Sussex: no current green infrastructure policy;* • *Haywards Heath less well served for access;* • *Isolated heritage assets.*
Opportunities • *The delivery and ongoing development of Horsham's Green Infrastructure Strategy andg reen infrastructure opportunities from new development;* • *Integrated approaches to managing Arun, Adur and Mole: enhance access, water resource protection and habitat connectivity and protect High Weald AONB;* • *Woodland enhancement in Rusper Ridge BOA: enhance habitats, strengthen landscape, integrate development and provide robust recreational sites to serve growing population;* • *Potential for improved access / enhancements to green spaces in urban areas.* *Potential to incorporate historic parks around Horsham town into wider green infrastructure projects and funding bids.*	***Threats*** • *Cumulative effects of development across boundaries of Horsham and Mid-Sussex;* • *Effects of development on the Rusper Ridge BOA between Horsham and Crawley;* • *Development-related pressures on the edge of High Weald AONB;* • *Historic parks around Horsham town potentially vulnerable to development – related pressures.*	***Opportunities*** • *Secure Burgess Hill Green Circle - seek further improvements;* • *Cross boundary opportunities including links to Ditchling Country Park from Burgess Hill;* • *Green infrastructure here would link High Weald AONB to National Park;* • *Further develop an access chain: High Weald AONB - Haywards Heath – Burgess Hill – Hassocks - National Park;* • *Further improve nature conservation and access for people in Local Nature Reserves.*	***Threats*** • *Development pressures now and in the future;* • *No strategic green infrastructure plan to respond to the significant scale of development, especially to respond to windfall development;* • *Key views and dark night skies are vulnerable;* • *Medium to high climate change vulnerability due to small habitat sizes.*

[24] Subject to a boundary review at a future date

<table>
<tr><th colspan="2">Hailsham to Eastbourne</th><th colspan="2">Adur Blue-Green Corridor</th></tr>
<tr><td colspan="2">The Hailsham to Eastbourne GIIA straddles Wealden and Eastbourne local authorities. There is development planned in both areas; in Hailsham and Polegate in Wealden, the latter being directly adjacent to the Eastbourne border. All of the settlements are situated on the upstream feeder streams for the Pevensey Levels SAC and Ramsar. Water resources are an issue, with constraints on waste water, flooding and the need for no adverse effect on Pevensey Levels. Access is fragmented by road and rail.</td><td colspan="2">This GIIA is one of the main river valleys cutting through the South Downs National Park. These valleys are important access corridors to the Downs, especially for deprived coastal communities, for water resources and biodiversity. This GIIA extends from Shoreham-on-Sea to Steyning/Upper Beeding, with the Adur continuing towards Henfield.</td></tr>
<tr><td>Strengths
• Eastbourne Park is a large green infrastructure site within Eastbourne performing essential flood mitigation functions as well as providing a wider range of functions including recreation;
• The Heritage Coast is an important and reasonably accessible asset for the urban areas, guided by a partnership approach and the Sussex Heritage Coast Plan which embeds the duty-to-cooperate and the seven qualities of the National Park.</td><td>Weaknesses
• Eastbourne Local Plan lacks a green infrastructure policy; no green infrastructure strategy planned. No Wealden district green infrastructure strategy;
• Lack of accessible natural greenspace, including in areas of poor health;
• Wilmington Wood a valuable recreational space but A22 is a barrier;
• Medium/high climate change vulnerability especially Eastbourne and Pevensey Levels.</td><td>Strengths
• Access good along most of corridor (cycling and walking), including 37 mile South Downs Link route linking North and South Downs.</td><td>Weaknesses
• Habitats less well connected than befits this important corridor: needs habitat restoration and connection, grazing marsh and wetland habitat.</td></tr>
<tr><td>Opportunities
• The strategic allocation plan for Polegate identifies on-site green infrastructure, but a greater opportunity is to improve the Biodiversity Opportunity Area, forming a blue-green corridor linking Eastbourne/ Shinewater; biodiversity, access and water;
• Realisation of Eastbourne's vision for Eastbourne Park;[25]
• Access improvements, building on the existing Cuckoo Trail;
• Pevensey Levels is a sensitive, highly visible landscape which should be strengthened with appropriate planting to provide a setting for and screening of new development;
• Opportunities around expansion of Arlington Reservoir.</td><td>Threats
• The strategic allocation at Polegate lies directly upstream from Shinewater/ Eastbourne Parks;
• Noise regulation: extensive areas of high need in Polegate (A27) and bypass, south east Hailsham and in Eastbourne;
• Whole area includes upstream tributaries to Pevensey Levels;
• Sensitive landscape around Pevensey Levels.</td><td>Opportunities
• Raise recognition of importance of access corridor and link from coastal towns to Downs;
• Shoreham Harbour JAAP has potential to provide significant blue-green corridors and bridges;
• Shoreham Cement works: cultural heritage and opportunity for green infrastructure enhancement;
• Re-naturalise rivers, e.g. support MORPH;
• To develop a 'Wild Adur' project (SWT).</td><td>Threats
• Shoreham Harbour JAAP could reduce access to sea; green infrastructure needed to retain access and views;
• Landscape character, quality, views and access threatened by development especially Lancing and Sompting Gaps;
• High climate change vulnerability.</td></tr>
</table>

[25] Eastbourne Park SPD February 2013 – Eastbourne Borough Council

Lewes Connections		Arun Blue-Green Corridor	
Lewes is one of the largest settlements within the South Downs National Park, situated on the River Ouse where the river cuts through the South Downs. This GIIA includes Lewes town and two corridors - the north-south River Ouse corridor and the east-west downland habitat and offers potential for an integrated approach to green infrastructure, incorporating water resources, access improvements and habitat connectivity.		This GIIA is one of the main river valleys which cuts through the South Downs National Park. These river valleys are important corridors for access to the Downs, especially for deprived coastal communities, for water resources and biodiversity. This GIIA extends from Littlehampton to Billinghurst, intersecting with the Rother Catchment, Coastal Plain and Coastal Communities GIIAs.	
Strengths • *Within the Brighton and Lewes Downs Biosphere;* • *At the crossing point of Downs and rivers offering potential for connectivity – habitats, water resources and recreation;* • *Active community interest in environmental issues.*	***Weaknesses*** • *Accessible natural greenspace around edge of Lewes but limited provision in town centre, with lack of play spaces and an existing deficit in sports and recreation areas;*	***Strengths*** • *North-south connectivity – biodiversity, landscape, recreation;* • *High biodiversity value and several biodiversity opportunity areas. Habitats include ancient woodland, wood pasture, chalk grassland, grazing marsh, reedbed, grassland and fen;* • *Wash lands of the River Arun with SSSI designation including Pulborough Brooks SSSI, Arun Banks SSSI and Arun Valley SPA and SAC, with Upper Arun SSSI north of Pulborough;*	***Weaknesses*** • *Fragmented access network;* • *Access barriers: lack of river crossings and major east-west railway and road barriers;* • *Littlehampton has high deprivation, poor health and no accessible natural greenspace and is disconnected from nearby areas by railway and river.*
Opportunities • *Enhancements to blue-green corridor towards Uckfield and south to Newhaven;* • *Explore natural solutions to flood issues (as indicated in Catchment Flood Management Plan)- upstream flood mitigation and habitat enhancement, tree planting and new wetlands;* e.g. *Trees on the Uck Project and Sussex FLOW initiative;* • *Realising the recreational potential of the river (subject to planning policy);* • *Access improvements - disused railway line to Uckfield (subject to any decision to re-open);* • *High demand for noise regulation along most access roads into Lewes.*	***Threats*** • *Impact of planned housing growth in the context of environmental constraints of outward expansion of main towns as either within the SDNP, in or near designated areas or in flood risk areas, or constrained by the highway network;* • *Potential pressure on existing green spaces;* • *Mount Caburn SAC an important recreation site close to the town but was highlighted as potentially sensitive to recreational pressure by land managers;* • *Medium to high climate change vulnerability Ouse catchment and valley;* • *Air quality issues in Lewes.*	***Opportunities*** • *Make improving connections from Littlehampton to river and beyond a high priority;* • *Requires co-ordinated approach between Arun, Chichester and Horsham Districts, SDNPA and West Sussex CC;* • *Cross boundary and cross sector approach required: view the river corridor as an asset for biodiversity, water resources, flooding and sea level rise management, heritage, recreation and tourism;* • *Footpath along riverbank with potential to upgrade for cycling;* • *Link routes to Ford Station - local access and tourism potential;* • *'Access for all' improvements at Pulborough Brooks as gateway to the river valley habitats;* • *Habitat restoration, naturalising channels (much of river is embanked), reconnecting habitats, floodplain grazing marsh and other wetland projects;* • *Urban fringe south of National Park needs enhancement to strengthen landscape quality whilst retaining its distinctiveness.*	***Threats*** • *Ecological climate change vulnerability – medium to high vulnerability along catchment and valley;* • *Longer-term issue of sea level rise in lower Arun valley;* • *Need to protect the long views to and from Arundel and across the low-lying landscape.*

Coastal Plain	
This GIIA covers the low-lying coastal plain from the west of Littlehampton (where it intersects with the Arun Blue-Green Corridor and the Coastal Communities GIIA) through to Chichester in the north and Bognor Regis and the Manhood Peninsular in the south and including Chichester Harbour AONB. This area is important for crops and horticulture, along with areas internationally important for wildlife. The plain crosses Chichester and Arun local authority areas, requiring a joined-up approach to developing strategic approaches.	
Strengths • *Managed retreat site at Medmerry;* • *Arun has green infrastructure plan and policy, with longer term ambitions;* • *The Manhood 'FLOW project is undertaking assessment work to identify potential improvements to wildlife and to reduce flood risk*	***Weaknesses*** • *Very little accessible natural greenspace across entire coastal plain, with some settlements having no sites or only small sites on the edge of the settlement;* • *A27 is a major barrier to accessing National Park and areas of accessible greenspace and woodlands;* • *Significant areas of poor health and deprivation, e.g. centre of Bognor Regis, Selsey and Yapton;*
Opportunities • *Development planned across several settlements in both local authority areas. Opportunity for co-ordinated approach in addressing some of the issues of the GIIA as a whole in response to development in both local authority areas;* • *Opportunity for environment to support tourism and the local economy;* • *Access improvements and circular walks will benefit both the economy and local residents;* • *A need for recreation to be developed without increasing pressure on recreation sensitive biodiversity sites;* • *Link existing access routes to improve access e.g. to the Manhood Peninsular;* • *Deliver aspiration (in Arun Green Infrastructure Plan) for new open spaces to north west of Bognor and in Barnham area;* • *Explore a new site of sufficient scale to serve residents in both districts with potential benefits in securing funding to deliver this, plus help to relieve pressure on Pagham and Chichester Harbours;* • *Potential to link habitat improvement and flood mitigation;* • *For partnerships to work together in delivering green infrastructure improvements e.g. The Arun & Western Streams Catchment Management Partnership, The Arun & Rother Rivers Trust and The Downs & Harbours Clean Water Partnership* • *Pollination Services: high demand along urban edge due to agricultural needs. Capacity to improve with improvements in green infrastructure especially in any future urban edge greenspace.*	***Threats*** • *Development planned across several settlements in both local authority areas;* • *Chichester Harbour and Pagham Harbour are the most significant accessible natural greenspace sites but both are Natura sites which are sensitive to recreational pressure;* • *Flooding is a risk across area;* • *Low-lying landscape could be sensitive to change;* • *Ecological climate change vulnerability – few areas of priority habitats within the coastal communities GIIA, but all are highly vulnerable.*

Potential Strategic Actions

Make Strong Connections

The need for better connections crosses many themes – biodiversity networks and sustainable transport, as well as planning and delivering green infrastructure across boundaries and across sectors.

Connected Nature
Improve ecological connectivity of habitats in all of the key areas already highlighted by applying the ecological connectivity modelling; and in particular develop a strategic solutions approach in providing landscape-scale green infrastructure to help maintain the interests of Bat SACs: • The chalk grassland ridge of the South Downs; • All of the river valleys; • The area of heathland and woodland complexes to the north of East Hampshire and into Surrey; • The heathland and river corridor of the River Rother; • The important bat networks around Ebernoe, The Mens and Singleton and Cocking Tunnels SAC the focus for a £2.9M bid to secure funds for improved connectivity based upon land management improvements.
Extend ecological network mapping specifically to river corridors to inform integrated approaches to naturalising water courses and natural solutions to water resource issues.
Co-ordinate approaches to ecological connectivity modelling to reduce duplication, maximise resources and enable results to be shared.
Embed ecological connectivity more fully into green infrastructure planning and delivery at both the local and strategic scale.
Connected Towns and Countryside
Enhance the blue-green river corridors which link the urban areas to the countryside. The larger scale corridors are highlighted as priority areas under 'Green Infrastructure Investment Areas' (next section) but the concept extends to smaller water courses.
Enhance the multiple benefits of the urban fringe: ecological connectivity, landscape character, urban intrusion and amenity and potential as link to the wider countryside.
Connected Access Networks
'Green Roads' – develop a strategically planned approach to upgrade roads to provide safer, attractive routes for walkers, cyclists and equestrians, with benefits to health; improving air quality and reducing noise impact.

As a priority area, plan and develop a co-ordinated green travel network through joint working between all coastal towns from Littlehampton to Brighton and Hove, to enable east-west movement, ease congestion, support economic development and improve levels of greenspace deficit.
'Leap of Discovery' – develop a major programme of breaking through the barriers to access, to include green bridges and crossings over roads, railways and rivers to give walkers and cyclists dedicated routes.
Plan town-scale access networks and join these links to neighbouring authorities.
Develop programmes to tackle strategic or significant access issues that help unlock wider access and add value to existing programmes: • 'Down to the Sea' - routes that link the National Park to the coast; • 'Down Town' - routes that link the National Park to the towns within and outside the Park; • 'Town Links'; commuter links between towns.
New major housing developments to include plans for green, traffic-free access routes that provide connections between homes and schools, shops and the public transport network, with plans extending beyond the development 'red line'.
Smaller new development to contribute to a planned green travel network to increase sustainable travel.
Develop an access network hierarchy across the Framework which extends beyond the National Park and County Council boundaries that: • Identifies local, linking and strategic routes; • Addresses key gaps in the network; • Provides link routes for local amenities, public transport and visitor attractions; • Supports the development of sustainable tourism and develops circular routes around settlements and hubs, consistent with and supporting the Sustainable Tourism Strategy; • Provides inter-urban routes between towns and conurbations; • Links to greenspaces.
Recreation Respecting Nature
Target areas of high visitor pressure to upgrade facilities and identify alternative sites to spread the visitor load, particularly those areas either side of the National Park boundary where there is heavy recreation pressure; including feasibility for new sites; e.g.The Devils Dyke, Ditchling Beacon, Queen Elizabeth Country Park, Selborne Common.
Take an integrated approach to understanding and managing recreational pressure on potentially sensitive biodiversity sites through: • Understanding the relative value and sensitivity of biodiversity sites within the open space network; • Identifying sites which serve a high population for which there is limited other open space; • Building the evidence base to understand better both visitors and impacts; • Collaborative working between owners/managers of accessible land.

A Natural and Cultural Canvas

The well-being of the area fundamentally relies on the quality of the landscape, its ecosystems and the services they provide. The natural landscape and cultural heritage should be strengthened and celebrated, providing distinctive settings for towns and villages and underpinning the future prosperity of the area.

New Lives New Landscapes

Develop landscape frameworks

- As the setting for all new major developments;
- To strengthen landscapes undergoing change e.g. the wetland landscape of the Pevensey Levels; and areas within view of designated landscapes;
- For the urban fringe – including the coastal urban fringe – to provide open spaces with positive uses and a network of woodlands and hedgerows to form green corridors and buffers around the urban fringe.

Woodlands that Work

Extend woodland management initiatives to the area between High Weald AONB and South Downs National Park.

Run ecological connectivity model to determine potential for new woodland in the Burgess Hill/Haywards Heath GIIA area between the High Weald AONB and the South Downs to link the two protected landscapes; to provide a setting for development and a recreation facility close to centres of population and to connect these two areas.

A landscape-scale, planned approach to the management of existing and creation of new woodlands to:

- Provide woodland buffer areas around ancient woodlands and heaths to protect from development and other pressures;
- Provide recreational opportunities, to screen development and filter noise and visual intrusion in urban areas;
- Maintain woodland cover to protect from the effects of climate change e.g. rapid water run-off and soil erosion;
- Target the linking up of fragmented woodlands in key landscapes;
- Developing new wooded landscapes as the setting for major development areas; to provide multi-functional landscapes that offer recreation facilities and screening of development;
- Provide carbon storage.

Explore increasing recreational and access provision in woodlands, especially in areas of greenspace deficit and to protect more sensitive biodiversity sites.
Where appropriate to the landscape character, expand and create woodlands around transport corridors to improve landscape, help limit noise and filter pollution.
Understanding Ecosystem Services
Extend ecosystem service modelling and incorporate into green infrastructure planning.
Use the existing ecosystem information, for example on noise and local climate regulation and pollination services in green infrastructure planning.
A Sense of Space
A better understanding of the landscape through: • Extending Dark Skies mapping to the wider Framework area to help reveal where dark skies are being lost; • Examining where there are areas of tranquillity – and perceived tranquillity – to develop a strategy for retaining and developing quiet areas of the landscape.
A programme to identify the key views across the Framework area. To include historic and inspiring long views from and into the Framework area; identify, record, celebrate and maintain! This can build upon the Viewshed analysis undertaken by the South Downs National Park Authority (External Link to Viewshed).
A Cultural Canvas
Incorporate heritage into green infrastructure planning: • Identify unregistered historic/designed landscapes and features and incorporate them into green infrastructure planning; • Target key historic parkland sites for enhancements to access, interpretation and visitor facilities; • Restore characteristic features in the landscape including Hammer Ponds, historic bridges and water meadow systems; • Interpret and celebrate heritage; • Celebrate cultural heritage through the development of local walks and promotion, involving local communities and businesses, to encourage sustainable approach to exploration of local heritage features and bringing benefits to local businesses.

Support Sustainable and Healthy Communities

The health and well-being of people living in the Framework area is linked to the quality of their environment. People need access to nature and the benefits of a green environment. New development must build communities, not just housing. This is vital for the health of the towns and villages and contributes to the economic prosperity of the area.

Greening the Grey
Greenspace for nature – incorporate more biodiversity into urban parks and greenspaces to increase multiple benefits and improve access to nature for urban residents.
Re-naturalise and connect urban water courses, also implementing amenity improvements and providing access to watercourses in a programme of 'blue-green' towns and villages. Start with pilot settlements.
Extend principles of urban ecological connectivity piloted in the Brighton and Lewes Downs Biosphere to rest of coastal towns.
Healthy Communities
Build on existing work by Sussex Community Development Association (SCDA) engaging with health professionals and together make a stronger case that greenspace is needed for healthy and sustainable communities.
Improve spatial understanding of greenspace provision and health and deprivation needs – and secure this in policy.
Strategically plan to target areas of poor health and deprivation to retain, increase and enhance local areas of greenspace.
Ensure that all new development proposals include a plan for on-site green infrastructure and links into the wider network, or make a contribution to greenspace provision, at a scale appropriate to the development.
Work across boundaries to tackle those areas where existing deficiencies in open space and/or access network coincide with planned housing where there is the potential for increased recreational demand and potential for enhancement from more than one planned major housing development.
Target the coastal towns and Winchester, Alton, Hailsham, Crawley and Eastbourne for green infrastructure enhancements to improve provision in areas of poor health. • Identify and develop new areas of local greenspace;

• 'Green Facelift' programme to upgrade and enhance existing spaces; removing graffiti and litter, improving visibility and safety, adding facilities and developing community links to support the management of the sites; • 'Green Hit Squads' to be based in the local community to target incidences of graffiti and rubbish and social problems in green spaces; • Access links from local greenspace to link with local residential areas, shops, schools and public transport.
Develop community-based interventions that 'make it easy to be active' based around green spaces and access. e.g. Extension of East Sussex Community 21 and AiRS health and wellbeing initiative.
Promote the concepts of Active Transport (walking or biking as a means of transportation and not purely as a form of recreation) and Active Living (a way of life in which exercise is fully integrated into daily activities).
Develop plans for a Children's Play Space Programme; where there is low ANG and low play space provision to maximise multifunctional benefits to include pilot 'natural area' site e.g. Worthing.
Cleaner Air – Greener Streets
Develop 'Green Zones' - Large-scale tree-planting and greening programmes for urban areas.
Target areas of noise pollution next to busy roads and implement noise regulation, potentially using EcoServ-GIS modelling.
Develop 'Green Roads' - Landscape-scale programmes to upgrade green infrastructure along major roads and provide safer, more attractive routes for walkers and cyclists; introducing a human-scale network to reduce the scale and dominance of the roads and improve the landscape, connectivity and accessibility.

Become Fit for the Future

The Framework area needs to build resilience to help it adapt to change. Housing growth and transport will continue to make demands on the landscape. Climate change will create pressures and challenges which will require adaptation. Economic forces will test farming and forestry. Greater demands will be placed on water resources, which will need to be in good condition and well-managed for future generations. The management of this complex list of challenges requires forward planning to view the medium and long term horizons.

Plan Ahead
A programme of activities to prepare the landscape for climate change, including: • research (e.g. into appropriate species mixes for resilient woodlands and a new agricultural landscape); • restoration of features in the landscape (e.g. to impede cross-land water flows (e.g. hedgerows and shaws)) • planting in key areas to reduce soil erosion; • developing wood-fuel (planting and markets) and other biomass.
Stay Cool
• Implement tree planting in schools, streets and public places in areas of high need of urban cooling. EcoServ-GIS indicated large areas of the coastal towns and some areas of the larger towns in the Framework area that need urban cooling, e.g. Horsham, Chichester and Winchester. • Ensure requirements for tree-planting and other methods of reducing solar heat on building surfaces are incorporated into the design of new commercial developments.
Use information on air quality to target local improvements to tackle urban pollution, which exacerbates the negative impact of urban heat.
Incorporate noise regulation modelling at the local scale to deliver improvements in urban heat, noise and air pollution regulation in urban areas.
Secure Water Resources
Increase provision of SuDS schemes and green roofs, considering a pilot area and supporting local authorities in securing these from new development, to conserve water resource quantity and quality.
Promote reduction in water resource demand – championing low water input parks, gardens and golf courses.

Identify and target pollutant sources posing greatest risk of polluting surface and groundwaters, for example drainage from industrial and commercial and roads and instigate green infrastructure improvements. Begin with a pilot scheme in high need area.
Natural Rivers – Natural Solutions
Target green infrastructure solutions to flooding issues, particularly upstream of settlements of Lewes, Uckfield, around Eastbourne and Hailsham, the Arun north of Arundel, the Rother and the Adur north of the South Downs, for example through new wetlands or woodland planting.
Tackle localised flooding through re-naturalising water courses and smaller scale wetlands.

Better Working Together

Partnership working, shared objectives, pooling knowledge, securing resources and advocacy will be the keys to success for the Framework and its ambitions.

Use the co-ordinated influence of the Framework partnership to position the area as a 'Blue-Green' area with the aim of significantly improving the implementation of water quantity and quality improvement measures and strengthening the impact and effectiveness of existing Catchment Partnerships.
Consider the strategic resourcing of new greenspace and access links in areas of identified deficiencies where development funding is not feasible.
Find ways of working across sectors to prioritise and join up the strategic planning of new access routes and open spaces to create a network that meets future needs.
Take a cross-boundary approach to planning and funding access sports and recreation space.
Promote the use of green infrastructure to Planners: • Provide green infrastructure workshop sessions for planners; • Develop a toolkit for Planners and Developers.
Find ways of working across sectors to prioritise and join up the strategic planning of the landscape • Take a cross-boundary approach to planning and funding; • Ensure landscape evidence and guidance is comprehensive, up to date and to a high standard across all the local authorities; • Target broad landscape areas for intervention where change is planned.
Consider cross-boundary green infrastructure, especially provision of larger sites, in areas where there is a low amount of accessible natural greenspace.
Work with recreation and tourism sectors to increase understanding and develop approaches to promotion.

Evidence and Themes

Review of Local Authorities in the Framework Area

In developing this Framework it is important to understand the position of each planning authority in terms of its statutory Local Plan, so that development and other pressures on the area may be better understood. In addition it is helpful to understand the progress, or otherwise, that each authority has made in planning for green infrastructure and what each authority might need from a green infrastructure Framework at the sub-regional level.

A review of the status of Local Plans and green infrastructure or green infrastructure-related policies was carried out. The review included the planning authorities within the Framework area, comprising twelve district authorities, one unitary authority and the National Park authority. The review can only be a snapshot in time and some of the Local Plans may have moved forward since this research was carried out.

A number of planning authorities were in the process of developing, updating or reviewing elements of their Plan and in the interim period were using a combination of parts of their current Plan and/or their previous Plan and its (saved) policies. The development status of Local Plans and green infrastructure policy for each of the planning authorities is shown in Table 1.

The review revealed a number of key issues.

Development Pressure

- All the planning authorities are planning housing growth and some more than others. For some local authorities this is resulting in pressure on green infrastructure;
- A shortage of housing land means that urban areas and their green spaces are increasingly squeezed by transport infrastructure and other built development;
- The timing of the Local Plan process is not neatly aligned with the bringing forward of strategic sites, with the result that green infrastructure and other policies may not apply to some of the sites;
- Most of the larger housing sites are all located in areas outside of the National Park and the AONBs. This provides protection to the designated landscapes, but places increasing pressure on the landscapes to the north of the National Park and to the south of the Surrey Hills and High Weald AONBs, as well as the coastal plain and areas to the north of Chichester Harbour AONB;

- The increasingly difficult financial position of local authorities means that in most areas the development and enhancement of green infrastructure is only likely to take place if it can be funded by new development, i.e. either directly on site by the developer, or in the form of developer contributions. However, changes in planning regulations under the NPPF and restrictions on the pooling of s106 funding mean that the funding of infrastructure (e.g. green or blue corridors, SUDS, cycle routes, major greening initiatives and so on) may be more difficult to achieve, particularly where the funding is to be sourced from smaller developments. In addition, local authorities are dealing with a range of competing pressures for this funding and green infrastructure may not be their highest local priority.

Green Infrastructure Policies

- There is no standard approach to the development or inclusion of green infrastructure policy across the authorities;
- Four authorities in the Framework area have current adopted green infrastructure policies. A number of authorities have draft green infrastructure policies within their emerging local plans. Other authorities do not have green infrastructure policies as such, but they have policies which support green infrastructure (e.g. policies regarding biodiversity, access provision, flood risk management, heritage and the setting of the National Park and AONBs);
- Where green infrastructure policies are included in Local Plans, a different approach is taken by each authority. Some include the retention and enhancement of existing assets only, whilst others are more forward-looking and include the development of new multi-functional green infrastructure and guidance for the development of green infrastructure.

Green Infrastructure Strategies and Other Evidence

- There is no standard approach to the development of green infrastructure evidence across the authorities. Some authorities have produced strategies, others have plans to do so in the future, whilst others have no stated intentions to develop a strategy;
- East Hampshire, for example, has carried out a comprehensive suite of green infrastructure strategies for its area at district level (i.e. a Green Infrastructure Study of its settlements, a Green Infrastructure Strategy of the district excluding the settlements and a Green Infrastructure Strategy for the proposed new eco-town at Whitehill & Bordon); Horsham has a green infrastructure strategy and a Draft Green Infrastructure Policy. Whilst Arun has no current green infrastructure strategy, it has carried out a Green Infrastructure Study and its emerging Local Plan includes policies which indicate its positive approach towards the development of green infrastructure in the future.

Examples of Green Infrastructure Pressures

- There are deficits in open space in a number of areas and more green spaces and wildlife sites are needed;
- Some green sites are not well-connected – to each other or to local housing and amenities;
- The coastal areas risk losing the potential for linking the Downs to the coast if development continues without the creation of green infrastructure (e.g. green and blue corridors);
- The pressures generated by development which may be improved by green infrastructure include recreation demand, water and flood issues and joint approaches are needed to address the pressures generated by new housing, including recreation demand and water and flood issues;
- A strategy for green infrastructure would help to direct and prioritise resources and help in potential joint bids for funding.

Example of a Sub-Regional Approach: The PUSH Initiative

South Hampshire was identified as an area for growth in the South-East Plan (GOSE, 2009). The Partnership for Urban South Hampshire (PUSH)[26] recognised the benefits of working together to support the sustainable economic growth of the sub region and to facilitate the strategic planning functions necessary to support that growth. The response to the scale of growth and development planned for the area included consideration of the effects that new growth might have on the natural resources of the region.

The development of this initiative and its integrated approach to green infrastructure is well-documented, but there are a number of outputs from the PUSH initiative which are of interest to this Framework and the actions which may be needed to take the work forward.

A Green Infrastructure Strategy[27] was commissioned with the aim of developing a framework to shape a multi-functional and integrated green network that would help provide a high quality of life for the people in the area. The Strategy was informed by the South East Green Infrastructure Framework produced in 2009 which provided detailed guidance on how green infrastructure can be delivered through the planning system.

[26] PUSH is a partnership of Hampshire County Council, the unitary authorities of Portsmouth, Southampton and Isle of Wight, and district authorities of Eastleigh, East Hampshire, Fareham, Gosport, Havant, New Forest, Test Valley and Winchester.

[27] Green Infrastructure Strategy for the Partnership for Urban South Hampshire UEA Associates June 2010

The PUSH green infrastructure strategy provided a mutually agreed basis for taking forward green infrastructure work across South Hampshire. The crucial role of local planning was recognised and the need to finalise a green infrastructure plan to respond to planning applications as they were submitted, while offering benefits to other aspects of work such as potential HRA mitigation requirements. A key action in the short term was to include green infrastructure policies within Core Strategies.

The PUSH green infrastructure Strategy was produced in 2010 and made a number of recommendations based around five strategic sub-regional initiatives and forty-six proposed projects. Since that time the partnership has had to adapt to a difficult economic climate and changes in the national and regional planning landscape. PUSH is now linked with the Solent LEP's growth strategy on the theme of sustainability and the link has been made between the economy and green infrastructure.

PUSH has no statutory powers or functions but works collaboratively with the Solent Local Enterprise Partnership to deliver its distinct but complementary roles and objectives.
There is recognition of the need to develop infrastructure at the same pace as development, together with the potential impacts of climate change, the principles of sustainability (including the need to protect and enhance environmental, historic and cultural assets) and the need for good design.

Through the LEP the green infrastructure agenda has developed and evolved, with a review of the green infrastructure Strategy and the Delivery Framework and the development of the Green Economy. The LEP has produced a SPD[28] (see appendix for details) to develop and interpret the PUSH Core Policy Framework for Sustainable Development into guidance and external funding has been secured (£3m RGF funding).

This example illustrates the value of a sub-regional partnership approach and the benefits of aligning green infrastructure with economic and sustainability work programmes through the LEP.

Conclusion

The local authorities across the Framework area are dealing with high levels of housing growth and a range of pressures that have impacts on the natural environment.

Strategic development sites have the potential to provide the benchmark for green infrastructure provision for other areas of the district.

It is clear that some of the pressures do not follow administrative boundaries and joint working across landscapes may be necessary to deal with the impacts and effects. For example, where there is a fragmented access network; where development plans span the boundary between authorities; where green infrastructure in one

[28] PUSH Sustainable Development SPD Resource Document 2009

authority area may be provided in respect of development in another; or where the issues are on a landscape scale e.g. river corridors, major transport routes and crossing points and urban fringe landscapes.

We already know that open space standards are low in some districts and there are deficits in open space provision in many areas. In some districts the standards may not even reach the Fields In Trust Standard. This nationally-recognised minimum standard only applies to outdoor sports and play provision, but is not ideal for use by local authorities who should be assessing their local requirements and setting their own standards in response to local needs. Development could provide opportunities to enhance green infrastructure provision in urban areas. However, constraints on public sector spending and changes to development-related funding are resulting in competition for resources and threaten the delivery of green infrastructure.

The variation in approaches to evidence and policy development across the area does little to raise awareness of the importance of green infrastructure. A more consistent approach to developing green infrastructure policy and supporting evidence across the Framework area would provide a foundation for the development and enhancement of green infrastructure and help identify where key infrastructure is needed; helping to raise awareness of the value of green infrastructure and supporting bids for funding.

Further Work to be Considered

- There is the potential for local authorities to build on their current evidence base and address gaps to ensure there is adequate information to inform the development of local green infrastructure policy. This would require an assessment of the current status of the evidence base and a review of green infrastructure policies across the area;
- Alternative delivery and funding mechanisms for green infrastructure need to be considered as there is too much reliance on Developers to deliver green infrastructure. This would include existing partnerships and initiatives who are already delivering green infrastructure enhancements;
- Development funds (CIL) should have a proportion based upon assessed need ring-fenced for green infrastructure;
- Lessons could be learned (e.g. from PUSH and other partnership arrangements) on how to develop and take forward a more integrated and strategic approach to green infrastructure that would raise awareness of green infrastructure in the local authorities and its relevance and importance to sustainable development;
- Green infrastructure delivery could be demonstrated by focusing on specific areas where there is a range of issues to be addressed (e.g. the GIIAs) in an area-based approach. This would help bring stakeholder organisations and local communities together around common purposes.

Table 1: Local Plan and Green Infrastructure Policy Status

Planning Authority	Date of current Local Plan	Plan in preparation	Green Infrastructure Policy	Notes
Adur	1996	2011-2031	None currently: included in proposed Submission Local Plan: green infrastructure strategy to be developed possibly jointly with Worthing Borough;	Local Plan not yet adopted; Commitment by Adur District Council to develop a green infrastructure SPD and green infrastructure Strategy by 2017;
Arun	2003	2011-2031	None currently; Included in draft LP Publication Version Oct 2014	Local Plan not yet adopted; currently commissioning a range of evidence base studies including:- Open Space, Sport and Recreation Study and Playing Pitch Strategy; Strategic Surface Water Management Study; Strategic Flood Risk Assessment; Landscape Study; Habitats Regulation Assessment update;
Brighton & Hove	2005	Pt 2 City Plan	Not in adopted Plan	Pt 1 City Plan (DPD) complete
Chichester	2014-2029	n/a	Yes, Policy 52	Local Plan: Key Policies; adopted July 2015
Eastbourne	2006-2027	n/a	No	Core Strategy: Local Plan; adopted February 2013
East Hampshire	2008-2028 JCS	n/a	Yes, CP28: Green Infrastructure; and CSWB10: Green Infrastructure; green infrastructure network linked to the wider countryside.	Joint Core Strategy (with SDNPA); adopted by EHDC and SDNPA in 2014
Horsham	2007	Core Strategy Review pending	Not in current plan; proposed as part of new plan pending adoption	Planning Framework for Horsham District outside the South Downs National Park for the period up to 2031 has been found 'sound' by the Inspector and is pending adoption by the Council
Lewes	2003 JCS	Joint Core Strategy pending	Not in current plan; proposed as part of emerging JCS	JCS EiP hearing due in December 2015
Mid-Sussex	2004	District Plan pending	Not in current plan; proposed as part of new plan pending adoption (The emerging Mid Sussex District Plan includes a green infrastructure policy (DP38): www.midsussex.gov.uk/districtplan)	2014-2031 District Plan due for adoption by July 2016
SDNPA	n/a	Local Plan in preparation	n/a	The South Downs National Park is covered by the saved policies of 11 inherited Local Plans and 1 adopted Core Strategy. Since the designation of the National Park, the SDNPA has been working jointly to adopt Joint Core Strategies with some of the authorities. The SDNPA is preparing its Local Plan, which will replace all existing planning policies across the National Park

Planning Authority	Date of current Local Plan	Plan in preparation	Green Infrastructure Policy	Notes
Waverley	2002	Local Plan (Part 1: Strategic Polices and Site Allocations)	Not in adopted Plan; green infrastructure Policy for new Local Plan under consideration	Provisional date for Publication Draft – April 2016 (subject to review).
Wealden	The Development Plan currently comprises Saved Policies of the Wealden Local Plan (1998) and the Core Strategy Local Plan (2006-2027) (adopted 2013) JCS	A review of the adopted Core Strategy is pending	Yes, green infrastructure Policy WCS13 is part of the Core Strategy Local Plan (2013); No specific green infrastructure policy within the Wealden Local Plan 1998;	Strategic Sites Local Plan has been withdrawn; Wealden to assess potential for increased housing numbers; evidence/background documents no longer apply;
Winchester	The development plan for the Winchester District consists of the policies in Local Plan Part 1- Joint Core Strategy (2013), plus the saved policies in the Local Plan 2006 JCS	LP Pt 2 in as 'Pre-submission' stage[29]	Yes; Policy CP15: Green Infrastructure	Local Plan Part 1 – Joint Core Strategy Development Plan Document was adopted by WCC and SDNPA on 19 and 20 March 2013; The Local Plan Part 2 – Development Management and Allocations Document is being developed and will also form part of the Development Plan when adopted, replacing the saved policies of the 2006 Local Plan;
Worthing	Core Strategy 2011 – 2026 adopted in April 2011	New Local Plan in preparation	Yes; Policy 14: Green Infrastructure	Worthing Local plan (2003) saved policies not deleted by the adoption of the Core Strategy

[29] Information updated at draft Framework report stage in February 2016. This information is subject to continual change.

Theme: Landscape and Cultural Heritage

Introduction

The Green Infrastructure Framework aims to achieve a strong environmental infrastructure framework within which planned settlements, sustainable growth and landscape change can be positively managed to assist with the delivery of sustainable communities. Landscape provides the backdrop or setting for our lives. The role of landscape in green infrastructure planning is fundamental as it provides the spatial context and basic framework for green infrastructure.

The wide range of landscapes across the Framework area provides varying patterns and scales of land-use and settlements. These landscapes range from the Greensand ridge with its spectacular views, the wide open downland of the chalk plateau and extensive areas of parkland; the undulating landforms of the Wealden Greensand; patterns of dispersed farmsteads and springline settlements below the Downs; the low-lying, grazed pasture and drainage networks on the Pevensey Levels; the medieval landscape of the Low Weald and the varied coastline.

The historic environment is a key component of the landscape and an integral part of green infrastructure. Heritage assets may be of archaeological, architectural, artistic or cultural interest; and some heritage assets can form key components of the landscape. These include significant areas of multi-functional open space such as parkland, gardens and battlefields. The rich cultural heritage of the landscape adds to the distinctiveness of a locality and its setting for development. However, some heritage features may be at risk of being lost or damaged by neglect, poor management, isolation or inappropriate development.

Pressures on the landscape are increasing. A continued high level of economic growth in the south-east brings new development, an increasing population and the associated impacts on the landscape of visual intrusion, noise, traffic and light pollution. Indirect impacts of development include intensification of farming and demands on already overstretched infrastructure; increased demand for water supply and processing and space for recreation.

The statutory planning framework provides protection to designated landscapes in presuming against major developments. However, development outside and on the boundary of designated landscapes has the potential to affect the character and quality of the landscape; and small-scale developments within designated areas could have a cumulative, erosive effect.

Climate Change has the potential to alter the landscape through changes to coastal land, habitats and land uses. The changing conditions and demands may provide opportunities as well as challenges, such as a move to renewable energy resources and new crops. But there will be impacts on the landscape and, potentially, some permanent changes.

A strategic approach to the development of a multi-functional green infrastructure network helps develop more resilient landscapes which can adapt to change and retain character and distinctiveness.

Heritage

The present landscape has been heavily shaped by the interactions between people and places through time. The cultural heritage of the landscape is revealed by archaeology, historic features, buildings and settlements; it provides amenity, educational and tourism value and adds to local distinctiveness.

Elements of the historic environment are recognised as heritage assets for their importance to society and are given a level of protection or consideration through designation. This can include World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields and Conservation Areas.

The conservation of our heritage is fundamental to the principles of sustainable development. The NPPF makes provision for sustainable development to contribute to the protection and enhancement of the historic environment[30].

Sustainable Development is defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' UN Brundtland Commission (1983)

Historic England[31] recognises that the protection of heritage can contribute towards a range of other spatial planning goals through its influence on environmental character and sense of place, as a potential to be a catalyst for regeneration and as inspiration for high quality design.

Some heritage features may be at risk of being lost or damaged through neglect, poor management, the effects of isolation or inappropriate development; and the potential effects of climate change will make some heritage features particularly vulnerable to extreme weather events or flooding. However, it is important to retain - and in some cases reinstate - the historic character of an area, as an essential component of the landscape.

Historic Landscape Assessment (HLA) seeks to promote a more integrated, less site-based approach to heritage conservation and to link with wider environmental issues. HLAs have been developed across the Framework area[32] and seek to identify and understand the historic development of the landscape and place emphasis on the contribution that past historic processes make to the character of

[30] NPPF Paragraph 7

[31] Officially known as the Historic Buildings and Monuments Commission for England, Historic England is an executive non-departmental public body sponsored by the Department for Culture, Media and Sport

[32] Across the Framework area HLAs have been carried out by the County authorities of Hampshire, Sussex and Surrey, and the SDNPA as part of its South Downs Integrated Landscape Character Assessment (SDILCA).

the landscape as a whole, not just selected 'special sites' and can contribute to wider landscape assessment, as well as guiding decisions on future change and management. HLAs provide useful information and context for the development of strategic green infrastructure plans and ensure that heritage is considered alongside other land uses.

Green infrastructure can play a role in helping to enhance the setting of heritage features, bring in resources to invest in heritage projects and celebrate local heritage as part of an integrated and multi-functional approach to environmental enhancement. Green infrastructure can also help protect below ground archaeology and the settings of historic features from the pressures of development.

Landscape

The value and diversity of landscapes and the need to maintain and improve landscape quality is recognised at national and European level.

The National Planning Policy Framework (NPPF) includes provision for local planning authorities to protect and enhance valued landscapes and the setting of criteria-based policies for judging the impact of development on landscapes. In particular the NPPF expects local planning authorities to protect the landscape of National Parks and AONBs[33]

The European Landscape Convention (ELC)[34] aims to improve the quality of landscapes and gives strength to the recognition of landscapes in law and to integrate into all relevant policies.

> *"Landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors."*
> ELC, 2000.

Landscape Character

The ELC defines landscape character as 'a distinct and recognisable pattern of elements that occur consistently in a particular type of landscape.'

Landscape character and quality strongly influence our perception and enjoyment of green spaces as destinations, as settings to new and existing settlements and movement routes through the landscape. Landscape Character Assessment (LCA) data is the main point of reference for considering the landscape from a green infrastructure perspective, as it is a systematically interpreted appraisal of key landscape attributes. LCAs consider local landscapes and townscapes, their unique sense of place and the effects of pressures for change.

[33] NPPF Section 11
[34] The ELC is an international agreement, signed by 38 out of 47 Council of Europe Members, including Britain in 2007 http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/176

Assessments can demonstrate the continuity of landscape character beyond administrative boundaries and provide a sound basis for co-ordinated cross-boundary plans and strategies. They also provide the basis for developing guidance and policy on landscape change. This is a key issue for the Framework area where the consequence of planning decisions in one area may impact on adjacent areas and landscapes.

At a national level Natural England has developed National Character Areas (NCAs)[35] (Plan 5). These are areas that share similar landscape characteristics and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment. The NCA Profiles can help guide decision-making and support the planning of environmental initiatives at a landscape scale, for example in informing the delivery of NIAs and encouraging broader partnership working through LNPs and can help to inform choices about land management.

The eight NCA profiles in the Framework area describe the features that have shaped and changed the landscape, the current key drivers for change and the potential opportunities for enhancing landscape and historic character.

The NCAs provide the background information for the more detailed Landscape Character Assessments which are in place at a County, Unitary and District level. This hierarchy of landscape characterisation from national to local level helps ensure that strategic heritage and landscape issues are reflected at a local level. Plan 6 describes each of the LCA units at a County level for the Framework area.

In the Framework area this work has been further developed to provide tools for use in planning for change in the landscape. These tools include landscape guidelines and strategies and studies into local distinctiveness (see Sources at end of chapter).

Visual Impacts on Landscape

Landscape Character Assessment is an objective, descriptive process and does not provide guidance on the potential visual impacts of change in the landscape, as this needs to be assessed with reference to the type and extent of proposed change.[36]

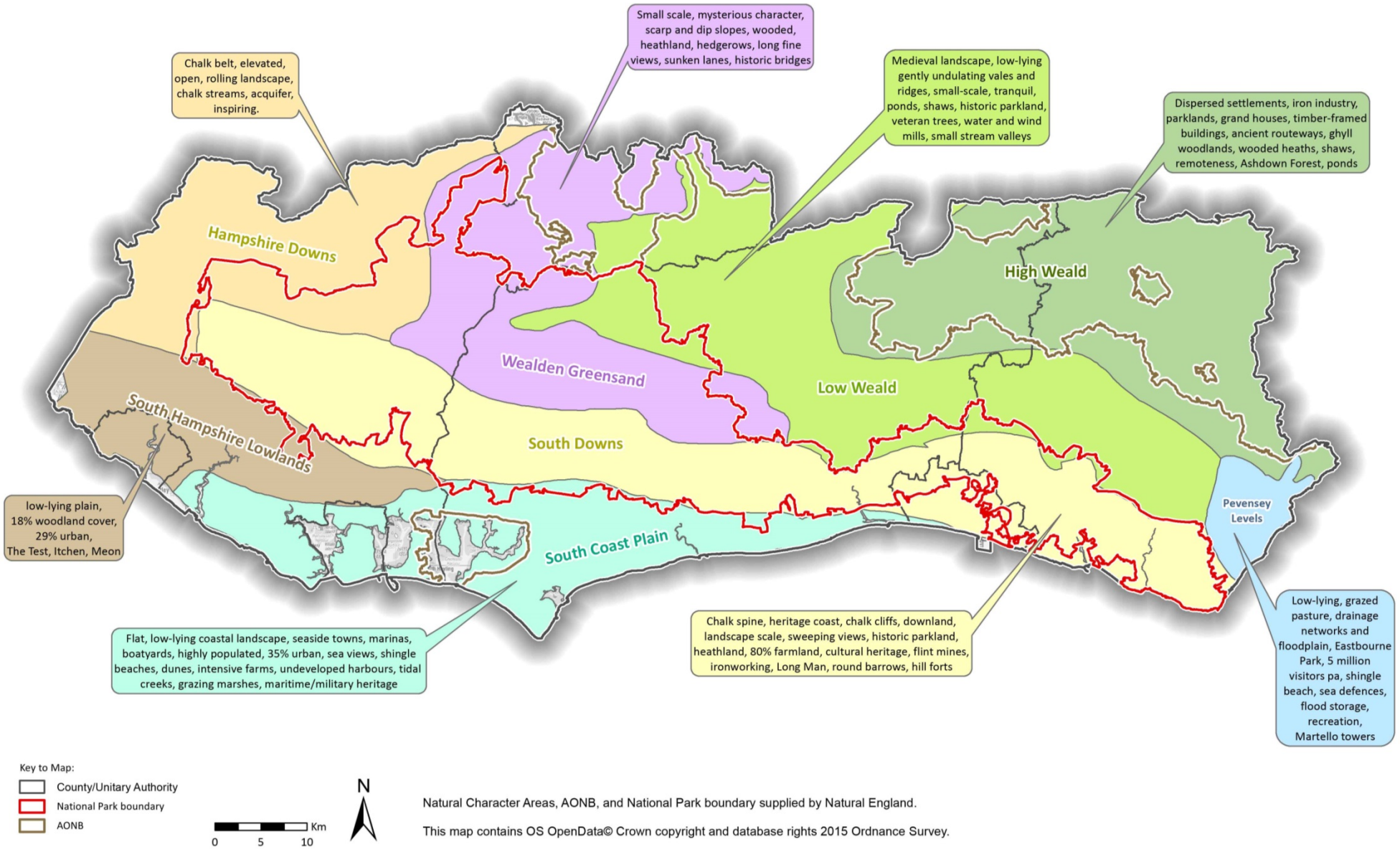
Guidance on potential visual impacts of proposed development – and visual impact assessment methodology – may be desirable as tools, particularly in designated or otherwise sensitive landscapes. In particular this could be useful is assessing the potential visual impact

[35] National Character Area profiles – Natural England 2014 https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making

[36] Landscape and Visual Impact Assessment (LVIA) is required for any development that may have a significant effect upon landscape character, or have a significant visual effect within the wider landscape

of smaller-scale or gradual changes and developments. A good example is the Viewshed tool being developed by the SDNPA.

Plan 5: National Landscape Character Areas



Natural Character Areas, AONB, and National Park boundary supplied by Natural England.

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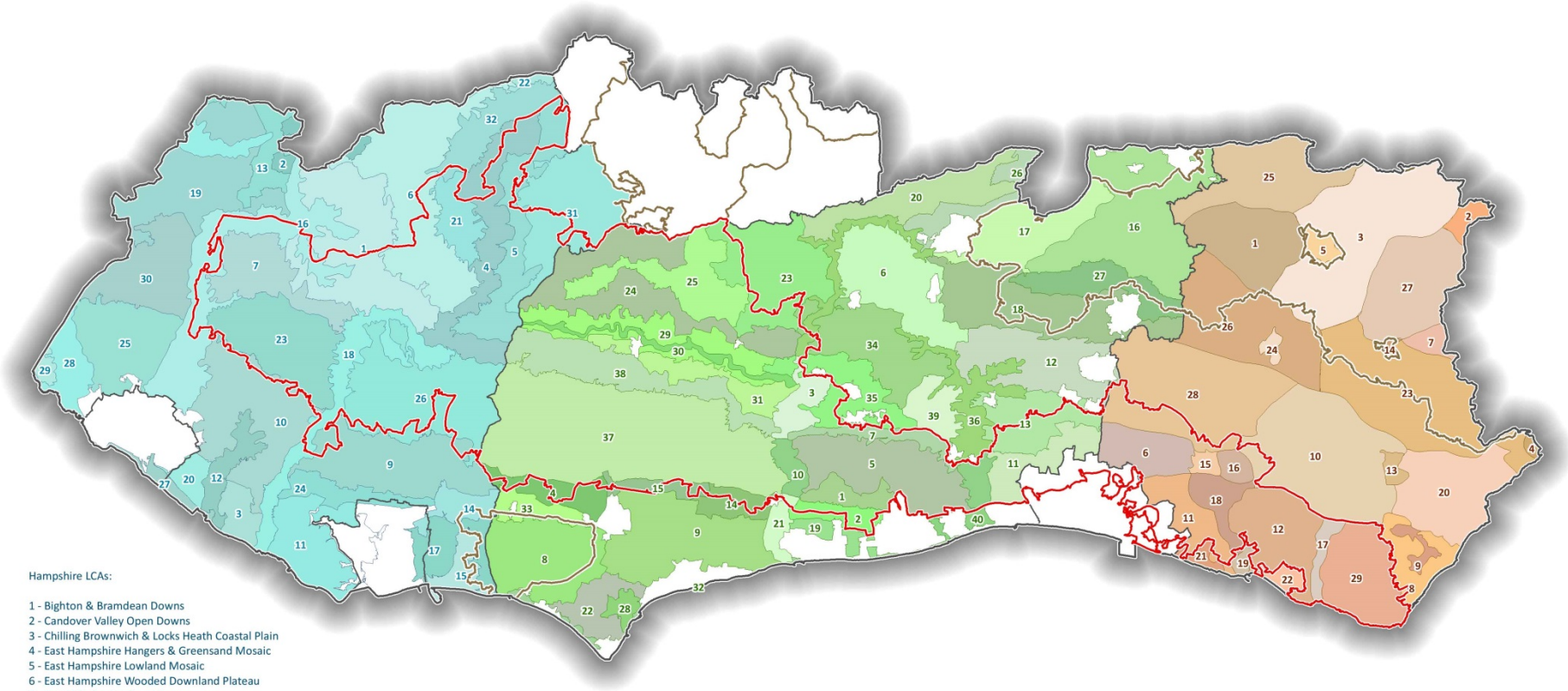
Plan 6: Landscape Character Areas – County Level



Hampshire LCAs:

1 - Bighton & Bramdean Downs
2 - Candover Valley Open Downs
3 - Chilling Brownwich & Locks Heath Coastal Plain
4 - East Hampshire Hangers & Greensand Mosaic
5 - East Hampshire Lowland Mosaic
6 - East Hampshire Wooded Downland Plateau
7 - East Winchester Open Downs
8 - Forest of Bere East
9 - Forest of Bere West
10 - Gosport & Coastal Plain
11 - Hamble Valley
12 - Hannington & Dummer Downs
13 - Havant & Emsworth Coastal Plain
14 - Hayling Island Coastal Plain
15 - Itchen Valley
16 - Langstone & Chichester Harbours
17 - Meon Valley
18 - Mid Hampshire Open Downs
19 - Netley Bursledon& Hamble Coastal Plain
20 - Newton Valance Farrington & East Tisted Downs
21 - North East Hampshire Open Downs
22 - Owslebury & Corhampton Downs
23 - Portsdown Hill Open Downs
24 - Romsey to Eastleigh Wooded Lowland Mosaic
25 - South East Hampshire Downs
26 - Southampton Water
27 - Test Valley
28 - Wellow & Awbridge Heath Associated Wooded Farmland
29 - West Winchester Downs
30 - Western Weald Forest & Farmland Heath
31 - Wey Valley

West Sussex LCAs:

1 - Angmering Park
2 - Angmering Upper Coastal Plain
3 - Arun Wildbrooks
4 - Ashlings Upper Coastal Plain
5 - Central Downs
6 - Central Low Weald
7 - Central Scarp Footslopes
8 - Chichester Harbour
9 - Chichester to Yapton Coastal Plain
10 - Downland Adur Valley
11 - Eastern Downs
12 - Eastern Low Weald
13 - Eastern Scarp Footslopes
14 - Fontwell Upper Coastal Plain
15 - Halnaker Upper Coastal Plain
16 - High Weald
17 - High Weald Forests
18 - High Weald Fringes
19 - Littlehampton & Worthing Fringes
20 - Low Weald Hills
21 - Lower Arun Valley
22 - Manhood Peninsula
23 - North Western Low Weald
24 - North Western Ridges
25 - North Western Valleys
26 - Northern Vales
27 - Ouse Valley
28 - Pagham Harbour
29 - Rother Farmlands
30 - Rother Valley
31 - Rother Woods and Heaths
32 - South Coast Shoreline
33 - Southbourne Coastal Plain
34 - Southern Low Weald
35 - Storrington Woods & Heaths
36 - Upper Arun Valley
37 - Western Downs
38 - Western Scarp Slopes
39 - Wiston Low Weald
40 - Worthing & Adur Fringes

East Sussex LCAs:

1 - Ashdown Forest
2 - Bewl Water Area
3 - Central High Weald
4 - Coombe Valley Haven
5 - Crowborough
6 - Ditchling-Mount Harry Downs
7 - Dudwell Valley
8 - Eastbourne
9 - Eastbourne Levels
10 - Eastern Low Weald
11 - Falmer-Telscombe Downs
12 - Firle Bishopstone Downs
13 - Hailsham
14 - Heathfield
15 - Lewes
16 - Lewes Downs
17 - Lower Cuckmere Valley
18 - Lower Ouse Valley
19 - Newhaven
20 - Pevensey Levels
21 - Saltdean-Peacehaven
22 - Seaford
23 - South Slopes of High Weald
24 - Uckfield
25 - Upper Medway
26 - Upper Ouse Valley
27 - Upper Rother Valley
28 - Western Low Weald
29 - Wilmington Heritage Downs

Key to Map:

National Park boundary
AONB
County/Unitary Authority

Km
0 5 10

N

Local Character Areas supplied by Hampshire, East and West Sussex County Councils. AONB, and National Park boundary supplied by Natural England. This map contains OS OpenData© Crown copyright and database rights 2015 Ordnance Survey.

Tennyson (of Black Down):
"You came and looked and loved the view, long known and loved by me, Green Sussex fading into blue with one grey glimpse of sea."

Landscape Change

The understanding of how the landscape is changing is linked closely with landscape character and is a useful tool in green infrastructure planning. NE's Countryside Quality Counts (CQL)[37] study monitored changes in the condition of the landscape at NCA level from 1990 to 2003. Among the issues identified in the study - and relevant to green infrastructure - were the degradation of the urban fringe, a deterioration in farmed character in areas close to urban centres in response to increased pressure for more recreational land uses and urbanisation of farmsteads and conversion of farm buildings to residential use with associated land uses (gardens and horse paddocks).

Plan 7 from Natural England shows the condition of the landscapes of the NCAs within the National Park. The maps show that across the Framework area the landscapes along the coastal plain and particularly the areas within the South Coast Plain NCA along the southern boundary of the National Park (within Chichester and Arun districts) are considered 'neglected'[38]. This weakened landscape area lying between the coastal plain and the National Park may be more vulnerable to loss of character and quality.

Tranquillity

In the crowded south-east, it is increasingly difficult to find quiet, natural areas which are not intruded into by the noise or visual intrusion from traffic, aircraft or urban areas. Tranquil areas can be defined by the analysis of noise levels, perceived naturalness, visible overt human impact, density of settlement/ diffusion of people and artificial lighting in each character area.

In the South Hampshire National Character Area only 7% of the area was identified as remaining tranquil, and this was mostly within The Forest of Bere.

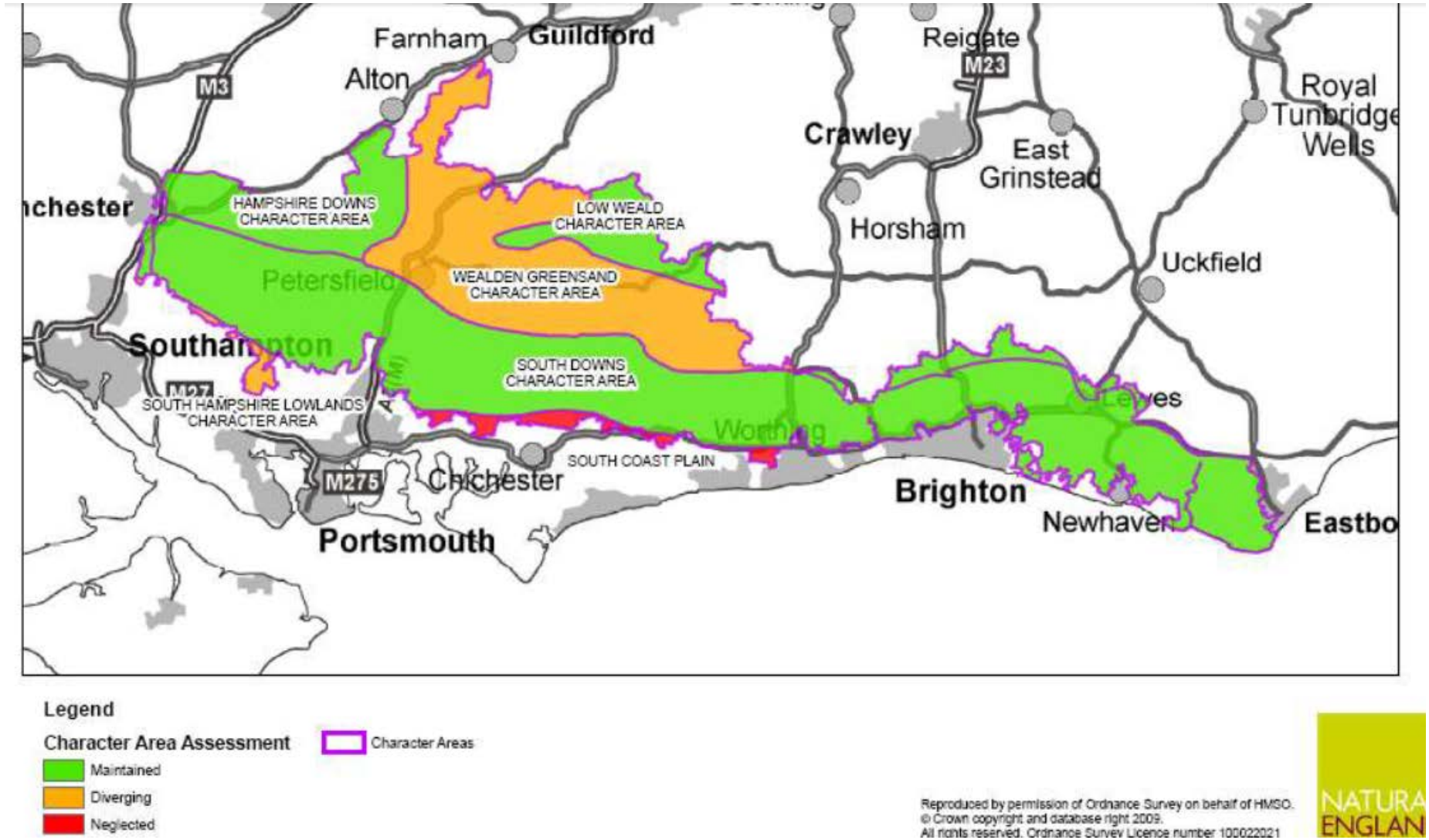
Tranquillity is one of the National Park's 'Special Qualities' and an important aspect of how people experience and value the landscape. In the South Downs a strong sense of tranquillity is associated with the open downland combes and ridges and with the ancient woodland and beech hangers in the west. The least tranquil parts of the National Park are associated with the areas that are close to the conurbations of Brighton, Hove and Worthing. Pockets of tranquillity

[37] Countryside Quality Counts - Tracking Change in the Character of the English Landscape, 1990-2003 (Countryside Commission). It is understood the work will be taken forward in the future by Natural England's 'Character and Quality of England's Landscapes' (CQuEL), an enhanced and updated assessment of landscape quality.

[38] In relation to NE's landscape vision

are associated with the central rural areas, the Manhood Peninsula and undeveloped harbours, including Chichester Harbour AONB.

Plan 7: Landscape Condition 1990-2003 Countryside Quality Counts



In the context of the most developed part of the South East, those areas of greatest tranquillity are especially important to protect. The decline in areas of tranquillity is due to the development of roads and urbanisation. However some landscapes can provide a strong sense of tranquillity – the heavily wooded valleys of the Weald for example – even when they are close to built development, making these landscapes valuable for informal recreation.

Dark Skies

The South East is the most light-polluted region of the UK, with only 1 per cent of the region defined as 'truly dark'. The SDNPA's work in mapping Dark Skies shows areas where skies may be viewed without the interruption of artificial lighting from urbanised areas.

CPRE have mapped areas of intrusion across the country[39]. A report for CPRE [40] maps the change in noise and visual intrusion across England. It is clear that in the south-east – and across the Framework area in particular – there has been a significant increase and spread in urban areas and an increase in areas disturbed by noise and visual intrusion. According to Defra's guidance[41] to help reduce light pollution and sky glow in the UK there is no statutory protection against light pollution; although there is guidance available to those planning and designing street and other lighting.[42]

National Parks and AONBs have been called on[43] to lead the way in retaining and creating areas of dark skies, including the skies over urban areas.

[39] http://www.cpre.org.uk/resources/countryside/tranquil-places/item/1839-

[40] Developing and Intrusion Map of England – LUC (August 2007)
[41] Defra's Guidance on Sections 101 to 193 of the Clean Neighbourhoods and Environment Act 2005 – Statutory Nuisance from Insects and Artificial Light

[42] Lighting in the Countryside: Towards Good Practice – DCLG 1997
[43] By the 2009 Royal Commission on Environmental Pollution report 'Artificial Light in the Environment'

The Framework Area and Analysis

There is great variation in the landscapes of the Framework area – from the ridges and valleys of the High Weald draped with small, irregular fields, ancient woods and hedges, the open downland of the South Downs, to the tidal flats, inlets and creeks of Chichester Harbour.

The character and quality of the landscapes have developed and changed over time in response to a number of factors including the economic situation, advances in transportation and agriculture and the shifts in population.

The expansion in the size of the population of the south-east has had a major impact on the landscape and continues to do so today; growing from a population of 145,000 in 1801 to 1.24 million in 2001[44]. This population growth has led to the expansion of urban areas, the development of the coastal resorts and the growth of the railway and road networks. It has also placed increasing pressures and demands on the landscape.

Sitting alongside these expanded urban areas lie landscapes designated for their landscape quality, their rich biodiversity and their heritage value. Table 2 lists the landscape designations across the Framework area.

[44] Hampshire LCA (2010).

These designated areas, representing 49% of the total area of land within the Framework area, are testament to the high value placed on the quality of this area and its unique and historic places.

Table 2: Designated Landscapes in Framework Area

Designation	Area (ha)	
South Downs National Park	1627km2	
High Weald AONB	1461km2	The largest AONB in south-east England
Surrey Hills AONB	422km2	Adjoins the SDNP
Chichester Harbour AONB	74km2	Land, sea and intertidal habitats

Framework Area: Heritage

At the green infrastructure Framework scale the assessment of cultural heritage is concerned with key sites and historic landscapes. This includes historic parks and gardens, battlefields, archaeological features and monuments, remnants of an industrial and military past, as well as the grain of the historic landscape as reflected in its field patterns and land-use. For example the present day Sussex landscape and its structural elements can be traced back to early medieval times. Traces of medieval enclosure can be seen in the irregular

pattern of fields; and the rich legacy of medieval and post-medieval landscapes of West Sussex includes the distinctive assart landscapes. The size and shape of fields and their boundaries are direct links to past uses and changes. Unenclosed and unimproved landscapes include the commons, Downland, greens and heaths. Other links to the past include ancient woodlands and remaining areas of wood pasture and historic parklands.

Plan 8 shows the distribution of Registered Parks & Gardens, Registered Battlefields and Scheduled Ancient Monuments (SAMs) across the Framework area[45]. The background map indicates the designated landscapes. It is interesting to note the prevalence of SAMs within the National Park and other designated landscapes in comparison with non-designated areas.

> *"The Cultural Landscape is held together by the commonplace and the rare, the ordinary and the spectacular" Common Ground*

The coherence of the historic environment is at risk in places from increased development and infrastructure pressures. In some areas the distinctive historic character of settlements is being eroded, particularly the common-edge settlements on the Hampshire/Surrey border.

The National Park's audit of cultural heritage[46] identified particular assets as having no overall management. These included disused railway lines, canals and roman roads. These assets were considered to be at risk if they are not protected by planning policy or designation. The report also identified potential projects for development at Petworth Park and Stanmer Park. These flagship heritage sites make a major contribution to the quality and distinctiveness of the landscape and showcase heritage assets to their many visitors (Plan 9).

Framework Area: Landscapes

Across the Framework area characteristic landscapes include the coast, Downs, river and chalk stream landscapes, wooded slopes and valleys and an agricultural landscape with its variety of field patterns and enclosures.

Coastal Landscapes

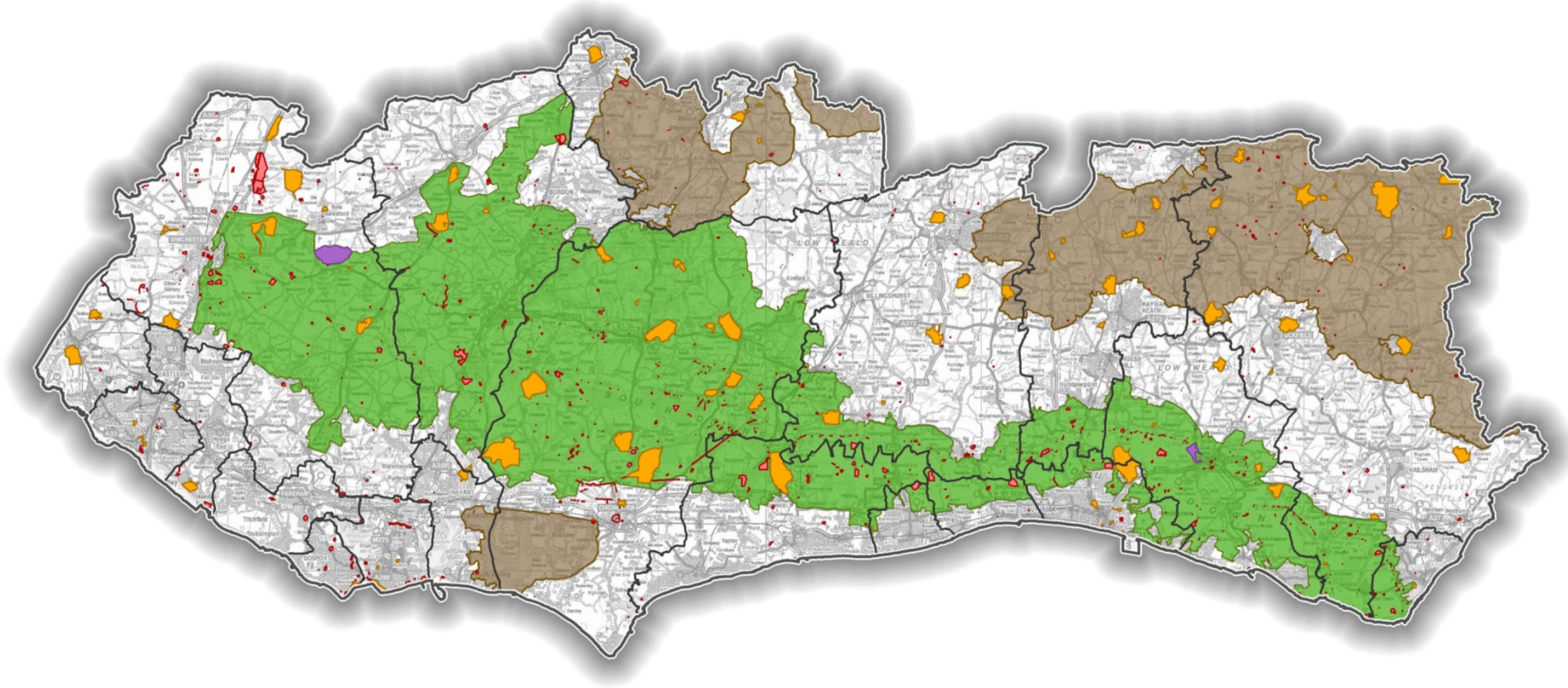
The extensive coastline provides contrasting landscapes. Low-lying, open landscapes are found at Pevensey Levels; an area of wetland with few trees or hedges and long views to the backdrop of the South Downs and out over the sea; and further west along the coastal plain, where inlets and harbours contain a diverse landscape of narrow tidal creeks, mudflats, shingle beaches, dunes and grazing marshes. These include the internationally important Chichester, Langstone, Portsmouth and Pagham harbours. A history of sea defence is revealed by remaining structures including Napoleonic

[45] other heritage assets including Listed Buildings and Conservation Areas are at a more detailed, local scale and of less relevance to a strategic approach

[46] Report on the Audit of Cultural Heritage Assets to the South Downs National Park Authority – by Business of Culture (December 2014)

Martello Towers at Pevensey and a 19th-century ring of forts near Portsmouth.

Plan 8: Scheduled Monuments and Battlefields



Key to Map:

- District/Borough boundaries
- Registered Battlefields
- Registered Historic Parks and Gardens
- Scheduled Ancient Monument
- AONB
- National Park boundary

0 5 10 Km

N

AONB and National Park boundary supplied by Natural England.

Scheduled Ancient Monuments, Registered Battlefields, Registered Parks and Gardens © Historic England 2015. The Historic England GIS data contained in this material was obtained on 10.11.2015. The most publicly available up to date Historic England GIS data can be obtained from historicengland.org.uk

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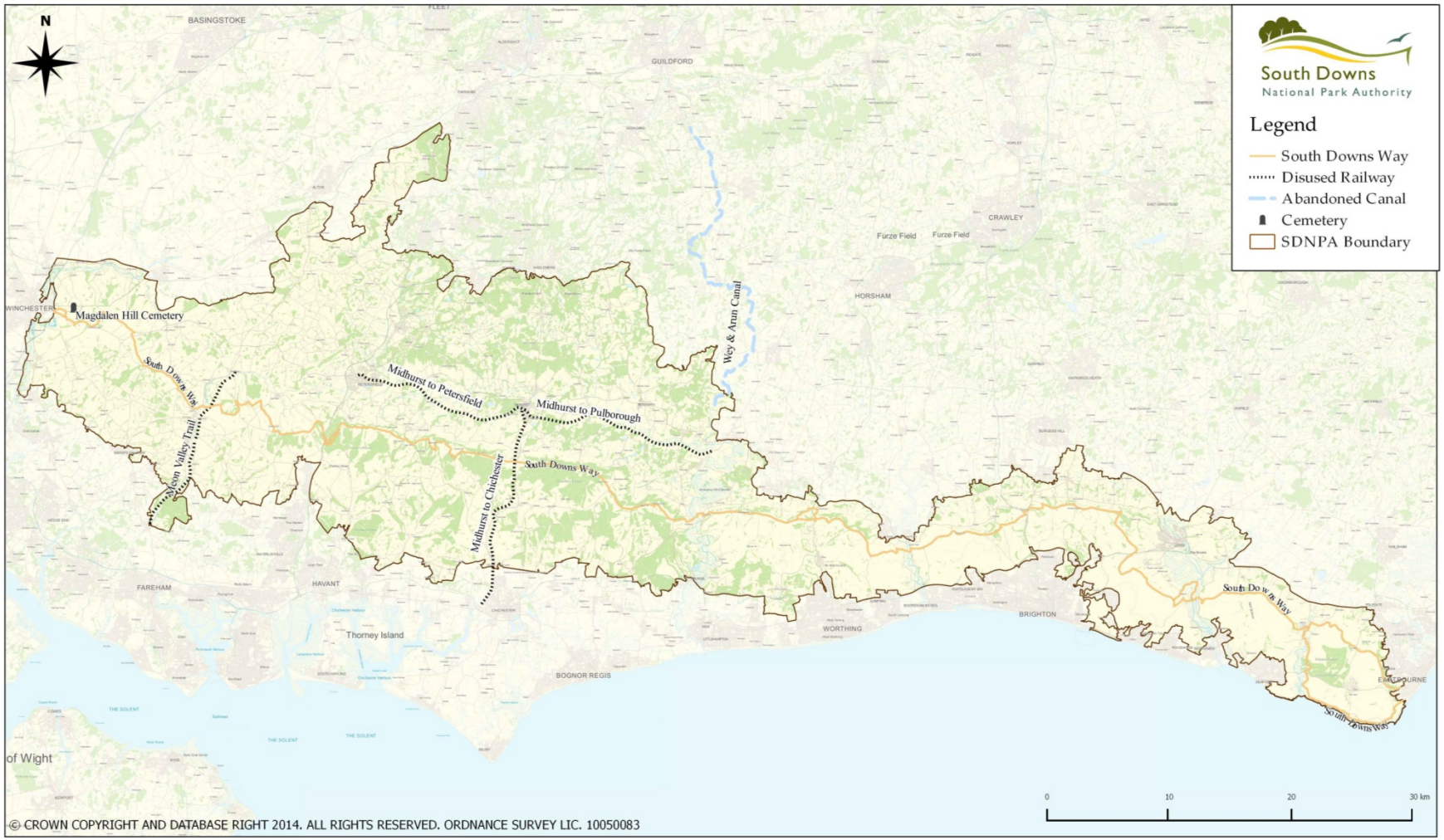
Plan 9: Audit of Cultural Heritage Assets



Audit of Cultural Heritage Assets

Infrastructure Within and Close to South Downs National Park

Infrastructure - these are former routes with heritage value and are still in use or could be brought back into public use. They are in public or charitable ownership or are a National Trail. The heritage value may be for the evidence of constructing the railway or canal and the buildings that served that route. The South Downs Way is an ancient route and also crosses on or close to many important archaeological remains.

These open, flat landscapes are vulnerable to tidal inundation as well as flooding from the rivers that flow through them and out to sea. As rising sea levels increase the probability of flooding for low-lying areas and the resulting 'coastal squeeze' reduces the area of coast; sea defences are constructed or natural processes alter the profile of the coastline. Defensive sea walls have already altered some of the natural coastline landscape e.g. at Southsea and Brighton Marina. However, the Medmerry scheme on the Manhood Peninsula is a good example of managed realignment.[47]

Green infrastructure can play a positive role in protecting the landscape from unacceptable change and flooding, through the development of SUDS in new developments and in its integrated approach which helps ensure that heritage, landscape character and quality are valued in decision-making; for example in soft-engineering solutions e.g. to flood defences and re-naturalising river channels. At Beachy Head and The Seven Sisters the chalk downs meet the sea. This is a 6 mile section of Heritage Coast; areas where the government places an expectation on local authorities to 'maintain the character of the undeveloped coast, protecting and enhancing its distinctive landscapes, particularly in areas defined as heritage coast and improve public access to and enjoyment of the coast.'[48] The effects of climate change including sea level rise and more frequent rainfall in winter, could lead to increased erosion of this coastal heritage asset.

Long stretches of developed coast are backed by landscapes pinched between towns and the slopes of the Downs. In these areas farming and recreation jostle for space with road and rail corridors. These peri-urban landscapes are vulnerable to further development pressure as the coastal conurbations continue to expand. However, through the development of green infrastructure these areas have the potential to provide a wide range of benefits and improvements to the landscape.

The Downs

The South Downs chalk ridge runs from east to west from the Hampshire Downs to the coastal cliffs and Heritage Coast at Beachy Head. Chalk grassland is the distinctive landscape of the South Downs; and is characterised as elevated, open land with sweeping views. There are areas of the Downs with dark skies and high levels of tranquillity. However this nationally-rare landscape is vulnerable to urban edge pressures. The South Downs Way Ahead Nature Improvement Area (NIA) took a landscape approach to improving and linking fragmented areas of chalk grassland habitat in a partnership project. This strategic approach to joining and extending habitats is crucial in building resilience and provides wider benefits to biodiversity and the protection of water resources, as well as the enhancement of important landscapes and views.

[47] Managed realignment allows an area that was not previously exposed to flooding by the sea to become flooded by removing coastal protection

[48] Paragraph 114 of the National Planning Policy Framework (March 2012). The protection, management and enhancement of the Heritage Coast is guided by a partnership approach and a Sussex Heritage Coast Plan, which embeds the duty-to-cooperate and the seven qualities of the National Park.

River Landscapes

Rivers and streams feature prominently in the Framework area landscape. The chalk ridge of the South Downs is dissected in the east by the Arun, Adur, Cuckmere and Ouse; and by the Meon in the west. In the Hampshire Downs the deeply incised straight-sided valleys of the Test and Itchen cut through the landscape. The Meon, Adur and Arun form wide alluvial flood plains as they flow towards the sea at the south coast. There are wide U-shaped valleys with steep sides and flat alluvial flood plains.

However, traditional river landscapes of water meadows and wet grasslands have disappeared as intensive farming, flood defence and built development have encroached into flood plains.

At a landscape scale the West Weald Landscape Partnership aims to improve biodiversity and ecological connectivity in woodlands across part of the Framework area,* address fragmentation and improve management. There are other initiatives involved in woodland management, but this landscape-scale approach could be a model for other areas where a multi-functional green infrastructure approach could help improve landscape quality, recreational value and sustainability.

* Includes part of the SDNP in West Sussex, plus an area of Waverley (Surrey).

Wooded Landscapes

Woodland is a key feature of the landscapes in the Framework area. From the wooded scarp of the East Hampshire Hangers and remaining areas of ancient woodland in the South Downs; the heavily wooded landscape of the High Weald with pits and hammer ponds from the iron-making industry; the shaws and ghylls of the Weald. All these woodland types are characteristic of their landscapes.

Woodlands can be a source of inspiration. To the north of the Framework area the Ashdown Forest has inspired Rudyard Kipling, William Robinson – who pioneered the English natural gardening movement, and is the 'home' of Winnie-the-Pooh.

However, woodlands are under pressure from fragmentation, a changing climate and poor management. In some areas ancient woodlands are suffering incremental damage and loss from lack of management, recreation and other factors including livestock damage and clay extraction (e.g. in the Low Weald).

Woodlands are important elements in the landscape; they support biodiversity, provide fuel and building materials and can provide robust recreational facilities. In appropriate locations woodlands can help to screen development and filter-out noise from roads and industry.

Pressures

In considering the landscape and cultural heritage across the Framework area, a number of issues have emerged which highlight the challenges the landscape is facing and the impacts of some of the changes taking place. The landscape is under pressure from a range of sources. These pressures are effecting changes in the landscape, some of which are readily apparent and others more subtle; but they include loss of character and distinctiveness, fragmentation and erosion of quality.

Development and Growth

The pressure for housing in the south-east places the Framework area under considerable development pressure. This could threaten settlement character and the sustainable development of smaller settlements. Plan 3 shows the locations of planned major housing developments in the current Local Plan period against a background of the National Park and the AONBS.

In these designated landscapes the planning system presumes against major development. As a result the main housing sites are located in areas outside and between the designated landscapes. Hence development is concentrated into areas to the north and south of the National Park, to the south of the Surrey Hills and High Weald AONBs and in the area surrounding the Chichester Harbour AONB. This in turn increases pressure on the coastal urban fringe and the other non-designated areas.

These areas are likely to experience further growth in future, as the drive to accommodate more housing and create more jobs in the south-east is further constrained by environmental and landscape protection.

The growing populations will need places for recreation and leisure and the destinations of choice are likely to be the superb landscapes of the National Park and the AONBs, or the coast.

Smaller-scale developments can bring about incremental change. For example, the conversion of traditional farm buildings to residential use has an impact on the surrounding landscape by introducing new, domestic uses, changing the surrounding farmland to garden or paddocks and bringing increased traffic into the area. Development and other associated uses (e.g. recreation) can also lead to fragmentation of the landscape and marginalisation of tradition land uses, leading to areas of neglect and poorer management.

Larger-scale developments will stamp their own character into the landscape, as well as bringing increased traffic and noise, other urbanising elements (e.g. street lighting, pylons) and demands on the landscape for recreation.

Urban-fringe landscapes are facing particular challenges. Along the coastal plain these landscapes are under pressure from development, recreation – including a growing trend for the keeping of horses - and fragmentation. These pressures are being exacerbated by the deficiency in recreational greenspace in the towns and eroding the quality and integrity of the boundary areas of the National Park.

The issues associated with development and growth have direct implications for the future of the designated landscapes across the Framework area and pose questions regarding future sustainable development in this sub-region.

Agricultural Change and Intensification

Agriculture is an important land use in the Framework area and over 80% of the South Downs is farmed. However, the demand for food and energy crops brings agricultural intensification; drainage and 'improvement' of river valley flood plains; loss of wet pastures and historic boundary features; and a decline of traditional farming practices and associated skills.

Climate Change

Climate change is predicted to bring changes in temperature, resulting in warmer winters which could alter the species composition of existing woodlands, shaws and hedgerows. Changes in rainfall patterns could result in more frequent winter flooding and summer droughts. Higher temperatures and drought could put heathlands under stress and increase the risk of fires. Pastures will be vulnerable to summer drought and therefore it is possible that set-aside will be seen more frequently in the landscape as a means of allowing pasture to recover from dry summers. Some crops will be unviable, allowing others, such as vines to be grown. Stormy, extreme weather could also damage fragile heritage features.

Inspiration: Landscapes provides the inspiration to writers, poets, artists and musicians. The South Downs has provided inspiration to Kipling, the Bloomsbury Set, Elgar, William Cobbet, WH Hudson, Richard Jeffries, Gilbert White, Edward Thomas and Hilaire Beloc

Conclusion

Change in the landscape cannot be halted, but it could be better accommodated in ways which reinforce and restore character and key features.

Landscape resilience may be strengthened through addressing fragmentation and developing strong landscape frameworks. Opportunities to make the most efficient use of land may have a negative effect on landscape character and quality.

Character Areas extend across boundaries and as such there is the potential for different approaches to planning for and dealing with landscape change across authorities. In order to ensure the planned and sustainable future of these landscapes, development proposals and management guidelines should be based on landscapes. This will require joint working among the relevant authorities.

There are key differences between the designated landscapes (the National Park and the AONBs) and the areas beyond in terms of the level of protection afforded and in the approach to development[49]. However, across the Framework area the proximity of designated

[49] NPPF Section 11

and non-designated landscapes means that pressures on the landscape cannot easily be confined to one area and thus it could be argued that the non-designated landscapes require similar 'protections' or approaches in order to protect the integrity, future sustainability and functioning of these landscapes and the services they provide. Strategic planning is needed at a sub-regional scale to address both the immediate and longer-term pressures which may lead to changes in the character and quality of the landscapes across the framework area.

Work is already under way in developing Dark Skies mapping and tranquillity mapping for the National Park. An extension of this work to the wider Framework area would help reveal where dark skies are being lost and provide a better understanding of the impacts on tranquillity in the Framework area. This would provide a foundation for a strategy to retain and create quieter areas for people to enjoy. Comprehensive and up to date landscape evidence (visioning, guidelines, strategies) across the Framework area would help maintain landscape character and support decision-making. Studies should include generous buffer areas and involve joint working across administrative boundaries.

The scale of proposed new development across the Framework areas has the potential to change the character and quality of the landscape across wide areas. Opportunities should be taken to enhance the landscape through development planning; ensuring that it fits with existing settlement patterns and character; conserves the local historic character; supports the maintenance and renewal of the agricultural landscape; maintains and enhances biodiversity; and promotes the celebration of the value and variety of the landscape. Landscape Frameworks and green infrastructure planning can provide essential guidance in areas undergoing change.
Actions are needed to minimise the landscape impact of infrastructure associated with development such as transport corridors – the loss of tranquillity, noise and visual intrusion.
Distinctive landscape character and historic landscape value could be reinforced by restoring, expanding and re-linking remnant areas of grassland, heathland, meadows, woodland and hedgerows. e.g. Forest of Bere in Urban South Hampshire. Linking remnants of ancient woodland and hunting forest and providing a valuable recreational resource for an area of urban growth. Also extending woodland around settlements and infrastructure developments to filter light pollution and reduce sound pollution and the visual impacts of further urbanisation.

In urban fringe areas the landscape should be a valued area with positive uses, combining a distinctive landscape character with well-managed land uses for the benefit of residents and visitors. The restoration of degraded landscapes in the urban fringe would help improve landscape character and value these important areas.
The targeted expansion of woodland where appropriate would help strengthen landscape character, improve biodiversity and provide recreational opportunities. This includes the restoration of hedgerow boundaries particularly in urban-fringe locations to restore traditional field patterns. The maintaining or creation of woodlands around urban areas would help to filter views of development beyond and to provide robust alternative recreational space close to where people live. For example, there is an opportunity to plan new landscapes within and around development areas including Crawley and Horsham; to include high quality green infrastructure, drawing on

existing strong landscape patterns e.g. traditional shaws and meadows within new development.
The Low Weald is a potential Forest District[50] and opportunities have been identified to create over 5000 Ha through connecting woodlands. Low Weald has been identified as an 'outstanding' priority for woodland conservation, particularly in relation to coppice restoration.

The restoration of river landscapes would improve landscape quality, help to conserve and enhance views over the surrounding landscape and provide a range of green infrastructure benefits.

There is a need to protect, interpret and celebrate the wealth of heritage present in the landscape. The coherence of the historic environment is at risk in places from increased development and infrastructure pressures. The distinctive historic character of some settlements is being eroded, particularly the common-edge settlements on the Hampshire/Surrey border.

Heritage assets and their setting should be identified and protected as part of structured, integrated approaches including strategic green infrastructure plans.

Many of the issues documented are already being tackled through other schemes or at a more local scale through planning guidance and other initiatives. However, it may be necessary to find ways of continuing to support existing initiatives, in particular those that operate at the local level with landowners and local communities; and to develop new programmes or initiatives to address gaps in delivery. In addition to short term targeted support there is a need for a partnership to address the longer-term challenges facing agriculture and forestry. Land uses must be financially viable in order for them to be sustainable in the longer term. For example, woodland and grassland management, both of which may need to look at alternative approaches such as tourism to ensure viability.

Examples of strategic and cross-sectoral partnerships include Integrated Coastal Zone Management (ICZM) and the Coastal Partnerships – Solent Forum, Hamble Estuary Partnership, and Manhood Peninsula Partnership provide a platform to deliver strategic coastal management and provide a network for closer working relationships.

Landscapes for Everyone

The continuing and growing pressures in and around areas which have been designated for the value of their landscapes, such as National Parks, AONBs and Registered Parks and Gardens, have led a group of organisations* to join together in calling for future government policy and funding to reflect the extraordinary value of landscapes. The Landscapes for Everyone vision# was launched in January 2005 and calls for a more integrated approach to ensure that laws, policies and regulations work together to balance the different needs with the special qualities of each place. The call to action supports the NCAs as tools for local authorities to take a more holistic approach to planning and landscape management in their areas.

** Charities across the UK have joined forces to campaign for the protection and enhancement of our landscapes. A wide range of national and regional organisations, including the Landscape Institute, Campaign to Protect Rural England, National Trust, The Open Spaces Society, British Mountaineering Council and Wilderness Foundation.*
 # Landscapes for Everyone: Creating a Better Future.

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Theme: Biodiversity and Woodlands

Introduction

Biodiversity sustains many ecosystems services, including provision of clean water, climate regulation, pollination and access, but despite efforts to reverse biodiversity loss, many species and habitats continue to decline.

The independent review of England's wildlife sites and ecological network, '*Making Space for Nature*',[51] concluded that biodiversity habitats do not currently represent a coherent and resilient ecological network capable of responding to the challenges of climate change and other pressures. Progress against the revised biodiversity indicators shows the status of priority species remains unchanged from its previous deteriorating state.[52]

The greatest immediate threat to habitats is land use change, but alongside direct habitat loss are more subtle agents of habitat deterioration; lack of or inappropriate management, degradation due to adjacent land uses, fragmentation and insufficient connectivity to support populations of species.[53]

Strategic planning for nature conservation at the landscape scale is required to manage these pressures and to restore ecological networks. The Natural Environment White Paper (2011), taking the conclusions from '*Making Space for Nature*', advocates that high quality reservoirs, such as designated nature conservation sites, should be linked at a landscape scale, with what is needed is to:

- Improve the quality of current sites by better habitat management;
- Increase the size of current wildlife sites;
- Enhance connections between, or join up, sites, either through Physical corridors or through 'stepping stones';
- Create new sites; and
- Reduce the pressures on wildlife by improving the wider environment, including through buffering wildlife sites;
- Summarised as: 'More, bigger, better and joined.'

England's biodiversity strategy, '*Biodiversity 2020*', responds to the Aichi Biodiversity targets of ensuring ecosystems are resilient by 2020, with the NPPF also setting out that in delivering sustainable development a net gain for biodiversity should be secured.

[51] J. H. Lawton et al (2010), Making Space for Nature: a review of England's wildlife sites and ecological network.
[52] Overview of assessment of change for all Biodiversity Indicators 2014, http://jncc.defra.gov.uk/page-4231. A habitat connectivity measure is under development. http://jncc.defra.gov.uk/page-6891

[53] Advancing Conservation Science Thinking on Protected Areas in the UK, Joint Nature Conservation Committee; UK National Ecosystem Assessment (2011); J. H. Lawton et al (2010), Making Space for Nature: a review of England's wildlife sites and ecological network.

Green infrastructure has an important role to play in this. The concept of seeking multiple benefits from green infrastructure offers opportunities to increase biodiversity value in a planned manner to support the creation of such landscape scale networks. Green infrastructure also offers particular opportunities to bring nature into urban centres, not only making urban areas better for wildlife, but also allowing people to come into contact with nature.

Description of the Framework Area and Analysis

The nature conservation value of the Framework area is varied. It is host to many priority habitats and species and with its biodiversity interest intrinsically linked to the landscape and cultural heritage. A summary of designations is shown in Table 3 and Plan 10.

Running from west to east across the Framework area is the ridge of the South Downs, joined with a thread of iconic sheep-grazed download linking the Heritage Coast at Beachy Head to Winchester. Several sites are Special Areas of Conservation (SAC) and of international importance, along with many Sites of Special Scientific Interest (SSSI). Many more sites have been identified at county level as being important (SINCs/SNCIs).[54]

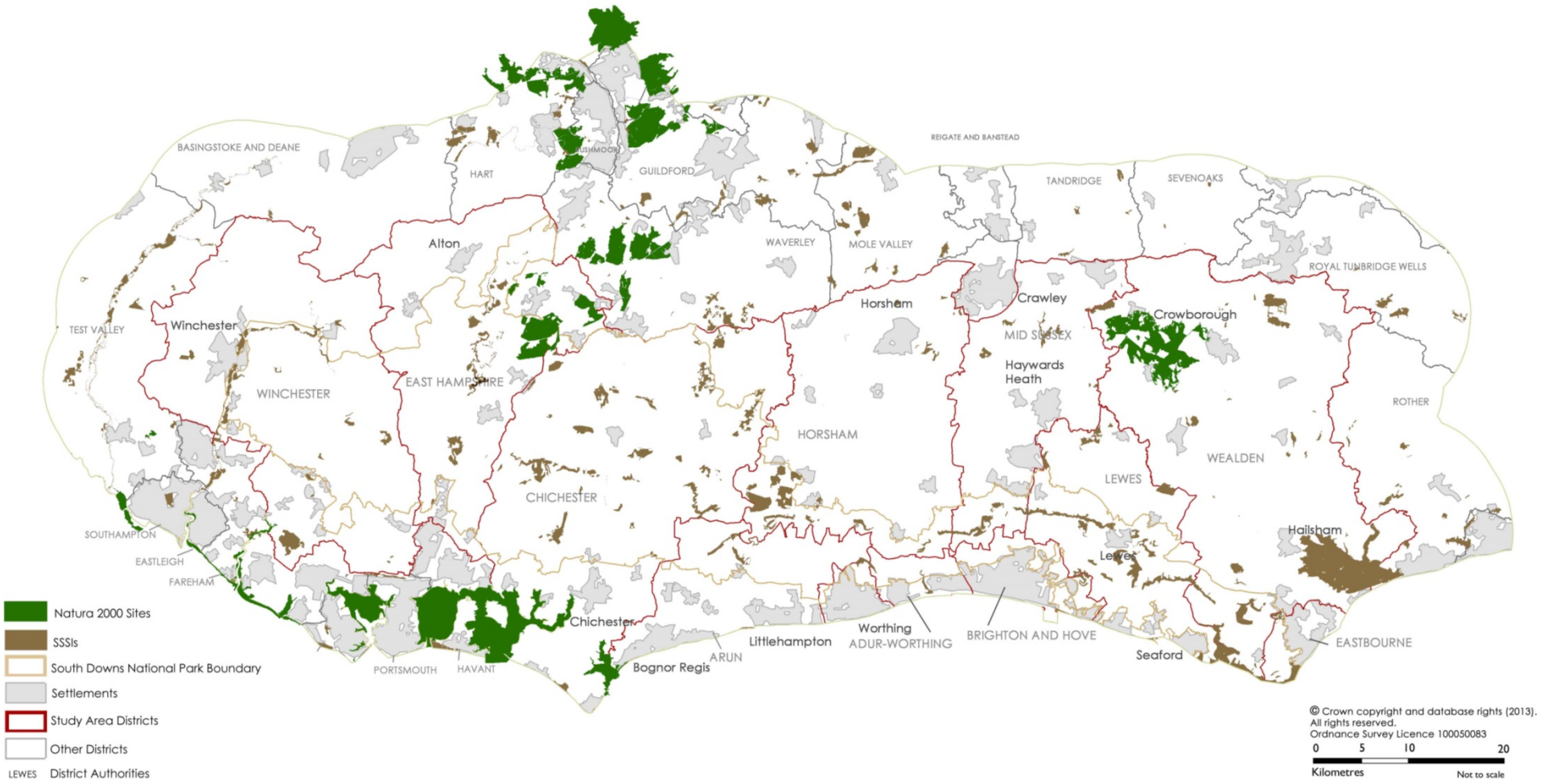
Table 3: Designated Nature Conservation Sites in the Framework Area

Designation	Number of sites (wholly/ partly in Framework Area)	Area (ha)
Special Areas of Conservation (SAC)	20	16,726
Special Protection Areas (SPA)	9	16,141
Ramsar	7	12,302
National Nature Reserve (NNR)	12	1,459
Site of Special Scientific Interest (SSSI)	186	31,875

There is considerable overlap between designations and all 'higher' designation are also SSSI. The total amount of land designated is 31,990 ha.

[54] Sites of Importance for Nature Conservation/Sites of Nature Conservation Importance, identified by county Wildlife Trusts.

Plan 10: Natura 200 Sites and SSSIs



The South Downs Way Ahead Nature Improvement Area (NIA) focused on the calcareous (chalk) grassland habitat that comprise the ridge of the South Downs. The vision is for 'A *better connected chalk ecosystem, sustainably managed to enhance biodiversity and people's well-being for now and the future'*. The NIA brought together 29 partners between 2012-15 to implement a landscape-scale approach to bring about biodiversity improvements and securing population gains for the rare Duke of Burgundy butterfly. Although the pilot period has ended the NIA will continue to work together.

The greensand of the Western Weald produces important lowland heathland habitats. There is a concentration of sites, many internationally designated, running north east between Liss and the Godalming area. A chain of heathland sites also runs along the River Rother between Petersfield and Pulborough. To the north east of the Framework area, in the High Weald Area of Outstanding Natural Beauty is Ashdown Forest, an extensive and internationally important area of heathland and woodland.

The river valleys intersect the South Downs running north to south, from the chalk rivers of the Itchen and Meon in the west, through to the Adur, Arun, Ouse and Cuckmere and the Pevensey levels in the far east of the Framework area. Also in the east, where the Downs meet the sea, are the iconic chalk cliffs of the Seven Sisters and Beachy Head, that comprise the Seaford to Beachy Head SSSI and where the intertidal portion west of Beachy Head is designated as part of the Beachy Head West Marine Conservation Zone. The River Rother follows the foot of the scarp flowing west to east to join the Arun and the River Wey flows northwards from northern East Hampshire. All of these rivers are important habitats for a diverse range of species and form blue-green corridors.

There are large areas of woodland, particularly in central Chichester District, to the north of East Hampshire and in the High Weald AONB, the most wooded part of England. Much of this diverse resource is ancient woodland[55] of many types, including the beech hanger woodlands such as in Hampshire and yew woodland such as Kingley Vale, both SACs. There are also historic parklands and wet floodplain woodlands. There are also large areas of plantation on former ancient woodland sites. The coastal plain and the area between the South Downs National Park and the High Weald AONB are far less wooded.

[55] Areas which have been continuously wooded since at least 1600AD.

Ecological Connectivity

In 2008, through wide consultation and evidence review, the first landscape scale approach to identifying priority areas for biodiversity enhancement was carried out and a number of 'Biodiversity Opportunity Areas' (BOAs) were documented.[56] Previously, the South East Wildlife Trusts had published priority areas for reconnecting ecological networks, which is being taken forward in the Living Landscapes Programme.[57]

Natural England also recognises habitats of 'principal importance' for nature conservation, with a target to bring 90% of these priority habitats into favourable condition by 2020. BOAs and priority habitats are shown in Plan 11.

Further work has been carried out to understand better ecological networks. A comprehensive study has been carried out in the South Downs National Park, assessing the connectivity of priority habitats and identifying habitat opportunity areas based on connectivity principles. The approach taken linked with existing modelling carried out for heathland and wetland habitats by Sussex Biological Records Centre. EcoServ models of selected habitats have been produced for East Sussex and Hampshire is also planning to carry out ecological network mapping. Chichester has mapped ecological networks for key species to represent key habitats.[58] There are many approaches and organisations carrying out ecological network mapping to inform projects across the Framework area.

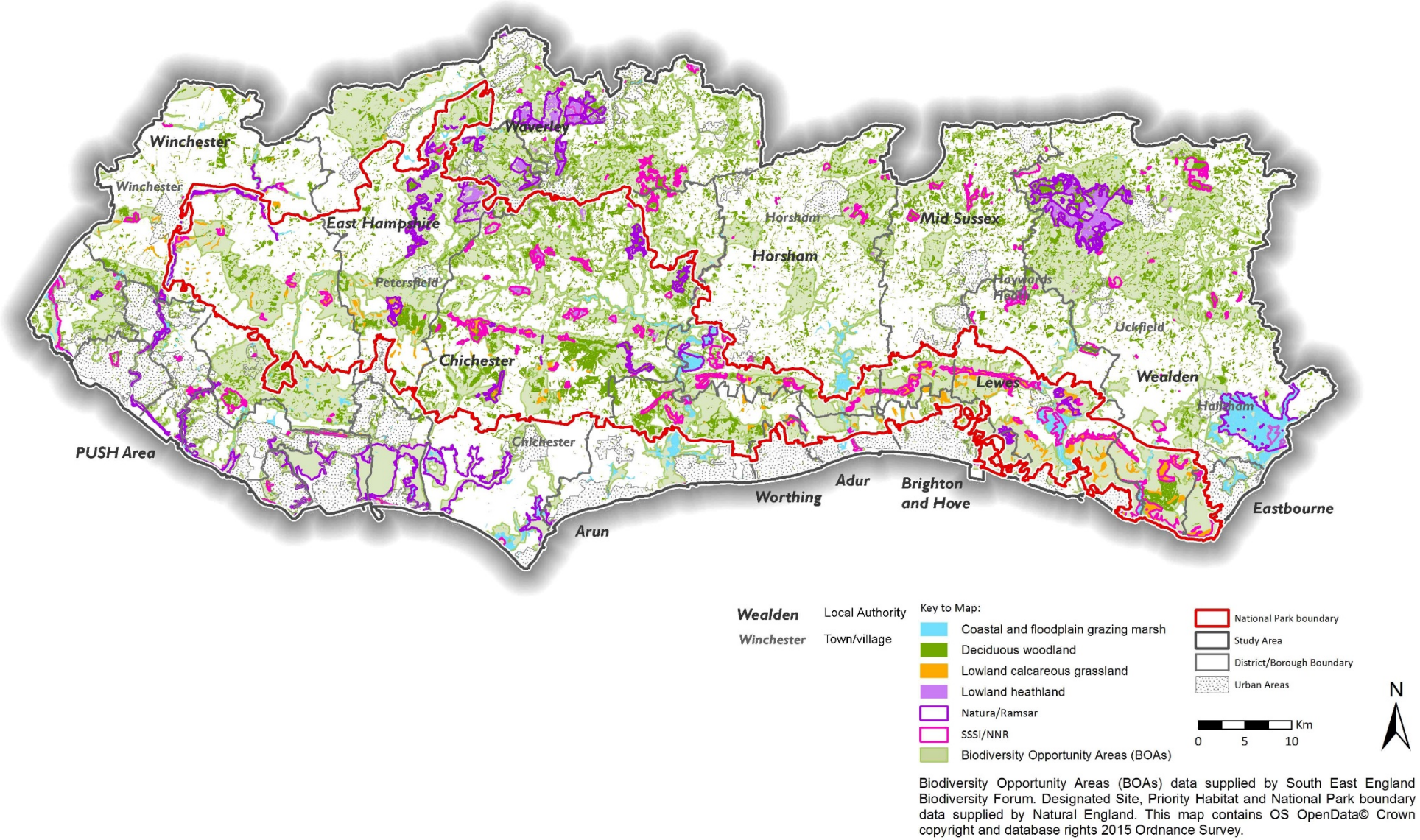
At a strategic scale, some key areas of high biodiversity value and potential for greater connectivity are highlighted through all of this work:

- The chalk grassland ridge of the South Downs;
- All of the river valleys;
- The area of heathland and woodland complexes to the north of East Hampshire and into Surrey;
- The heathland and river corridor of the River Rother;
- Bat commuting and foraging networks focussed on the Mens, Ebernoe and Singleton and Cocking Tunnels SACs.

There is a need to coordinate future ecological mapping work and share results to gain best value from this work. The South Downs ecological mapping exercise was confined to within the boundary of the National Park, but now the model is established it could be extended across the Framework area, potentially at a lower cost than commissioning new work. The areas across the boundary of the National Park, the river valleys and any further development work in the Green Infrastructure Investment Areas would be priority areas to further this Framework.

[56] By the South East Biodiversity Forum.
[57] The Wildlife Trusts in the South East (2007), *A Living Landscape for the South East.*
[58] Water Vole, Woodland Bats, Barn Owl, North Lapwing, Chalkhill Blue butterfly, Dormice.

Plan 11: Biodiversity Opportunity Areas, Main Priority Habitats and Designated Nature Conservation Sites



Biodiversity Opportunity Areas (BOAs) data supplied by South East England Biodiversity Forum. Designated Site, Priority Habitat and National Park boundary data supplied by Natural England. This map contains OS OpenData© Crown copyright and database rights 2015 Ordnance Survey.

Recreation and Urban Edge Pressures

The debate and evidence relating to recreation and wildlife is complex, but it is clear that on some sites recreational access can have a detrimental effect on biodiversity through effects such as trampling, disturbance, erosion or general degradation such as litter and anti-social behaviour. Urban edge sites in particular can be subject to a high level of impacts including fly-tipping, arson, motor vehicle use and damage to infrastructure preventing habitat management.

Habitat Regulations Assessments for European designated sites consider the issue. The Hampshire and Isle of Wight Wildlife Trust[59] and two reports for the South Downs National Park[60] have also investigated the issue.

In the Access Network and ANG Study two types of site were recorded; both European designated sites for which a Habitat Regulations Assessment indicated that recreation could have an effect on the protected species or habitats and sites highlighted through discussion with the South Downs National Park officers, Natural England, the National Trust and the Wildlife Trusts of Sussex and Hampshire and Isle of Wight.

Plans12 and 13 show sites identified as potentially sensitive to recreation in relation to the overall provision of ANG sites.

Some key areas emerge from this research:

- Visitor management across the entire coastal area needs careful consideration of greenspace provision due to increases in housing, e.g. north of Adur-Worthing, which has the lowest density of ANG and little urban greenspace and where five sites were identified;
- Chichester and Pagham Harbours are in an area with low provision of rights of way and accessible natural greenspace and, although mitigation measures to relieve visitor pressure on the European designated sites are being taken forward separately, further accessible greenspace would support these measures;
- The European sites of Thursley, Wealden Heaths Phase II SPA and Shortheath Common SAC have been assessed as sensitive to recreational pressure, with mitigation measures proposed. However, several further sites were identified as potentially sensitive, supporting the recommendation in the East Hampshire Green Infrastructure Strategy (2013) for a cross-boundary approach to visitor management;
- The Winchester Green Infrastructure Strategy recognises a lack of natural green space close to settlements as well as a deficit in Local Nature Reserves, with potentially recreation sensitive sites in and around the city.

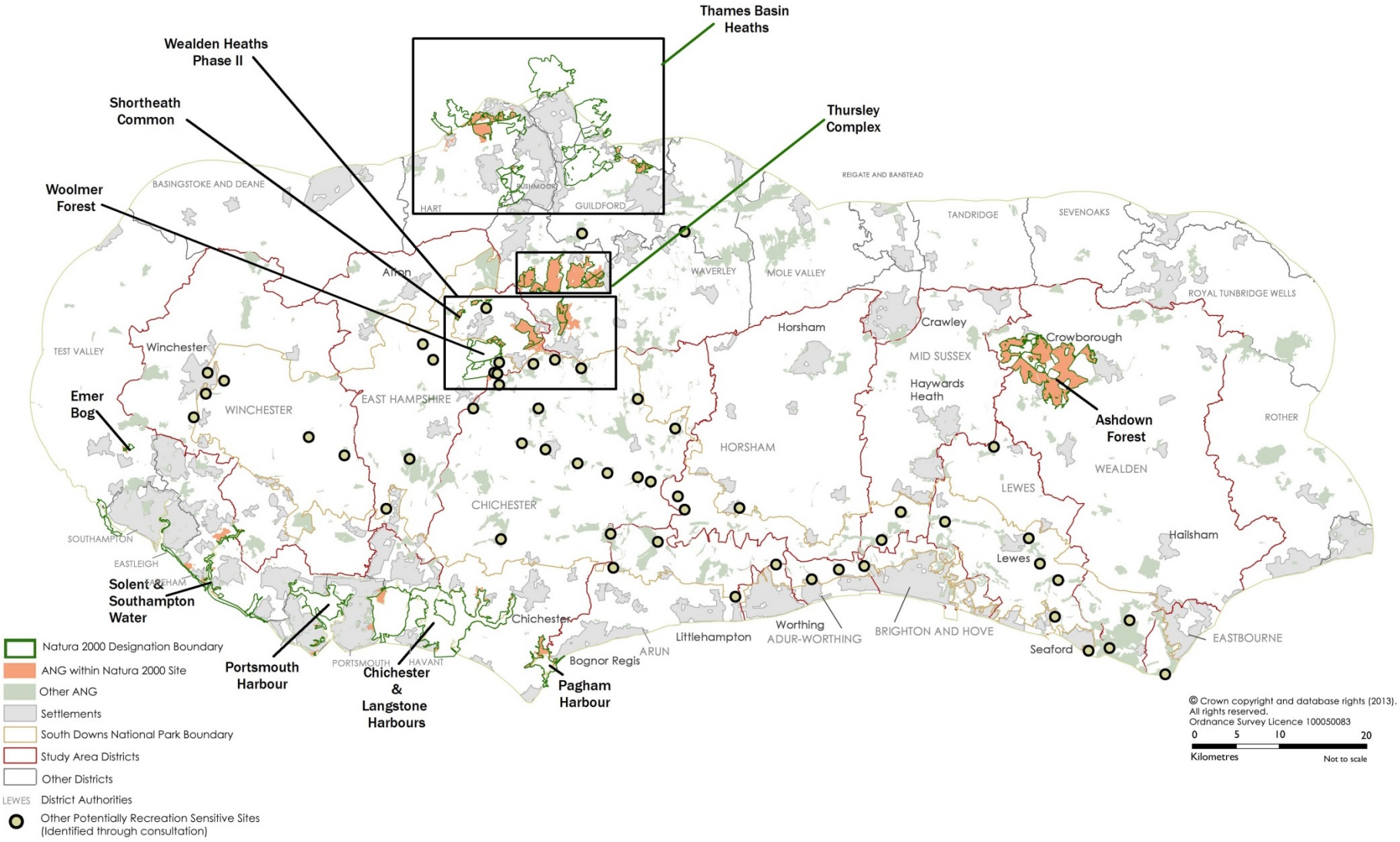
[59] Hampshire and Isle of Wight Wildlife Trust (2012), *Fresh Air and Exercise*.

[60] South Downs National Park, Visitor Survey 2012, Environment Element, Final Report and the Access Network and Accessible Natural Greenspace (ANG) Study (2013).

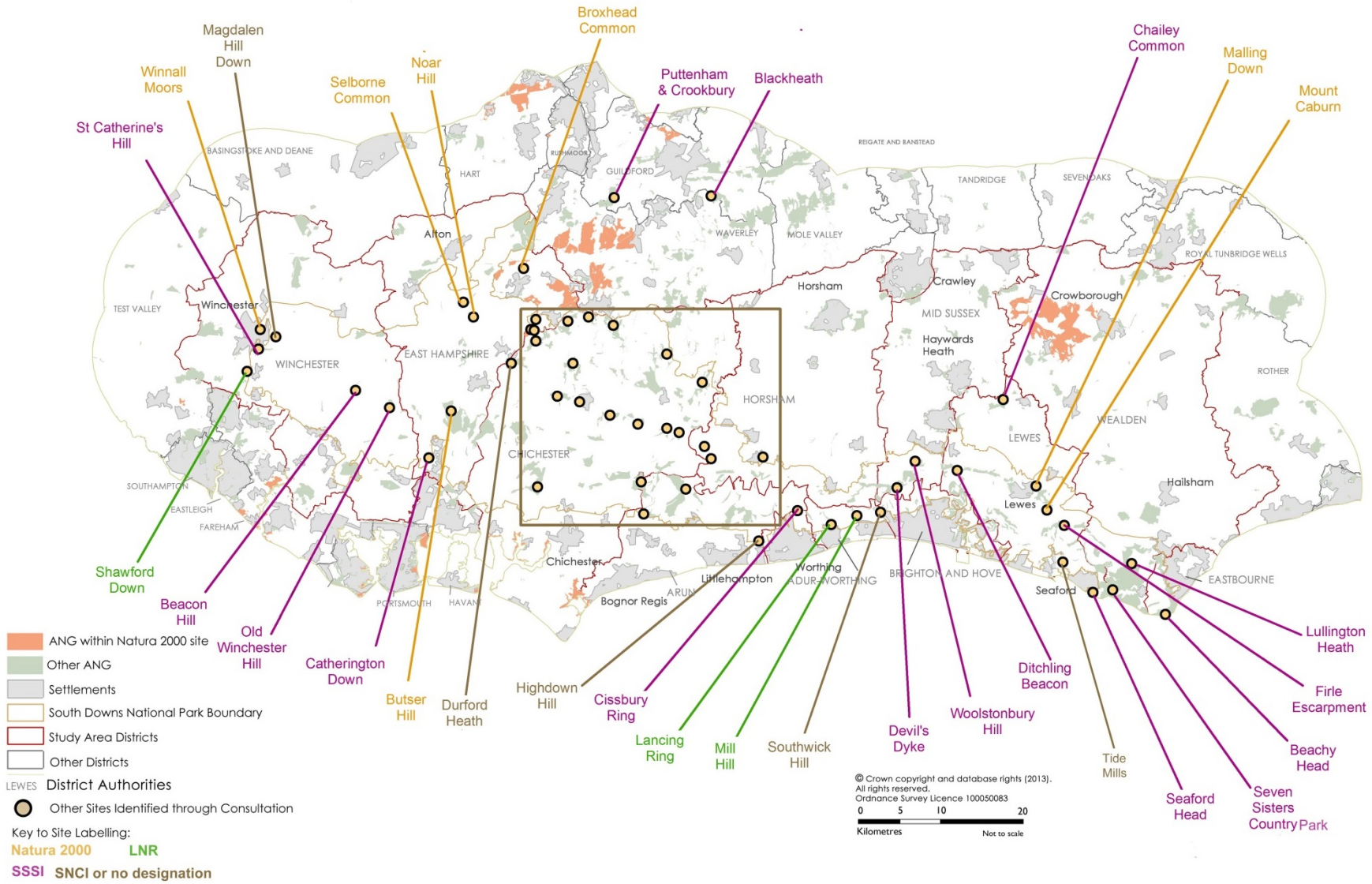
In taking forward more local level green infrastructure planning, further investigation could include:

- Understanding how much of the open space network consists of biodiversity sites; which of these are potentially sensitive; and how favourable opportunities are to link to sites in close proximity to create bigger more joined up habitat?
- Identifying sites which serve a high population for which there is limited other open space;
- Building the evidence base to understand better both visitors and impacts;
- Cross-boundary green infrastructure, especially provision of larger sites - sites in one local authority area will serve visitors from an adjacent area;
- Developing more integrated approaches to creation of attractive and accessible areas close to where people live - those seeking recreational space, or even a degree of 'naturalness', may not necessarily need high quality biodiversity sites. Other approaches to increase access may help to relieve pressure.

Plan 12: Sites Potentially Sensitive to Recreational Pressure – Internationally Designated Sites and Others Named by Consultees



Plan 13: Sites Potentially Sensitive to Recreational Pressure - Named



Links to Ecosystem Services

Biodiversity is a supporting ecosystem service. There is growing evidence that the stability of ecosystem service provision improves with greater biodiversity. Overall, however, there has been significant biodiversity loss in the last 50 years, with the main drivers being land use change and pollution.[61]

The Geographic Information Systems (GIS) EcoServ-GIS model has been used in the evidence base for health and well-being. EcoServ-GIS uses spatial data, such as greenspaces, habitats, landscape character, along with socio-economic data to show where ecosystem services occur and to indicate levels of demand (need) for a given ecosystem service and the capacity of the ecosystem to deliver that service.

Two models were run to include in the evidence base for this theme.

Pollination Services

Wild pollinators such as bees and wild insects are vital in sustaining crop production. Land use is important in sustaining these pollinating species, with natural and semi-natural habitats providing additional sources of pollination. Although the relationship of the many species of pollinators with the landscape is highly complex, studies have indicated the distance that pollinators tend to travel and have shown that urban landscapes do not necessarily impact negatively on pollinators. Different habitats provide more or less resource; for example pollinators can use all of grassland, but tend to use only the edge of woodlands. These factors are used by EcoServ-GIS to model the capacity of the ecosystems to provide pollination services. The demand (need) for pollination services is generating by identifying agricultural land, allotments and orchards, with the assumption that the need is greatest on or directly adjacent to that land and declines as the distance from this land decreases.

The modelling highlighted clearly the arable areas of the Framework area; in Winchester, along the South Downs and the coastal plain area between Chichester and Bognor Regis, see Plan 14. While there were a few isolated areas where high demand was being met by existing ecosystems, in most areas there is capacity to improve this function. The need for this service extends to the urban edges, particularly apparent around Bognor Regis, the coastal towns, Chichester and Winchester. Urban edge greenspace in these areas should therefore consider improvements to pollination services and urban green infrastructure initiatives could also help to support the pollinators needed for allotments within towns.

[61] National Ecosystem Assessment (2011), Chapter 4, Biodiversity.

Those areas shown are:

- Pollination High Demand – High Capacity are areas where there is a high need for pollination services and the ecosystems are performing well in providing this. *These areas should be conserved and protected;*
- Pollination High Demand – Low Capacity are those areas where there is a high need for pollination services but the performance of ecosystems in providing this could be improved. *Pollination capacity in ecosystems should be increased*.
- Pollination Service Benefitting Areas These are areas where there is some need for climate regulation along with some capacity in existing ecosystems to deliver this.

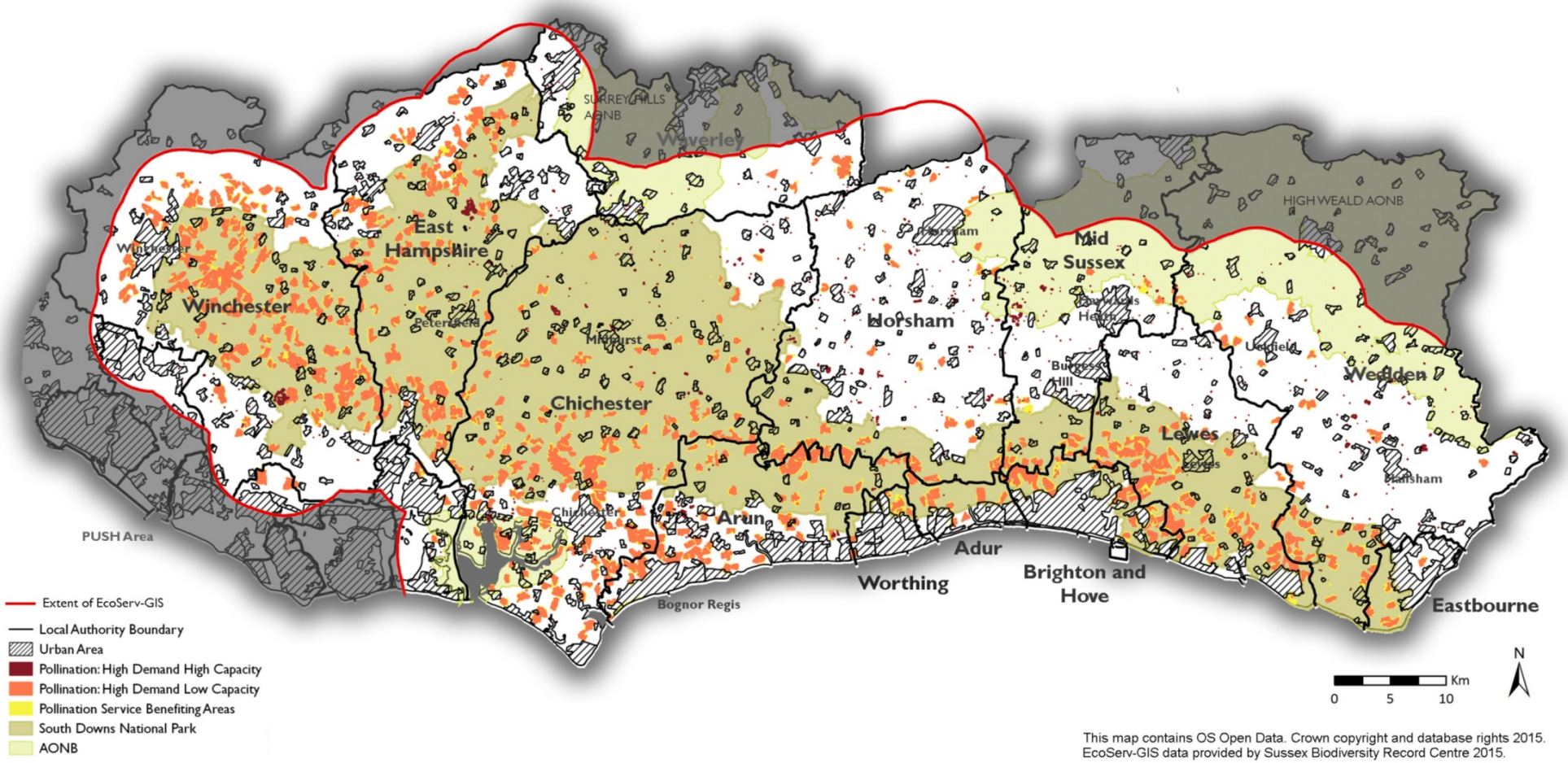
Carbon Storage

Alongside the need to reduce greenhouse gas emissions, CO_2 sequestering from the atmosphere into soils and vegetation can contribute to mitigation measures. Different land uses have differing capacities to achieve this.

EcoServ-GIS predicts the amount of carbon which could be stored in the vegetation and top 30cm of soil, depending on the habitat type present and land use. Water courses, man-made surfaces, sea and sand dunes are recorded as having no capacity for carbon storage, but urban areas generally do have carbon storage capacity and are included. Demand (need) is mapped at the same level (high) across the entire area as the effects of climate change are at a large scale (global) and particularly local effects cannot be identified.

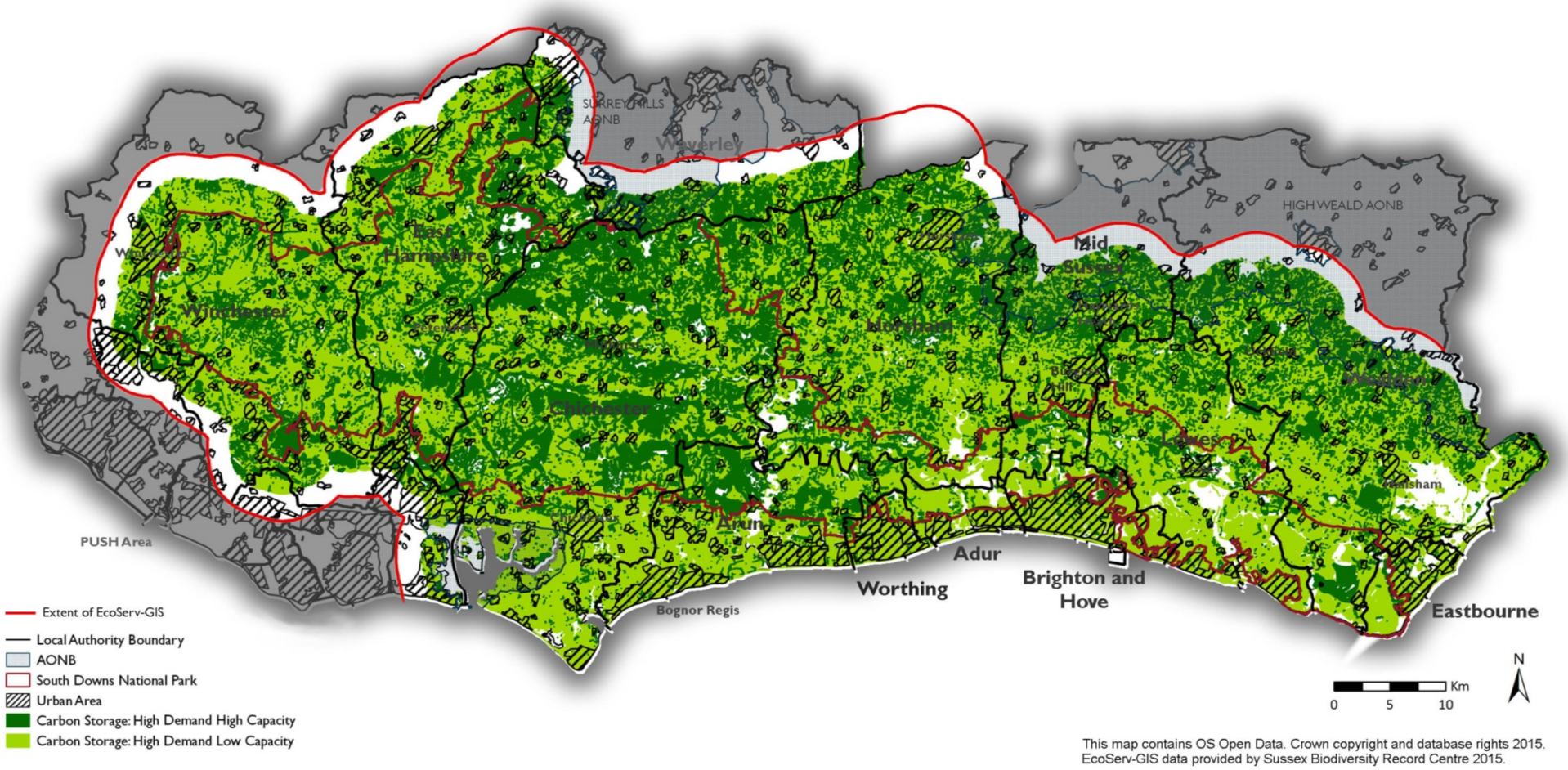
The modelling highlighted clearly in particular the wooded areas of the Framework area, in Chichester district and the High Weald, see Plan 15. However, there is high capacity throughout the Framework area and capacity to improve carbon storage in all urban areas.

Plan 14: EcoServ-GIS – Pollination Services



This map contains OS Open Data. Crown copyright and database rights 2015.
EcoServ-GIS data provided by Sussex Biodiversity Record Centre 2015.

Plan 15: EcoServ-GIS – Carbon Storage



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EcoServ-GIS data provided by Sussex Biodiversity Record Centre 2015.

Climate Change Vulnerability

Climate change over coming decades will bring a range of direct and indirect pressures and consequences for biodiversity. Many species and habitats are strongly influenced by temperature and rainfall and the interactions between these.

Natural England has developed a GIS climate change vulnerability model to assess the vulnerability of priority habitats. Natural England has produced outputs from the model specifically to inform this Framework.

The guiding principles developed by the UK Biodiversity Partnership for biodiversity adaptation action underpin the vulnerability model:

- Conserve existing biodiversity through conserving Protected Areas and other high quality habitats and a range and ecological variability of habitats and species;
- Reduce sources of harm not linked to climate;
- Develop ecologically resilient and varied landscapes through conserving and enhancing local variation within sites and habitats and making space for the natural development of rivers and coasts;
- Establish ecological networks through habitat protection, restoration and creation;
- Make sound decisions based on analysis of the causes of change and respond to changing conservation priorities;
- Integrate adaptation and mitigation measures into conservation management, planning and practice.

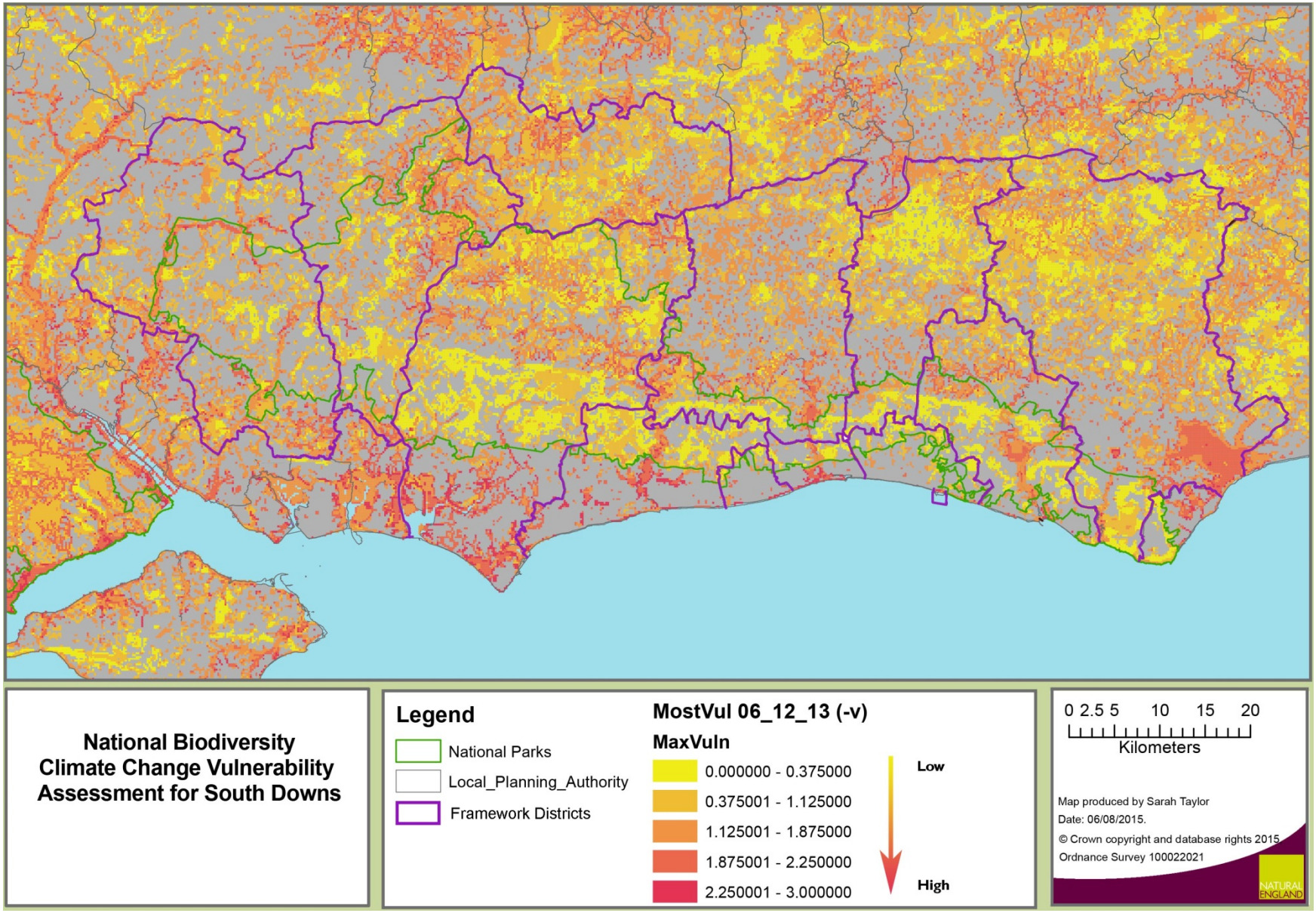
This Framework has the potential to support the delivery of these principles.

The model uses four measurements which, when combined, provide an overall assessment of vulnerability to climate change.

- Sensitivity to Change: classifies each priority habitat as high, medium or low sensitivity to climate change impact based on scientific literature and expert judgement;
- Habitat Fragmentation: measures how isolated or aggregated areas of the same habitat are and how permeable the surrounding landscape is. Larger patches of habitat can support larger population and are less susceptible to extremes and better connections allow species to move in the landscape;
- Topographic Heterogeneity: incorporates variations in height and aspect, as less variation can increase vulnerability;
- Management and Condition: assesses habitat condition based on SSSI condition and consultation and current negative impacts which are not linked to climate change, as these can increase vulnerability.

The overall vulnerability mapping for all priority habitats across the Framework area is shown in Plan 16. Additional mapping is available for each priority habitat to further inform future planning.

Plan 16: Biodiversity Climate Change Vulnerability



The most sensitive habitats were along the river valleys, the Pevensey Levels and the wetland and coastal areas around Pagham and Chichester Harbours. Of mid sensitivity were extensive areas in north east East Hampshire and along the Rother catchment, on the coastal plain and to the west of Burgess Hill. Habitat fragmentation was high in many parts of the Framework area, with lower fragmentation in some areas of north east East Hampshire and on the South Downs north of Chichester.

Overall, taking all four parameters, the most climate change vulnerable areas are indicated to be:

- All of the river valleys;
- The coast and coastal plain around Chichester and Pagham Harbours;
- North east East Hampshire and the Rother and Western Streams Catchment (although this is a mixed picture and in some areas there is low vulnerability);
- The area between the High Weald AONB and South Downs National Park.

Nature in Urban Areas

It is difficult, but not impossible, to improve biodiversity in urban areas. Urban areas have fragmented patches of habitat, with many breaks in connectivity and large areas of potentially hospitable greenspace, in the form of gardens, in private ownership and not necessary managed with nature in mind.

There are advantages in improving wildlife in urban areas. For biodiversity, permeability created across an otherwise impenetrable area, especially through enhancing existing connected routes such as green or blue corridors, will increase connections around and outside the urban area. For people there are benefits in experiencing nature close to home.

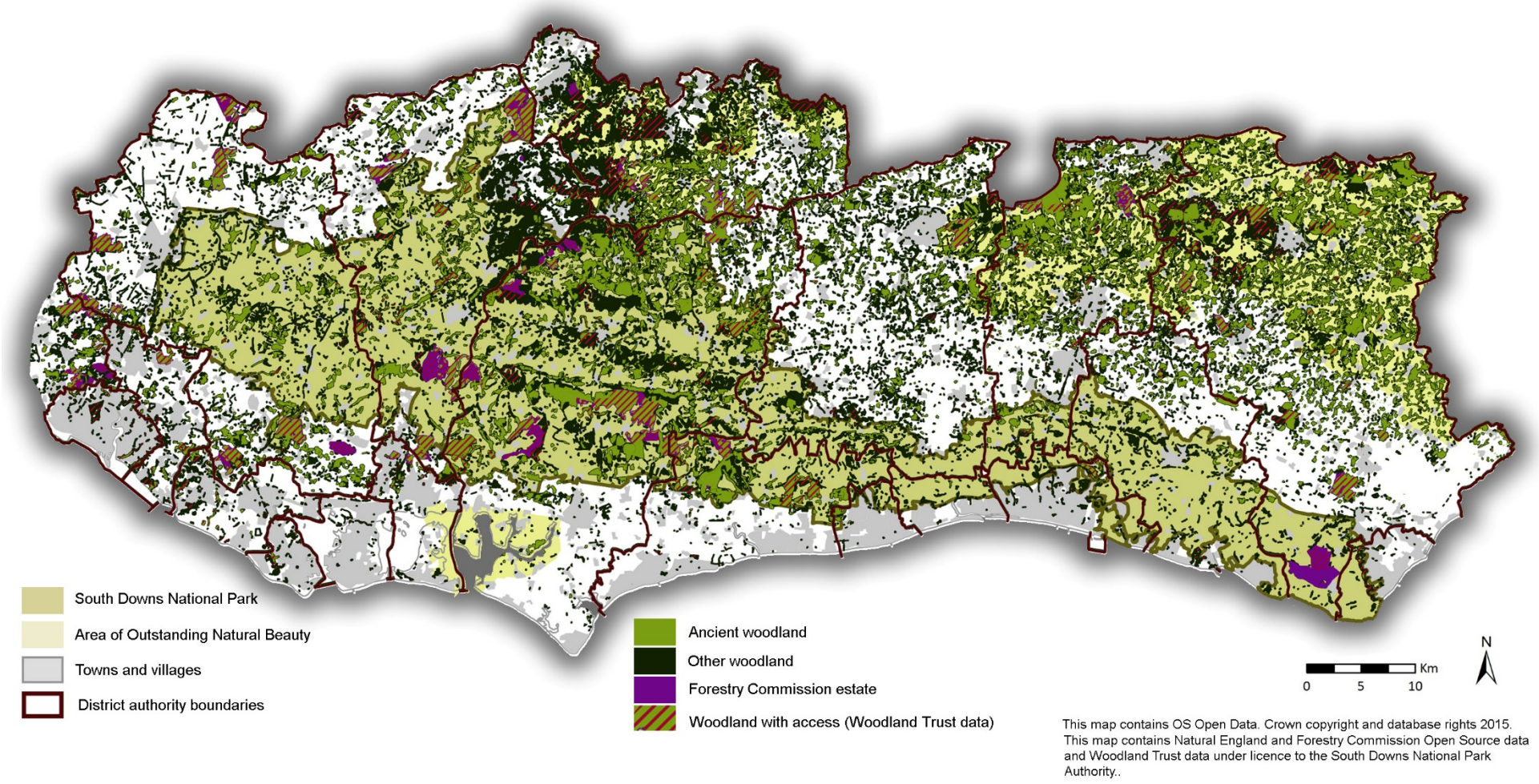
Across the Framework area, there is generally less accessible natural greenspace in urban areas, but there are opportunities to increase the biodiversity value of existing greenspace with altered management, for example wildflower meadows, native rather than ornamental tree planting and re-naturalising urban watercourses.

The Brighton and Lewes Downs Biosphere is taking forward urban biodiversity enhancement projects and offers opportunities to expand initiatives through the coastal towns and across the Framework area.

Woodland

Woodlands can deliver many green infrastructure and ecosystem services functions; biodiversity, timber and fuel, recreation, carbon sequestration, improvements in air quality and urban cooling. Plan 17 shows woodland in the Framework area.

Plan 17: Woodlands



This map contains OS Open Data. Crown copyright and database rights 2015. This map contains Natural England and Forestry Commission Open Source data and Woodland Trust data under licence to the South Downs National Park Authority..

Lack of management has historically been a key issue for woodland habitats. Within the protected landscapes of the South Downs National Park and the High Weald AONB, where there is the greatest woodland cover of the Framework area, there are active projects to support landowners in managing woodland. There are areas outside of the protected landscapes where there is concentration of woodland where the approach might be beneficial, for example in the area between the National park and High Weald AONB outside of both protected areas.

The South Downs ecological network mapping shows potential for improving connectivity along the foot of the scarp slope, especially at the southern end of the River Rother catchment and the area in northern East Hampshire district, both for deciduous woodland and beech-yew woodland. It also hints at potential to the east of Burgess Hill, but does not produce results beyond the National Park boundary. There are many small woodlands in this area and further connection could support access to greenspace for these two urban areas and link the protected landscapes.

To the south of the National Park, north of the coastal plain, are several large woodland estates, several with public access, but which are effectively cut off from the residents of the coast due to the A27. There may be scope in the western area of Arun/Chichester to extend woodland cover south of the A27 in the coastal plain/downs transition area, subject to retaining the important landscape character of this area. There may be potential for improving woodland connectivity and increasing recreational access in the area to the north east of Worthing to provide additional recreational area in this access-deficient area, subject again to landscape character constraints. Decisions regarding the suitability of changes to land-use and land cover can be supported by a range of 'tools', including Landscape Character Assessments.

The National Park authority is developing View Characterisation (or 'Viewshed') (see link) which provides evidence on views and view types within the National Park. This should help assess the visual impact of changes and developments in the landscape; and by mapping existing important views it should be possible to identify areas where views should be retained.

There is also potential for increasing ecosystem services benefits and woodland cover is a key parameter in the EcoServ-GIS outputs of climate regulation, carbon storage and noise regulation.

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Theme: Health and Well-Being

Introduction

The connections between greenspace and health and opportunities for healthy living are widely documented, with broad agreement on the conclusion that the natural environment provides physical, mental and social well-being benefits. Some of these benefits help contribute to government targets in the reduction of obesity and ill health.

Further, there is evidence that the natural environment can provide physical health benefits through improvements in air quality, noise and temperature regulation; and reduce the impacts of extreme events such as flooding, which negatively impact on people's welfare.

The idea of creating greener environments in our towns and cities is not new; there are many examples of initiatives that have been planned and developed over the years. Providing adequate amounts of green space enables local communities to maximise the benefits of a healthy lifestyle.

However, development pressures and scarcity of land have resulted in the fragmentation of green infrastructure in some of our towns and villages; and plans for the creation of new greenspace in existing areas can be difficult to achieve.

'Green exercise', defined as any physical activity taking place in the presence of nature, is predicted to lead to positive health outcomes, as well as promoting ecological knowledge, fostering social bonds and influencing behavioural choices *(UKNEA Technical Report Ch 16)*

In order to benefit local communities green spaces have to be easily accessible and provide appropriate and well-maintained facilities. However, the amounts of green space are often insufficient for local needs, or they can be inaccessible due to physical barriers, distance to travel or for cultural reasons. For people in poor health or with disabilities the difficulties of accessing open space can be even greater; and local greenspace within easy reach can be even more important.

A one percent decrease in the UK sedentary population is estimated to result in 848 fewer deaths per year and 30,363 fewer illnesses.
Mourato, S., G. Atkinson, et al. 2010. Economic Analysis of Cultural Services. The UK National Ecosystem Assessment: Technical Report. Cambridge, UNEP-WCMC

Levels of Activity

Being physically active is strongly linked to improvements in health and wellbeing. There is an established causal link between physical activity and at least 20 different chronic health conditions, including coronary heart disease, stroke, cancer, type 2 diabetes and mental health problems[62].

It is clear from a large body of evidence that the natural environment plays a part in facilitating physical activity[63] and can encourage communities to become more active.

Physical activity is influenced by a number of attributes of green space:

- Distance of residence from a green space;
- Ease of access in terms of routes and entry points;
- Size of the green space in terms of levels of population use;
- Connectivity to residential and commercial areas;
- Attractiveness, including biodiverse habitats and absence of graffiti and litter;
- Range of amenity, the wider the range of informal and formal facilities the more likely the space is to be used by different kinds of people.

In 2008, only 39 percent of men and 29 percent of women aged 16 and over met the UK Chief Medical Officer's minimum recommendations for physical activity.
Aresu, M., L. Becares, et al. 2009. Volume 1: Physical activity and fitness. Health Survey for England 2008. R. Craig, J. Mindell and V. Hirani. London) (** At least 30 minutes of moderate or vigorous activity 5 times per week or more)

These findings, whilst not surprising, are of particular interest in the planning and provision of green infrastructure, as they support the need for a well-connected and easily accessible network of footpaths, cycle routes and greenspaces. For existing urban areas these green space attributes may be difficult to achieve as the areas may be constrained by built development and infrastructure. However, they should be considered as part of community intervention for health programmes; they could form part of an area's longer-term plan for green infrastructure and they should certainly be included in the requirements for green infrastructure in new developments.

It is estimated that by 2050, 60% of adult men, 50% of adult women and 25% of children under 16 could be obese and that this would cost the National Health Service (NHS) £10 billion a year and wider society £49.9 billion* a year. Any increase in the amount of physical activity undertaken could therefore lead to significant social and economic benefits.
Foresight. 2007. Tackling Obesities: Future Choices DIUS. London (*at 2007 prices).

[62] Department of Health. 2011. Start Active, Stay Active: A report on physical activity from the four home countries' Chief Medical Officers. London, Physical Activity Team
[63] Masterclass Briefing; Evidence Review; Spatial Determinants of Health in Urban Settings. Building Health; Planning and designing for health and happiness; One-day conference, 22 January 2010, Frenchay Campus, University of the West of England, Bristol

Mental Health

The benefits of physical activity on mental health are well-documented and include reducing stress and alleviating depression. Green exercise – physical activity such as walking in outdoor settings – has also been shown to be a good way to improve mental and physical health[64]

> People who visit non-countryside green spaces such as urban parks at least once a month, and those who spend time in their own gardens at least once a week, have higher life satisfaction than those who do not. Survey respondents who used domestic gardens and local green spaces at least once a month also showed better self-reported health, measured by physical functioning and emotional well-being, compared to those who do not.
> *UKNEA Technical Report Ch 16.*

Social Well-Being

Access to green spaces and nature also contributes to increased social interaction and cohesion and this in turn benefits health. In order for sites to be well-used by all sectors of society, the size of site and facilities provided must be appropriate to the populations they serve and the sites must also be well-maintained.

It is therefore important to keep greenspaces in good condition, provide facilities that will attract a wide range of people and give 'life' to the site and to quickly tackle any social problems that may arise. This important link to social well-being may help support the case for enhancements to local greenspace.

Children's Mental Health

Open green space and access to nature and natural play is important for children's mental and physical health. The quality of their environmental exposure is closely linked to their wellbeing. Children's relationship with nature is a fundamental part of their development, allowing opportunities for self-discovery and natural environmental experience[65].

Environmental Factors Affecting Health

There is a long list of environmental factors that can have a damaging effect on human health and well-being. They include poor air quality, noise intrusion and extreme temperatures.

These environmental factors are usually reported in isolation, but their effects are often made in conjunction with other factors, as a

[64] J. Pretty et al., 'A countryside for health and wellbeing: the physical and mental health benefits of green exercise' (Countryside Recreation Network, Sheffield, 2005): http://www.countrysiderecreation.org.uk/pdf/CRN%20exec%20summary.pdf

[65] UKNEA Technical Report Ch 16.

result of which they need to be tackled in an approach that is holistic and cross-sectoral.

Traffic: Road transport has direct impacts on health in terms of air quality and traffic accidents, but it also has indirect effects on wellbeing as a result of noise, reduced opportunities for exercise and infrastructure which discourages walking and cycling. Roads can also be barriers to the movement of pedestrians, cyclists and horse-riders.

Air Quality: In urban areas in particular, road transport is a major source of air pollution. It emits pollutants that damage the natural and built environment and human health. Although levels of some pollutants have declined in recent years, the rising volume of traffic and increase in the use of diesel engines amongst other factors means that air quality continues to be a threat to human health. Particulate matter from exhaust gases is of great concern and should be avoided by people with respiratory or heart disease, the elderly and children.

Nitrogen Dioxide (NO2) is a gas that is readily inhaled and can cause health effects, particularly in the lungs. There is good evidence for health effects at exposure to high concentrations. It is found in the air and derives from a number of sources, notably motor vehicle traffic.
Data from http://www.envhealthatlas.co.uk/eha/environmental/NO2/

As far back as 2007 a report to Government was urging the need to address air pollution and to 'tackle the dominance of road transport in towns and cities in order to reduce air pollution and greenhouse gas emissions, provide more access for pedestrians and cyclists and improve the quality of urban living'[66].

Noise: Evidence indicates that exposure to road traffic noise is linked to an increased risk of hypertension, heart disease and heart attack in adults. However, there is evidence that vegetation - including lawns, dense vegetation and belts of trees - green roofs and green walls can reduce sound levels and this has known health benefits[67].

Vegetation can filter gases and particulate matter and the addition of trees and greener areas can soften the visual impact of roads and help to reduce noise. An approach of greening of traffic routes together with actions to reduce the traffic flows through towns and villages could help to reduce the impact of roads on local communities and encourage more sustainable methods of transport such as cycling and walking. A network of routes and open spaces can provide an urban ecosystem, help filter-out pollution and noise, reduce the impact of road traffic and relate better to the human scale.

[66] Royal Commission on Environmental Pollution Twenty-sixth Report The Urban Environment March 2007

[67] Natural England research report NERR057

green infrastructure can help to regulate temperatures by providing shade, shelter and evapo-transpiration. Water bodies can help to stabilise temperatures; and a single large tree can transpire 450 litres of water in one day.
Bolund, P. and S. Hunhammar (1999), Ecosystem Services in Urban Areas, Ecological Economics.

Temperature Regulation: In the context of climate change, managing high temperatures is recognized as being a key concern. Respiratory and cardiovascular diseases are made worse at higher temperatures and this is partly due to interactions with air pollution, which also becomes worse at high temperatures. The natural environment can make an important contribution to regulating the local climate and reducing temperature-related health and environmental impacts, as well as reducing the heating and cooling costs of indoor spaces.

In England in summer 2006, there were an estimated 75 additional deaths per week for each degree of increased temperature. (Armstrong et al. 2010, cited in Public Health England 2013)

Deprivation: It is known that those at greatest risk of ill-health often live in the most deprived areas where a combination of environmental, social and economic factors leads to poor outcomes and low life expectancy.

The long term conditions of obesity, diabetes, heart disease and dementia are much more prevalent in deprived communities. These communities are often those which have the least access to greenspace. However, even when adjusted for lifestyle issues such as smoking, alcohol and inactivity, there is still a strong link with lack of access to greenspace. It is thought that the chronic stress of poverty and a hostile environment are also contributory factors.
Overall, better health is related to access to green space regardless of socio-economic status, highlighting the importance of providing accessible green spaces to reduce socio-economic health inequalities.

There is also an economic case for tackling health inequalities. The Marmot Review estimated the annual cost of health inequalities at between £36 billion to £40 billion (ref at 2010 prices) through lost taxes, welfare payments and costs to the NHS.

The Marmot Review Report 'Fair Society, Healthy Lives' (2010) (http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review) looked at the differences in health and well-being between social groups in England. One conclusion was that the lower one's social and economic status, the poorer one's health is likely to be. The review proposed ways to reduce health inequalities, and proposed a list of policy objectives including a healthy standard of living for all and the creation of healthy and sustainable places and communities.

This places green infrastructure and the role of local authorities at the centre of the issues relating to the health of urban communities.

Description of the Framework Area and Analysis

There are wide differences in population health across the Framework area. This may in part be explained by the age profile of some of the areas – in particular the coastal towns such as Eastbourne are an attractive retirement destination – but there are also correlations between areas of poor health, deprivation and deficiency of open space.

The Local health data[68] for the districts in the Framework area outlines the health priorities based on local needs. Across most of the areas the priorities which may be associated with improvements to green infrastructure include mental health and well-being, tackling health inequalities and promoting healthy lifestyles.

In terms of the links between green infrastructure and the health of the population, the mapped analyses in this study draw on the evidence created for the Accessible Natural Greenspace Study (see link). This evidence included health of the populations based on the range of conditions known to be improved by contact with greenspace and exercise (Composite Health Score[69]); general health (Census 2011[70]); long-term, limiting health conditions (Census 2011[71]) and levels of deprivation. These health issues and socio-economic factors were analysed and the results compared with the provision of accessible natural greenspace. Plan 18 shows levels of participation in sport across the Framework area.

The ANG study showed that a number of urban areas across the Framework area are deficient in accessible natural greenspace and in some areas this is compounded by levels of deprivation and poor health (Plans 19 and 20).

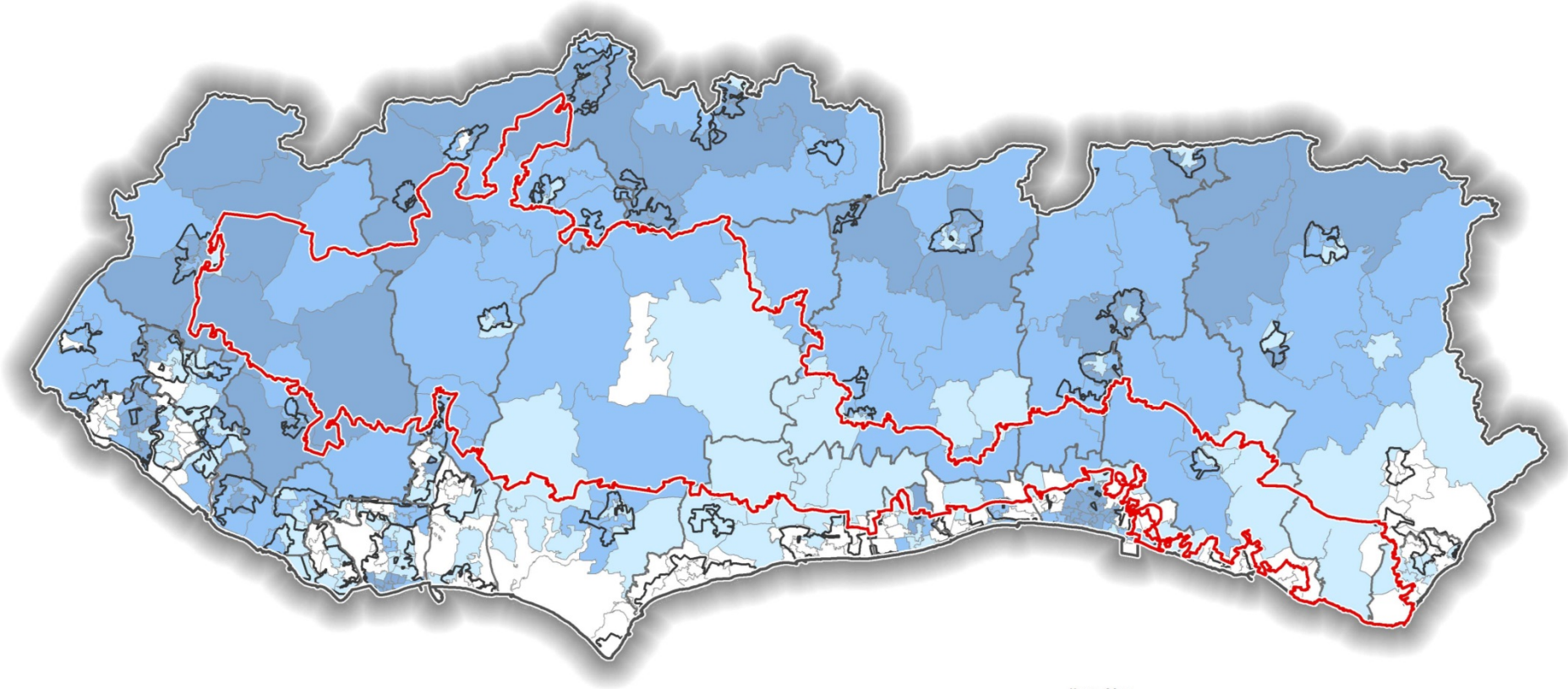
The research tells us that access to local greenspace is very important in areas of poor health and deprivation and the spaces need to be:

- Close to where people live;
- Easy to access;
- Closely connected to residential and commercial areas;
- Attractive and well-maintained and must feel safe;
- Have a wide range of facilities to attract different people.

[68] http://www.apho.org.uk/resource/view.aspx?QN=HP_RESULTS&GEOGRAPHY=45
[69] Composite Health Data includes diabetes, obesity, cardiovascular conditions, hip fracture and mental health.

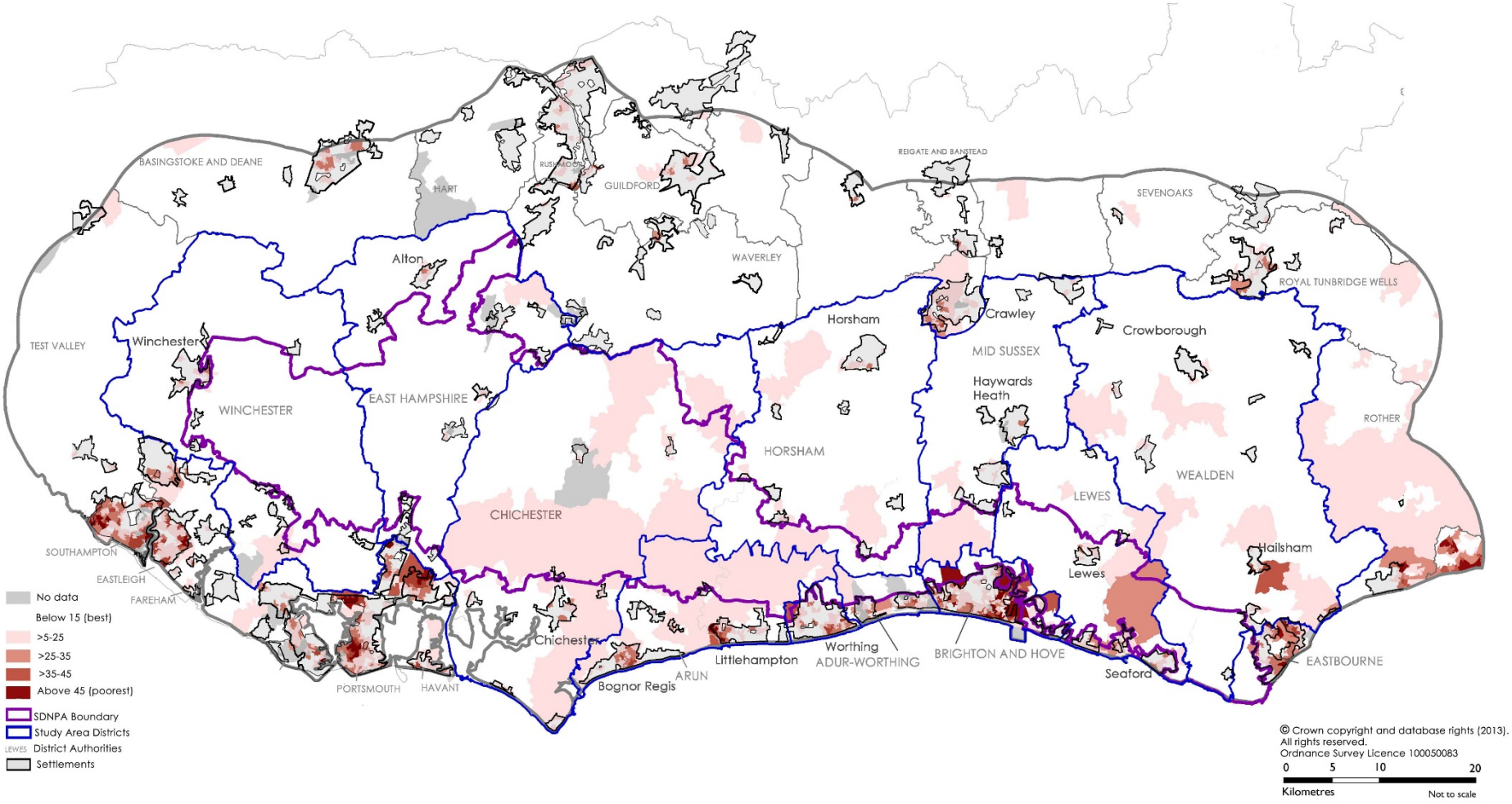
[70] A self-assessment of a person's general state of health. People are asked whether their health was, good, fair, bad or very bad
[71] A self-reported assessment of whether a person's daily activities are limited by a health condition

Plan 18: Participation in sport at least once a week (Sport England)

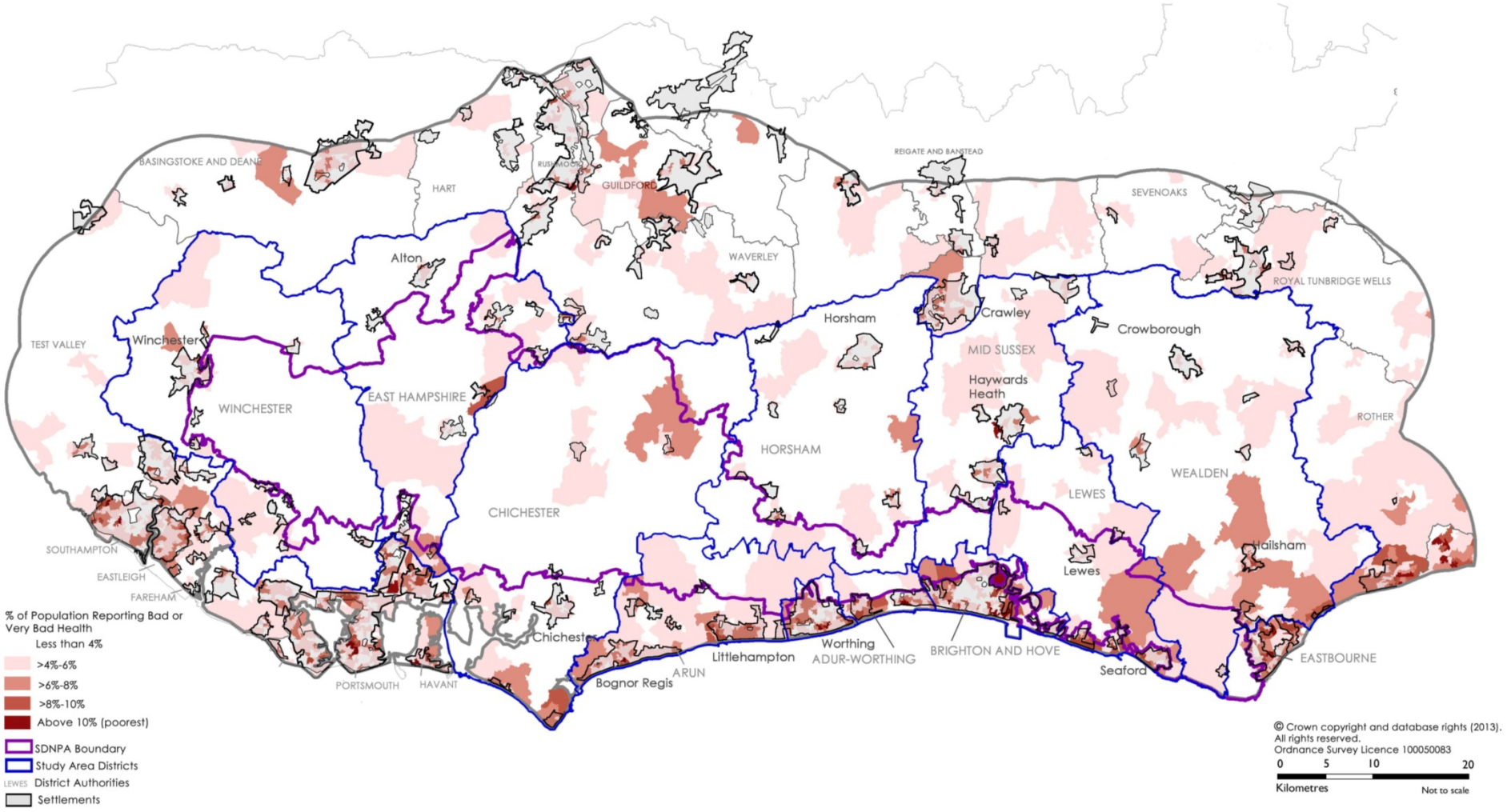


Once a week sport participation data supplied by Sport England. National Park boundary supplied by Natural England. This map contains OS OpenData© Crown copyright and database rights 2015 Ordnance Survey.

Plan 19: Indices of Multiple Deprivation 2010



Plan 20: General Health, Bad or Very Bad (Census 2011)



Plan 20 shows that households with the poorest levels of health are mostly located in the coastal towns outside the National Park, with more limited areas in parts of Winchester, Alton, Whitehill & Bordon[72], Haslemere, Hailsham and Eastbourne.

There is a strong coincidence between areas with the poorest levels of health and lack of greenspace. In these areas it is important to consider improving the provision of greenspace and its accessibility. Where these areas are located close to planned major housing developments there is an opportunity to deliver new greenspace and access opportunities through the development – as is the case in the coastal towns, Winchester, Alton, Hailsham, parts of Crawley and Eastbourne.

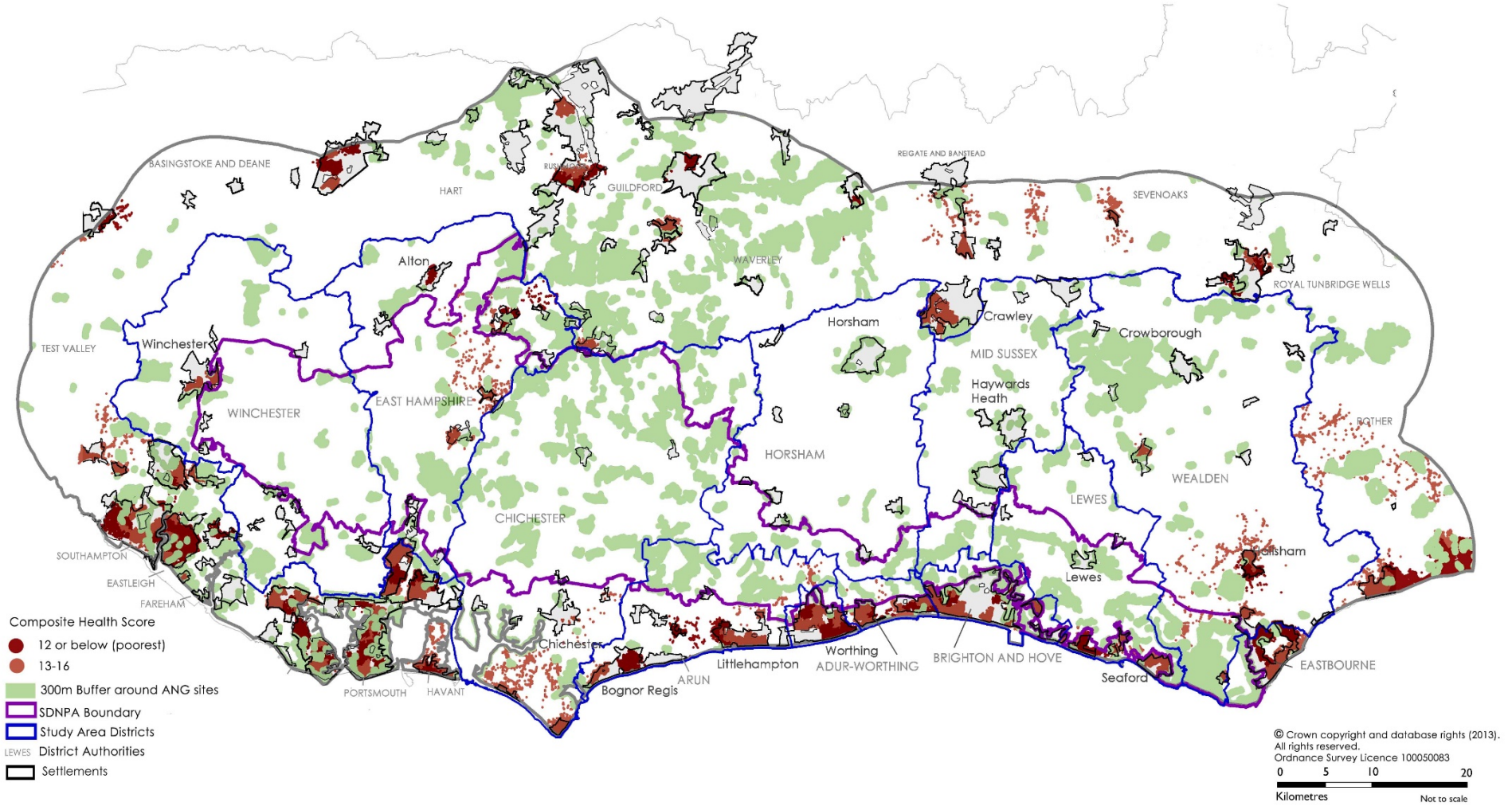
However, in areas where poor health coincides with adequate levels of ANG it may be necessary to intervene to improve the use of this ANG through targeting of groups in the population, to support access and better use of existing areas of natural greenspace (see Table 4)

An analysis of the PRoW (public rights of way) network shows that the coverage – or density – of rights of way varies across the Framework area. This network of access routes is important in enabling people to walk, cycle or horse-ride to explore their local area; to access green spaces and the wider countryside. Some areas of low PRoW density coincide with poor levels of greenspace (ANG), as can be seen on Plans 21 and 22. Areas with the poorest provision include some of the areas previously identified as having poor health, including areas in the coastal towns and parts of Winchester, Crawley and Eastbourne. Improvements to access and open space should be priorities for these areas.

The Access and Recreation theme discusses the barriers to access in the Framework area, including major roads, railway lines and rivers. For people in poor health these barriers are a serious obstacle. Accordingly, any programmes of access enhancement in areas of poor health must also address these barriers to access. Examples are the coastal towns where the A roads and railway lines form east-west barriers to movement north towards open spaces and into the National Park.

[72] The data from Whitehill & Bordon is not considered relevant as it is in the process of re-development into a major new town.

Plan 21: Two Lowest Composite Health Score Categories and Accessible Natural Greenspace with 300m buffer



Plan 22: Households deprived of Accessible Natural Greenspace and Public Rights of Way Density

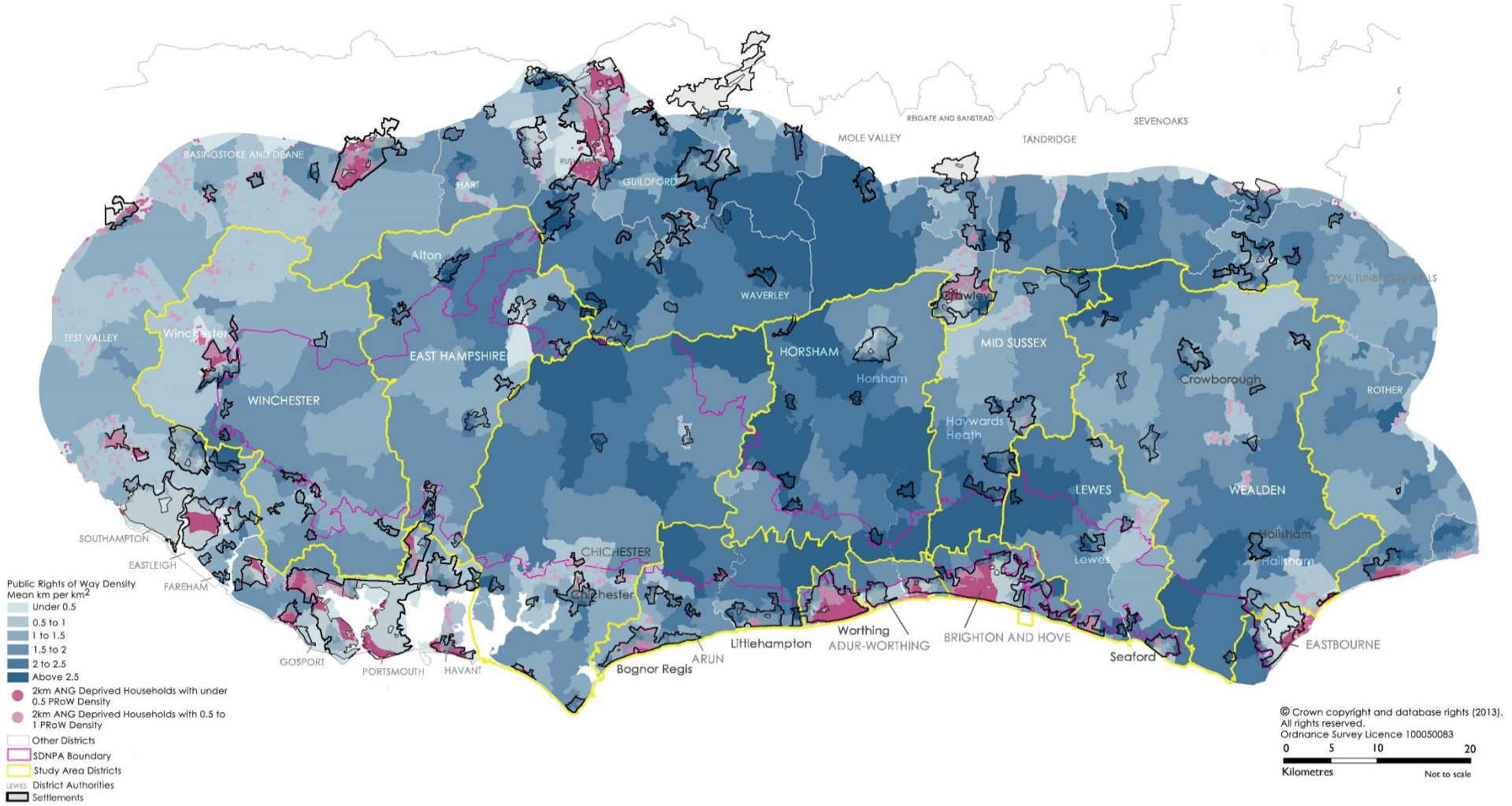


Table 4: Interventions to Improve Health through Greenspace Provision

Health and ANG Issues	Potential Interventions
Scenario 1: Where there are areas of poor health and natural greenspace is easily accessible and has capacity for more use.	• Promote commissioning of green exercise, its use and benefits; • Remove barriers; • Improve quality and management; • Establish outreach programmes that link health services with greenspace use. Connect People To Greenspace • Ensure green infrastructure is designed and managed to appeal to communities suffering health inequalities; • Promote measures to encourage use of green infrastructure by targeting communities (e.g. health walk provision, links to Health facilities, reducing social and cultural barriers).
Scenario 2: Where there are areas of poor health and a lack of nearby natural greenspace.	• Influence planning and green infrastructure development. Infrastructure Provision • Provide and accessible natural greenspace close to people's homes • Improve access to greenspace;
	• Ensure green infrastructure is identified as an integral part of 'health service' provision, along-side surgeries, hospitals etc.

Current Activities

It would be beyond this Framework report to estimate the amount and variety of activities currently taking place in support of public health across the study area. However, the SDNPA and other organisations are developing programmes that aim to support public health through contact and engagement with the natural environment. For example, The Sussex Community Development Association and Community 21 / AiRS are promoting access to outdoor activities and treatment pathways.[73]

While the specific issues for each area differ, some common themes emerge which have relevance to future green infrastructure projects:

- The strong correlation between poor health, deprivation and lack of greenspace;
- The role of greenspace provision in helping to reduce socio-economic health inequalities;
- The need to improve access and greenspace provision in and around key conurbations including the coastal towns;
- The potential for delivering new greenspace and access opportunities through development;
- The potential for green infrastructure to improve 'liveability' in urban environments;

[73] http://community21.org/partners/eschwav/

Links to Ecosystem Services

In Ecosystems Services terms, access to green spaces provides 'non-material benefits that result from our interaction with the natural environment. These non-material benefits include opportunities for informal recreation and physical exercise, as well as places for spiritual enrichment and inspiration.

The Geographic Information Systems (GIS) EcoServ-GIS model has been used in the evidence base for health and well-being. EcoServ-GIS uses spatial data, such as greenspaces, habitats, landscape character, along with socio-economic data to show where ecosystem services occur and to indicate levels of demand (need) for a given ecosystem service and the capacity of the ecosystem to deliver that service.

Noise Regulation

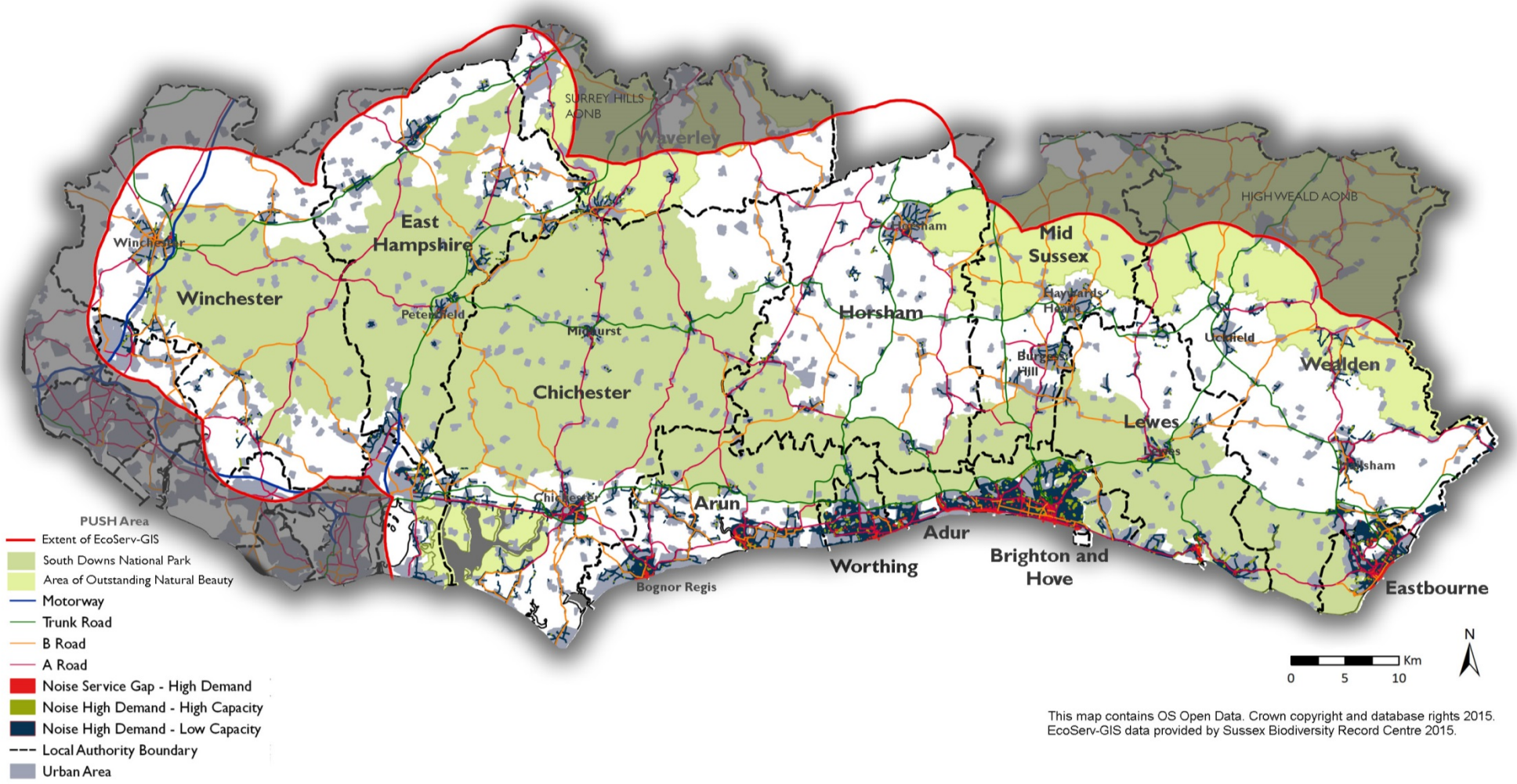
Noise pollution is a recognised public health issue and one which can be regulated by the presence of vegetation and greenspace. The structure of the buffering vegetation is important. Trees and shrubs are best at scattering noise, with coniferous trees carrying out this function all year round. Grassland, although not as effective as trees, is better than un-natural sealed surfaces and even low hedges and vegetated walls can help to reduce noise. The creation and management of greenspace buffers alongside roads can make a positive impact on noise levels.

EcoServ-GIS models the capacity of vegetation to absorb and reflect noise, ranking areas of vegetation in terms of composition (coniferous woodland awarded the highest absorption value, then other woodland, scrub, hedges and finally man-made surfaces, which score zero) and taking into account the size of the vegetation block. It also assesses the need for noise regulation (calling this 'demand') based on distance from roads, railways and airports, with each of these having a different expected impact range.[74] It also assesses the societal need based on the population density and the mean health scores of residents.

The modelling shows that there is potentially a need for noise regulation in all of the larger urban areas and in several places alongside busy roads. Although there are few areas where high demand is being met, there are few areas where there is high demand and no capacity at all. There are extensive areas alongside roads and in town centres where vegetation is helping to address noise pollution and where there is some capacity to improve this. Plan 23 shows the output across the Framework area. The needs of particular urban areas are difficult to assess at this scale. A inset of Brighton and Hove is shown in Plan 24 to highlight the detail which is possible.

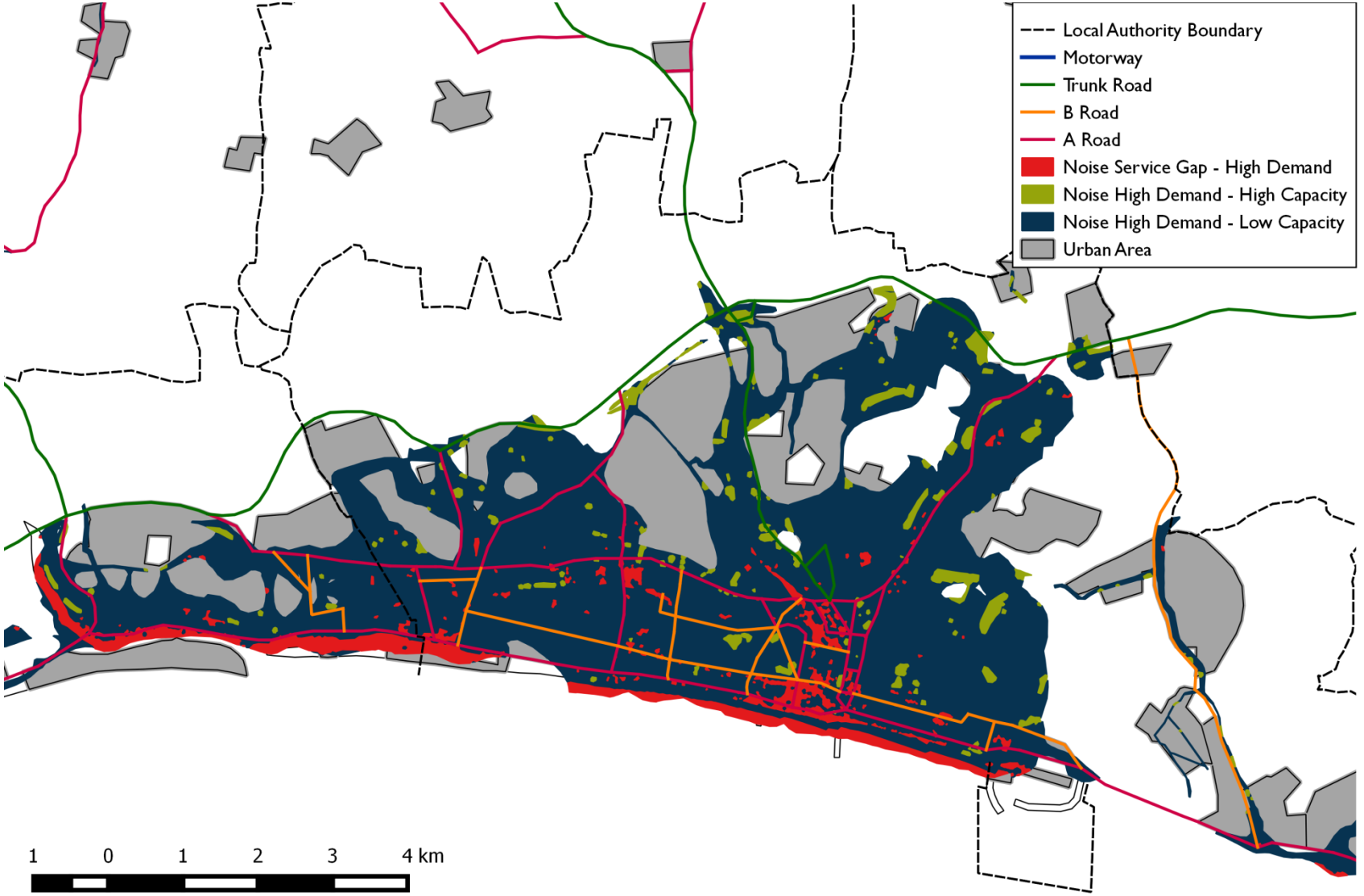
[74] E.g. Motorways 800m, major roads 600m, airports 1500m.

Plan 23: EcoServ-GIS – Noise Pollution



This map contains OS Open Data. Crown copyright and database rights 2015.
EcoServ-GIS data provided by Sussex Biodiversity Record Centre 2015.

Plan 24: EcoServ-GIS – Noise Pollution – Brighton and Hove



Those areas shown are:

- Noise Service Gap – High Demand are areas where there is a high need for noise regulation but zero capacity for an ecosystem to provide at present – i.e. there is no functioning ecosystem present;
- Noise High Demand – High Capacity are areas where there is a high need for noise regulation and the existing vegetation is performing well in providing this. *These areas should be conserved and protected;*
- Noise High Demand – Low Capacity are those areas where there is a high need for noise regulation but vegetation is not performing well in providing this. *Noise regulating vegetation should be increased*.

Regulating Local Climate

Land use has an impact on local climate because different surface types create absorb or reflect differing amounts of radiation. Urban areas can experience higher temperature climates compared to rural areas, particularly due to the larger amount of impervious surfaces. Global climate change is likely to increase these effects. Vegetation and greenspace in urban areas has been shown to have positive effects in cooling urban areas, as well as local benefits such as providing shade.

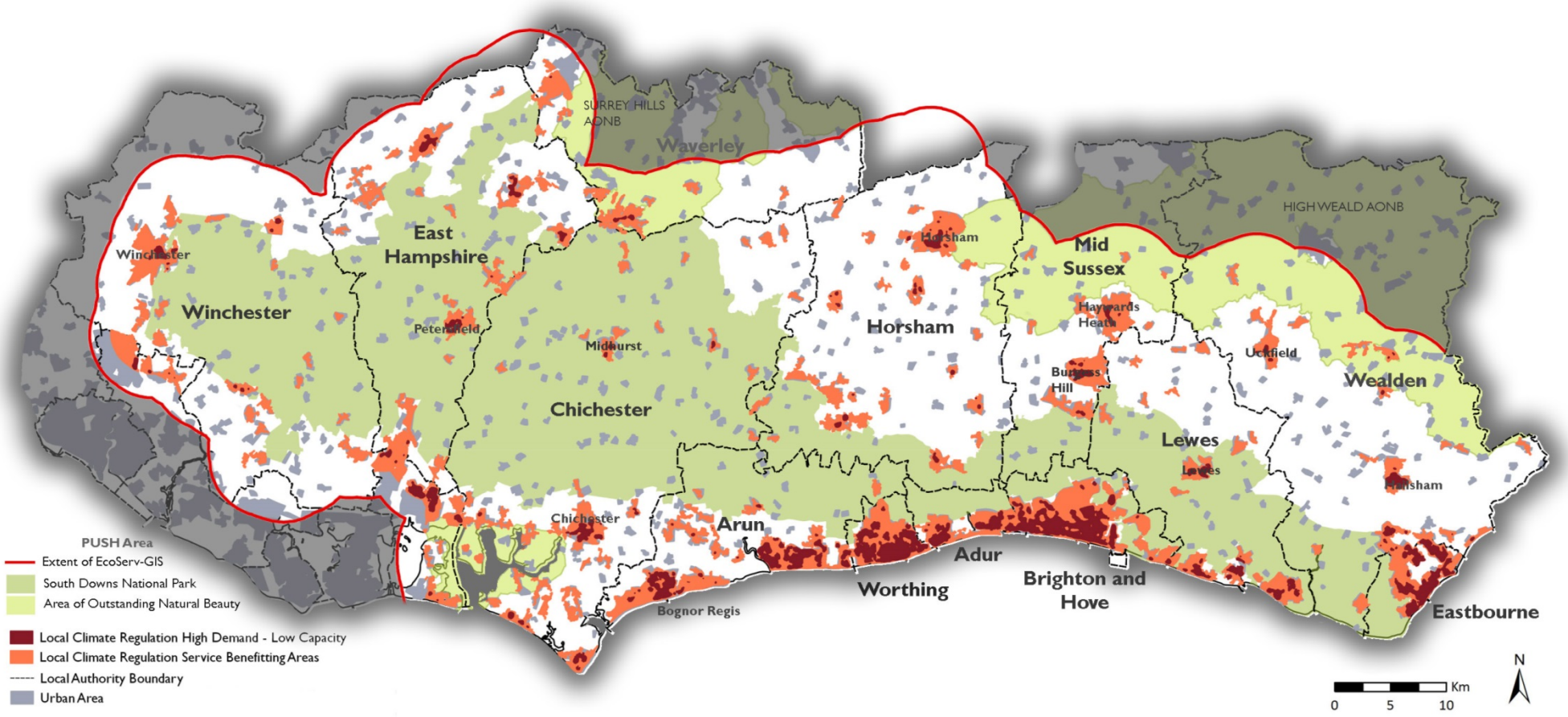
EcoServ-GIS models the proportion of the landscape that is covered by greenspace, with larger greenspaces assumed to provide greater cooling benefits. It also assesses the societal need, selecting larger urban areas and using data on population density and proportion of younger and older residents.

The modelling showed that there were no areas where demand (need) for climate regulation was high and where the ecosystem was also performing well in providing this. There were, however, extensive areas were ecosystems were providing some benefits (shown as low capacity) and where improvements could be made. This included large areas of the coastal towns and some area of the larger towns in the Framework area, e.g. Horsham, Chichester and Winchester.

Those areas shown are:

- Local Climate Regulation Service Benefitting Areas These are areas where there is some need for climate regulation along with some capacity in existing ecosystems to deliver this;
- Local Climate Regulation High Demand – Low Capacity are those areas where there is a high need for climate regulation but vegetation could perform better in providing this. Although the service is not being performed particularly well at present, there is scope for improvement. *Climate regulating vegetation should be increased*.

Plan 25: EcoServ-GIS – Local Climate Regulation



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EcoServ-GIS data provided by Sussex Biodiversity Record Centre 2015.

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Theme: Recreation and Access

Introduction

Recreation and Access form important components of a multi-functional Green Infrastructure Framework and play a key role in society's social, environmental and economic well-being.

Recreational open space can take many forms, from formal sports pitches to open areas within a development, linear corridors and country parks, historic parkland, water bodies, urban parks and play areas.

Means of access to recreational facilities include public rights of way and other walking, cycling and riding routes, rivers and canals.

In common with other components of green infrastructure, open spaces and access routes can provide wider multi-functional benefits to society, including health and recreation benefits to people living and working nearby; an ecological value; an important part of the landscape and setting of built development; a setting for heritage assets and a component in the achievement of sustainable development[75]

In terms of green infrastructure the focus is on providing opportunities for informal recreation in natural or semi-natural environments where recreation is most likely to complement other aspects of green infrastructure including biodiversity, historic environment and landscape. Informal recreation includes walking, cycling, horse riding, boating, children's play and the simple enjoyment of being in a green space or countryside.

The use of recreational greenspace and access is dependent on connectivity with - and accessibility of - the users; so it makes sense to consider provision in terms of where people live and where they like to visit.

An interconnected network of green spaces and routes can provide a safe and attractive recreation resource that provides links within the urban area, to areas beyond the settlement boundary and into the wider countryside. This network approach lays the foundation for greenspace and access planning; providing a range of green spaces and sustainable access routes across urban areas and linking to the wider countryside.

A hierarchy of green spaces and access links can provide different levels of provision in terms of size of site, range of facilities and distance away from users, depending on the size and type of community they serve.

[75] National Planning Policy Framework paragraphs 6-10

The concept of hierarchy of provision is a key element of a number of widely-applied Open Space standards (see data section at end of

theme) and green networks are integral to the Green Infra

Open Space Standards

Accessible Natural Greenspace was defined by English Nature in the 1990s as areas where a "*feeling of naturalness predominates*" (Natural England (2010), Nature Nearby, Accessible Natural Greenspace Guidance*). The Accessible Natural Greenspace Standard (ANGSt) was developed by Natural England (NE) and was based on research into minimum distances people would travel to the natural environment. The standard uses distance thresholds to define the maximum distance that any resident should have to travel from their home to reach accessible natural or semi-natural greenspace which is freely accessible. It is divided into four tiers:

1. Sub-regional provision Sites or habitats over 500ha within 10km;
2. County scale provision Sites or habitats over 100ha within 5 km;
3. District scale provision Sites or habitats over 20ha within 2km;
4. Neighbourhood scale provision Sites or habitats over 2ha within 300m.

In addition the standard also recommends a minimum of one hectare of statutory Local Nature Reserves per thousand population.

* (based on Natural England's Accessible Natural Greenspace Standard (ANGSt) Model; English Nature (2003) *Accessible Natural Greenspace Standards in towns and Cities: A review and Toolkit for Implementation*)

F.I.T. (Fields in Trust standard) sets out benchmark standards for the provision of outdoor sport and play. Fields in Trust is the operating name of the National Playing Fields Association. Since the 1930s their recommendations for open space standards have been known as 'The Six Acre Standard' - this is currently set out in their document 'Planning and Design for Outdoor Sport and Play' (2008).

The Woodland Access Standard was developed by The Woodland Trust, and aspires that everyone should have access to:

- a wood of at least 2 ha within 500m of their home; and
- a wood of at least 20 ha within 4km of their home

Other standards which may be applied to open space include visitor service standards – such as NE's standards for country parks (Country Parks Accreditation Scheme), standards for NNRs and LNRs (national and local nature reserves) - and quality standards such as Green Flag. http://www.keepbritaintidy.org/GreenFlag/

Strategies and plans of a number of local authorities. However, for some areas local priorities, restrictions on available land and lack of funds mean that these concepts remain an aspiration.

Open Space Standards

Standards for open space are a useful tool in assessing current levels and quality of greenspace and planning for better provision and open space standards are often incorporated into local development plans as targets. Standards may be set locally, but are often selected from established standards including those for accessibility and quantity such as ANGSt (Accessible Natural Greenspace Standard), F.I.T. (Fields in Trust standard) or The Woodland Access Standard (see data section at end of theme).

Open Space Assessments

Since the introduction of the National Planning Policy Framework (NPPF) in 2012 local planning authorities are required to base their policies for the provision of accessible open spaces and recreation facilities on up-to-date assessments[76]. In addition the NPPF requires planning authorities to protect and enhance public rights of way and access[77].

It is for local planning authorities to assess the need for open space and opportunities for new provision in their areas. In carrying out this work, they should have regard to the duty to cooperate where open space serves a wider area. The open space assessments are used as evidence by local authorities in setting local standards as best-suited to their local needs. Although the NPPF does not now directly require a PPG17[78] assessment there is still a clear reference made in the new guidance to the principles and ideology established within PPG17 and it is still regarded as best practice by many local authorities.

Provision of Open Space

Publicly accessible sites are owned and managed by a range of organisations including local authorities, The National Trust and other third sector organisations. Public access is permitted on some privately-owned sites and access is also provided by farmland owners through agri-environment schemes. Access Land dedicated as a result of the CROW Act also provides around 4% of open access areas in the countryside. Public access can also be a welcome benefit to be gained from Heritage Lottery Funding for enhancement programmes at heritage sites.

Local authorities consider the protection and provision of open space as part of their planning role and may develop policies for the development of open spaces or the broader issue of green infrastructure. However, the provision of sites is increasingly becoming reliant on major sites where green space may be provided on-site by developers, or off-site by others as part of an s106 Agreement or CIL payment.

Links to Ecosystems Services

In Ecosystems Services terms Recreation and Access are classed as Cultural Services; 'non-material benefits that result from our interaction with the natural environment'[79]. They provide opportunities for physical exercise, enjoyment and spiritual and cognitive development. However, sites will also provide a range of other ecosystems functions, dependent on their size, habitats, location and connections to other areas of green infrastructure importance.

[76] NPPF section 73
[77] NPPF section 75
[78] Planning Policy Guidance note (PPG) 17: Sport, Open Spaces and Recreation
[79] SDNP Preferred Options Local Plan Draft September 2015; Figure 1.3

Table 5: Open Spaces Standards of Framework Area Local Authorities

Local Authority	Amenity Greenspace (ha per 1000 population)	Accessibility Distance	Parks and Gardens (ha/1000 population)	Accessibility Distance	Outdoor Sports (ha per 1000 population)	Accessibility Distance	Children/ Teen Play (ha per 1000 population)	Accessibility Distance
Lancing and Sompting (Adur)	.72	800m	.22	1200m	No standard set	No standard set	0.04	1200m
Shoreham –By-Sea (Adur)	.81	800m	.73	1200m	No standard set	No standard set	.04	1200m
Southwick and Fishergate (Adur)	1.33	800m	.04	1200m	No standard set	No standard set	.08	1200m
Worthing	.78	800m	.20	1200m	No standard set	No standard set	.05	1200m
Arun	.86	720m	.47	720m	1.88m	720m	1.15	480m
Brighton and Hove	.58	480m	.92	720m	.47	960m	.055	720m
Chichester	.50	480m	1.60	600m	(inc in parks)	No standard set	.15m	480m/ 600m
East Hants	1	700m	1	650m		No standard set	.25	480m/ 650m
Lewes	No standard set	No standard set	No standard set	No standard set	1.7 (FIT)	No standard set	0.7 (FIT)	No standard set
Horsham	1.7 (multi-functional greenspace)	No standard set	No standard set	No standard set		No standard set	0.52	No standard set
Eastbourne	No standard set	No standard set	No standard set	No standard set	1.5	No standard set	0.1	No standard set
Mid Sussex	See sports		.2	900m	1.28	No standard set	0.1	300m
Wealden	1.5	600m	See amenity	No standard set	1.5	600m	.05	600m
Winchester	0.8	700m	1.5	650m	No standard set	No standard set	0.5	480/ 650m

Description of the Framework Area and Analysis

Current position: Open Space

Information collected by local authorities is a very useful starting point in comparing provision across the Framework area and developing green infrastructure planning. However, recent studies[80] show that across the National Park and the wider Framework area there is no standardised approach to the assessment of open spaces, the typology listings and components of open space information, or the setting of standards of provision. In addition some local authorities have not set standards for areas in their districts that lie within the National Park. As a result it is not possible to make reliable comparisons of open space provision across the Framework area using open space assessment data alone.

A 2014 study[81] analysed the access components of the green infrastructure network across the Framework area and beyond[82], including Accessible Natural Greenspace (ANG). The ANG Standard provides a set of benchmarks for ensuring access to places near to where people live. As part of the 2014 study, ANG data was updated to provide an accurate baseline access dataset. In the absence of reliably comparable open space data across the Framework area, ANG data is used as a proxy for open space in the development of the Framework.

The provision of ANG varies across the Framework area as can be seen from Plan 26 (access to ANG within 2km). In the National Park areas of Winchester and East Hampshire are lacking in open space; and outside the National Park much of the coastal conurbation from Bognor to Brighton is deficient in open space along with parts of the districts of Horsham, Wealden, Lewes and Winchester.

Current position: Access

The NPPF[83] places a requirement on planning authorities to protect and improve Public Rights of Way and access.

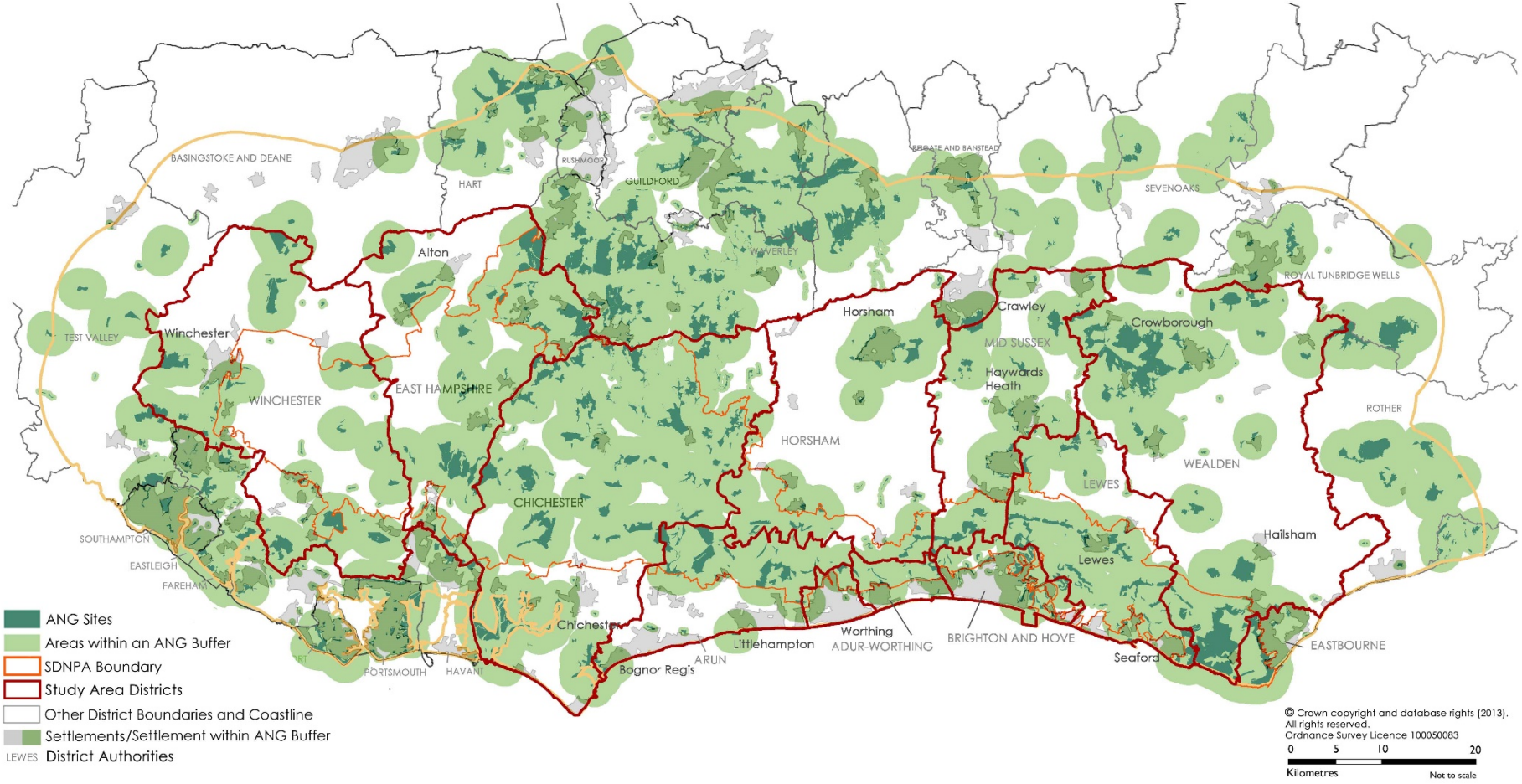
There is an extensive Public Rights of Way (PRoW) network across the Framework area and a range of local, circular and long-distance paths and cycling routes linking towns, attractions, historic sites and other features.

In the National Park the access network is the main way that visitors explore the area. In the National Park around 80% of the land area is farmed or managed and access to these areas may be limited to the Public Rights of Way network or permissive routes.

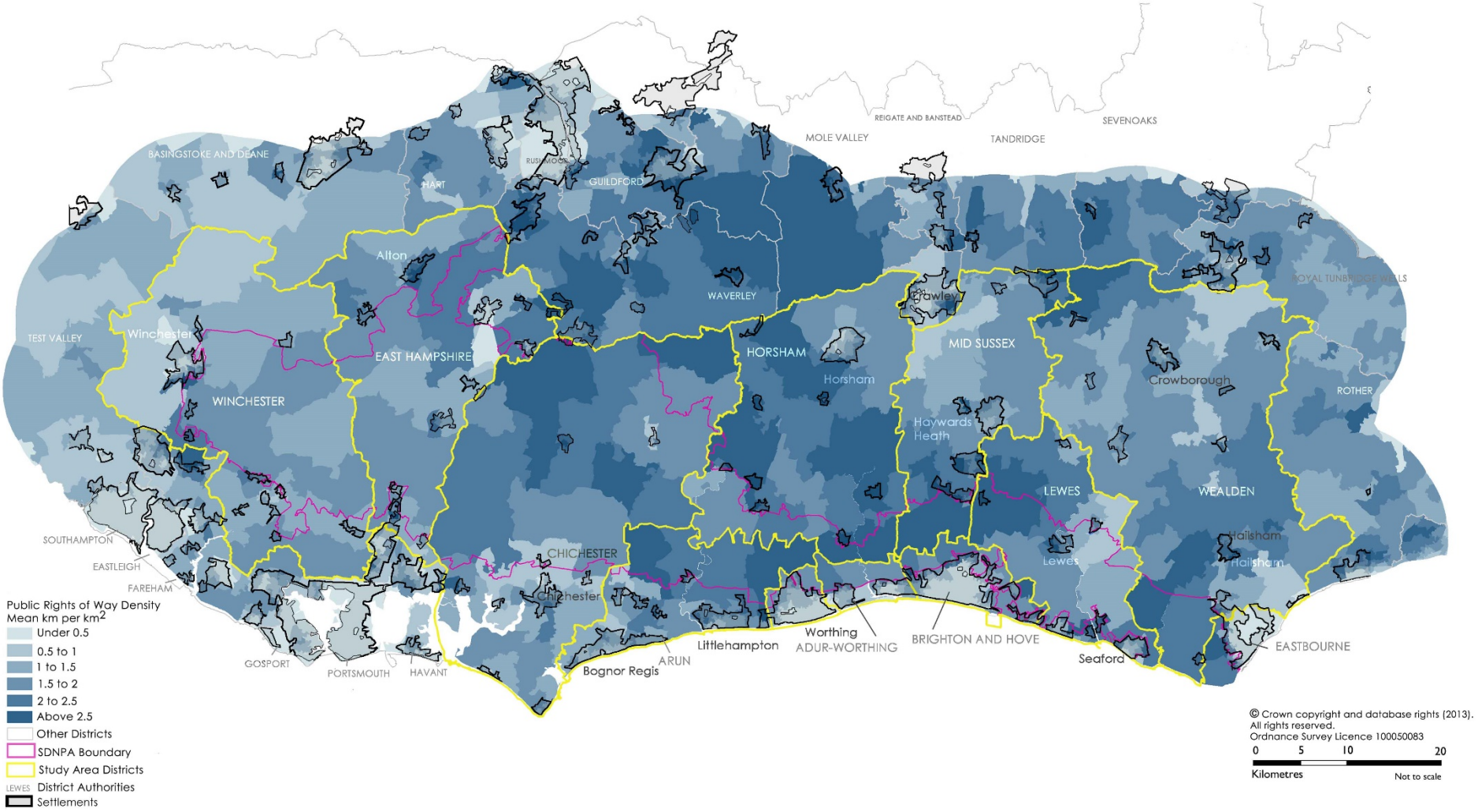
[80] SDNP PPG 17/ Open Space Data Assessment report July 2014; and SDNP Open Space, Sports and Recreation - Evidence Study May 2015.
[81] South Downs National Park Authority – Access Network and Accessible Natural Greenspace Study – July 2014
[82] The study included all the districts that are included partly or completely within the National Park and added a further buffer area of 10km beyond the district boundaries
[83] National Planning Policy Framework; paragraph 75

The PRoW and promoted routes network varies across the Framework area. In terms of PRoW per km^2 (density) it is clear from the Plan 26 that provision is not uniform across the area. The National Park areas within the districts of Chichester, Horsham, Arun, Mid Sussex, Wealden and Eastbourne have particularly good PRoW densities. Outside of the National Park the densities are poorer to the south (i.e. towards the coast) and in areas near to the National Park boundary in Winchester and East Hampshire.

Plan 26: Access to Accessible Natural Greenspace within 2km



Plan 27: Public Rights of Way Density



Equestrian users are also better served in the National Park than on the coastal plain.

Outside the National Park the situation is different. In particular the coastal towns and conurbations lack access to local ANG and PRoW.

The City of Winchester, situated just outside the National Park boundary is deficient in local ANG and access to PRoW, as are parts of Horsham town and Haywards Heath. These three areas are also the locations for a number of planned major housing developments that will result in increased numbers of local people and potentially increased pressure on the countryside access network

Promoted Routes

There are promoted walking and cycling routes across the Framework area. The National Park, AONBs and local authorities are the main promoters and developers of these routes which explore and in many cases help interpret the rich beauty and heritage of the landscape.

The South Downs Way National Trail runs east-west across the length of the National Park and is suitable for walking, cycling and horse-riding.

Various north-south routes link with the South Downs Way southwards towards the coast and northwards to main towns. These routes provide the strategic primary network of routes and although some routes are designed primarily for leisure use, they enable link routes to be developed to towns and villages and public transport to enable local use (Plan 28).

Cycling

A number of long-distance and local promoted routes continue to be developed. The ambition to create a cycling network is being realised and good progress has been made in improving the safety of routes by taking them off-road. However many routes are still running along A roads and cyclists have to negotiate busy traffic junctions. There are areas where cycling could be encouraged – into the National Park for example where sustainable transport could help counter traffic congestion and more link routes to railway stations could encourage commuter and leisure use.

Barriers to Access

Across the Framework area there are roads, railway lines and rivers which can be barriers to access for walkers, cyclists and equestrians. Along the southern coastal plain the east-west A roads and railway lines hinder access to the National Park and the coast. The A27 is a particular barrier to communities all along the south coast in accessing the National Park, with the A3 and A3(M) barriers to east-west movement. Taking cycling and walking routes away from roads is essential if people – and particularly families – are to be encouraged to cycle or walk to open spaces and countryside.

Plan 28: Strategic Access Network

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Responsibility for Rights of Way

Responsibility for rights of way rests with the four Local Highway Authorities (LHAs)[84]. The LHAs each produce plans[85] which provide a framework for improvements to the access network in their area. The plans take different approaches, but there are a number of commonalities in their aspirations e.g. Encouraging people to walk, cycle and use public transport as a sustainable means of transport and reducing the dependency on cars; improving access for all; improving cycling and PRoW networks and inserting missing links; providing better signage; improving safety and removing barriers to access.

Across the green infrastructure Framework area the Public Rights of Way (PRoW) network is managed by four local highway authorities (LHAs). The National Park has the longest PRoW network of all the National Parks in the UK and includes the South Downs Way National Trail. This is the National Park's most significant recreational resource, and is the primary means by which people access and enjoy the National Park. A Joint Accord between the National Park Authority and the four LHAs provides a co-ordinated approach to management.

In the National Park the SDNPA has a key role in supporting the delivery and promotion of access. Working with the LHAs as part of an Accord[86], the SDNPA adds value by drawing in funds and delivering access improvements. The SDNPA sources funds from a range of funding providers including the Local Enterprise Partnerships. In particular, the SDNPA has helped to deliver a number of long-distance routes including the Meon Valley Trail in Hampshire, The Centurion Way in West Sussex and The Egrets Way in East Sussex. These routes and their promotion celebrate not only the natural beauty of the landscape, but the rich heritage of the landscape and its former uses, helping to bring these routes to life. The SDNPA's recently-completed Cultural Heritage Audit assessed heritage assets in the National Park. Of particular interest, the report highlighted redundant canals, disused railway lines and other routes with heritage value. These heritage assets may have the potential to support the development of further projects to provide access opportunities and other green infrastructure benefits.

The SDNPA are also helping to improve access by developing multi-user routes. The joint arrangement also helps in tackling more strategic issues such as railway crossings.

The SDNPA has legal responsibilities for Access Land[87] and is improving its connectivity by developing links into the wider access network.

[84] Hampshire, West Sussex and East Sussex County Councils and Brighton & Hove Unitary Authority

[85] The production of Rights of Way Improvement Plans (ROWIPs) is a legal requirement of local Highway Authorities under the CRoW Act 2000

[86] The RoW and Access Accord signed in 2012 provides the agreement for SDNPA to work in partnership with the LHAs on RoW and Access projects that are over and above the statutory responsibilities of the LHAs to maintain RoW

[87] Access Land as defined in the Countryside and Rights of Way Act 2000

This is a good example of where joint action with the LHAs enables access enhancements to be addressed across County boundaries. It also illustrates the importance of having plans in place as access enhancements are often opportunistic and respond to the requirements of funding providers and organisational and legal issues.

The presence of the SDNPA - and its ability to harness resources - could help prioritise access enhancements into the National Park. The Framework offers an opportunity to prioritise where investment takes place and ensures it helps to serve the needs of communities beyond the National Park boundaries.

Visitors

Accessible and high quality green spaces are a major part of the tourism offer in the National Park and along the coast and attract visitors from a wide area.
The south coast is a big draw for visitors and Brighton alone is said to attract 4.5 million visits per year to its famous pier.

The National Park has a resident population of over 112,000; by far the biggest population of any National Park in England and a further 1.97 million live in the surrounding areas. The park also receives the highest number of visitors of all the National Parks at 39 million visitor days per year. As the towns and villages within the National Park and surrounding areas are set to grow, the number of visitors accessing the park will continue to increase. This high level of visitor pressure is already impacting on some of the more popular areas of the National Park and a number of sites are experiencing difficulties in managing the pressure at peak times.

Tourism is promoted by a number of organisations in the Framework area, including the National Park Authority and the coastal towns. However, the aims of these organisations and their tourism messages are not necessarily consistent across the area. There may be a need for a more joined-up approach to tourism promotion that recognises the sensitivities and limitations of some sites and landscapes.

Housing Growth

Significant growth is planned for areas of the study area over the next 20 years, see Plan 3 in section 'Why a Sub-Regional Framework Approach'.

The locations of planned major[88] housing sites were mapped against the existing provision of ANG and against the density of the rights of way network as part of the Access Network and Accessible Natural Greenspace Study.[89] This highlighted the co-incidence of new housing in relation to areas where there are existing gaps in the access network and deficiencies in the provision of ANG,[90] e.g. in

[88] More than 100 dwellings.
[89] South Downs National Park Authority – Access Network and Accessible Natural Greenspace Study – July 2014.

[90] In relation to ANGSt.

Horsham district, Mid Sussex, west and north-west of the National Park around Winchester and East Hampshire and the PUSH districts and coastal towns.

To ensure that communities have access to adequate areas of green space for recreation and access in the future, there needs to be an understanding of the potential impact of housing growth. A co-ordinated response to planning for green infrastructure will be of value in locations where growth is proposed, particularly where this crosses administrative boundaries, where there is an existing resource, where there are other considerations – such as landscape character or heritage - or where there is potential for creation or expansion.

While the specific issues for each area differ, some common themes emerge which have relevance to future green infrastructure projects:

- The differences in provision of greenspace and access across administrative areas and between the National Park and areas outside;
- Lack of comparable information on open space between different authorities;
- Gaps in the network:
    - Deficiency of local or strategic greenspace sites;
    - Lack of connectivity of some parts of the access network which acts as a barrier to access through the landscape;
- How to meet future needs of new populations;
- Barriers to access and how these can be overcome - Roads, Railway lines and rivers;
- Urban-edge recreation pressures and the impact on local landscape character;
- The continuing loss of green gaps and other local open spaces and the impacts; and the potential effects of reliance on adjacent authorities to provide public open space;
- Housing growth and future recreational pressure:
    - Cross-boundary pressures on greenspace and access;
    - Different planning approaches;
- Visitor pressures:
    - On 'honey-pot' sites particularly in the National Park, with issues around car parking capacity, local road congestion, impact on the sites and on the visitor experience;
    - On the National Park boundary;
- The need for a strategic, pan-authority approach to the planning of greenspace sites and access;
- The need for strategic and joined up approaches to address specific issues relating to recreation and access across administrative boundaries (e.g. barriers such as highways, river crossings and rail issues; provision of large open space sites; creation of green corridors); the potential role of Local Access Forums in supporting delivery;
- The resourcing – funding and delivery – of access and recreation in a world where it has to compete against many other priorities;
- The difficulties in funding off-site schemes using development funding.

Theme: Water Resources

Introduction

Water Resources and Green Infrastructure

The water environment is essential in providing water to drink and for industry, as well as providing a host of biodiversity and amenity benefits. There is also good evidence that the natural environment and green infrastructure can have an effective role in improving the water environment, providing improvements in water quality, quantity, biodiversity, flooding and amenity benefits.

Agricultural practices frequently produce diffuse pollution, with the water industry spending many millions of pounds removing nitrates and pesticides to make water safe for drinking.[91] Urban and highways runoff also carries a range of pollutants into watercourses and can also be a major contributor to reducing water quality as well as being at risk of surface water flooding due to the extent of impermeable surfaces, plus the blocking of culverts and accumulation of debris.

In natural environments fluvial flooding occurs as a dynamic process between the river and its floodplain. Un-engineered rivers with vegetated channels can slow flows and channel water to natural floodplains outside of urban areas. Restoring wetlands can also help to prevent diffuse pollution from entering surface waters, with a high cost-benefit ratio.

Woodlands, in appropriate locations in the catchment, can intercept rainwater and reduce peak run off, as well as helping to reduce pollution,[92] and tree planting in urban areas can be beneficial in slowing otherwise rapid run-off rates. Green roofs are also effective at reducing runoff, particularly for smaller storm events. Urban layout and landscape can be designed to allow the space for water to pass freely and Sustainable Drainage Systems (SuDS) can both intercept flows and pollutants. The design of new green infrastructure, especially in parks and gardens and changed practices in green infrastructure management can reduce water demand for site maintenance.

Green infrastructure can also benefit groundwater quality and supply, through reducing pollutant loading reaching the aquifers and increasing recharge through land management. A summary of green infrastructure solutions for water resources management is shown in Table 6.

[91] 2004/5 – 2008/9 water companies in England spent £189m removing nitrates and £92m removing pesticides, NERR057 (Natural England).

[92] Forest Research (2011), Woodlands for Water: Woodland Measures for meeting Water Framework Directive Objectives.

Table 6: Some Green Infrastructure Solutions for Water Resources Management[93]

Water Management Issue		Potential Green Infrastructure Solutions
Water supply regulation (incl. drought mitigation)		Re/afforestation and forest conservation * Reconnecting rivers to floodplains * Wetlands restoration/conservation/construction * Water harvesting * Green spaces (bio-retention and infiltration) * Permeable pavements
Water quality regulation	Water purification	Re/afforestation and forest conservation * Riparian buffers * Reconnecting rivers to floodplains * Wetlands restoration/conservation * Constructing wetlands * Green spaces (bio-retention and infiltration) * Permeable pavements
	Erosion control	Re/afforestation and forest conservation * Riparian buffers * Reconnecting rivers to floodplains * Removal of engineered banks
	Biological control	Re/afforestation and forest conservation * Riparian buffers * Reconnecting rivers to floodplains * Wetland restoration/conservation/construction
	Water temperature control	Re/afforestation and forest conservation * Riparian buffers * Reconnecting rivers to floodplains * Wetlands restoration/conservation * Constructing wetlands * Green spaces (shading of waterways)
Moderation of extreme events (floods)	Riverine flood control	Re/afforestation and forest conservation * Riparian buffers * Reconnecting rivers to floodplains * Wetlands restoration/conservation * Constructing wetlands * Establishing flood bypasses * Removal of engineered banks
	Urban stormwater runoff	Green roofs * Green spaces (bio-retention and infiltration) * Water harvesting * Permeable pavements

Water Framework Directive

The Water Framework Directive (WFD) (2000) introduced a comprehensive river basin management planning system protect and improve the ecological health of the water environment. The WFD splits the water environment into waterbodies, classified as rivers, lakes, transitional (estuaries), coastal and groundwater.

[93] Source: UNEP (2014), Green Infrastructure Guide for Water Management

WFD sets out quality objectives, requiring that waterbodies must reach 'good' status by 2015. To achieve 'good' status, both the ecological and chemical status must be 'good' in the case of surface waters and the chemical and quantitative status 'good' for ground waters.

Heavily modified waterbodies are those which are significantly affected by human activity, the default objective is good ecological potential; the best the waterbody can be without compromising human use. Many estuarine waterbodies are heavily modified.

Links to Ecosystem Services

Water is an essential component of ecosystem services and performs a supporting (the water cycle), regulating and provisioning role and, in some cases fulfils a cultural role as well. The National Ecosystem Assessment reports that the main long-term driver of changes in water quantity is human activity, alongside changes in climate which will vary precipitation patterns.[94]

Description of the Framework Area and Analysis

The majority of the Framework area is with the South East River Basin District (RBD). Part of northern East Hampshire district fall within the Thames River Basin District.

River Catchments

There are five catchments which fall within the South East RBD; Test and Itchen, East Hampshire, Arun, Adur and Ouse and Cuckmere with the Wey catchment within the Thames RBD, see Plan 29.

Each of these catchments have Catchment Partnerships, listed in Table 7. Other active initiatives include:

- Downs and Harbours Clean Water Partnership;
- SMART (Sediment Pressures and Mitigation Options for the River Rother);
- Catchment sensitive farming initiatives, e.g. following the 'Up Stream Thinking' model;[95]
- Some areas are within target areas for the Catchment Sensitive Farming Capital Grant Scheme – River Rother, parts of East Hampshire catchment around Horndean, areas of River Itchen catchment and Hailsham to the Pevensey Levels.
- Chalk Streams and Springs Initiative.

Plan 29: Catchments and River Network

Groundwater

The Brighton Chalk aquifer provides public water supplies to 365,000 people as well as base flow to rivers. The aquifer is vulnerable to diffuse urban and rural pollution and its status is at risk due to rising nitrate levels, as well as quantity issues due to high abstraction, principally for public water supply. The Brighton Chalk Integrated Catchment Management Partnership aims to identify and implement measures to reduce nitrate concentration and reduce urban and rural pollution reaching the aquifer.

Other chalk aquifers, the East Hants. Chalk and River Itchen Chalk aquifers, are also at risk due to varying degrees of pollution, nitrate and low flows.

The Lower Greensand and the Littlehampton Anticlines East and West aquifers are currently at good status but increased abstraction is a pressure.

Catchment Pressures and Opportunities for Green Infrastructure

Much of the Framework area is failing under the WFD. The ecological status of the waterbodies is shown in Plan 29.

Many of the Catchment Partnerships have produced or are in the process of producing Catchment Management Plans, which detail the pressures on the water environment. The work of the Catchment Partnerships will offer further detail on priority areas for intervention, for joint working and for the development of multifunctional green infrastructure approaches through this Framework. The specific actions or green infrastructure approach requires evaluation on a case by case basis using the extensive evidence base available. Some potential overarching areas which provide links with green infrastructure from these management plans are listed in Table 7.

While the specific issues for each catchment differ, some common themes emerge which have relevance to future green infrastructure projects:

- Barriers to fish passage;
- Pollution from urban areas (e.g. surface water flow, highway drainage);
- Physical modifications, canalisation, culverting etc.;
- Aims to re-naturalise water channels for habitat;
- Aims to re-naturalise water channels for flood storage;
- For some rivers, water temperature;
- Riparian tree planting;
- Reconnecting communities with water environment through engagement and access.

Table 7: Catchments and Potential Green Infrastructure Actions

	Description	Issues Relevant to Potential Green Infrastructure Actions	Catchment Partnership
Test and Itchen Catchment	The Itchen is within the Framework area and the River Test flows out of the Framework area in north Winchester district. A predominantly rural catchment containing two rivers popularly regarded as two of the finest chalk streams, fed from chalk groundwater. The River Itchen is a Special Area of Conservation (SAC). Chalk streams have been historically modified for agriculture and industry, leading to rivers being over-widened, impounded and disconnected from the floodplain.	• SSSI, SAC and condition and WFD status; • Barriers to fish passage; • Physical modifications; • Natural flood management, increase water attenuation with strategic woodland and wetland creation – 'multifunctional wetland'; • 'Keeping Rivers Cool' programme.[96]	Hosted by the Wessex Chalk Streams and Rivers Trust and the Hampshire and Isle of Wight Wildlife Trust.

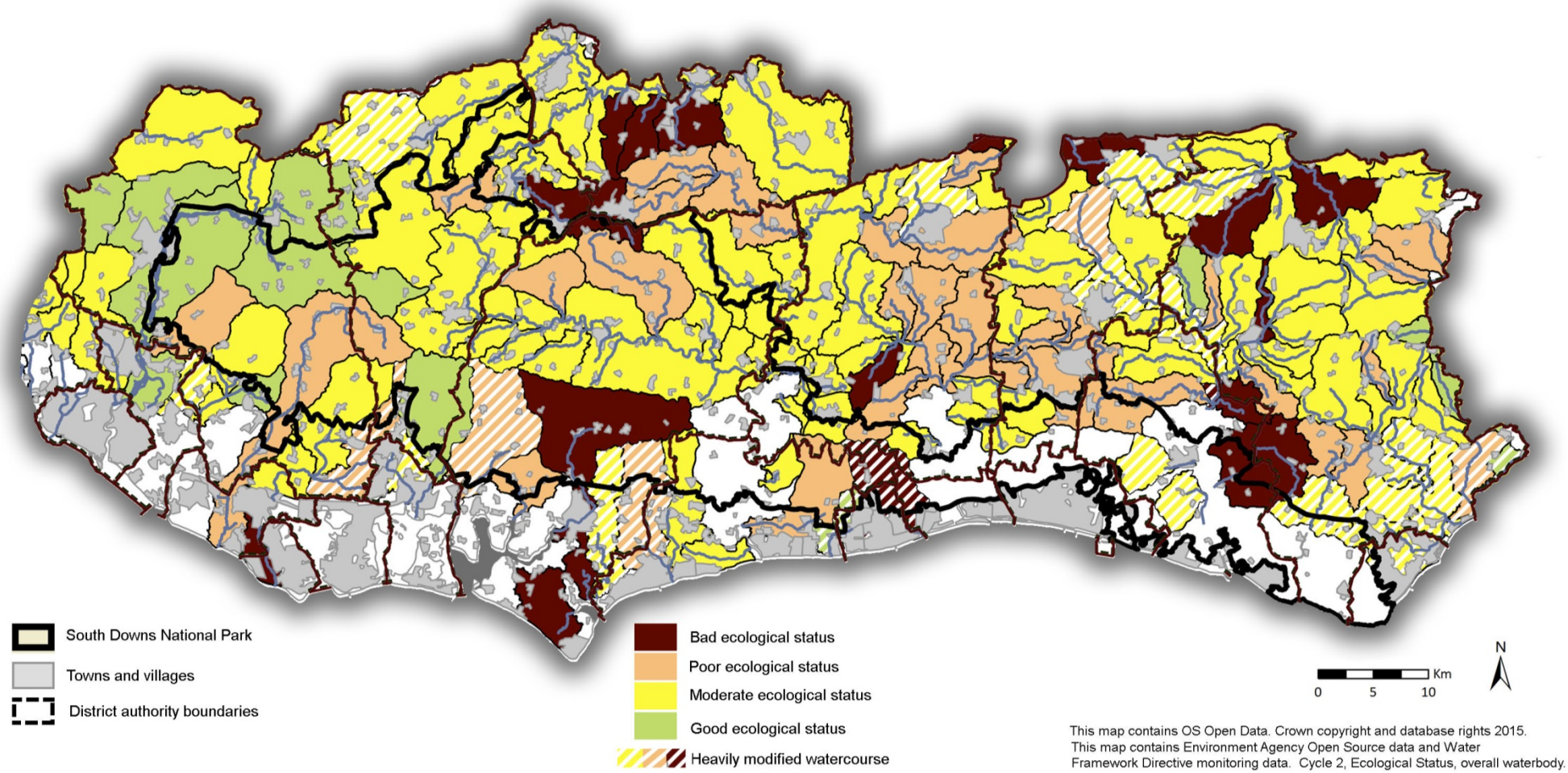
East Hampshire Catchment	This catchment includes the Meon, Hamble, Hermitage, Wallington and Lavant.
	
	Also Wessex Chalk Streams and Rivers Trust and Meon Valley Partnership active in the catchment.
		• High urban impact, adjacent to PUSH area,
		• Barriers to fish passage;
		• Physical modifications;
		  • naturalise watercourses and remove barriers to fish movement;
		• Urban and rural pollution;
		  • Create blue-green corridor links to the PUSH area.
			Hosted by Groundwork South (Solent).

Arun and Western Streams Catchment	Two main rivers in this catchment, the Arun and the River Rother. The Arun flows from Horsham to Pulborough, where it is joined by the Rother which originates in Hampshire. Both rivers flow through the South Downs to the coast at Littlehampton. Arun and Rother Connections is an active wetland restoration and reconnection project. The Arun and Western Streams Catchment incorporates Lower Arun floodplain that has been subject to periodic extensive flooding most recently over winter 2014.	• Barriers to fish passage, especially on River Rother; • Habitat restoration on both rivers, reconnect habitats, floodplain grazing marsh and other wetland projects; • Improvements to 'access for all' at Pulborough Brooks; • Wet woodland creation; • Sustainable urban and rural land management to reduce pollutants reaching groundwaters; • Urban and rural pollution; • Some local demand to restore as navigable river.	Hosted by Arun and Rother Rivers Trust (ARRT).

[96] Projects listed in the Test and Itchen Catchment Management Plan.

	Description	Issues Relevant to Potential Green Infrastructure Actions	Catchment Partnership
Adur and Ouse Catchment	This catchment includes the Adur and the Ouse rivers flowing over chalk and sand bedrock through inland towns including Lewes, Haywards Heath and Burgess Hill and through the South Downs to the coast at Brighton and Hove and Newhaven. Water quality of both river systems is compromised by a range of pressures, including point-source and diffuse pollution, nutrification and water demand. River channels affected by navigation, canalisation, culverts and hard engineering.	• Urban and rural pollution - sustainable urban and rural land management to reduce pollutants reaching groundwaters; • Barriers to fish passage; • Restoring natural river courses; • Riparian planting and supporting delivery of Trees on the River Uck Project; • Re-naturalisation of the rivers, e.g. supporting projects such as MORPH to continue.	Hosted by the Ouse and Adur Rivers Trust.
Cuckmere and Pevensey Levels Catchment	The northern extent of the catchment is in the rural High and Low Weald, flowing south to the internationally designated Pevensey Levels to the east of Eastbourne, a large area of wetland and grazing marsh. The River Cuckmere rises near Heathfield and Hailsham, flowing south through the South Downs at Cuckmere Haven, to the Heritage Coast of the Seven Sisters. The Lower Cuckmere has a coastal management regime of no active intervention and experiences periodic over-topping of the river defences particularly during autumn storms.	• Barriers to fish passage; • Improvement of habitat; • Urban and rural pollution - sustainable urban and rural land management to reduce pollutants reaching groundwaters; • Re-naturalisation projects. • Periodic damage to the sea defences for which there is no longer resources allocated to maintain.	Hosted by the Sussex Wildlife Trust and the South East Rivers Trust.
Wey Catchment	The River Wey has two sources in the Framework area; the Northern Wey from a chalk spring near Alton and the Southern Wey from near Liphook. The river flows north east through the Thames basin, joining the Thames at Weybridge. Native brown trout in headwaters. Opportunities to improve for wildlife and people in this densely populated area.	• Barriers to fish passage; • Improvement of habitat; • Urban and rural pollution - sustainable urban and rural land management to reduce pollutants reaching groundwaters; • Re-naturalisation projects; • Alton river restoration; • Improvements as element of Whitehill & Bordon; • Local Trust with aim of restoration of navigable link between Wey and Arun.	Hosted by the Surrey Wildlife Trust on behalf of the Wey Landscape Partnership.

Plan 30: Ecological Status, 2014 (Cycle 2) and Heavily Modified Waterbodies



Climate Change

Climate change over the next 30-40 years has already been determined by historic emissions and inertia in the climate system. The requirement of some adaptation is therefore unavoidable.

With regard to the water environment, despite some uncertainties over the precise effects and future emissions scenarios, climate change is likely to lead to increases in the amount of winter rain which falls in heavy downpours, along with a decrease in summer rainfall and higher temperatures. Rising temperature in rural areas may threaten valuable biodiversity, such as trout, for which river shading has been shown to be effective.[97] Demand for water is likely to increase, in the South East RBD

24% of river and 81% of groundwater is at/probably at risk from abstraction and flow regulation.[98]

The key pressures which will be affected by climate change for which the green infrastructure measures listed can play a role are:[99]

- Abstraction (very high);
- Nitrogen and phosphorus loads (high);
- Physical modification (high);
- Biological (low/medium);
- Temperature (low).

Blue-Green Towns and Villages

The rivers are central to the life of the Framework, many originating from their position on the rivers for water, industry and trade, with the river networks linking the towns and villages of the Framework area.

Urban areas produce effects such as increased surface flow and input of pollutants, as well as issues of engineered watercourses, as previously detailed. Water quality and failure under the WFD are key issues across the entire Framework area. Whilst the reasons for this are complex and not all related to the urban environment, there are several significant issues which can be addressed. The issues relevant to each town vary, but an ambition within the Framework area should be to re-establish the water environment as central to towns and villages of the Framework area, not only to improve WFD issues, but to reconnect people with the water environment. Green infrastructure planning in these 'blue-green' towns and villages should include the water environment as a central element.

[97] E.g. in New Forest, Environment Agency (2011), *Keeping Rivers Cool*, referenced in NERR057 (Natural England publication).

[98] Environment Agency (2009), South East River Basin Management Plan, Annex H: Adapting to Climate Change.

[99] Ibid.

There are many towns and villages which are situated on rivers, for which improving and reconnecting with the water environment should be furthered, to name a few:

- Petersfield and Liss
- Alton
- Winchester
- Lewes
- Midhurst
- Arundel

As a principle, new development should not contribute to a deterioration of the water environment, but with greater ambition, more enhancements can be gained to support the natural water cycle and provide measures to manage flooding, improve water quality, biodiversity and amenity value.

Potential green infrastructure approaches could include:

- Surface water lagoons and reedbeds to capture highways drainage;
- Work to identify pollutant sources posing greatest risk of polluting surface and groundwaters and target these areas;
- Target drainage from industrial and commercial and roads;
- The re-naturalisation of channels and water courses;
- Associated amenity improvements and access to watercourses;
- Reduction in demand – championing low water input parks and gardens;
- SuDS schemes;
- Green roofs.

Natural Rivers – Natural Solutions

A range of green infrastructure measures can help to relieve flooding, as well as improving biodiversity and amenity, as previously outlined. The 'Trees on the River Uck Project', for example, has implemented riparian planting to help relieve flash flooding in Uckfield.

There are other parts of the Framework area which could benefit from a range of catchment based green infrastructure approaches, many of which have been captured or are being researched through catchment based work, especially in areas highlighted as falling under Policy 6 in the Catchment Flood Management Plans, see Plan 30.

Policy 6: Areas of moderate flood risk where [the Environment Agency] will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

Blue-Green Connections

All of the river corridors provide connections not only for the water environment but for biodiversity and amenity, as outlined in other sections of this report.

Mapping of potential habitats has been carried out the Sussex Biodiversity Record Centre for the Arun and Western Streams and Adur and Ouse catchments. This highlights high potential for wet woodland in the upper catchments of the Adur and Ouse catchments, which could have biodiversity as well as water flow regulations benefits, plus the potential to link with the highly wooded High Weald AONB. There is high potential for other habitats; lowland meadow particularly in the Arun and Western Streams catchment and grazing marsh in the lower reaches of both catchments.

Sources

Catchment Management Plans: Adur and Ouse Partnership, Arun and Western Stream Partnership, Test and Itchen Catchment Partnership, River Wey Partnership (draft).

Biodiversity Opportunity Areas: South East England Biodiversity Opportunity Areas (2009), Statements Folio and Mapping, Hampshire and Sussex Biodiversity Opportunity Area Statements.

Environment Agency (2009), South East River Basin Management Plan.
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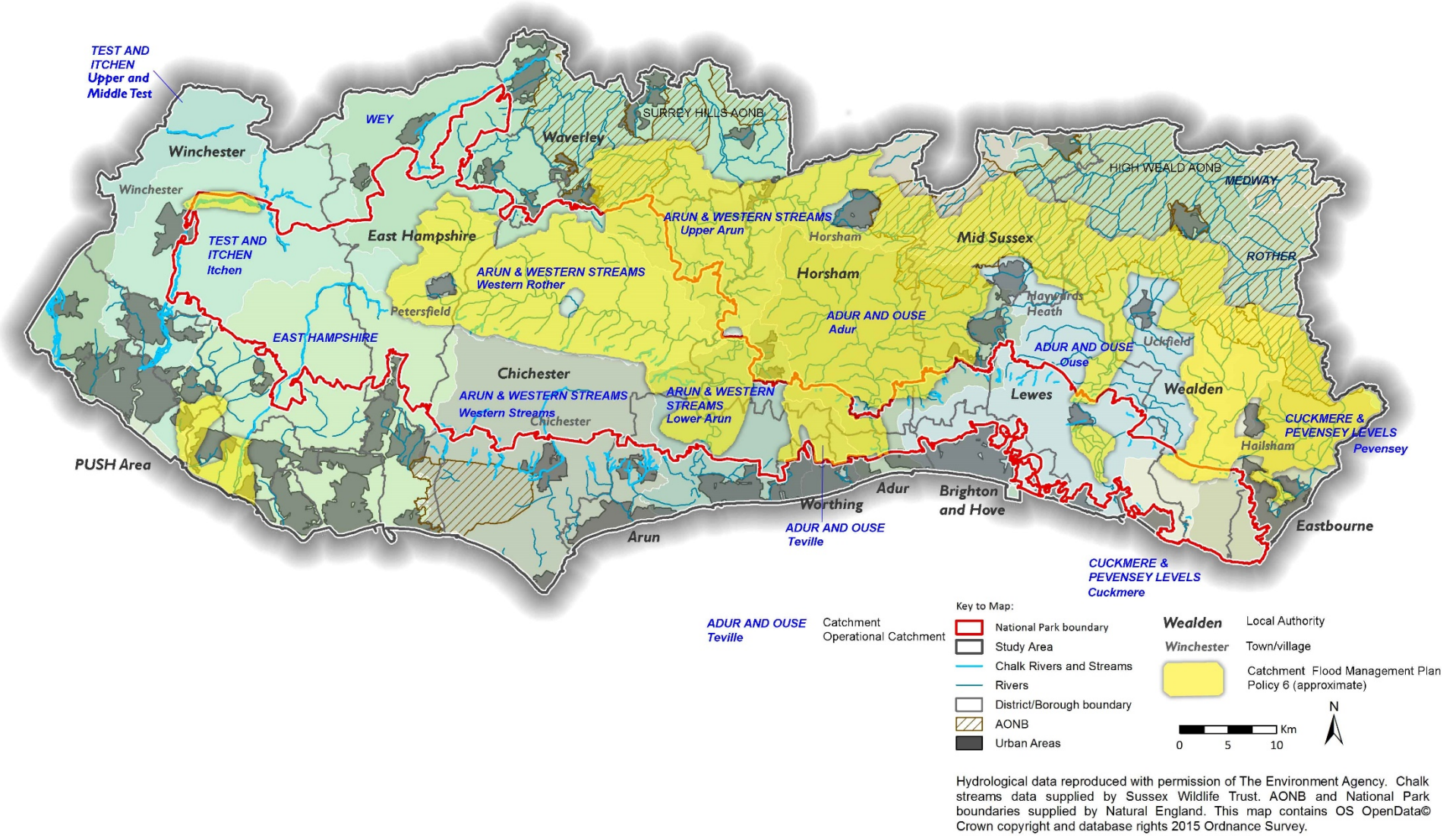
Forest Research (2011), *Woodlands for Water: Woodland Measures for meeting Water Framework Directive Objectives*.

UNEP (2014), *Green Infrastructure Guide for Water Management*.

Plan 31: Catchment Flood Management Plan Policy 6 Areas



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Plan 32: Habitat Potential Mapping Adur and Ouse Catchments – Wet Woodland Habitat