



Natural Capital Investment Strategy for Sussex 2019-2024

**Sussex Local Nature Partnership
December 2019**

Final Version

[Adopted by Sussex LNP October 2019]

Table of Contents

OVERVIEW	1
1. INTRODUCTION	2
SUSSEX LOCAL NATURE PARTNERSHIP	2
A NATURAL CAPITAL INVESTMENT STRATEGY FOR SUSSEX	2
GUIDING PRINCIPLES	4
WHAT DO WE MEAN BY 'INVESTMENT'?	4
2. WHAT IS NATURAL CAPITAL?	5
DEFINITION	5
TAKING A 'NATURAL CAPITAL APPROACH'	7
ACCOUNTING FOR THE 'VALUE' OF NATURE - SOME EMERGING FIGURES	8
RECOGNISING THE VALUE OF 'NATURE AS NATURE'	11
NATURAL CAPITAL AND ITS ROLE IN THE CLIMATE AND BIODIVERSITY EMERGENCIES	12
3. EVIDENCE BASE	14
4. FRAMEWORK FOR INVESTMENT IN NATURAL CAPITAL	16
5. OVERARCHING PRINCIPLE: A FORMAL COMMITMENT TO BIODIVERSITY WITHIN THE NATURAL CAPITAL APPROACH	18
6. PROTECTING AND ENHANCING NATURAL CAPITAL ASSETS	20
i) PROTECTION OF NATURAL CAPITAL ASSETS 'AT RISK'	20
A. 'NO FURTHER LOSS' FROM DEVELOPMENT OF NATURAL CAPITAL ASSETS AT HIGH-RISK	21
B. IMPROVING THE POOR CONDITION OF ASSETS AT RISK	24
C. REDUCING THREATS/PRESSURES TO ASSETS AT RISK	25
D. KEEPING A WATCHING BRIEF ON OTHER ASSET-BENEFIT RELATIONSHIPS AT RISK AND ACTING WHEN REQUIRED	26
ii) STRATEGIC ENHANCEMENT OF NATURAL CAPITAL ASSETS THROUGH THE CREATION OF A 'NATURE RECOVERY NETWORK'	27
iii) FOCUSING EFFORT ON SOILS - A VITAL AND OFTEN FORGOTTEN ASSET	30
7. USING NATURAL CAPITAL TO DELIVER 'PRIORITY' BENEFITS	34
SUFFICIENT QUANTITY OF WATER	35
A CLEAN WATER ENVIRONMENT	37
REDUCED FLOOD RISK (SURFACE/FLUVIAL AND COASTAL)	39
ACCESSIBLE NATURE	43
HEALTHY AND PRODUCTIVE INSHORE WATERS	47
IMPROVED CLIMATE REGULATION (THROUGH CARBON STORAGE AND SEQUESTRATION)	51
DELIVERING FOR MULTIPLE BENEFITS	55

8. MAKING IT HAPPEN	56
----------------------------	-----------

APPENDICES	64
-------------------	-----------

APPENDIX A: SUSSEX LOCAL NATURE PARTNERSHIP: MEMBERS (2019).	64
---	-----------

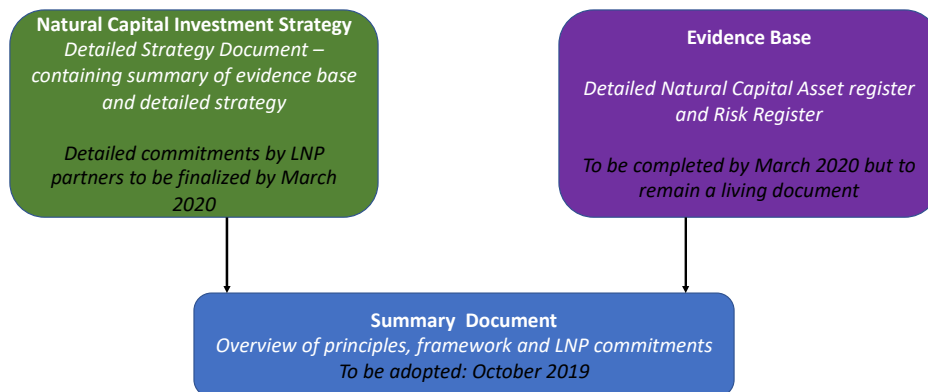
APPENDIX B: SUMMARY OF ANALYSIS OF 'NATURAL CAPITAL AT RISK'	65
---	-----------

Overview

In October 2019, Sussex Local Nature Partnership produced a comprehensive 'Natural Capital Investment Strategy' to guide its approach to directing investment in nature, across **the terrestrial, coastal and marine environments**, for the next 5 year period and beyond. This summary document sets out the rationale for the use of the natural capital approach, the framework for action and investment and the commitments made by the LNP in taking this approach forward.

The Strategy itself is made up of three documents:

1. **Summary document** which sets out the broad principles, framework and collective actions to guide the work of the LNP. For adoption by the LNP (October 2019).
2. **Detailed strategy document** – which sets out the detailed strategy and commitments by LNP and partners. It also contains a summary of the evidence base. This will be finalised by March 2020 following engagement with all LNP partners.
3. Detailed **evidence base document**, which collates information about the natural capital of Sussex in the form of an 'Asset Register' and 'Risk Register'. This is intended to be a 'living' document which is added to as more information and evidence about our natural capital is identified.



This summary document sets out:

- The role of the strategy document and the broad principles used in its preparation
- An introduction to natural capital
- An overview of the strategy for **protection of natural capital assets** of Sussex
- An overview of the strategy for investing in natural capital for the delivery of specific **'benefits and services'**
- The steps needed to **'make it happen'**

1. Introduction

Sussex Local Nature Partnership

Sussex Local Nature Partnership was formally established in 2014 and brings together approximately 25 organisations in Sussex, from across seven different sectors¹. Its purpose is to “work across sectors and organisations to secure the healthiest ecological system possible thereby protecting and enhancing the natural environment and all that it gives us”.

To enact this vision, the work of the LNP is guided by two high-level objectives:

I. **Conserve, enhance and expand Sussex’s Natural Capital**

Growth in Natural Capital is the fundamental pre-requisite for enhancing the services provided by ecosystems and so underpins the economic and social well-being of Sussex. The LNP will promote the greening of the economy including the need to invest in nature because of the many benefits and essential services it provides.

II. **Ensure that Sussex residents share in the benefits provided by healthy, well-functioning ecosystems.**

The LNP will aim to improve the connection between people, their environment and the benefits they get from the environment. This will cover a broad spectrum of activities including health, well-being, social and economic areas. In order to deliver growth in natural capital and share in the benefits of healthy ecosystems, the LNP will ensure that the evidence is collated to promote concepts, projects and initiatives that support the positive development of ecosystem services in Sussex. This will be shared across all sectors and audiences.

A Natural Capital Investment Strategy for Sussex

Investing in natural capital in Sussex will:

- Support nature’s recovery as a fundamental component of a healthy, prosperous and secure future for Sussex
- Protect and enhance the natural assets of Sussex so that these continue to provide multiple benefits for people into the future
- Position nature as a foundation for a strong, stable local economy and resilient society
- Increase resilience of natural capital assets in the face of current and future risks, such as climate change, increasing development and extreme weather events, which in turn will help to secure the benefits they provide

This document has been developed to provide strategic, high level direction for the **Sussex LNP** and marks the beginning of an important process to plan and coordinate the collective investment in the natural capital of Sussex. It covers the entire geography of the counties of East Sussex, West Sussex and Brighton and Hove Unitary Authority, both on land and at sea (out to the boundary of inshore waters at 6 Nautical Miles). It is intended to complement existing strategies and policies within these administrative areas for the conservation of nature (not replace them) by providing a different ‘lens’ through which to understand and communicate the value of nature to society and decision-makers.

¹ A list of members of the LNP is provided in Appendix A

This is in line with the refocussing on natural capital by Defra, as outlined in the 25 Year Plan for the Environment². The ultimate intention is to open up new opportunities for investment in nature.

This document is not fully comprehensive and has its limitations. However, it is a **first step** which will require future refinement and modification as the natural capital methodology evolves and as scientific understanding and datasets grow. More detailed work will also be needed to take the broad strategy it contains, and translate this into detailed proposals for action and investment on the ground.

This strategy provides:

- Initial understanding (based on best available data) of the natural capital of Sussex, **where** it is located and the raft of **benefits and services** it provides to people and the economy of the area
- Initial strategic assessment of how best to focus effort, resources and funds to protect and enhance the stock of natural capital assets for the benefit of nature and people
- Identification of opportunities to use a natural capital approach to deliver specific outputs of interest to LNP members, such as clean water, accessible nature, carbon storage and flood risk reduction
- Guidance on the steps needed to take this broad spatial strategy forward into action and outcomes on the ground

The strategy is divided into 4 main parts, as shown in Figure 1 below.

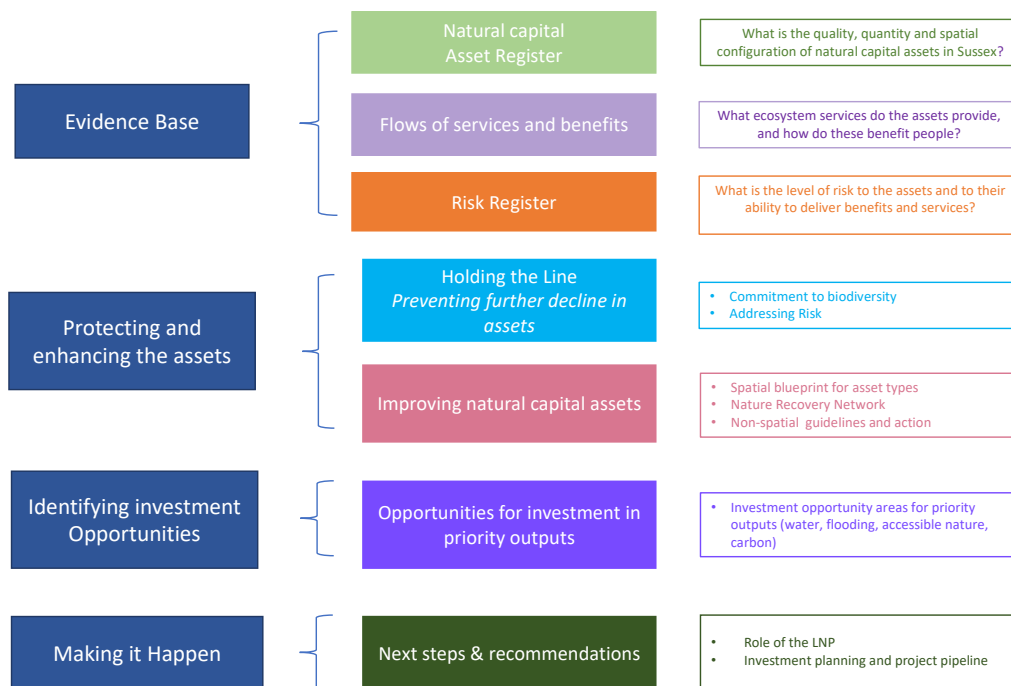


Figure 1: Structure of the Investment Strategy

² <https://www.gov.uk/government/publications/25-year-environment-plan>

Guiding Principles

The preparation of this strategy has followed a set of guiding principles:

Guiding principles
<p>This strategy:</p> <ul style="list-style-type: none">• Is aligned with and where possible, links to national policy frameworks for natural capital and the environment. Most notably, the work of the Natural Capital Committee and the Defra 25 Year Plan for the Environment• Brings together terrestrial, coastal and marine natural capital assets under one integrated strategy• Draws on lessons learned from the application of emerging natural capital methodologies within the UK and elsewhere• Applies a 'natural capital approach' that seeks to understand where and how natural capital contributes to a flow of services and benefits as the basis for decision-making; it does not attempt to apply natural capital valuation or seek to calculate an economic value for the natural capital in Sussex (although it does provide some of the information that could be used for these sorts of calculations in the future if needed)• Is based on best available data – where possible using ground-truthed survey data, but if necessary relying on modelled data where this is easily understood and produces meaningful outputs. The preference has been to use available data and express its limitations, rather than rely on complex and potentially misleading outputs from models. Where models are used, this is clearly stated• Reflects current priorities for delivery of benefits and services from natural capital – as expressed by LNP members. It is important to note that the strategy has not tried to reflect broader priorities or needs at this point, as this can be developed through subsequent broader stakeholder engagement. The strategy is also reacting to priorities expressed at the time of writing and these will need to be reassessed through time• Provides high level, spatial understanding of where investment in natural capital might deliver on some of the key priorities identified by LNP members. The detail of precisely how and where the investment will be focused on the ground will flow from project development and design-work at a finer scale• Provides a framework for the channeling of funding mechanisms for natural capital (such as net gain funds, emerging environmental land management schemes, corporate sustainability funds and so on) where these will contribute to recognized strategic priorities• Is a first step in understanding natural capital in Sussex and how it contributes to the economy and society of the area. The strategy is not designed to be definitive or comprehensive in its analysis, but is designed to provide overarching strategic direction that can be expanded and built on over time through more detailed work and analysis

What do we mean by 'investment'?

'Investment' can be defined narrowly to relate simply to the input of funds – or more widely as an allocation of **funds, effort and influence** to achieve a certain end.

Within this strategy, the latter definition of investment is used as natural capital will require not only funds but effort and influence on the part of the LNP, government and wider partners, to create the 'enabling environment' needed to make a natural capital approach happen in practice.

Thus, throughout the strategy, actions will be flagged for LNP partners and others to act as champions, advocates and influencers and to invest time and staff resources as well as funds to secure progress required.

However, the strategy will also highlight where projects can be developed or financial investment opportunities could be pursued through more detailed future planning so that new and innovative sources of financial investment in nature can be identified.

2. What is Natural Capital?

Definition

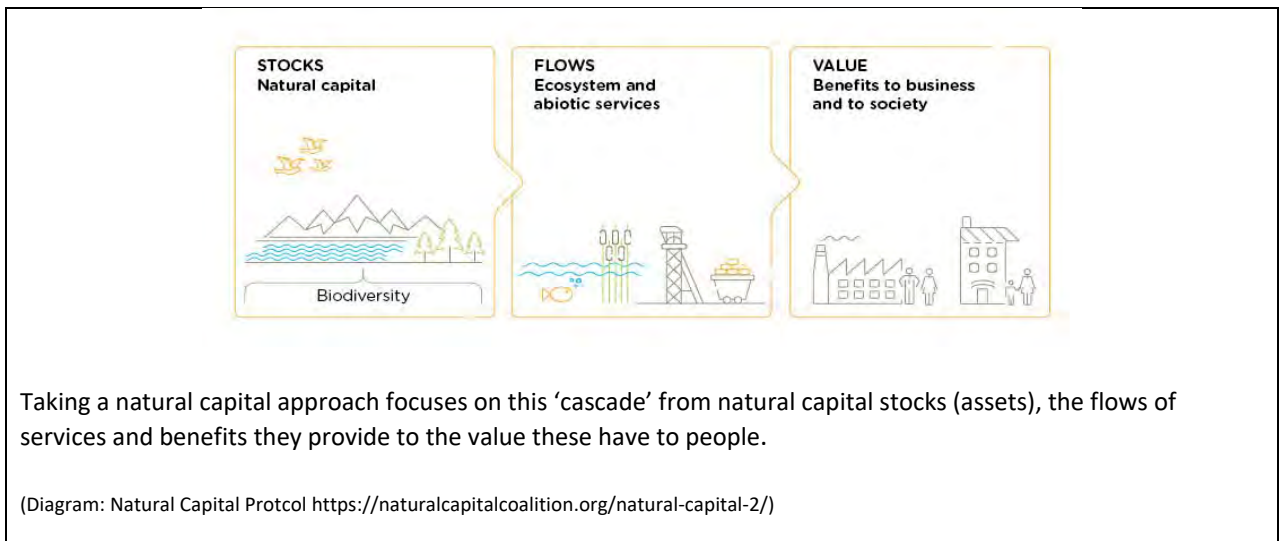
Natural capital refers to the elements of nature that produce value (directly and indirectly) to people, such as the stock of forests, rivers, land, minerals and oceans³.

The stocks of renewable and non-renewable natural capital (known as **natural capital assets**) include soils, freshwater, farmland, forests, atmosphere, oceans, ecological processes and the natural processes that underpin them. The flows of **ecosystem services and benefits** they provide can be very obvious such as food, fuel, clean air, clean water, and opportunities for recreation. Others are much less visible, such as climate regulation, flood defences provided by natural vegetation, the billions of tonnes of carbon stored by peatlands and other habitats and the pollination of crops by insects⁴. Often the pathways linking assets to goods and services that benefit humans are complex⁵.

These services and benefits all have a **value** to people, society and the economy. Some of these values can be easily quantified and reflected in the economy (such as the value of timber or food produced from farmland), whereas many others cannot and are thus hidden or missing from decision-making and economic valuation.

The boxes below illustrate the concept of natural capital and highlight some of the important elements that need to be understood when applying it in practice.

Box 1: Natural Capital 'cascade' Framework



3 <http://www.naturalcapitalcommittee.org/>

4 Scottish Wildlife Trust. Briefing on Natural Capital

https://scottishwildlifetrust.org.uk/docs/002_293__naturalcapital_scottishwildlifetrust_natureinbrief_november2013_1385469768.pdf

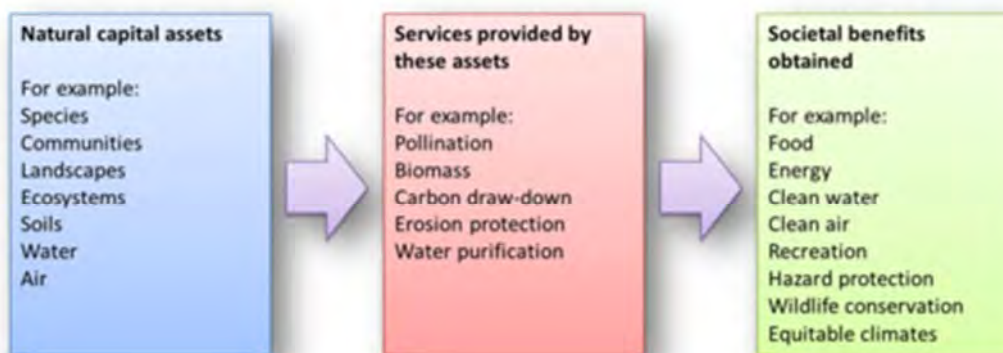
5 Natural Capital Committee (2017). How to do it: a natural capital workbook.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/608852/ncc-natural-capital-workbook.pdf

Box 2: Elements of the Natural Capital Approach

Important elements of the 'natural capital approach' to understand when applying it in practice

Within economics, there is a distinction between a natural resource and a capital asset. Whereas *natural resources* such as land, water and forests can exist in nature independent of human presence, *capital assets* are resources created and used by people in production of the final goods and services necessary to satisfy their needs and wants. In other words, when people take what nature provides and apply their ingenuity to transform natural resources into a more useful forms they convert them into capital. This enhanced usefulness is what gives natural capital its value, and explains the label 'asset', showing that it is a source of benefits to people⁶.



Natural capital approaches consider the relationships between natural assets, the services they support and the benefits derived from them.

Natural capital assets usually need to be **managed** to generate goods and services, and other types of capital are then usually necessary to generate benefits. For example, crop production relies upon assets such as soil, water and possibly pollinators, but also requires human capital such as labour and manufactured capital such as machinery. Ultimately, to turn the crops into the benefit of 'food' will require substantial human and produced capital including roads, factory processes, marketing and distribution (Mace et. Al 2011).

The relationships between natural capital assets and the benefits that flow from them are multiple and complex. They are affected by how many people manage the assets, and by the effect of the history of their use and the application of other sorts of capital (manufactured or human).

The form and function of any particular ecosystem depends on many factors and small changes in conditions (either natural (e.g. weather) or human (e.g. harvesting or additives) may have large outcomes in terms of structure or function (and thus delivery of services and benefits to people). There may be obvious **thresholds and tipping points** in the system, whereby a small change in conditions leads to major shifts in the structure or function of the system. In many natural systems these lead to irreversible changes, so that by simply reversing the driving factor to its starting condition does not re-establish the system to its starting condition.

These features of systems are crucial to their management and analysis and are one reason why interventions need to often be moderate and precautionary, and why monitoring and evaluation is of great importance.

(above, adapted from "How to do it: a natural capital workbook" by Natural Capital Committee)⁷

⁶ Taken from Deane, R. and Walker, A. (2018). Towards a Register of Exmoor's Natural Capital. Report to the Exmoor Society, Dulverton. https://www.exmoorsociety.com/wp-content/uploads/2018/07/ES_Register_Report_FinalWeb_290618.pdf

⁷ Natural Capital Committee (2017). How to do it: a natural capital workbook.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/608852/ncc-natural-capital-workbook.pdf

Taking a 'natural capital approach'

“Despite its importance, the value of natural capital is routinely taken for granted. The benefits that come from nature are not taken into account in decision-making. There is growing evidence that uninformed decisions not only damage the environment, but also have significant negative consequences for the economy ”⁸.

Across the world and across a range of sectors, the natural capital approach is being adopted as a way of making the environment more visible in financial and economic decision-making. This has been driven in large part by the continued degradation and loss of nature and natural processes, and an awakening that this is not only devastating for nature but is having a direct impact on our wellbeing and economy⁹. Equally, it is increasingly understood that protecting and enhancing the natural environment should not be considered as an economic cost, but as the foundation of a strong, stable economy and resilient society¹⁰. A 'natural capital approach' provides a framework that can help address these failures, by better reflecting and communicating the many values of nature to people during decision-making.

It is important at this point, to underline that it is impossible to fully quantify the value of nature including its intrinsic value, and the importance of hard-to-quantify aspects like biodiversity must not be overlooked. However, systematically incorporating even a 'partial' value of nature into economic decision-making “could really transform the way that nature is managed, helping us to meet our conservation goals, and avoid further risks and costs to our own wellbeing and prosperity, caused by its destruction¹¹.

It is an approach that is increasingly being recognised by government. The UK has been making important progress which started with the publication of The Natural Environment White Paper in 2011, which provided a political commitment to leave the environment in a better state for future generations¹². The Natural Capital Committee was then established in 2012 to build on this. It set about defining natural capital and creating a firm conceptual framework for it based on science and accounting principles¹³. It proposed a 25 Year Plan for the Environment based on natural capital principles, and this has now been published. In parallel leading companies and NGOs have also recognised the importance of natural capital and various initiatives and alliances have been built to develop the concept and its implementation in practice, most notably the Natural Capital Coalition.

In some areas of the UK, Local Nature Partnerships, concerned with the ongoing steep decline in nature, have also embraced natural capital, as it provides an opportunity to connect the loss of nature with impacts on people, society and the economy and to therefore find new impetus and focus for the recovery of nature and all that it does for us.



8 Natural Capital Committee. <http://www.naturalcapitalcommittee.org/natural-capital>).

9 Natural Capital Committee (2015), The State of Natural Capital: protecting and improving natural capital for prosperity and wellbeing. Third Report to Economic Affairs Committee.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/516725/ncc-state-natural-capital-third-report.pdf

10 RSPB (2017) Accounting for Nature: A natural capital account of the RSPB's estate in England.

11 Ellis, K (undated). Natural capital and conservation - can valuing nature save the planet? Posted on World Forum on Natural Capital. <https://naturalcapitalforum.com/news/article/natural-capital-and-conservation-ndash-can-valuing-nature-save-the-planet/>

12 Department of Environment, Food and Rural Affairs, "The Natural Choice: Securing the Value of Nature", White Paper. June 2011

13 Helm, D. 2019. Green and Prosperous Land: a blueprint for rescuing the British countryside. William Collins Books.

Accounting for the 'value' of nature - some emerging figures

The Government's Office for National Statistics (ONS) has gathered data for the preparation of Natural Capital Accounts (i.e. estimates of the financial and societal value of natural resources to people in the UK). These accounts have been published for the period 1997-2017 and are, by the government's admission, experimental and subject to methodological improvements. They are also 'partial' as they do not capture values for several ecosystem services and so should be used with caution. However, they are useful in the emerging understanding of the contribution of natural capital assets to people in the UK. The headline calculations are shown in the box below.

Extracts from the ONS Natural Capital Accounts for the UK¹⁴

- The cooling shade of trees and water saved the UK £248 million by maintaining productivity and lowering air conditioning costs on hot days in 2017
- Models suggest that 1,238 years of life were saved through vegetation removing air pollution in 2017
- In 2016, living within 500 metres of green and blue space was estimated to be worth £78 billion to UK homes
- Overall net carbon sequestration in the UK was 15.1 million tonnes in 2017. 52% of net carbon sequestration was from England, 39% from Scotland, 5% from Wales, and 4% from Northern Ireland. Per hectare, Scotland has the greatest net carbon sequestration at 0.74 tonnes because it has the largest amount of forest cover. England is the second greatest with 0.60 tonnes per hectare, followed by Wales at 0.40 tonnes per hectare, and Northern Ireland at 0.38 tonnes per hectare
- Carbon sequestration and air pollution removal are provided by a range of habitats, with woodland being the primary supplier for both. In 2017, forest land removed 18.0 million tonnes of carbon, equating to a value of around £1.19 billion annually and an asset valuation of £53.9 billion.
- However, a recent report by the Centre for Ecology and Hydrology for the Department for Business, Energy and Industrial Strategy, estimates that damaged peatland emissions (23 million tonnes of CO₂ equivalent) negate all terrestrial sequestration in the UK
- In 2017, the removal of pollution by vegetation in the UK equated to a saving of £1.3 billion in health costs
- Noise mitigation by vegetation in UK urban areas led to a minimum saving of £15.3 million in associated health costs in 2017. Vegetation acts as a buffer against noise pollution, in particular road traffic noise. Noise pollution causes adverse health outcomes through lack of sleep and annoyance. The total number of buildings in UK urban areas benefiting from a reduction in noise was 167,000
- Green and blue space in Great Britain's city regions reduced the air temperature leading to a saving of £248 million in avoided labour producing and air conditioning costs during 2017
- In the UK, around 11 billion hours were spent in the natural environment in 2017. This cultural service was valued at a substantial £7.8 billion. Since 2009, the amount of time spent in the natural environment has gradually increased over time. With more people living in and visiting urban habitats, on average 48% of time spent on outdoor recreation was in urban areas, for example parks and allotments

Other 'headline' figures emerging from the research in this area include the following:

- The value of pollination to UK agriculture is estimated at £440 million per year¹⁵

¹⁴ UK Natural Capital Accounts: 2019. Estimates of the financial and societal value of natural resources to people in the UK. <https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalaccounts/2019>

¹⁵ Defra (2011). The Natural Choice: Securing the value of nature. <https://www.gov.uk/government/publications/the-natural-choice-securing-the-value-of-nature>

- At the official 2016 carbon price, the value of carbon locked up in UK woodlands is around £16,000 per hectare¹⁶
- Excluding flood and water management benefits and health benefits other than air pollution mitigation, the total value of UK woodlands is around £270 billion¹⁷
- England's coastal wetlands have been valued at £1.5 billion annually for the benefits they provide as storm buffers and defence from flooding¹⁸
- Invasive Non-native species (INNS) cost the economy in England at least £1.3 billion per year¹⁹
- Bringing SSSI grasslands into favourable condition is estimated to be worth £20m per annum in increased wellbeing. Including non- SSSI grassland increases this to £40m²⁰
- The value of benefits from marine ecosystem services in the UK, and the natural capital that underpins them, are not yet well quantified. However, estimated values for some of the values have been calculated by the government²¹:
 - aquaculture, fisheries and processing - £1.1 billion Gross Value Added (GVA);
 - marine tourism and recreation - £4-5 billion GVA;
 - climate regulation/CO₂ sequestration (in the coastal shelf) - £7 billion GVA
 - coastal protection - £3.1-33.2 billion GVA (provided by intertidal habitats of sand dunes and salt marshes, these are lower and upper estimates that arise from capital savings in sea defence)
 - In the UK the combined marine and maritime sectors are estimated to be worth around £47 billion GVA (~2.7 per cent of total UK GVA) and employ more than 500,000 people

At a smaller scale, natural capital accounting has helped organisations understand more about the economic and societal contribution of the land they own and manage. For example:

National Nature Reserves: Natural England has estimated that the quantifiable benefits from the National Nature Reserves managed by them in England (> 64,000 hectares managed solely by NE or in partnership with others) to be in excess of £36 million per year, with a natural capital asset value in excess of £1.8 billion. They note the very large significance of the many benefits that they have not been able to value in monetary terms and suggest that these are probably greater than the quantifiable values²².

RSPB has prepared a natural capital account for its reserve estate in England, which is made up of 110 reserves and totals >60 000 ha of land managed for conservation. From this work, the organisation concluded, that even though it was not possible to measure all the benefits delivered

¹⁶ Europe Economics (2017). The Economic Benefits of Woodland. Prepared for the Woodland Trust. <https://www.woodlandtrust.org.uk/media/1732/economic-benefits-of-woodland.pdf>

¹⁷ Europe Economics (2017). The Economic Benefits of Woodland. Prepared for the Woodland Trust. <https://www.woodlandtrust.org.uk/media/1732/economic-benefits-of-woodland.pdf>

¹⁸ Defra (2011). Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services. <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services>

¹⁹ CABI 2010. The economic cost of non-native species on Great Britain. Defra Report.

²⁰ Natural Capital Committee (2014). The State of natural capital: restoring our natural capital. <https://www.gov.uk/government/publications/natural-capital-committees-second-state-of-natural-capital-report>

²¹ Office for Science Foresight 'Future of the Sea Report' quoted in Natural Capital Committee (2019). Marine and the 25 Year Plan. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801512/ncc-advice-marine.pdf

²² Sutherland et al. (2019) Accounting for Natural Nature Reserves: A natural capital account of the National Nature Reserves managed by Natural England. NE Research Report NERR078. <http://publications.naturalengland.org.uk/publication/4535403835293696>

by this land, the values of these to society outweigh the costs of managing the reserve network by 2:1²³.

Surrey LNP carried out a natural capital valuation of all woodland in the county (not just that in its ownership). This estimated a flow of socio-economic benefit of £90 million annually from woodland in Surrey (41,225 ha)²⁴. This was made up of a range of values:

- Approximately 800 tonnes of air pollutants are removed from the county's air by Surrey's woodland worth £13 million through the avoided healthcare cost;
- Carbon removed from the atmosphere by woodland within Surrey is estimated to be over 350,000 tonnes a year valued at £12 million;
- Each year around 18 million visits are made to Surrey's woodland valued at £63 million;
- The main market benefit of woodland is timber production in Surrey which is estimated to be in excess of 150,000m³ of timber worth £2.5 million a year, the fourth largest monetary value provided by the county's woodland;
- The three largest sources of value from Surrey's woodland are not reflected in market prices. Non-market benefits of carbon and air quality regulation (£24m) are both estimated to be worth several times the market benefits of timber (£2.5m), and in turn are much smaller than recreational values (£63m) of the county's woodland; The existence (non-use) value of wildlife in Surrey's woodland to the local population is estimated to be around £2 million a year.

Work by cities and local authorities is also starting to highlight the values of natural capital in and around urban areas. For example:

The City of Stirling carried out a natural capital assessment as the basis for strategic decision-making and investment in the city and surrounding area. This estimated that investment in natural capital would bring a range of benefits that could bring net economic benefits worth £218million²⁵.

The London Borough's contain public green spaces which are estimated to deliver £950million in avoided health costs (related to the opportunities they provide for people to exercise, socialise, relax and enjoy being part of their community). This is made up of £580 million per year by being in better physical health and £370 million by being in better mental health. These public spaces also uplift the value of properties within their vicinity (by over £900 per year for the average household). These public green spaces also store carbon in their soils and trees to the estimated value of £10million and £8 million respectively²⁶.

Greater Manchester Combined Authority: the value of benefits provided by Greater Manchester's natural capital have been estimated at approximately £900m per year. Many of the monetised benefits represent improvements in human health, either in terms of avoided health costs or in

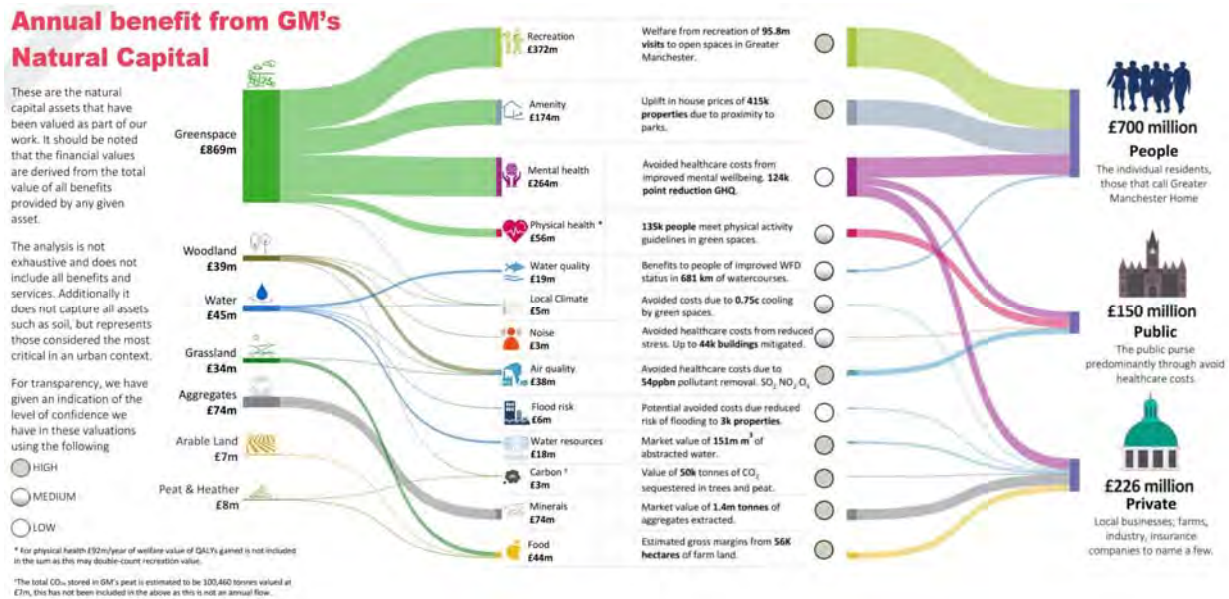
²³ RSPB (2017). Accounting for Nature: A natural capital account of the RSPB's estate in England. https://www.rspb.org.uk/globalassets/downloads/documents/positions/economics/accounting-for-nature.pdf?utm_source=accountingfornature&utm_medium=shorturl

²⁴ Surrey Nature Partnership. Valuing Surrey. <https://surreynaturepartnership.files.wordpress.com/2015/11/surrey-nature-partnership-valuing-surrey-summary-june-2015.pdf>

²⁵ Natural Capital Solutions et al. (2018). Alive with Nature: a natural capital development plan for Stirling. <http://www.naturalcapitalsolutions.co.uk/wp-content/uploads/2018/11/Stirling-NatCapDevPlan-final.pdf>

²⁶ Vivid Economics (2017). Natural Capital Accounts for Public Green Space in London. Report prepared for Greater London Authority, National Trust and Heritage Lottery Fund. https://www.london.gov.uk/sites/default/files/11015viv_natural_capital_account_for_london_v7_full_vis.pdf

improved quality and length of life (as measured by Quality Adjusted Life Years). A more detailed breakdown is provided in the diagram below²⁷.



At time of writing this strategy, no 'valuations' have yet been published for the natural capital of Sussex. However, the LNP will work over the short-medium term to collate and publish information this information as a means of promoting and communicating the importance of the natural capital of the area to people and the economy (see section 6 for more details).

Recognising the value of 'nature as nature'

One of the emerging issues in the application of the natural capital approach, is that it tends to focus only on the quantifiable and monetizable economic values that nature delivers. Due to scientific and practical challenges, it is not possible to measure all of nature's values and this often leads to the full extent of biodiversity's 'value' being hidden or missing.

"For example, while we can estimate and value the carbon sequestered by a woodland, it is not possible to value England's woodlands reverberating with birdsong. Put simply, economic valuation will only ever be a partial reflection of nature's values and is unable to reflect the value of retaining the wonder of nature, for its own sake and for future generations to enjoy"²⁸.

Nature provides a wide range of values, that can be divided into three main groups²⁹:

- the ecosystem and biotic services it provides.
- its role as the living component of the natural capital stock (i.e. natural capital assets), which provide the underpinning ecological functions and resilience that allow ecosystem services to flow and adapt to change.

²⁷ Greater Manchester Combined Authority (2019). The Natural Capital Approach in Greater Manchester (summary).

https://naturegreatermanchester.co.uk/wp-content/uploads/2019/03/GM-Natural-Capital-Accounts-Summary-March-2019_Digital.pdf

²⁸ RSPB (2017). Accounting for Nature: A natural capital account of the RSPB's estate in England.

https://www.rspb.org.uk/globalassets/downloads/documents/positions/economics/accounting-for-nature.pdf?utm_source=accountingfornature&utm_medium=shorturl

²⁹ RSPB (2017). Accounting for Nature: A natural capital account of the RSPB's estate in England.

https://www.rspb.org.uk/globalassets/downloads/documents/positions/economics/accounting-for-nature.pdf?utm_source=accountingfornature&utm_medium=shorturl

- The value of ‘nature as nature’ - the deep-seated value of nature to people and the importance many people place on protecting wildlife as ‘the right thing to do’³⁰

Scientific and practical challenges mean that it is not possible to fully understand or quantify all of nature’s values. If the natural capital approach is applied in a way that fails to acknowledge and incorporate the wide role of biodiversity or over-estimates the partially-quantified economic values, this may lead to perverse outcomes and undermine efforts to restore nature and recover populations of wildlife³¹.

“There is no guarantee that increases in Natural Capital economic value will be accompanied by improvements in the ‘stock’ of nature and wildlife. Indeed, it is equally possible for the measurable economic benefits of nature to increase, while the value of the stock of nature declines. For example, an ancient woodland could be replaced by a non-native coniferous forest, increasing its Natural Capital “value” as measured by its rate of carbon sequestration and contribution to regulating the climate. Add some BMX cycle tracks and the recreational value is also enhanced. But, what is lost is irreplaceable and its value cannot be quantified”.
(RSPB, Accounting for Nature³²)

However, natural capital as a concept and approach - when ‘done well’ and in a way that reflects some of the more intangible values of nature - has a role to play in ensuring that both the costs of environmental degradation and the value of benefits that nature provides are better reflected in decision-making. This strategy therefore follows the lead of the RSPB in its approach to natural capital, to propose that the natural capital approach in Sussex should be applied within an overarching **commitment to biodiversity**³³. This enables the wide range of values of biodiversity (and particularly those that cannot be quantified) to be considered within the strategy and will ensure that the approach taken across Sussex not only delivers benefits to people, but ensures that above all, ‘nature’s recovery’ is supported and encouraged – for all the benefits and values this will bring. This is covered in more detail in section 5 below.

Natural capital and its role in the climate and biodiversity emergencies

Our natural assets have a key role to play in tackling the two huge environmental crises we now face:

- Climate change
- The devastating loss of biodiversity

In fact, investment in nature and the protection, enhancement and creation of natural capital assets will **both** support biodiversity whilst also providing natural climate solutions. Natural capital assets help to mitigate carbon dioxide emissions whilst also building resilience in our landscapes, which in turn helps in adapting to the impacts of a changing climate.

Natural climate solutions include:

- Absorbing carbon in woodlands, hedgerows, grasslands, heathlands and coastal and marine habitats

30 RSPB (2017). Accounting for Nature: A natural capital account of the RSPB’s estate in England. https://www.rspb.org.uk/globalassets/downloads/documents/positions/economics/accounting-for-nature.pdf?utm_source=accountingfornature&utm_medium=shorturl

31 *Ibid.*

32 *ibid*

33 *ibid*

- Restoring and creating specific habitat types in catchments to slow the flow of water through the landscape, thus reducing flood events in times of high rainfall, whilst supporting base flows in rivers during times of drought
- Protecting and restoring areas of coastal habitat to reduce the impact of storms on the shoreline
- Greening the urban environment to reduce extreme temperature and pollution in towns and cities

Much more needs to be done to highlight the role that nature can play in both mitigating and adapting to a changing climate.

“Estimates have found that protecting [these] natural systems could provide more than a third of the emissions reductions needed to keep to global heating below 1.5 degrees Celsius while also enhancing the resilience of people and nature across the world to climate change.

*Despite this promise, Natural Climate Solutions receive only around **2% of the funding** spent on climate change mitigation globally, and few have heard about it.”*

Taken from ‘Nature Now’ 2019. Film.

<https://www.conservation.org/press-releases/2019/09/19/nature-now-a-short-film-narrated-by-greta-thunberg-and-george-monbiot-is-released-in-advance-of-global-youth-climate-strike>

With the growing focus on both the biodiversity and climate emergencies, this strategy provides the vehicle needed to promote and drive investment in nature in Sussex as a ‘win-win’ part of the solution to both urgent and grave issues.

At a policy level, it fits within the framework of the Government’s Climate Change National Adaptation Programme (July 2018)³⁴ and more locally, with the Climate Change Adaptation Plan for the South Downs National Park³⁵.

³⁴ Defra (2018). The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf

³⁵ South Downs National Park. Climate Change Adaptation Plan. <https://www.southdowns.gov.uk/sdnpa-climate-change-adaptation-plan/>

3. Evidence Base

The starting point for the strategy is the **evidence base**. This sets out the current understanding of:

- The natural capital assets (terrestrial, coastal and marine) found within Sussex
- The range of economic and social benefits provided by these assets and their associated ecosystem services
- The extent, condition (where known) and distribution (or ‘spatial configuration’) of the natural assets and how this relates to the benefits derived from them.

This information is compiled for each asset type and is presented as an ‘Asset Register’ for Sussex. With this information in place, the evidence base then provides an assessment of the level of **risk** to the assets and the flow of benefits from them. This is presented as a ‘Risk Register’.

The assets included are:

Terrestrial:

Natural capital asset types	Natural capital assets: sub-types
Freshwater	River
	Chalk stream
	Lake
	Reservoir
	Pond
	Grazing marsh
	Reedbed
	Fen
	Bog
	Spring
	Aquifer
Heathland	Heathland
	Sandstone Outcrops
Grassland	Lowland calcareous grassland
	Unimproved grassland
Agricultural land	Arable and Horticultural
	Improved grassland
	Hedgerows
Woodland	Ancient woodland
	Plantation on ancient woodland
	Deciduous non ancient woodland
	Coniferous non ancient woodland

Coastal

Natural capital asset types	Natural capital assets: sub-types
Coastal	Sand dune
	Saltmarsh
	Vegetated Shingle
	Seacliffs
	Coastal lagoons
	Mudflats

Marine

Natural capital asset types	Natural capital assets: sub-types
Marine	Seabed habitats
	Marine Protected Areas
	Designated bathing waters
	Coastal and Estuarine water bodies (as identified and monitored under the Water Framework Directive)
	Designated shellfish waters

The full 'Asset and Risk Register' is published as a companion to this document.

4. Framework for Investment in Natural Capital

The central objective within this strategy is ***“to protect and enhance the stock of natural capital in Sussex in a way that will benefit nature and help to deliver strategic benefits and services to the people of Sussex”***.

This will be done through two main, complimentary approaches:

- a. Protecting and enhancing the natural capital assets of Sussex
- b. Investing in natural capital in order to deliver a set of specific benefits/services that are a priority for the LNP and its partner organisations

This will be underpinned by a **formal commitment to biodiversity**, which means that the natural capital approach will only be used where it delivers benefit for nature.

a. Protecting and enhancing the natural capital assets of Sussex requires:

- Action to **‘hold the line’** against further degradation of the stock of natural capital assets
- Action to **improve and enhance** natural capital assets

This can be done via two main areas of action:

- **Protection of natural capital assets ‘at risk’** by:
 - Seeking ‘no further loss’ from development of natural capital assets at high risk
 - Improving the poor condition of assets at risk
 - Reducing threats/pressures to assets at risk
 - Keeping a watching brief on other asset-benefit relationships at risk and asking when required
- Strategic enhancement of natural capital assets through the creation of a **‘Nature Recovery Network’**

b. Investing to deliver specific, priority benefits and services provides a way to channel funds (both existing and new funding strands) into the enhancement or creation of natural capital assets as a way of delivering benefits and services that are of value to the society and economy of Sussex. A central commitment within this strategy is that this must be done in such a way that it also benefits nature and contributes to an overall Local Nature Recovery Strategy (LNRS)³⁶.

To keep production of this strategy deliverable within the time and resource constraints of the project, the LNP agreed to focus on the following ‘priority benefits’ as a first starting point, although others can be added through time:

- Sufficient quantity of water
- A clean water environment
- Reduced flood risk
- Healthy and productive inshore waters
- Accessible Nature
- Improved climate regulation (through carbon storage and sequestration)

The above priorities align closely with some of the priority goals of the Defra 25 Year Plan for the Environment. This strategy thus provides a local approach to implementation of core themes within the 25 year plan.

³⁶ Local Nature Recovery Strategies are a proposal within the emerging Environment Bill.

This framework is illustrated in Figure 2 below and is set out in more detail in the following sections.

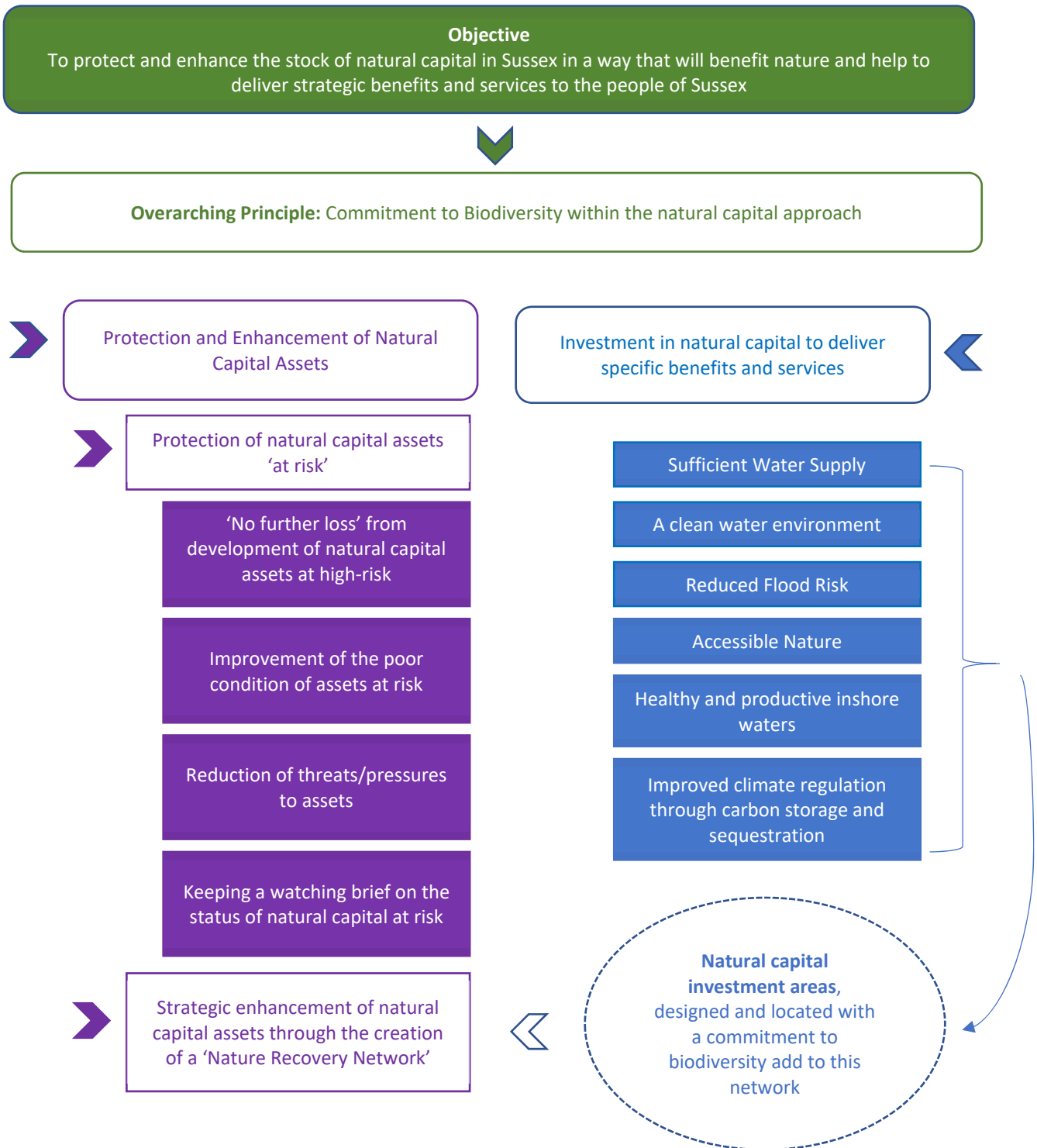


Figure 2: Framework for Investment in Natural Capital in Sussex

5. Overarching principle: A formal commitment to biodiversity within the natural capital approach

If the natural capital approach is applied in a way that fails to acknowledge and incorporate the wide role of biodiversity or over-estimates the partially-quantified economic values of nature, this may lead to perverse outcomes and undermine efforts to restore nature and recover populations of wildlife³⁷.

This can be overcome if two fundamental concepts are embedded in any natural capital approach³⁸:

- **Emphasis on the protection of ‘stocks’ of natural capital.** Placing the emphasis on protecting and enhancing the underlying **assets** that all services and values depend on (habitats, soils etc), will help to protect them as the source of all associated values, rather than simply economic ones.

and

- Placing a **commitment to biodiversity** at the heart of the application of the natural capital approach. This will act as a ‘double lock’ – ensuring that the values of biodiversity are central to the process and that any natural capital investment should have a positive impact on nature’s recovery.

Thus this strategy includes a **formal commitment by the Sussex LNP**, to apply the natural capital approach in a way that achieves a ‘net gain’ for biodiversity³⁹.

“The Sussex Local Nature Partnership is formally committed to the use of the natural capital approach only where this results in a positive result for nature, and in particular a ‘net gain’ for biodiversity”.

This commitment will underpin how the LNP applies the natural capital approach in its own (and members’) activities and how it seeks to see the approach applied more widely across Sussex.

Strategy: Promotion of a commitment to biodiversity within the natural capital approach

Desired outcomes

All natural capital approaches developed within Sussex, and beyond, carry a formal commitment to ‘net gain’ for biodiversity.

Natural capital becomes an approach that is thus valued and trusted as a mechanism for delivery of ‘nature’s recovery’.

Possible perverse or negative impacts on biodiversity from narrowly defined or poorly designed natural capital projects in Sussex are avoided, through promotion of the ‘biodiversity double-lock’ by the LNP and its members.

Proposed collective actions by LNP

- Ensure any projects/programmes designed and/or delivered by the LNP contain a commitment to delivery of net gain for biodiversity
- Encourage a similar approach in others delivering natural capital projects in Sussex
- Demonstrate and share best practice between LNP partners

³⁷ *Ibid.*

³⁸ *Ibid.*

³⁹ Where ‘net gain for biodiversity’ is assessed using accepted metrics and approaches for this.

- Report on 'successful' natural capital projects carried out in Sussex that provide multiple benefits and include net gain for biodiversity
- General messaging and advocacy on natural capital as a mechanism for nature's recovery as well as delivery of social and economic value

Commitments by LNP partners

To be agreed

6. Protecting and Enhancing Natural Capital Assets

i) Protection of natural capital assets 'at risk'

A key task for the LNP, is to identify what is needed to 'hold the line' against further degradation of natural capital assets in Sussex. Following guidance from the Natural Capital Committee, this strategy proposes that effort should be focused initially on protection of those assets where there is a risk to their ability to provide key benefits and services, because of threats to their quality, quantity and/or spatial configuration⁴⁰.

An assessment of Natural Capital at Risk in Sussex has been included in the 'Risk Register' set out in the evidence base (published as a companion document to the strategy). A summary of the analysis of 'assets at risk' in Sussex is provided in Appendix B.

A range of policies, programmes and projects are in place across Sussex that seek to protect natural capital assets, including statutory designated areas, catchment management schemes, Environmental Land Management Schemes (ELMS), conservation projects involving farmers/landowners and so on. Mechanisms within the planning system also provide some protection to specific assets. This strategy does not seek to replicate any of these but sets out several proactive approaches through which the LNP can target effort and achieve additional protection for assets at high-risk.

Efforts by the LNP will focus on the following areas:

- a. Achieving **no further loss of high-risk assets from development**, particularly where these are not already well protected and where delivery of benefits is being diminished by losses to development and changing land use
- b. Improving the **poor condition** of assets, where this is placing their delivery of benefits at high risk
- c. **Reducing threats/pressures** to assets at risk where possible
- d. Keeping a **watching brief** on natural capital at risk and calling for action when required

⁴⁰ Natural Capital Committee (2014). The State of Our Natural Capital: restoring our natural capital. Second Report to the Environment Affairs Committee.

a. 'No further loss' from development of natural capital assets at high-risk

This approach should focus specifically on those assets that:

- are not adequately protected under existing mechanisms
- are fragile or vulnerable and/or already highly fragmented
- may be of particular significance in a Sussex context
- are irreplaceable or not easily re-created (either on-site or elsewhere) if destroyed

Based on the evidence in the risk register, this includes the following asset types:

Asset type	Area found in Sussex ⁴¹	Benefits and services provided
Lowland Heath	2981 ha	Lowland heath is particularly significant in Sussex due to the small amounts present in the south of England, the fragmentation of the habitat type (especially outside Ashdown Forest) and the benefits that this asset type provides for a range of benefits (but particularly clean water).
Mudflats and saltmarsh	Total: 2398.74 ha <i>Mudflats: 1993.42 ha</i> <i>Saltmarsh: 405.32 ha</i>	These habitats provide a wide range of benefits yet are under increasing pressure from climate change, development and construction of hard sea defences. The national picture one of medium risk, but the Sussex context (with high levels of coastal squeeze) increases the risk to these asset types and the benefits they provide
Vegetated shingle	526.14 ha	This focus on this asset type is required because of the high global significance of the area found in Sussex and the relatively low priority afforded to it. Further loss would represent a significant loss to the international presence of this very specialised habitat type.
Reedbed, fen and grazing marsh	Total: 15,018 ha <i>Reedbed: 179.73 ha</i> <i>Fen: 228.52 ha</i> <i>Grazing marsh: 14610.19 ha</i>	Small and highly fragmented areas of these asset types remain in Sussex – yet they have the potential to provide a wide range of benefits, particularly flood risk mitigation in flood plains and provision of clean water
Floodplain woodlands	1597 ha	Fragmented habitat type which plays a very important role in floodplain function
Species rich grassland	Lowland Calcareous grassland: 5,132.1 ha	Highly fragmented and those areas outside formal designated areas have little/no protection from further loss. These areas are a priority for protection for loss to development.

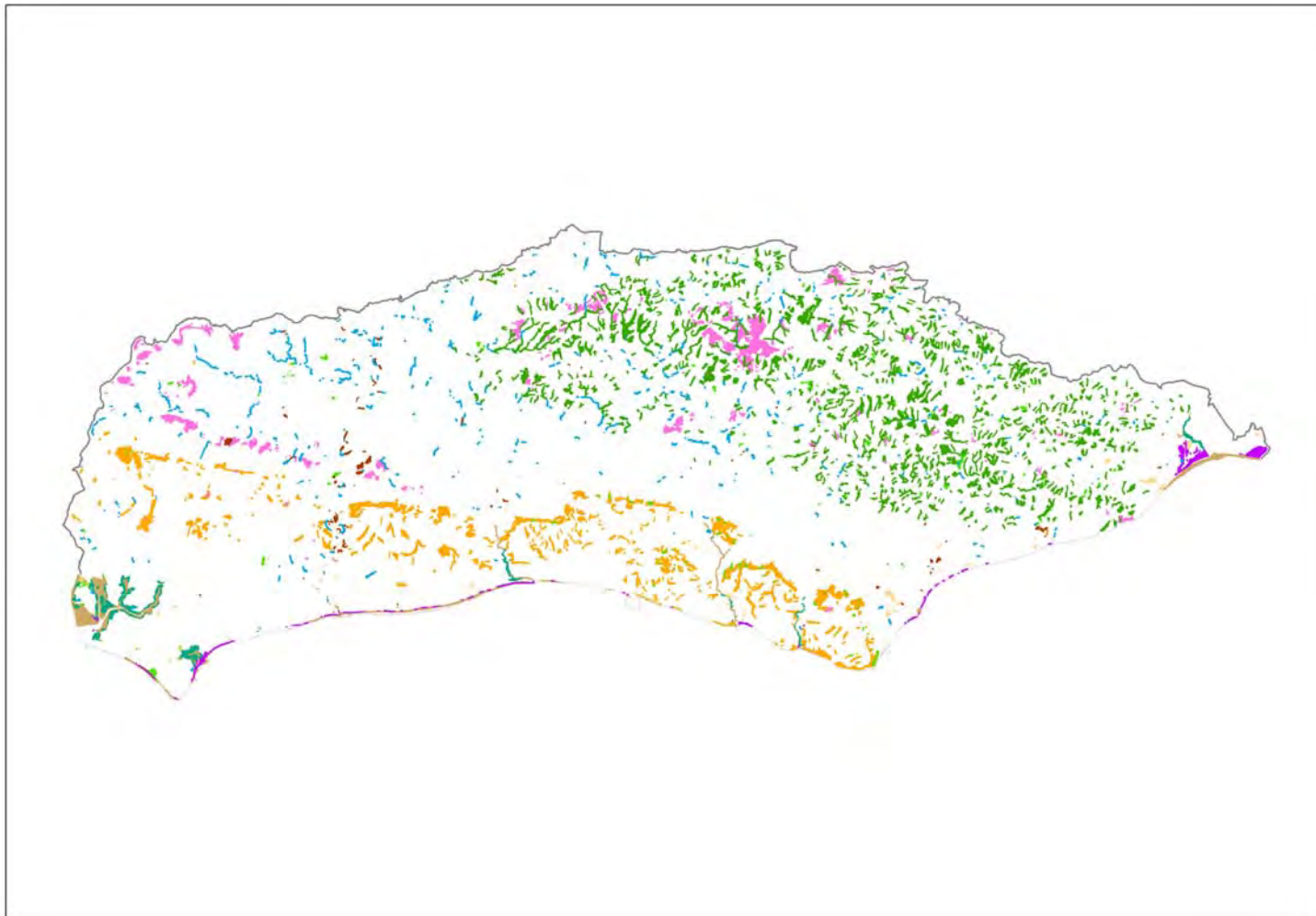
The location and spatial distribution of these assets is shown in Figure 3 below.

It should be noted, that the focus here is on no further loss from development, rather than 'no further loss' *per se*, as several of the assets particularly on the coast, are under extreme pressure from sea level rise and increasing storm intensity. Whilst it is not possible to directly influence these

⁴¹ Figures calculated from data held by Sussex Biodiversity Record Centre and calculated as part of Annual Monitoring Reports (2019).

factors, it should be possible for the LNP to achieve much stronger recognition and protection of these assets from loss to development pressure.

Strategy: protect natural capital at risk from further loss from development
<p>Desired outcome No further loss of the above asset types (as measured by area of habitat) from development</p>
<p>Proposed collective action by the LNP</p> <ul style="list-style-type: none"> • Produce and share an ‘alert map’ map identifying the spatial location of assets at high-risk - which are otherwise not well protected by existing mechanisms. • Position these assets within local planning and spatial decision-making frameworks as ‘no-go’ natural capital areas – where the LNP will advocate and defend a strong policy of no loss. • Develop greater understanding and quantification of the natural capital benefits of these habitats to assist in their defense. • Champion and defend these assets from loss/degradation. • Monitor changes to the extent of high-risk/ ‘no-go’ assets on an annual basis and reporting this as part of an annual update by the LNP on ‘natural capital This can be linked to local protected area annual monitoring reports, already carried out. • Seek recognition and protection of coastal assets at risk within Shoreline Management Plans.
<p>Commitment by LNP Partners To be agreed</p>



Key to Map:

- County boundary
- Ghyll woodland
- Floodplain woodland
- Coastal vegetated shingle
- Lowland fen
- Reedbed
- Lowland heathland & acid grassland
- Coastal saltmarsh
- Intertidal mudflat
- Lowland meadow
- Lowland calcareous grassland



Contains public sector information licensed under the Open Government Licence v3.0.

Contains Ordnance Survey data © Crown copyright and database rights 2019.

Figure 3: Natural capital assets at risk: targeted for “no further loss from development”

b. Improving the poor condition of assets at risk

High risk to the delivery of benefits from natural capital assets is most often due to **poor quality or condition** of the asset⁴². Tackling poor condition of assets across the board would thus do much to uplift the flow of benefits from our natural capital and reduce the risk to them in the future.

Priorities for action are:

- **Freshwater assets: Improving the water quality within freshwater bodies, particularly rivers, streams and ponds**

At a national level, the poor condition of **freshwater assets** is of particular concern and has been highlighted by the Natural Capital Committee within its risk register. This national picture is replicated across Sussex, with a significant proportion of water failing against Water Framework Directive (WFD) indicators of ecological and overall condition. This is placing the range of benefits produced by freshwater assets at high risk, most particularly clean water, hazard protection and wildlife.

There are many factors causing this trend, but one of the most significant is run-off of diffuse pollution and sediment as a result of agriculture and land use practices, although discharge from waste water treatment processes is also a major concern. There is a role for the LNP to push for much better performance against WFD indicators and to work with those involved in developing natural-capital projects and initiatives that could help make progress in this area. The LNP can also work with those delivering projects and programmes (e.g. Catchment Partnerships) to develop a sharper focus on natural capital and the evidence base to build a stronger and broader funding case for their work.

Strategy: target investment to address status of failing water bodies
<p>Desired outcomes</p> <p><u>Short term</u>: Reduction in overall number of water bodies failing when monitored under WFD indicators</p> <p><u>Medium term</u>: all water bodies in Sussex monitored under WFD indicators achieve 'good' status</p>
<p>Proposed collective action by the LNP</p> <ul style="list-style-type: none"> • Keep a watching brief on the policies, programmes and projects already in place in Sussex to protect freshwater habitats by reducing impacts from land use/agriculture • Use influence and advocacy to keep pressure on regulators and government agencies to drive greater improvement • Liaise with catchment project/programme managers to promote a natural capital element to these initiatives where this could add an extra dimension of protection, and to add weight to their business case for investment in natural capital • Source and channel natural capital investments into projects and programmes focused on protecting freshwater natural capital assets at risk • Champion work to reduce the impact of development on water courses
<p>Commitments by LNP members</p> <p>To be agreed</p>

- **Other assets where condition can be improved through management**

These include:

- Woodland
- Ponds

⁴² Mace et al. (2015). Towards a natural capital risk register. *Journal of Applied Ecology* (52): 641-653

- Heathland
- Chalk grassland and Wealden Meadows
- Urban greenspaces

These are in essence, the ‘easy wins’ – where management techniques are known and understood, and the improvement in flow of benefits as a result of improved condition is evident. The LNP has an opportunity to highlight these as very tangible examples of where investment in management can reduce risk to natural capital and increase benefits from these assets.

Strategy: target management action to improve poor condition of high risk assets

Desired outcomes: Lower risk to the benefits from woodland, heathland and pond habitats in Sussex as a result of improved condition

Proposed collective action by the LNP

- Focus attention on ponds, woodland, heathland, chalk grassland/Wealden Meadows and urban greenspace assets – as asset types which can be readily improved through management
- Develop and disseminate guidelines for land managers and others on how to improve the condition of key asset types of delivery of multiple benefits
- Gather case studies and share best practice
- Prepare “physical flow” analyses for each asset type to identify the benefits produced. Use this to prepare cost/benefit analyses for use in making the case for investment
- Provide training for Sussex planners on all of the above so that these issues can be part of Sussex Net Gain principles
- Provide training for Sussex developers on all of the above demonstrating the expectation of Sussex Stakeholders in standards of development in Sussex

Commitments by LNP members

To be agreed

c. Reducing threats/pressures to assets at risk

Much of the risk to natural capital in Sussex comes as a result of loss of area or reduction in condition of assets from exposure to a range of pressures – such as climate change, the impacts of agriculture and land use, development and so on.

Whilst it may not be in the gift of the LNP to tackle all of these complex factors, it may be possible to work to reduce certain pressures on specific asset types and/or ‘lift’ the pressure a little from others by increasing their resilience to pressures.

Examples specific to certain habitat types include:

- Reducing coastal squeeze in some areas through managed re-alignment and/or increase of areas of pressurised habitats through habitat creation. For many coastal habitats, the emphasis will have to be on increasing resilience of habitats and creating more ‘room’ for them where possible, given the nature of the pressures from climate change.
- Working with farmers and landowners through ‘farm clusters’ to reduce pressures from agriculture on natural capital assets, most particularly soil condition, wildlife habitats and impacts on freshwater assets

Strategy: reduce pressure on ‘at risk’ assets

Desired outcomes

Reduced risk levels for specific assets through reduction in pressures or increase in resilience of the assets to existing pressure

Proposed collective action by the LNP

<ul style="list-style-type: none"> • Create a priority list and map of assets and locations where very specific pressures are having a direct impact on assets at risk • Disseminate the list/maps of priority assets at risk to planners and decision-makers in Sussex • Work with partners to identify possible ways of reducing pressure or increasing resilience in order to protect the flow of benefits from these assets • Design and seek funding for project work to address specific pressures to 'at risk' assets. • Call for adequate regulation and enforcement to reduce pressure from those industries and users that impact on natural capital • Draw up a list of appropriate mitigation/planning conditions to protect assets from development pressures • Use influence to ensure that site allocations avoid assets at greatest risk
<p>Commitments by LNP Members</p> <p>To be agreed</p>

d. Keeping a watching brief on other asset-benefit relationships at risk and acting when required

Many asset-benefit relationships are at risk, at a range of levels, both nationally and in Sussex. The LNP has a role to keep a watching brief on the status of these and periodically review whether action is needed to push for greater protection. Opportunities should also be taken to embed a general understanding of 'natural capital at risk' within decision-making processes in Sussex, so that impacts of decision on the assets involved are fully discussed and understood.

<p>Strategy: Keep a watching brief on status of natural capital at risk</p>
<p>Desired outcomes</p> <p>Trends and threats to natural capital at risk in Sussex are monitored and reported, triggering LNP action where necessary</p> <p>'Protection of natural capital at risk' is a well-understood concept that is embedded in all decision-making processes that have an impact on natural capital</p>
<p>Proposed collective action by LNP</p> <ul style="list-style-type: none"> • Keep a watching brief on natural capital at risk and flag any threats/trends • Report and disseminate the above on a regular basis • Develop LNP actions required to address emerging priorities as required • Share successes, challenges and progress with comms/media outlets (using partner contacts and channels) • Establish and run a biannual natural capital conference
<p>Commitment from LNP Members</p> <p>To be agreed</p>

ii) Strategic enhancement of natural capital assets through the creation of a 'Nature Recovery Network'

In addition to the actions needed to protect our stock of natural capital assets and 'hold the line' against future degradation, it is also necessary to **improve and enhance** this natural capital to ensure that the natural environment continues to provide our society and economy with a range of benefits into the future.

An important step in achieving this will be to understand spatially where and how natural capital assets need to be improved, enhanced or created to both help nature to recover, and to secure flows of benefits into the future. This sort of strategic analysis will enable the investment of time, effort and funds to be targeted in the areas where they will have the greatest impact.

A spatial approach to nature conservation was expressed in the Lawton principle (i.e. that our areas of importance for wildlife in the UK need to be bigger, better, more and joined). Two emerging government policy areas are now being developed by Defra to try to bring this into effect:

- Creation of **Nature Recovery Networks (NRNs)** across the country. This is a central ambition within the 25 Year Plan for the Environment: "to develop a growing and resilient network for nature recovery (a "Nature Recovery Network")⁴³. The 25 Year Plan also includes a goal of creating an additional 500,000 ha of priority habitat as a result across the UK
- Preparation of **Local Nature Recovery Strategies (LNRSs)** – to provide an agreed local spatial, strategic strategy for the targeting of investment and effort where it is needed most to support nature. These will be legislated for via the emerging Environment Bill⁴⁴.

While these concepts are still evolving, the Sussex LNP has an opportunity to position its work on natural capital as a core contribution to preparation of a Sussex LNRS and thus creation of a Nature Recovery Network across Sussex on the ground. This strategy contains several principles and concepts that can be taken forward into this process:

- A LNRS for Sussex should both:
 - Enhance the stock of natural capital assets, in a strategic and spatial way
 - Support nature where it "needs it most"
- As per the concept of a NRN being developed by Defra to date, it should include:
 - **Core areas** of existing wildlife-rich habitat, including protected sites (but also including other areas important for wildlife such priority habitats. The focus on these areas is on improving the **condition** of habitats, restoring natural ecosystem functions, and where appropriate, expanding these areas of habitats
 - **Potential areas** – where habitat **restoration and creation** is prioritised and will help to expand and connect the core areas⁴⁵
- It should also include all areas of '**natural capital at risk**' as identified in this strategy (where these are not already included in core areas)
- To reflect the opportunity that natural capital investment will provide for supporting nature, it should also include additional "**natural capital investment areas**". Investment in these areas will be driven by other objectives (e.g. flood risk

⁴³ Defra (2018). Our Green Future: Our 25 year plan to improve the environment.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

⁴⁴ Defra (2019). Net Gain: summary of responses and government response.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/819823/net-gain-consult-sum-resp.pdf

⁴⁵ Defra Group Discussion Paper (not policy) (2019). Unpublished.

mitigation, improving water quality, carbon sequestration, accessible nature and so on) but due to the biodiversity double-lock, will also be designed to support nature. What makes them different from the core and potential areas above, is that without investment for the other objectives, these may not necessarily be strategic areas for nature (core areas or potential areas) but will add to the overall recovery of nature in the wider landscape. New areas of tree planting for carbon storage and sequestration are included in this

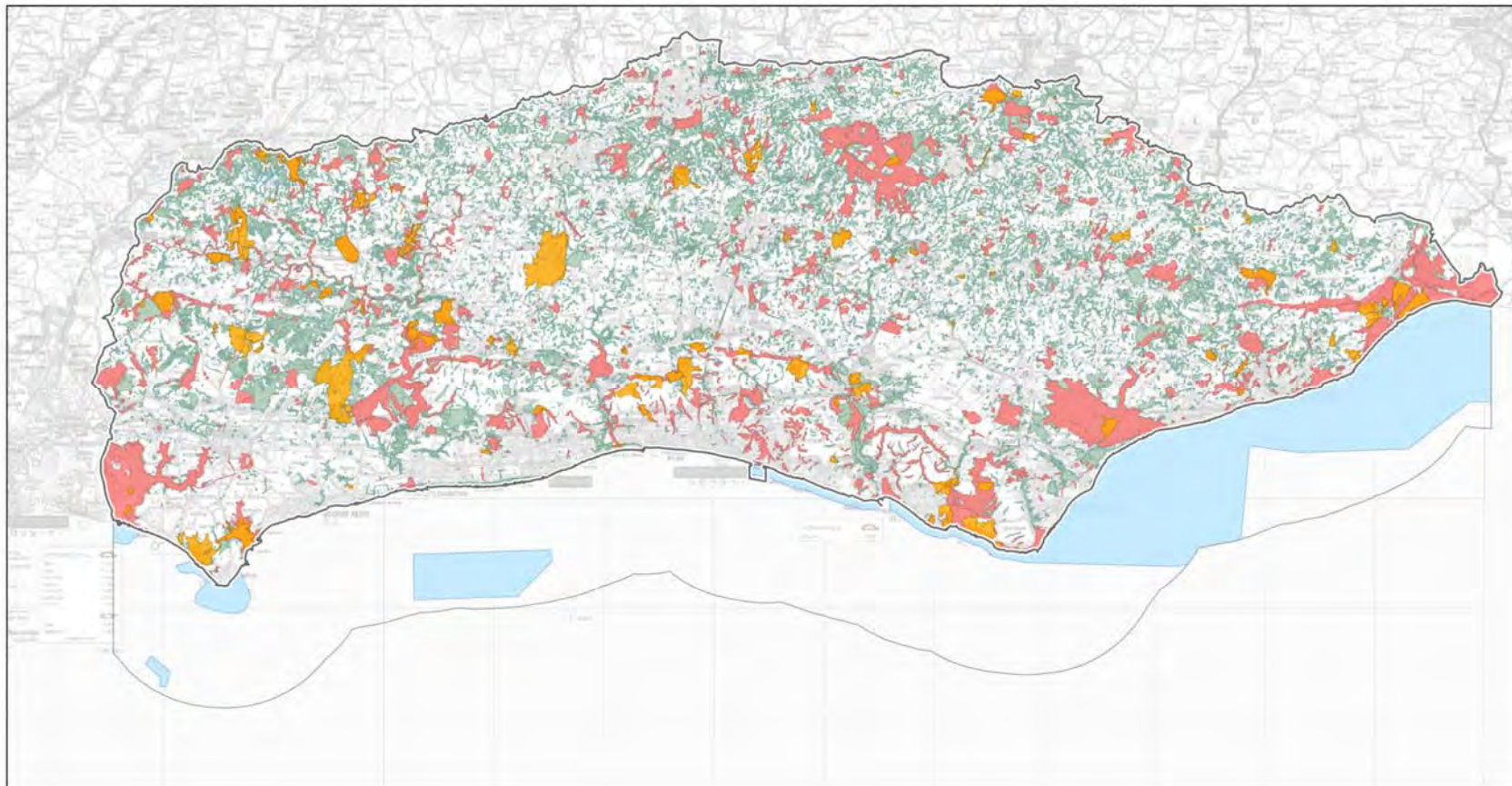
- The LNRS should identify **priorities to be funded by current and emerging funding streams** (which may come for example, from Mandatory Biodiversity Net Gain, investment in Green Infrastructure and potentially from new Environmental Land Management Schemes (ELMS) etc.), whilst the LNP Natural Capital Investment Strategy can reinforce this but also seek new and innovate sources of funding for nature as a means of delivering wider economic, social and environmental benefits
- Work done in the preparation of this Natural Capital Investment Strategy provides a strong foundation for preparation of the LNRS and should be built on, rather than replicated

In terms of work already done in this area, Figure 4 below provides an initial map of **core areas** (all designated sites, areas of priority habitat (s41 habitats) and other areas dedicated to wildlife conservation in Sussex) – for terrestrial, coastal and marine habitats. Given that many of the habitat types found within these areas are currently in poor condition, there will a need to focus on uplifting the condition of these areas as part of the delivery of a Nature Recovery Network.



Work still needs to be done to identify **potential areas** for the creation of new areas of habitat. These areas have not been identified within this strategy, but can be based on available data and the extensive work that has been done in parts of Sussex on ‘habitat potential modelling’⁴⁶. This can be led by the LNP and its members who together have extensive knowledge as to where new habitat creation would be best located to support nature’s recovery.

Broad **Natural capital investment areas**, where investment in nature will deliver specific benefits and services are outlined later in this strategy. These can be refined over time, with more specific areas for the delivery of natural capital projects brought forward by the LNP, its members and others.





46 See the work on the Arun and Rother catchments (Sussex Wildlife Trust 2016)
http://arunwesternstreams.org.uk/sites/default/files/images/HPM%20FINAL%20REPORT%202016_0.pdf



Key to Map:

-  Sussex county boundary
-  6 Nautical Mile Limit

Natural Capital Assets

-  Areas in Conservation Ownership
-  Designated Sites (terrestrial)
-  Designated Sites (marine)
-  Section 41 habitats



Designated sites and habitat data supplied by Natural England. Further data supplied by Sussex Wildlife Trust, Sussex Biodiversity Record Centre, The Woodland Trust, The National Trust, RSPB, The Knepp Estate, Sussex Local Wildlife Sites Initiative, Sussex Geodiversity Partnership.

Contains public sector information licenced under the Open Government Licence v3.0.

Contains Ordnance Survey data © Crown copyright and database rights 2019.

Figure 4. Map of proposed core areas for a Nature Recovery Network for Sussex

Strategy: LNP leads the way in development of a Local Nature Recovery Strategy, to provide spatial strategic approach to creation of NRN and protection of natural capital assets.

Desired outcomes: the natural capital of Sussex is enhanced and expanded in a strategic and spatial way to create a Nature Recovery Network, with strategic investment guided by a LNRS that has the support and buy-in from all relevant sectors.

Proposed collective action by the LNP

- Play a lead role in preparation of a Local Nature Recovery Strategy for Sussex, identifying both core and potential areas for investment
- Work collectively to encourage and facilitate the implementation of the LNRS as the spatial strategy through which ongoing effort and investment in enhancing the stock of natural capital will be channeled
- Seek to embed the NRN in local spatial planning documents and processes

Commitment by LNP partners

To be agreed.

iii) Focusing effort on soils - a vital and often forgotten asset

A key component of our natural capital which has received insufficient attention in the past, is soil. Soil is a vital natural capital asset, crucial to agricultural production (and thus farmer’s livelihoods), climate change mitigation and adaptation, flood risk management, the production of sufficient, clean water and the support of habitats and wildlife.

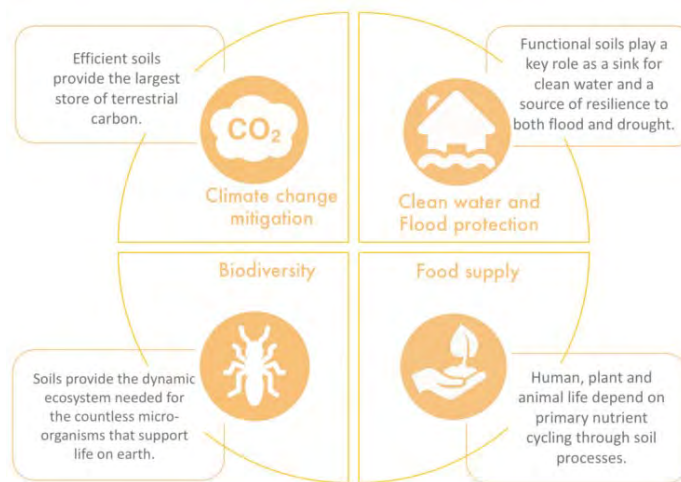


Figure 5. The role of soils in delivering a range of benefits and services (Sustainable Soils Alliance <https://sustainablesoils.org/about-soils>).

Yet the ability of soil to perform its multiple functions is reduced when it is **degraded** (its quality is reduced) or **eroded** (its quantity is reduced) - which can arise from several factors, such as erosion, salinization, intensification of farming and soil-sealing (e.g. from construction)⁴⁷. Climate change,

⁴⁷ Natural Capital Committee (2019). Advice on Soil Management. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/801515/ncc-advice-soil-management.pdf

with increased rainfall intensity, also plays a part⁴⁸. Poorly managed, degraded soils have a negative impact, not only on the productivity of land use, but on other natural capital assets such as water courses and freshwater habitats. Soil biodiversity, which itself provides a range of benefits, is also under threat from the erosion and degradation of soil⁴⁹.

Of growing concern, is the impact of soil degradation on climate change. Levels of stored carbon in soil are also lost to the atmosphere as soil is degraded, with significant implications for greenhouse gas emissions⁵⁰. There is thus growing awareness of the importance of older, relatively undisturbed habitat types - such as ancient woodlands and semi-natural grassland - whose soils are thought to be important carbon stores compared to plantation woodlands and more managed grasslands respectively^{51,52}.

The general picture is one of continuing soil loss and degradation in the UK, with ecological, social and economic implications. Yet, in terms of a solution, when soil health is improved through effective soil management practices, many of these negative impacts can be reversed.

In Sussex, 60% of the land area is farmed and the loss and continued degradation of soil health is of concern across all soil types, but most particularly in areas of chalk and Lower Greensand geology, which are among the soil types in Britain most susceptible to erosion⁵³. Protecting soil assets and improving 'soil health'⁵⁴ is thus a strategic priority, both nationally and locally.

At a national level, the Government's 25 Year Plan for the Environment provides a national target to *reverse soil degradation and restore soil fertility in England by 2030*. It also commits to addressing one of the greatest obstacles to progress in this area, which is the relative shortage of data about soil and soil health, and the need for greater understanding of the effectiveness of soil management measures at the farm level, on both soil health and other related environmental outcomes⁵⁵.

Whilst this is progress, there is as yet no national strategy to guide delivery of this target. It also remains difficult to fully consider soil in a natural capital framework given the lack of data about soil and limited scientific understanding of the pathways through which soil assets deliver benefits and

⁴⁸ Climate Change Committee (undated). Soil Case Study. <https://www.theccc.org.uk/wp-content/uploads/2019/07/Outcomes-Soil-case-study.pdf>

⁴⁹ European Commission (2010). The Factory of Life: why soil biodiversity is so important. https://ec.europa.eu/environment/archives/soil/pdf/soil_biodiversity_brochure_en.pdf

⁵⁰ Soils store three times as much carbon as is contained in the atmosphere, and degradation of carbon-rich soils releases significant quantities of CO₂. Defra. Written evidence to Environmental Audit Committee. 2016. <http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/environmental-audit-committee/soil-health/written/27299.pdf>

⁵¹ Wilson et al (1997). The nature of three ancient woodland soils in southern England. *Journal of Biogeography* 24(5). https://www.researchgate.net/publication/237091612_The_nature_of_three_ancient_woodland_soils_in_southern_England. This research suggested that soil carbon content was higher in ancient woodland than in recently planted woodland.

⁵² Natural England Access to Evidence Note. EIN012. Summary of evidence: soils. <https://static1.squarespace.com/static/58cff61c414fb598d9e947ca/t/5addbd308a922d433d1094c0/1524481330409/EINO12+edition+1.pdf>

⁵³ Boardman, J. (2013). Soil Erosion in Britain: updating the record. *Agriculture* (13). 3(3) 418-442.

⁵⁴ 'Soil health' refers to the capacity of soil to function as a living system, to *sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health*. It relates to both its ecological and physical characteristics. <http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/soil-biodiversity/the-nature-of-soil/what-is-a-healthy-soil/en/>

⁵⁵ HM Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

services⁵⁶. As a result, this strategy does not deal with soil assets in any spatial detail, but rather sets down a small number of actions to be taken forward through the work of the LNP and its partners to further understanding of the importance of soil assets in Sussex, and to develop greater strategic assessment of where and how investment in soil protection and improvement should be focused.

Soil: Facts and Figures

The annual costs of soil degradation in England and Wales are between £0.9 and £1.4 billion, with a central estimate of £1.2 billion. These costs are mainly linked to the loss of organic content of soils (47% of total cost), compaction (39%) and erosion (12%). *The total costs of soils degradation in England and Wales, Cranfield University (2015).*

The contribution of damaged soils to flooding events is estimated to be £233m per year. *Securing UK Soil Health, Parliamentary Office of Science & Technology (2015).*

The UK has lost 84% of its fertile top soil since 1850, with the erosion continuing at a rate of 1cm to 3cm per year. *The Committee on Climate Change (CCC) report (2015).*

Around 3000 hectares of UK soil are thought to be contaminated with toxic elements - such as cadmium, arsenic and lead. *Environmental Audit Committee report on Soil Health (2016).*

English farmers are losing valuable resource through diffuse pollution. 235,000 tonnes of nitrogen and 8,391 tonnes of phosphorus are lost every year that would otherwise help farming. *Consultation on new basic rules for farmers to tackle diffuse water pollution from agriculture in England (2015)*

UK soils store over 10- billion tonnes of carbon in the form of organic matter. Over half of the UK's carbon store is contained in peat soils. Of Wales' peatlands, only 30% of the area is thought to be in good condition. Around 80% of Northern Ireland's Peatlands have been degraded and need to be restored. *The Welsh Government State of Natural Resources Report (2017).* In England, only 1% of deep peat habitats have been mapped as being in an undamaged state. *Natural Capital Committee (2019).*

Compiled by Sustainable Soil Alliance <https://sustainablesoils.org/facts-figures-1>

Strategy: LNP raises the profile of soil as an asset and seeks investment in soil protection and improvement

Desired outcomes: Soil, and the importance of its protection and enhancement, achieves a higher profile locally and nationally; knowledge of soil assets in Sussex is expanded and used to strategically target investment for delivery through existing and new partnerships.

Proposed Collective action by the LNP:

- Work to highlight the often unappreciated importance of soil as a natural capital asset - and support the call by the Natural Capital Committee for its status to sit alongside air and water in public policy and decision-making⁵⁷
- Ensure that the importance of soil natural capital and how it can be protected and enhanced, is built into engagement with decision-makers and local planning authorities within Sussex
- Collate existing knowledge on the soils of Sussex in order to develop an 'asset register' and identify priority areas for investment in soil natural capital
- Share lessons on the role of soil management measures from pilot projects currently taking place in Sussex across LNP members and wider partners. Ensure that these lessons inform future project development.

⁵⁶ Janes Bassett, V., and Davies, J. (2018). Soil natural capital valuation in agri-food businesses. Valuing Nature Natural Capital Synthesis Report. VNP08. https://valuing-nature.net/sites/default/files/documents/Synthesis_reports/VNP08-NatCapSynthesisReport-SoilAgriFoodBus-A4-12pp-144dpi.pdf

⁵⁷ Natural Capital Committee (2019). Advice on Soil Management.

- Include soil carbon as part of a wider LNP focus on investment in natural capital for carbon storage and sequestration (see section 5 of this strategy). Emphasise the importance of semi-natural habitats as important existing stores of soil carbon.
- Ensure that soil protection and enhancement measures are considered for inclusion where relevant, in all new natural capital investment projects developed by the LNP
- Work collectively across LNP members and wider partners to support and build partnerships for the delivery of projects for the protection and enhancement of soil assets in Sussex. This will include the existing work with catchment partnerships and farm clusters.

Commitment by LNP Partners:

To be agreed

7. Using natural capital to deliver 'priority' benefits

There are many actors in our economy interested in the delivery of specific benefits – such as clean water, better protection from flooding, areas for recreation and exercise and so on. Natural capital can be used to contribute to this and in so doing, it will deliver not just the cleaner water or the reduced flooding, but benefits for wildlife and a range of other benefits. Without these single drivers, it may not be as easy to achieve the general protection and improvement of the underlying natural capital that is needed to more widely support our society and economy. Investing in nature 'for nature's sake' is part of the solution – but is not the only approach (and is one that has struggled historically to make any real inroads into the protection and recovery of nature).

The Sussex LNP has identified an initial set of priority benefits for delivery through natural capital investment. These represent the main concerns, objectives and interests of LNP members whilst also making an important contribution to the society and economy of the area.

- Sufficient quantity of water
- A clean water environment
- Reduced Flood Risk (surface/fluvial and coastal)
- Accessible Nature
- Healthy and Productive Inshore Waters
- Improved Climate Regulation (through carbon storage and sequestration)

Sufficient quantity of water

Strategy: Target investment in natural capital in a way that contributes to sufficiency of water supply into the future – and particularly at times of low rainfall/drought

Guiding Principles

- i) **Improve water storage in key catchments through the creation and improvement of freshwater assets** (particularly wetlands in flood plains), creation and management of woodland and hedgerows and better soil management where this will play a role in slowing the flow of water through the landscape. There is sufficient evidence to support this approach. This action should obviously be targeted for use in those river catchments where the risk of low flows is high, and where there is potential for providing the suitable type of freshwater asset required
- ii) **Promote the targeted use of Environmental Land Management Schemes (ELMS) and Catchment Sensitive Farming** to improve agricultural practices and soil health, to slow water flow through catchments and thus improve baseline flows
- iii) **Seek synergy and overlap with natural capital approaches for water quality and flood risk management**, as similar interventions (such as wetland habitat creation) can improve water quality, regulate peak and low flows and reduce flooding. A ‘multiple benefits’ approach to investment in natural capital for water related benefits is therefore an efficient approach

Proposals for collective action by the LNP

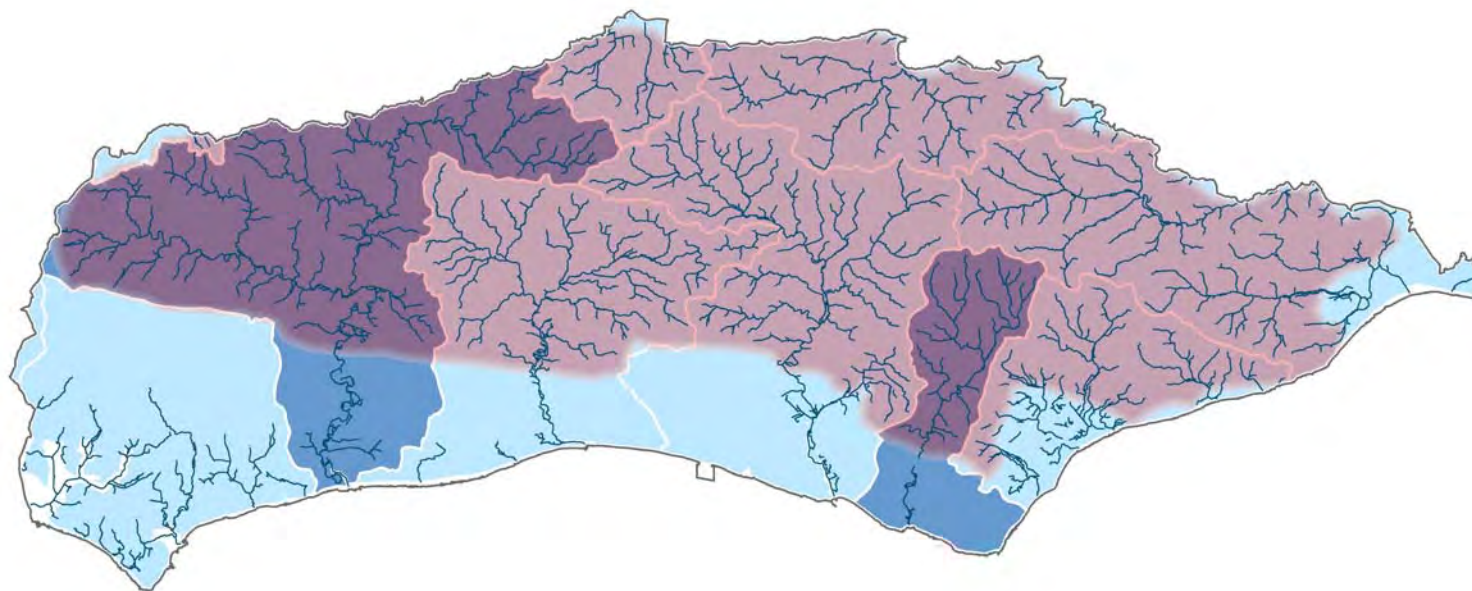
- Share knowledge and best practice on the impact of habitats and land use on infiltration and the recharge rates of aquifers. Several LNP partners are involved in research projects in this area at present
- Refine identification of ‘natural capital investment areas’ – where investment in natural capital will provide benefits for water quantity
- Identify a pilot project in one of these areas, through which to apply techniques and assess physical flows and costs/benefits (metrics) – in order to guide future investment
- Work with others to bring forward new project ideas incorporating the following mechanisms, which will help to support base flows (whilst also delivering other benefits)
 - Wetland improvement and creation projects at the catchment level
 - Soil management initiatives with landowners
 - Flow pathway disruption on and off floodplains

Projects could be designed and targeted specifically to uplift river base flows – or could be incorporated into projects with a wider focus to deliver multiple water and flood risk benefits in catchments
- Find opportunities to link and create synergies between existing schemes to demonstrate a coordinated catchment approach to water and flooding issues
- Propose a formal knowledge sharing role for LNP and Catchment Partnerships, in order to collate best practice and disseminate across partners and between catchment areas in Sussex

Commitment by LNP partners

To be agreed

Natural Capital Investment Areas (NCIAs) for the targeting of investment to contribute to sufficient water supply are shown in Figure 6 below.



Natural Capital Investment Area: Investment in all headwaters (shaded pink) will be beneficial in supporting the resilience of water quantity in catchments – but those shaded purple should be considered a priority. This relates to the prevalence of low flows in these catchments and their importance for water extraction.

Key to Map:

- County boundary
- Rivers
- Headwaters
- Headwaters in priority catchment
- Priority catchment
- Surface water catchment

Contains public sector information licensed under the Open Government Licence v3.0.

Contains Ordnance Survey data © Crown copyright and database rights 2019.

Figure 6. Natural Capital Investment Areas: *sufficient water quantity*

Investment in the protection, enhancement and creation of natural capital in all catchments (focusing on habitats and soil management) has the potential to increase the **resilience** of these catchments in terms of supporting base river flows in times of low rainfall. However, priority should be given to investment in particular catchments where resilience is currently low and where:

- low base flows are prevalent in times of low rainfall – which is threatening commercial water supply, habitats and wildlife.
- the catchments contain important abstraction points for water companies
- there is the potential to enhance and create natural capital assets in a way that will help to store water in the landscape and facilitate its slow release to rivers in times of water stress. This is best applied in upper catchments (headwaters).
- projects to support low base-flows can be aligned with/ include approaches to support water quality and flood risk as well-functioning natural capital assets and catchments will be beneficial for all three outcomes.

Two particular areas have been prioritised in this strategy:

- **Cuckmere** – upstream of Arlington Reservoir. Arlington is an important water supply feature for South East Water and low flows from the Cuckmere impact its replenishment.
- **Arun and Western Rother** – headwaters. Southern Water abstract water at Hardham so flows upstream of Hardham on the Arun are critical.

As evidence grows on the impact of habitat types and land use on boosting groundwater recharge to aquifers – focus this activity on priority areas:

- Worthing and Brighton Chalk Blocks
- Friston Forest

A Clean water environment

Strategy: To target investment in natural capital where this will contribute to the production of clean water for both drinking supply and the freshwater environment. As a priority, target action on failing water bodies and to ensure the protection of water quality for internationally important wildlife sites.

Guiding Principles

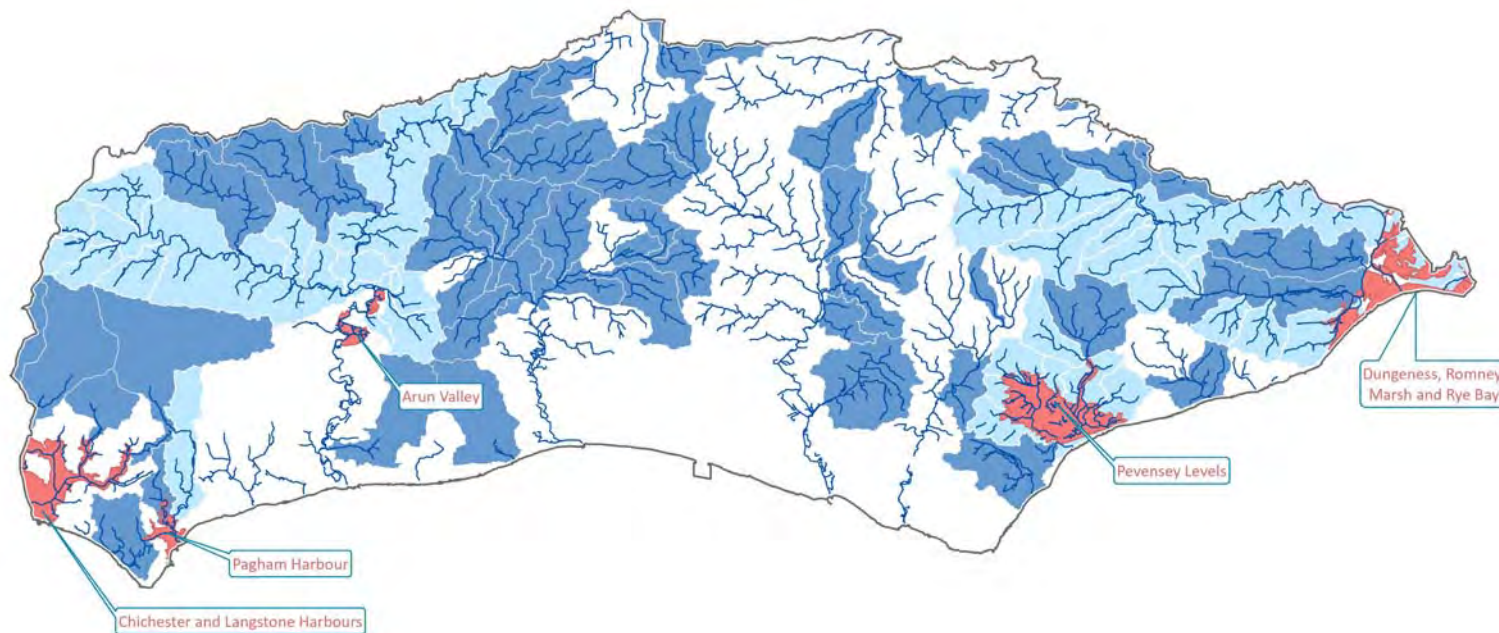
- i) **Target action on water bodies whose condition is currently failing as per WFD indicators.**
- ii) **Improve or create habitats within catchments and adjacent to water courses, to provide a water ‘purification’ service** – removing/reducing sediment and pollutants before they reach water courses. In many places, these services have been diminished through degradation/loss of habitats and/or destruction of natural catchment and floodplain functions. There is thus potential to increase the ‘supply’ of these purification services through creation/enhancement of habitats in specific locations where they will be effective in playing this role.
- iii) **Reduce inputs (the sources of pollution and sediment) affecting water quality.**
 - Water companies and the Environment Agency already work to identify high-risk water quality areas and ‘failing’ water-courses in terms of water quality standards. This information should be used to target action
 - Identify **priority/target** areas where a natural capital investment approach to reduction of inputs could be developed
 - Encourage innovative thinking on reducing inputs via farm clusters (and other farmer led initiatives) and identify those which could be applied or scaled up in other locations if opportunity arose
- iv) **Seek synergy and overlap with natural capital approaches for water quantity and flood risk management**, as similar interventions (such as wetland habitat creation) can provide a range of benefits for water.

Proposals for collective action by LNP

- Assess lessons from Brighton Chalk Block (CHAMP project) and identify which chalk block(s) should be the next priority for investment
- Identify a pilot project in one of these areas, through which to apply techniques and assess physical flows and costs/benefits (metrics) – in order to guide future investment.
- Work with others to bring forward new project ideas
- Influence developing ELMS policy (via Defra/ NE engagement) to strategically target funds towards better soil management in catchments.
- Promote soil management techniques through landowner advice.
- Encourage Defra/NE to prioritise soil management options in areas of high turbidity and to work alongside existing catchment scale delivery.
- Develop guidance/check list of issues and data sources for **farm clusters**.
- Increase engagement with **Catchment Partnerships** as important delivery mechanisms for natural capital investment in soil health and water quality. Seek to improve their effectiveness, influence prioritization and targeting of CP activity (based on natural capital data) and bring forward projects for their consideration.

Commitment by LNP partners

To be agreed.



Natural Capital Investment Areas: All areas shaded in blue are suitable but the priority areas are those shaded **dark blue (failing water bodies)**. The urgency for investment is greatest in those priority areas affecting internally recognised protected sites.

Key to map:

- County boundary
- Rivers
- International Wetland (Ramsar) Sites
- River Water Body Catchments - Poor/Bad Ecological Status
- River Water Body Catchments upstream of Ramsar - Moderate/Good Ecological Status

Contains public sector information licensed under the Open Government Licence v3.0.
 Contains Ordnance Survey data © Crown copyright and database rights 2019.

Investment in the protection, enhancement and creation of natural capital in all catchments (focusing on habitats and soil management) will help to improve the freshwater environment by increasing the ‘filtering’ of sediment and pollutants they carry out. Buffering along water courses, disruption of flow pathways in the landscape, woody debris and other actions for ‘slowing the flow’ will further support this function.

Priority should be given to investment in those catchments where:

- the need is great (i.e. water quality is currently poor). This is defined by the status of water bodies against WFD indicators
- there are important downstream abstraction points and/or freshwater or marine habitats/protected sites/bathing waters that are being adversely affected by existing water quality derived from upstream sources
- there is the potential to enhance and create natural capital assets in a way that will help to improve the water purification function of habitats
- there is potential to improve soil management and soil condition to reduce impacts of water quality (through reducing erosion/siltation and improving filtration) store water in the landscape and facilitate its slow release to rivers in times of water stress. In most cases, this is best done in upper catchments (headwaters).
- Preferably, existing structures (such as farm clusters, Catchment Partnerships etc) are in place, through which soil management and investment in habitats on farmland can be coordinated at scale.

All waterbodies upstream of internationally important wetland sites have been highlighted as the water quality coming into these sites is vital for the biodiversity for which they are designated. Priority is also given to water bodies that are either Poor or Bad under the Water Framework Directive’s ecological status metric.

Figure 7: Natural Capital Investment Areas: a clean water environment

Reduced flood risk (surface/fluvial and coastal)

Strategy: to work within existing flood risk management frameworks and policies in Sussex (for surface water, ground water, fluvial and coastal) – to identify opportunities for investment in natural capital that will make a contribution to:

- i) reduction of flood risk in specific locations via **natural flood management** approaches
- ii) general improvement in adaptation and resilience of catchments and coastal areas to flooding

Guiding Principles

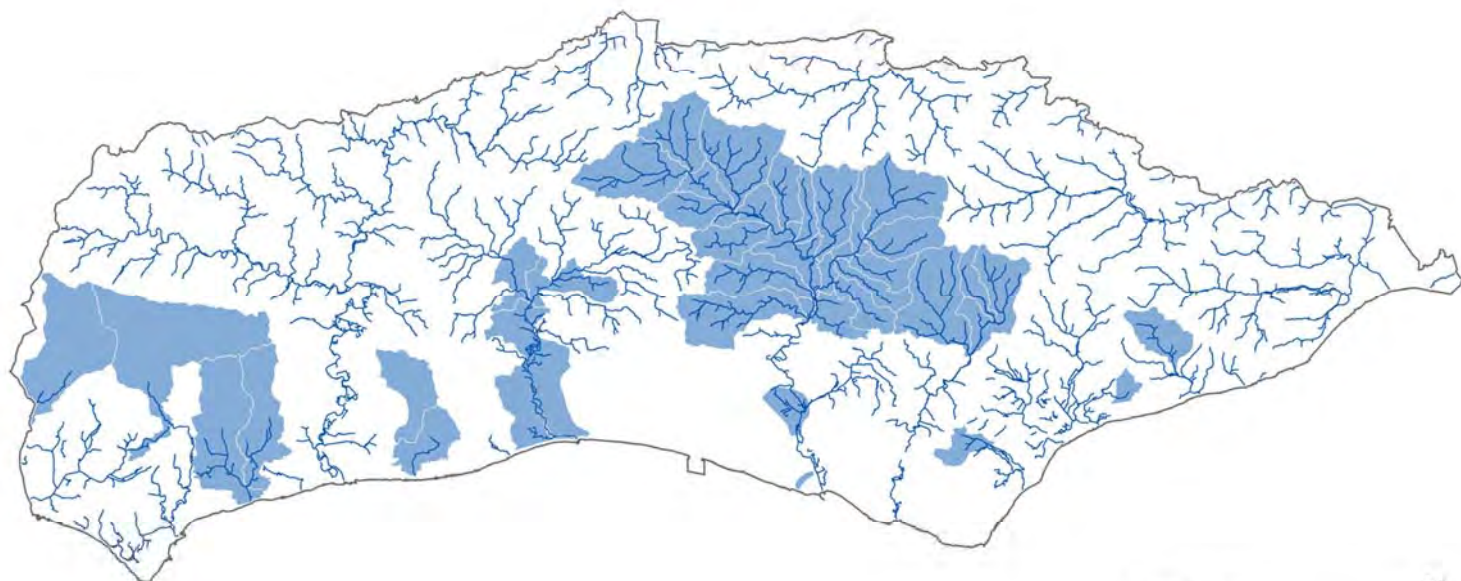
- i) Increase protection for existing natural capital assets which play a part in reducing flooding – both within catchments and at the coast and at sea.** These have been identified in the mapping work done for the Natural Capital Asset register (companion document to this strategy)
- ii) Invest in the implementation of Natural Flood Management approaches in key catchments and as a means of reducing flood risk around housing and critical infrastructure.**
 - Natural Flood Management (NFM) can be used as part of a package of flood risk measures in targeted high-risk areas (e.g. creating wetland on floodplain close to housing areas); but it can also be used in a more general way to raise the overall resilience and ability of catchments and coastal areas to adapt to climate change
 - Work is ongoing within Sussex to identify **where and how** NFM has practical application (led by Environment Agency). The role of the natural capital investment strategy will be to support/work within existing or emerging spatial strategies for the use of the NFM approach within catchments and coastal areas and make a stronger case where possible for its use by highlighting additional benefits/services (and therefore ‘return’ on investment) that could be produced by it use
- ii) Promote investment in NFM and SuDS technologies within new development and infrastructure projects** as part of an overall net gain and natural capital approach to their planning and delivery.

Proposals for Collective action by the LNP

- Refine identification of ‘natural capital investment areas’ – where investment in natural capital via ‘natural flood management’ (NFM) would be beneficial and should be applied for this purpose alone or as part of multiple benefit projects
- Work with an existing NFM project in Sussex to assess physical flows and costs/benefits (metrics) – in order to guide future investment.
- Work with others to bring forward new NFM project ideas
- Produce maps of existing natural capital assets that currently provide a function to reduce flooding and seek greater protection for these via planning system and land use management.
- Increase capacity and expertise within local planning authorities by providing training on natural capital and NFM approaches to flood reduction
- Encourage application of SuDS and NFM in all new development and infrastructure projects in Sussex and develop guidelines for developers on how to include SuDS and NFM approaches into their proposals
- Introduce businesses to opportunities for NFM as part of building business resilience (opportunities in Gatwick area)
- Develop a ‘natural capital’ narrative and numbers to support the case for SuDS and NFM in development and infrastructure projects
- Use the evidence base in Sussex to assist with targeting of ELMS funding/ CSF activity for NFM projects

Commitment by LNP partners

To be agreed.



Natural Capital Investment Areas: areas where investment in natural capital may contribute to flood risk mitigation for properties at risk of flooding

Key to Map:

- County Boundary
- Rivers
- Natural Flood Management Schemes



Contains public sector information licensed under the Open Government Licence v3.0.

©Environment Agency copyright and/or database right 2019.

Contains Ordnance Survey data © Crown copyright and database rights 2019.

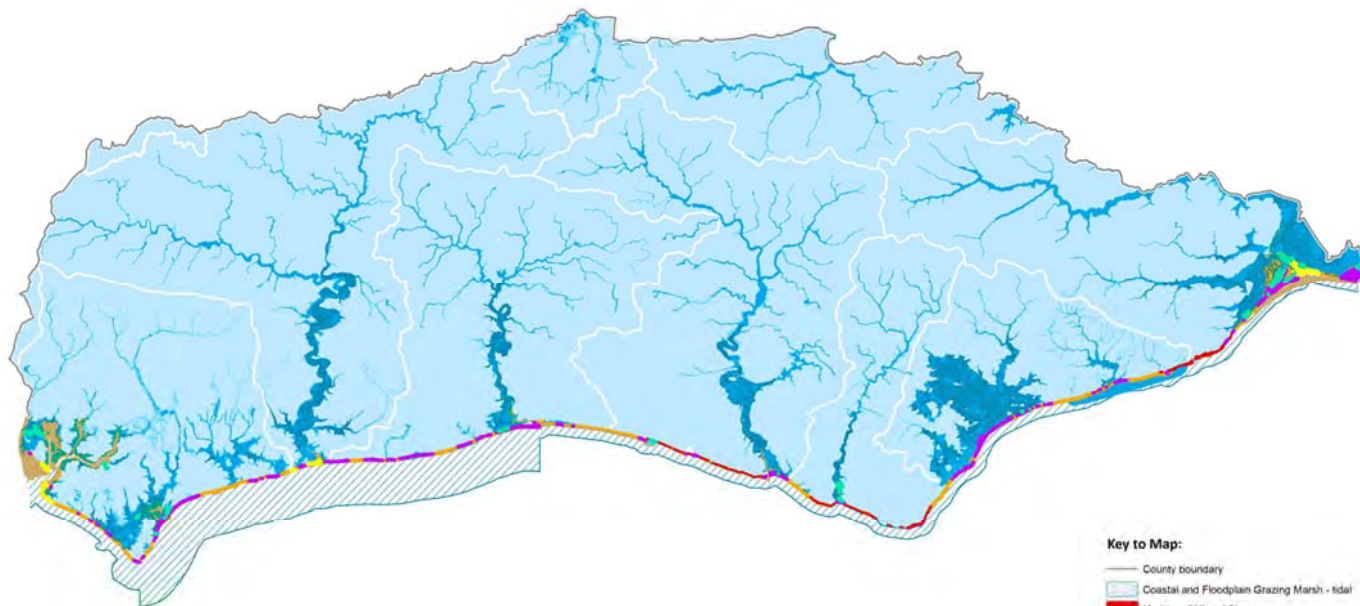
Investment in natural capital through the enhancement and creation of natural capital assets (habitats and soils) high in catchment areas, alongside water courses and in flood plains will help to increase the natural functioning of catchments and ‘slow the flow’ of water through the landscape.

Nationally, the Environment Agency has identified ‘properties at risk’ from flooding. Locally, the Environmental Agency has also mapped areas where natural capital assets can contribute to risk mitigation (for its ‘South Downs and Solent’ area). This has been combined in this map as NCIAs for the targeting of natural capital investment to contribute to flood risk management. More work is needed to map areas outside this South Downs and Solent area.

In Sussex, priority should be given to investment in natural capital:

- upstream of areas of known flood risk
- integrated into all Flood Risk Management Schemes where possible
- in targeted catchment scale approaches.
- in all areas of the floodplain impacted by tidal flows.
- in transitional waters

Figure 8a: Natural Capital Investment Areas: *flood risk management upstream from properties at risk*



Natural Capital Investment Areas: areas where investment in natural capital may contribute to flood risk mitigation at the coast: tidal reaches of the main rivers; inter-tidal habitats and areas of inshore waters (for restoration of kelp beds and other seabed habitats that can absorb wave energy).

In terms of coastal and tidal flooding, there is also opportunity to use natural capital investment to create and restore areas of inter-tidal habitats, sand dune and shingle to reduce coastal flood risk. This should be prioritised initially along **tidal reaches** of our main rivers and estuaries. In order for these to deliver their full range of benefits, these habitats should be considered together as a 'functional unit'. Fundamentally, existing areas of these habitats should also be protected from further loss.

Off shore habitats can have an impact on reducing the impact of storms on coastal areas. Removal of abrasion pressure due to trawling from these areas in the zone marked, will provide the platform for restoration of seabed habitats (such as kelp) that can play an important role in reduction of wave energy on coastal areas.

Figure 8b. Natural Capital Investment Areas: coastal and tidal flood risk management.

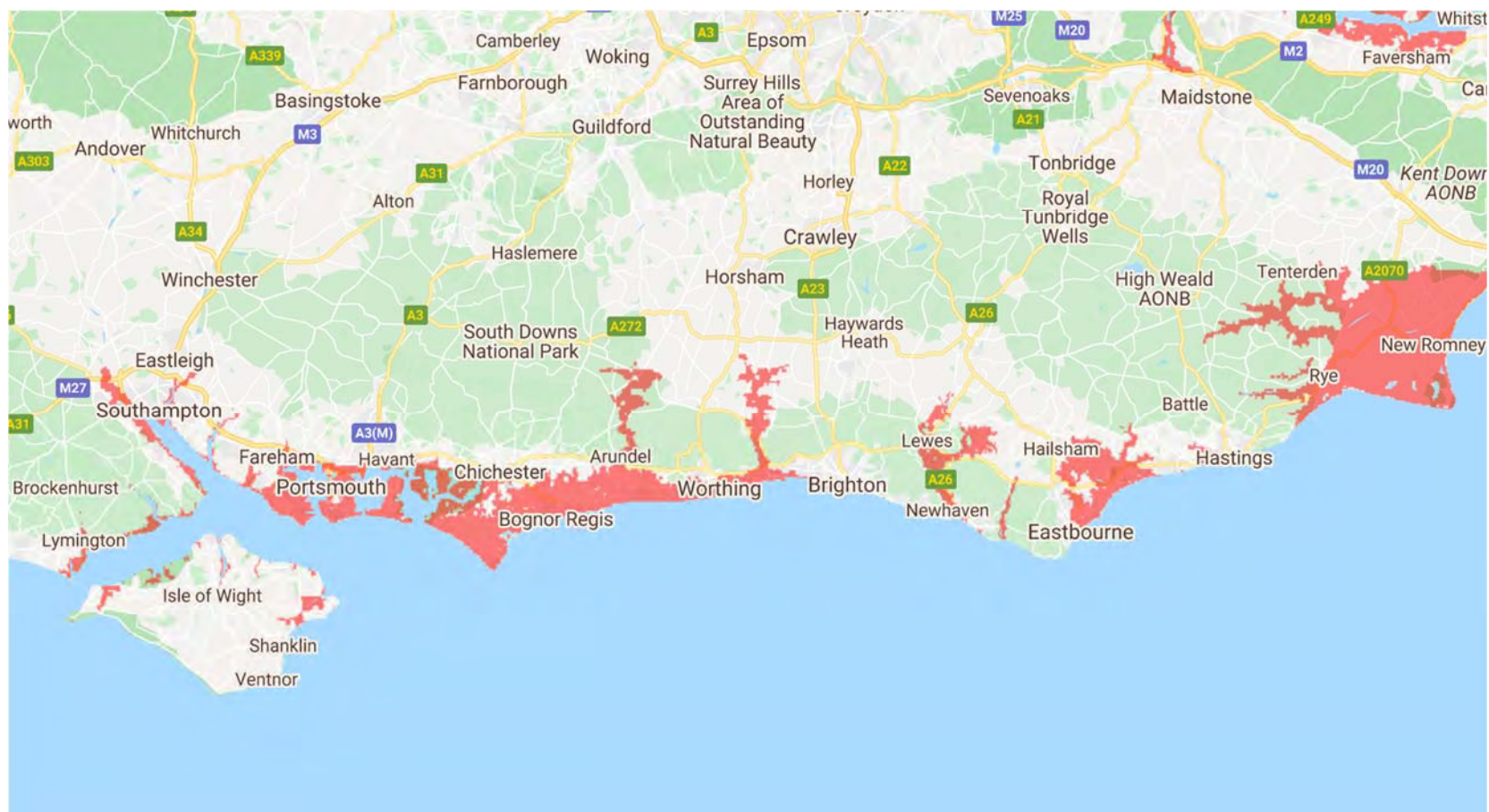


Figure 8c . Map of land on the Sussex coast projected to be below the annual flood level in 2050 (coastal flooding).

Areas shaded in red are 'land at risk'. Mapped areas are identified as vulnerable based on land elevation relative to the selected shoreline water level, and refined by requiring hydrological connectivity to saltwater. It does not account for existing engineered sea defences.

Taken from 'Climate Central' online tool. See https://coastal.climatecentral.org/map/9/-0.2777/50.8718/?theme=sea_level_rise&map_type=coastal_dem_comparison&elevation_model=coastal_dem&fbclid=IwAR2xohfzRyVRn12MiZQjiri-90HoLym7F6k3-azPO9MSNWQguOIBROZVm8s&forecast_year=2050&pathway=rcp45&percentile=p50&return_level=return_level_1&slr_model=kopp_2014

Accessible Nature

Strategy: Target investment in natural capital where this will help to deliver accessible nature, particularly where it will bring the most benefit to people/communities. Support work being led by the South Downs National Park Authority to implement a **Green Infrastructure Strategy** for the National Park and wider areas of Sussex.

Approach

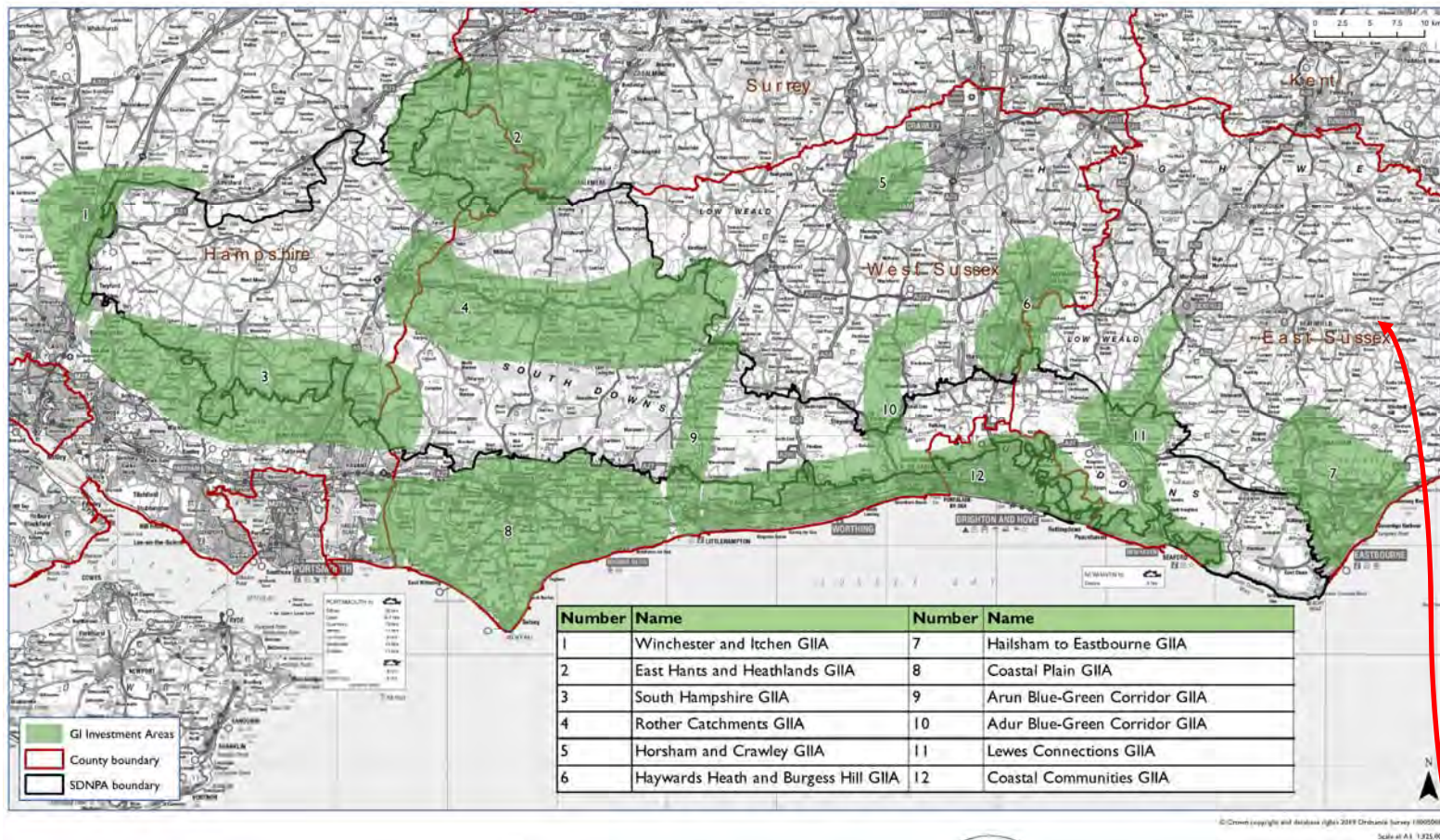
- Support the lead being taken in this area by the South Downs National Park Authority via its **Green Infrastructure Strategy** which identifies priorities for investment in accessible greenspace and natural capital investment areas for the delivery of accessible nature
- Support additional work to apply the methodology in the above strategy to any areas of Sussex outside the Park that are not covered by this strategy
- In addition, areas flagged to achieve more housing in the future in Sussex should be prioritised for protection and enhancement of accessible green space. Areas likely to increase in size due to new housing: Horsham, Crawley and the coastal belt between Worthing and Brighton and Hove. Other significant areas include Eastbourne, Haywards Heath, Hailsham and Chichester.
- Whilst the provision of green space is one part of the solution, it is also necessary to encourage people to access these spaces. 'Social prescribing' is an emerging approach which links people to social interventions which will benefit their health and well-being. These can be prescribed by GPs and those with a 'nature' focus can include activities such as nature walks or participation in conservation activities. This is not an area of current expertise of the LNP, but will be an important area to seek greater capacity and involvement in the future.

Proposals for Collective action by the LNP

- Formally support and adopt the Green Infrastructure Strategy for the South Downs National Park as the strategic vehicle through which the LNP will work to seek investment in accessible nature in Sussex
- Ensure any geographical gaps in the above strategy are filled to ensure Sussex-wide coverage of the strategy
- Work with the SDNPA in developing a delivery plan for the strategy across the whole of Sussex
- Work collectively to seek inclusion of high quality accessible green spaces in new developments in Sussex
- Identify a pilot project through which to apply techniques and assess physical flows and costs/benefits (metrics) – in order to guide future investment.
- Work with others to bring forward new project ideas
- Make formal connections with health/wellbeing and business interests in Sussex to investigate opportunities for discussion and collaboration in both the planning and delivery of investment in accessible nature

Commitment by LNP partners

To be agreed



The South Downs National Park Authority (SDNPA) has been leading a partnership of organisations in the analysis of the need and potential for investment in natural capital to deliver multi-functional greenspaces (green infrastructure) across the National Park and wider area of Sussex and Hampshire (a 'People and Nature network').

At the heart of the analysis has been the need to address deficits in greenspace provision, improve connectivity between greenspaces and address urban edge pressures, but to do so in a way that supports sustainable and healthy communities, strengthens natural and cultural heritage and builds resilience to the effects of change. The analysis also anticipates potential development pressure and proposes 12 Natural Capital Investment Areas where targeted, strategic investment in natural capital should be focused.

It should be noted that additional work needs to be done to ensure that this methodology is also applied to the area of Sussex that sits outside the boundary area of the SDNPA study. This will be a priority for the LNP within this Natural Capital Investment Strategy.

Figure 9. Natural Capital Investment Areas for the targeting of investment to contribute to accessible nature (prepared by the South Downs National Park Authority).

The NCIA identified within the SDNPA 'People and Nature Network' are as follows:

<p>1. Winchester and Itchen</p>	<p>This NCIA follows the River Itchen from south of Winchester city and in an arc to the north. The Itchen also forms 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.</p>	<p>2. East Hants and Heathlands</p>	<p>This NCIA lies includes several heathland sites, many 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.</p>
<p>3. South Hampshire</p>	<p>This NCIA lies across the northern PUSH area and the southern part of Winchester and East Hampshire districts. 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. The southern area of the framework abuts this initiative and needs to respond to ensure that a continuous approach to nature, water and people is developed.</p>	<p>4. Rother Catchment</p>	<p>This NCIA follows the wider catchment of the River Rother from Liss, through Petersfield and Midhurst, to join the River Arun at Pulborough Brooks. This GIA is wholly within the National Park and crosses a number of local authority boundaries; East Hampshire, Chichester and Horsham and Hampshire and West Sussex County Councils.</p>
<p>5. Horsham and Crawley</p>	<p>Growth of these towns is ongoing with more planned. This includes an extension to Crawley 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 across connections and greenspace provision and protect the edge of the High Weald AONB</p>	<p>6. Haywards Heath and Burgess Hill</p>	<p>This NCIA 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, which means a robust long term approach to planning for nature is needed.</p>
<p>7. Hailsham to Eastbourne</p>	<p>The Hailsham to Eastbourne NCIA straddles Wealden and Eastbourne local authority areas. There is development planned in both areas; in Hailsham and Polegate, the latter being directly adjacent to the Eastbourne border. All of the settlements are situated on the upstream feeder streams for the Pevensy Levels SAC and Ramsar. Water resources are an issue, with constraints on waste water, flooding and the need for no adverse effect on Pevensy Level. Road and rail infrastructure forms a barrier to access in some areas.</p>	<p>8. Coastal Plain</p>	<p>This NCIA covers the low-lying coastal plain from the west of Littlehampton (where it intersects with the Arun Blue-Green Corridor and the Coastal Communities GIA) through to Chichester in the north and Bognor Regis and the Manhood Peninsular in the south, 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. There is a likely need to adapt to flood-risk and coastal change resulting from rising global temperatures, increased rainfall and storminess."</p>

9. Arun Blue-Green Corridor	<p>This NCIA is one of the main river valleys which cut 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 GIA extends from Littlehampton to Billingshurst, intersecting with the Rother Catchment, Coastal Plain and Coastal Communities GIAs.</p>	10. Adur Blue-Green Corridor	<p>This NCIA is one of the main river valleys which cut 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 GIA extends from Shoreham-by-Sea to Steyning/Upper Beeding, with the Adur continuing towards Henfield.</p>
11. Lewes Connections	<p>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 GIA 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.</p>	12. Coastal Communities	<p>This extensive GIA stretches from Littlehampton in the west to Seaford and Newhaven in the east, including Worthing, Shoreham-by-Sea and Brighton and Hove. It includes two rivers, the Adur and the Ouse that connects the coast with the South Downs and Weald. There are multiple issues in this GIA, with a commonality of needs, requiring co-ordinated action on many fronts. This includes the likely need to adapt to flood-risk and coastal change resulting from rising global temperatures, increased rainfall and storminess</p>

Healthy and productive inshore waters

Strategy: To identify opportunities for investment in natural capital that will contribute to a thriving and sustainable food supply and fishery within Sussex inshore waters and support a range of other benefits for people and the environment.

Guiding Principles

According to the Natural Capital Committee, the marine environment lends itself to “a more integrated approach to the delivery of benefits and services than that on land”⁵⁸ and thus a focus on some carefully designed interventions and investments in natural capital, will unlock a wide range of benefits. It is much more inclined to the delivery of ‘multiple benefits’ through single interventions than habitats found on land.

Within Sussex inshore waters (and taking the lead from other natural capital marine approaches in the UK⁵⁹) guiding principles for action include:

- i) Investment in **improvement of the condition of seabed habitats by reduction in pressure on habitats** that are most sensitive and provide the greatest flows of benefits.
- ii) **Investment in creation and recovery of natural capital assets** which have been damaged or destroyed and where there is potential for recovery. There is particular potential for this in Sussex for saltmarsh and seagrass (which both provide important coastal defense and carbon storage benefits) and for kelp beds. Care for local reefs and protection from trampling could also be encouraged.
- iii) **Improvement of water quality of inshore waters** through a multi-pronged approach:
 - o Targeting the sources of pollution from small vessels – through a combination of awareness raising and provision of improved disposal facilities in harbours/marinas
 - o Integrated approach to pollution from land based agricultural and urban sources, through better representation of the marine natural capital impact in these discussions (e.g. where there is a significant marine impact (as there has been in Chichester Harbour), this should be an added driver for changing catchment land use practices)
- iv) More effective **management and control of other pressures** on inshore waters – via the MMO Marine Plan framework and application of net gain principles to marine activities
 - o Many of the pressures on the inshore waters listed above are regulated by a range of bodies (such as the Crown Estate, the MMO, Natural England, Environment Agency). Yet much more effort is needed to ensure joined up approaches to regulation and licensing of activities so that the full range of impacts on natural capital is considered.
 - o Promote the use of natural capital and ‘net gain’ approaches to licensing of activities in the marine environment so that these consider all impacts and deliver positive benefits
- v) **Reduced impact of algal blooms and invasive species**
 - o Support innovation in the development of natural capital projects to use invasive species or reduce their impact
- vi) Seek **‘net gain’ for the environment** delivered as part of integrated approach to harbour development, which in many cases is having a detrimental impact on marine natural capital assets/ seabed habitats.
 - o Engage with port authorities on applying a natural capital approach to harbour activities and expansion.
 - o Advocate for a natural capital ‘master plan’ to be produced for all harbour development to identify all impacts on natural capital assets, mitigation and delivery of net gain
- vii) **Investment in survey and monitoring of MCZs and European Marine sites in Sussex inshore waters** as ‘indicators’ of natural capital condition. These sites are very new and very little information is available on their condition. The ambition should be to build this over time, with the view to understanding the natural capital contribution of these areas and to inform future management and protection

Proposals for Collective action by the LNP

⁵⁸ NCC (2019)

⁵⁹ Notably, the North Devon Marine Pioneer project commissioned by Defra. See Ashley, M., Rees, S.E., Cameron, A. 2018. North Devon Marine Pioneer Part 1: State of the art report of the links between the ecosystem and ecosystem services in the North Devon Marine Pioneer. A report to WWF-UK by research staff the Marine Institute at University of Plymouth AND Rees, S.E., Ashley, M., Cameron, A. 2018. North Devon Marine Pioneer Report 2: A Natural Capital Asset and Risk Register A SWEEP/WWF-UK report by research staff the Marine Institute at Plymouth University.

- Support Sussex IFCA in its lead role in applying the natural capital approach to management of inshore waters in Sussex
- Work with Sussex IFCA and others to bring forward a marine natural capital pilot project, which can be used to assess flows and metrics and assist with the development of future projects
- Provide project partnership support and assistance with identifying project funding options
- Carry out advocacy on the need for improved facilities at marinas to reduce pollution from small vessels
- Ensure upstream and catchment-based initiatives on land consider opportunities for improvement of downstream coastal and estuarine water bodies. These positive impacts should be factored in to any monitoring or measurement of benefits of investment.
- Promote the application of the new ELMS approach to influence the impact of land use practices on downstream and marine environments
- Carry out advocacy for marine regulation and licensing activity to deliver **net gain for the marine environment**; engage with work by the Natural Capital Committee and others on this and identify how this could work.
- Engage with MMO and other marine stakeholders to encourage more joined up and integrated approach to marine planning and activity. Seek this approach for delivery of Marine South Plan.
- Provide support in development of possible projects for reducing invasive species or algal bloom in Sussex waters; Assist in identification of possible funding sources
- Engage with local authorities to promote 'net gain' for the environment as part of integrated approach to harbour development; seek support for net gain approach at national policy level (from Natural Capital Committee and Defra through 25 year plan delivery etc)
- Work with Port Authorities and invite a representative to sit on the LNP
- Advocate for monitoring as basis of future management of MCZs; to position this as recipient of marine net gain funds

Commitment by LNP partners

To be agreed

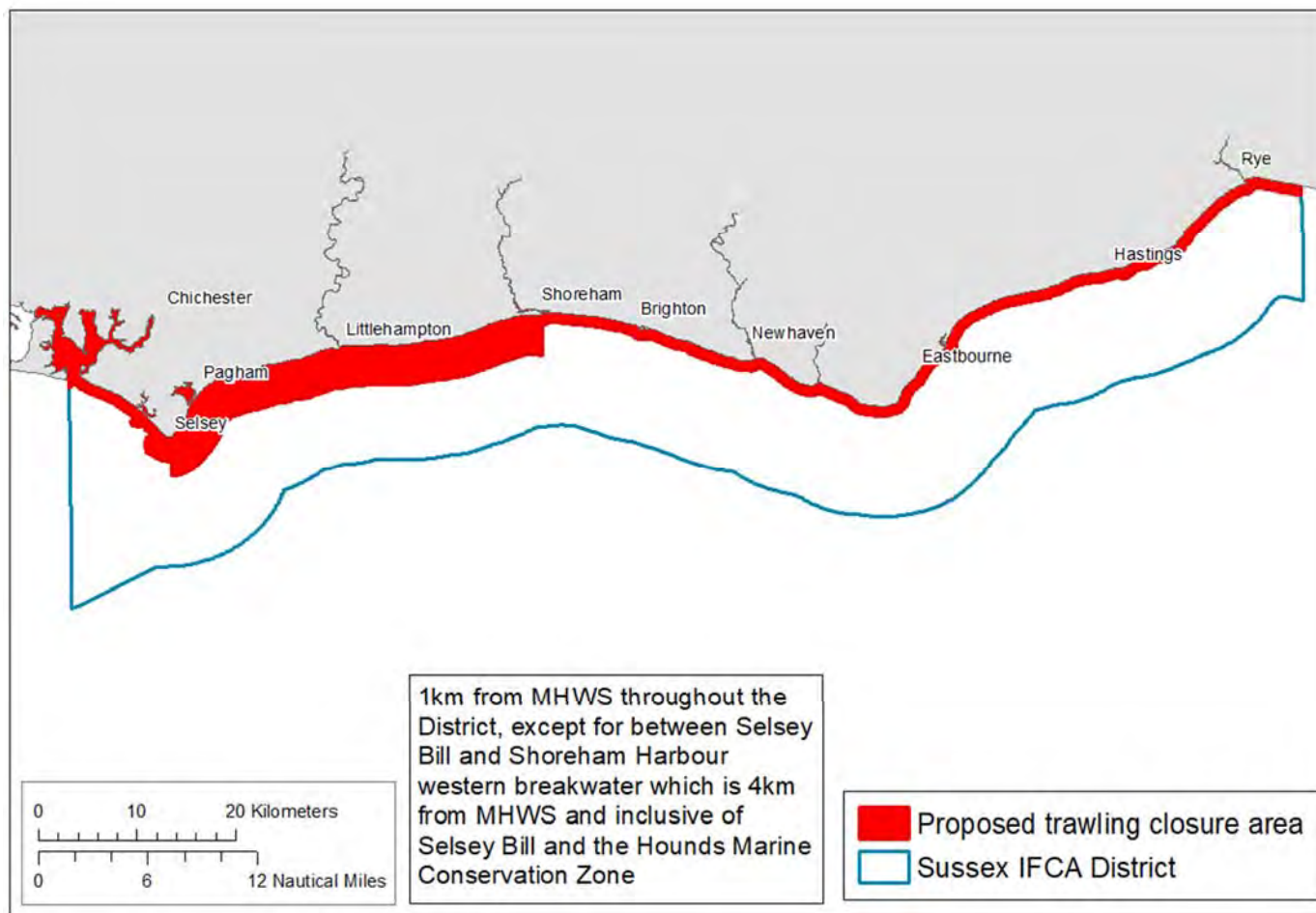


Figure 10a. Natural Capital Investment Areas: area for removal of trawling pressure from seabed habitats. Foundation for future recovery of inshore marine natural capital assets.

Sussex IFCA is currently seeking approval for a bye-law to remove trawling pressure (year-round) from a portion of the Sussex in-shore waters. If successful, this will relieve abrasion pressure on sensitive sea-bed habitats and thus enable recovery of these habitats and the benefits and services they provide. This will provide a solid foundation upon which other natural capital investment initiatives can then be built. Investment should initially be focused particularly on creation and recovery of kelp-beds, inter-tidal habitats (such as seagrass and saltmarsh) and on the protection of reefs.

Priority in Sussex:

- Removal of abrasion pressure (via trawling) from sensitive inshore habitats – in 4 specific areas:
 - 1 km (0.54nm) between Chichester Harbour and Selsey Bill
 - 4km (2.16nm) from Selsey Bill to Shoreham Harbour
 - 1km (0.54 nm) from Shoreham Harbour western breakwater to Rye Bay
 - Selsey Bill and the Hounds MCZ
 - Removal of other pressures causing inshore turbidity of nutrient enrichment.
- Investment in enhancement, expansion and creation of three specific asset types: kelp, seagrass and saltmarsh (which deliver benefits such as carbon storage, coastal flood protection, support for biodiversity, nursery grounds for fisheries)
- Identification of investment options and opportunities for marine protected areas

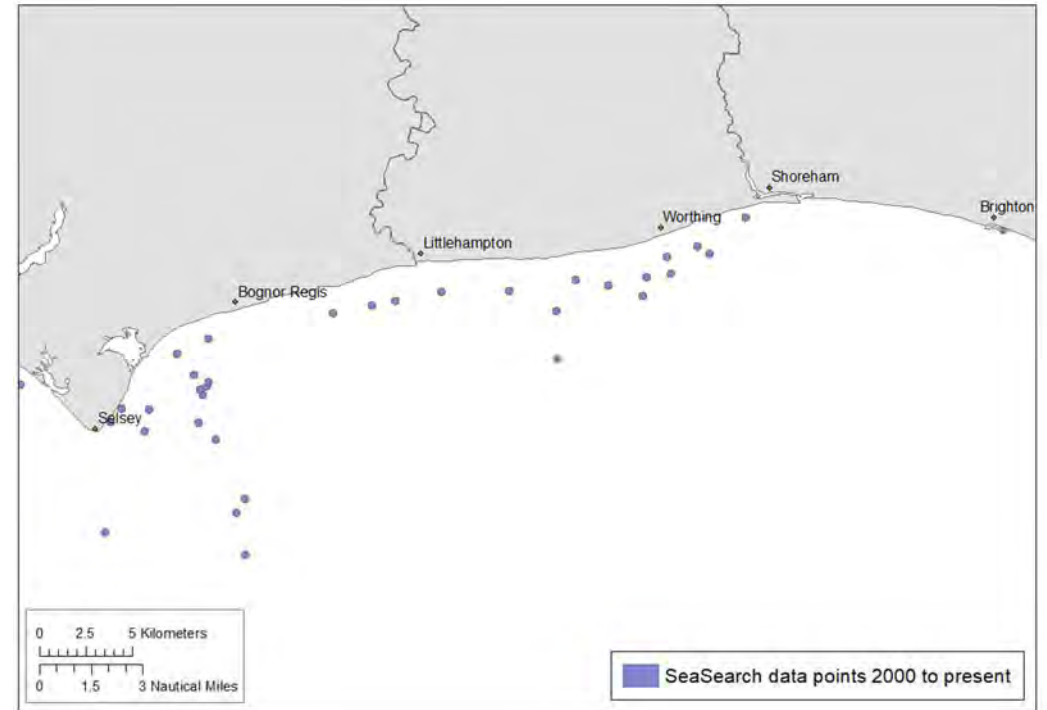
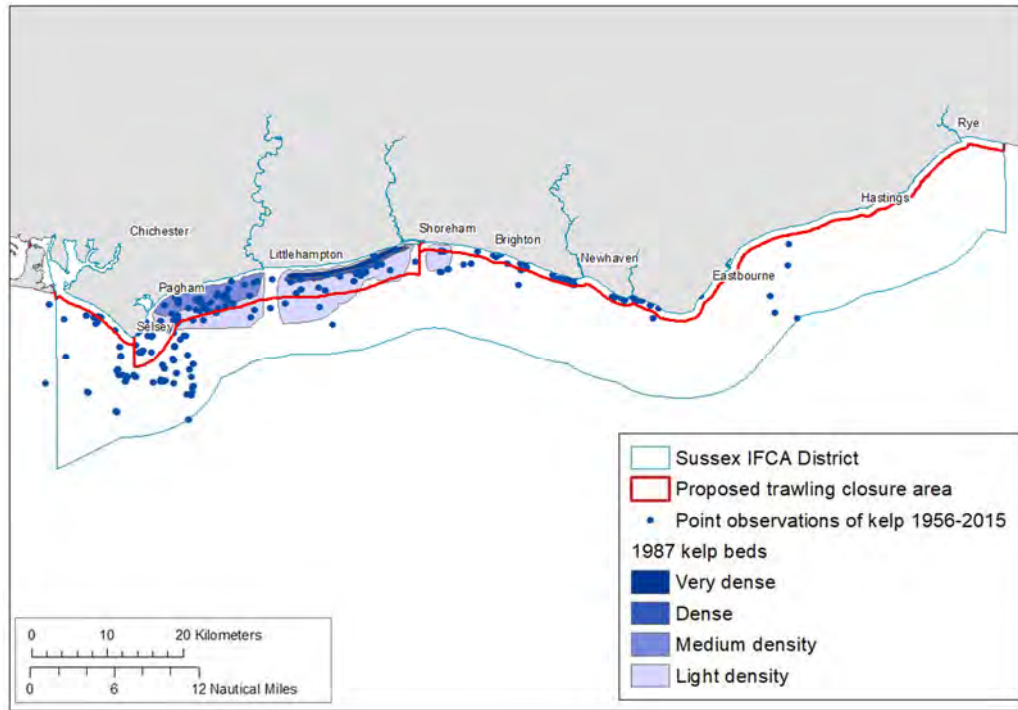


Figure 10b and 10c: Historic location of kelp beds in Sussex Inshore waters – and current location of kelp (confirmed survey points 2000 to present). Kelp is thought to cover only 5% of its area in the 1980s. (Source: Sussex IFCA). There is potential to recover historic areas of kelp through removal of abrasion pressure and additional natural capital investment.

Improved climate regulation (through carbon storage and sequestration)

Strategy: To increase opportunities for investment in natural capital to protect and increase the level of carbon storage and sequestration taking place via natural capital assets in Sussex – across the terrestrial, coastal and marine environments.

Guiding Principles

- i) Increase the level of 'carbon literacy' within land use/ conservation decision-making in Sussex – by providing greater information and strategic guidance on the role of natural capital in Sussex in carbon sequestration and storage
- ii) Target investment in the protection, enhancement and creation of natural capital assets that play an effective role in carbon sequestration and storage
- iii) Promote a strategic approach to new tree planting in Sussex – to ensure it is located where it will provide other benefits (e.g. for wildlife, accessible nature and so on) and where it will not result in loss of other natural capital assets

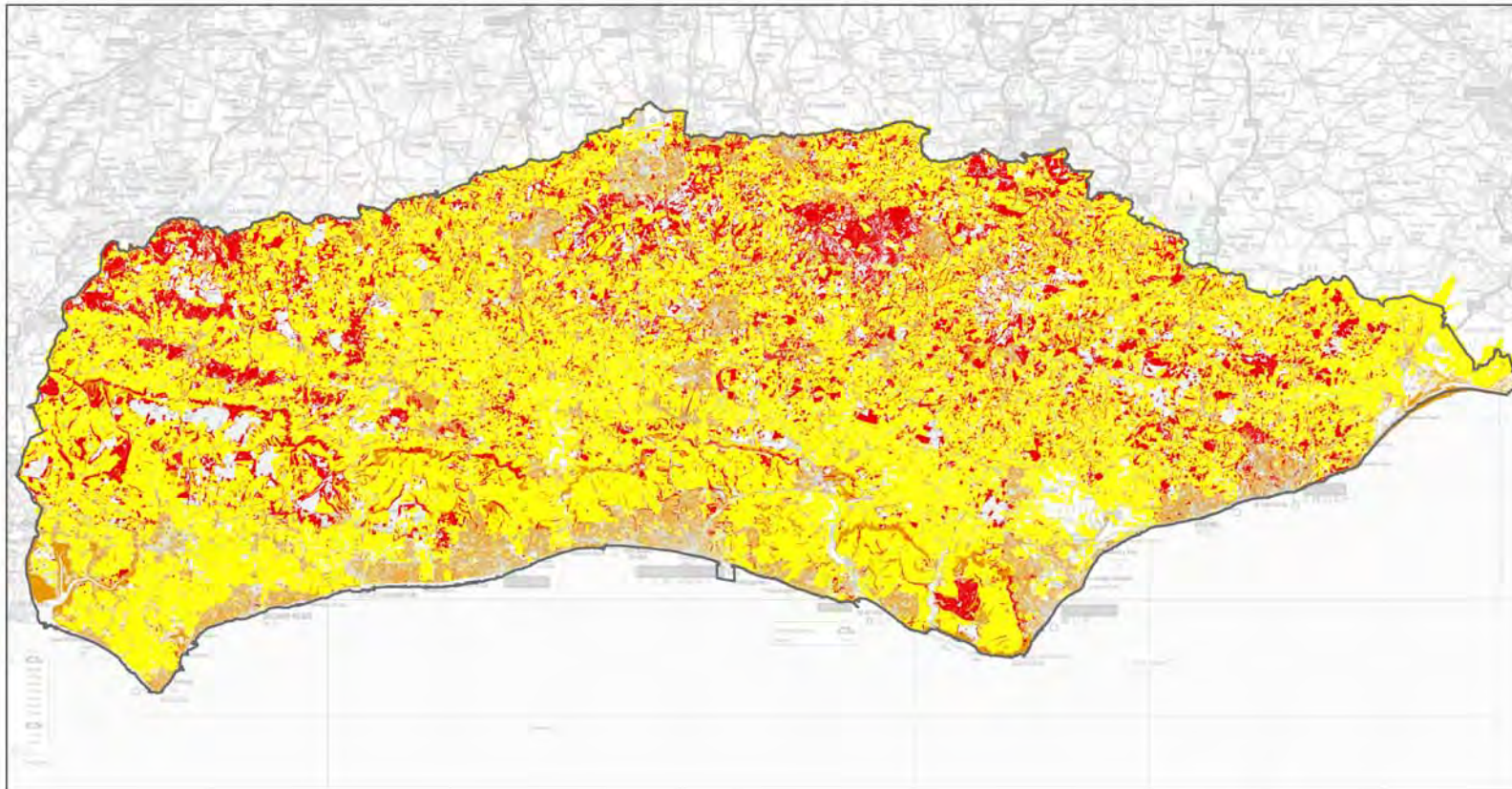
Proposed collective role of the LNP

- Commission/support research to identify the relationship between different natural capital asset types and carbon storage/sequestration
- Use this information to better integrate carbon storage/sequestration elements into existing and new projects and initiatives
- Disseminate the information to LNP partners and wider decision-makers in Sussex to influence/inform land use decisions so that existing carbon stores are adequately protected and that opportunities for the creation of new carbon storage assets are built into development proposals
- Produce a Sussex guideline/framework to guide decisions on location/design of investment in tree planting
- Bring forward natural capital project ideas for carbon storage/ sequestration in Sussex

Commitment by LNP partners

To be agreed

Thinking about where and how to invest in natural capital in Sussex to improve carbon sequestration and storage is still in its infancy. However, it is possible to identify two issues that can be tackled spatially and strategically at present:



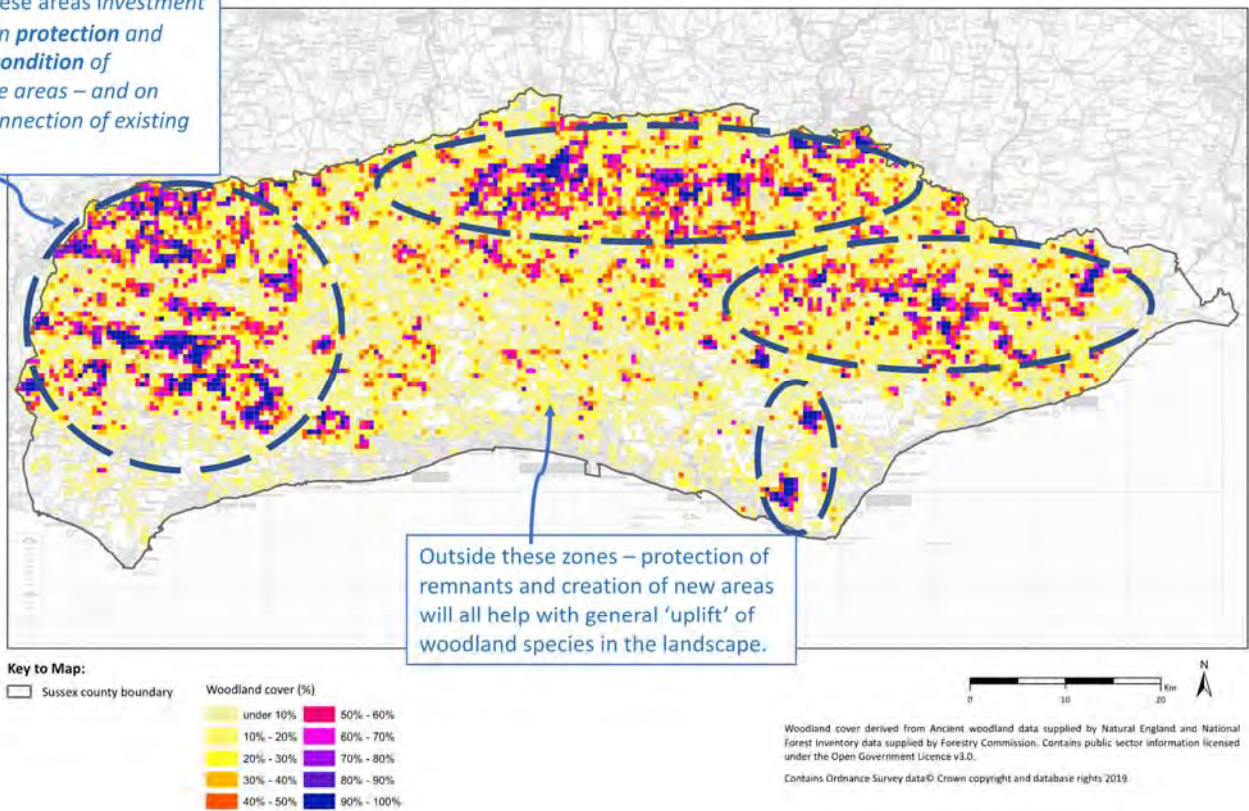
1. Protection of those assets that currently play an important role in climate regulation (carbon storage, carbon sequestration) – and ensuring this role is adequately included in planning and land use decision-making.

This ‘climate regulation heatmap’ helps to identify where natural capital assets are currently playing an important role in this regard.

Work can be done by the LNP and others to build on this information and develop information for decision-makers so that these assets are better protected into the future.

Figure 11: Location of natural capital assets currently playing a high, medium and low role in carbon storage and sequestration.

Investment in woodland networks: In these areas investment focus should be on **protection and improvement of condition of woodland in these areas – and on expansion and connection of existing areas**



Outside these zones – protection of remnants and creation of new areas will all help with general ‘uplift’ of woodland species in the landscape.

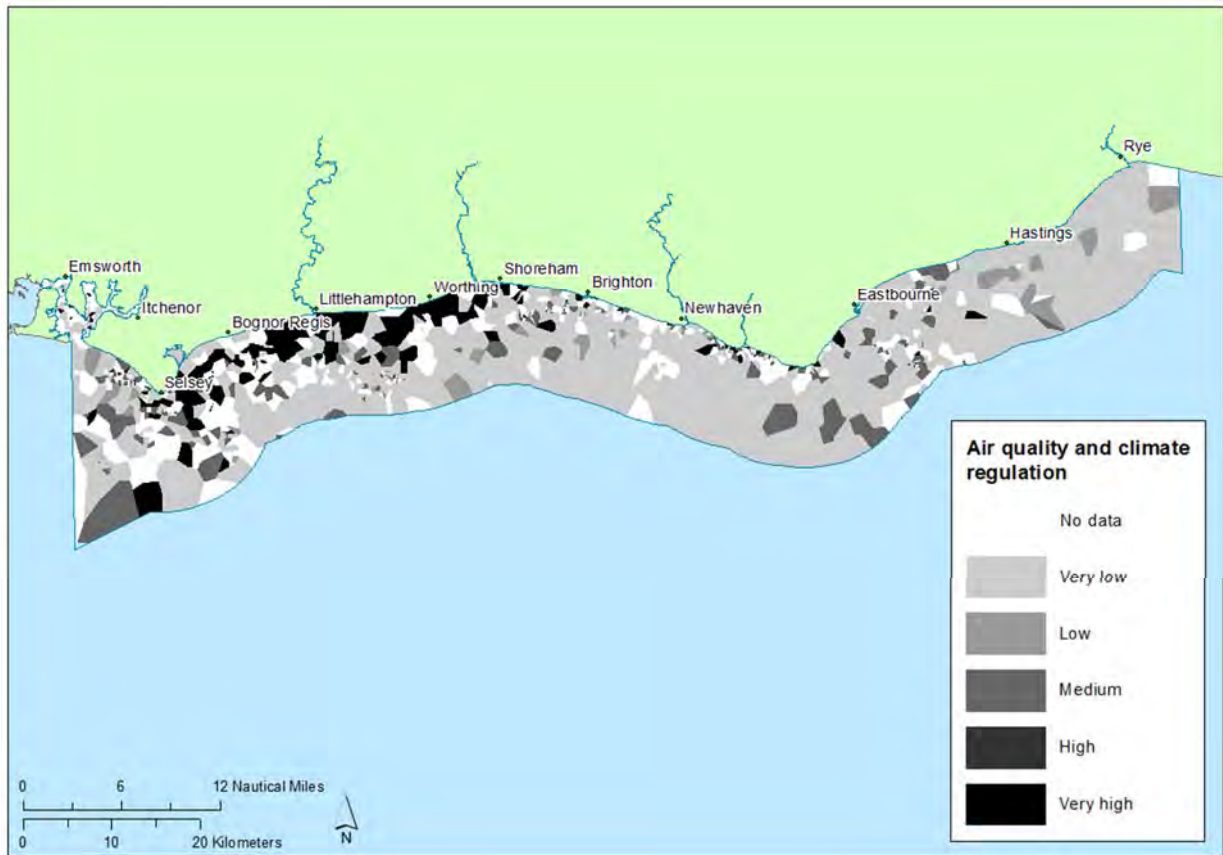
2. **Targeting tree regeneration, tree planting and hedge planting** for carbon storage purposes – to areas of Sussex where this will not only increase carbon storage, but will deliver other benefits and in particular will support woodland biodiversity.

This ‘**woodland heatmap**’ identifies existing woodland concentrations in Sussex. In terms of biodiversity benefit, new woodland planting or regeneration in the areas of high woodland concentration can be used very beneficially to expand and connect woodland fragments and thus strengthen woodland ecological works.

Outside these areas, new planting in areas where this will not damage existing habitats of value, will help to ‘uplift’ the presence of woodland species in the landscape.

This sort of approach can be worked into a broader strategic ‘natural capital’ approach to new woodland creation for carbon (whether by planting or regeneration), so that this new focus on ‘trees for carbon’ can be used to deliver other benefits where they are needed most.

Figure 12: Natural capital Investment Areas – broad zones for protection and investment in new woodland for strengthening existing woodland ecological networks



Carbon storage and sequestration in the marine environment.

Work by Sussex IFCA has modelled the ecosystem services provided by the seabed habitats in the inshore water. This map shows where existing habitats contribute to air quality and climate regulation (via carbon sequestration and storage).

Plans by IFCA to remove trawling pressure from inshore habitats (see Figure 10a above) will allow many of these habitats to recover their condition and extent, which should over time increase their ability to sequester and store carbon.

Figure 13: Seabed habitat contribution to air quality and climate regulation.
Data source: Sussex IFCA

Delivering for Multiple Benefits

The above section of the strategy has taken a 'siloed' approach and identified how and where investment in natural capital has the potential to deliver on six specific benefits of interest to the LNP. However, the beauty of the natural capital approach is that it is inherently good at delivering **multiple benefits**. As shown in the asset register, a habitat (when in good condition) carries out many ecological functions which in turn deliver a whole range of services and benefits.

An important part of identifying opportunities for investment in natural capital is to both use this capacity of natural capital as a means of increasing its attractiveness to investors AND to make sure that the design and delivery of investment projects leverages as many benefits as possible from the investment. This provides opportunities for collaborative and/or partnership working where various funding streams can be brought together to create the funding necessary. "Packaging" a project in a way that identifies the full range of flows of benefits will be important in making this happen.

Project design can also play an important part in turning a 'single focus' project into one that delivers across a range of benefits. This can be left to chance (e.g. by improving the condition of an asset for one reason, it can be assumed that other benefits will also increase). Or, care can be taken when designing a project to ensure that it delivers both the 'primary benefit' (the purpose of the project) AND other 'parallel' benefits.

Guiding Principle: to approach **all natural capital interventions and projects** with the goal to leverage as much value across a range of benefits as possible, by using a knowledge of the ecosystem services and benefits they provide and the design and management approaches needed to deliver them.

The 'biodiversity double lock' should ensure that all natural capital projects, by default, are designed and delivered in a way that optimises the benefits to biodiversity whilst also delivering the benefits of interest to the investor.

8. Making it happen

The Sussex LNP has shown great vision in commissioning this strategy. It has allowed a great deal of progress to be made in collating spatial data and creating a framework within which to think about natural capital in Sussex. But to take the next step towards attracting greater investment, will require the LNP to play a leading role. Work by Surrey Nature Partnership has identified its role – and potentially the network of LNPs nationally – as one of “stimulating and catalysing a multi-capital approach” to investment in Surrey, with natural capital at its core⁶⁰.

This final section sets out the steps needed to take the natural capital approach forward in Sussex – and to move towards a situation where it is attracting investment and delivering tangible benefits for the local economy, people and environment. These are steps that can be led by the Sussex LNP, and so can form a ‘roadmap’ for the partnership in its work in this area going forward.

1. Engage across sectors

This document has been developed for use by the Sussex LNP, to progress its understanding of the natural capital assets of Sussex, to identify how and where investment is needed to protect and enhance these assets, and how a natural capital approach can be used to help deliver priority ‘benefits’ of specific interest to LNP partners.

It has been important to reflect the interests of LNP partners in this way, as it has helped all involved to understand how a natural capital approach can help to deliver the vision of the LNP and support their own work. But it is now important to engage across other sectors, particularly business and industry, Local Enterprise Partnerships and representatives of the health and well-being sector, to develop a wider and more integrated approach to natural capital investment in Sussex. Natural capital should underpin aspirations for a sustainable local economy. It is up to the LNP to develop the relationships and mechanisms through which this can become possible in the near future.

2. Embed natural capital in planning and decision-making processes

‘We use nature because it is valuable, but we lose it because it is free’⁶¹

One of the founding premises of the natural capital approach, is that it is a mechanism through which the wide range of benefits provided by nature can be better represented in decision-making. One of the fundamental tasks for the LNP, is thus to champion its use across a wide range of decision-making forums or ‘arenas’ in Sussex. If this can be achieved, (it is assumed) that more resources and investment will flow towards natural capital approaches and towards the protection of the underlying assets.

Planning for natural capital investment in the Netherlands has identified three decision-making arenas where natural capital plays a part. There are different opportunities for embedding the natural capital approach in each⁶².

These roughly translate to the UK setting as:

- Sustainable business

⁶⁰ Surrey Nature Partnership (2018). Natural capital investment plan for Surrey.

<https://surreynaturepartnership.files.wordpress.com/2018/03/natural-capital-investment-plan-for-surrey.pdf>

⁶¹ TEEB project leader Pavan Sukhdev in Van Egmond and Ruijs (2016). National Capital in the Netherlands: recognising its true value. PBL Netherlands Environmental Assessment Agency

⁶² Van Egmond and Ruijs (2016). National Capital in the Netherlands: recognising its true value. PBL Netherlands Environmental Assessment Agency

- Local planning and place-making
- An entrepreneurial approach to nature conservation

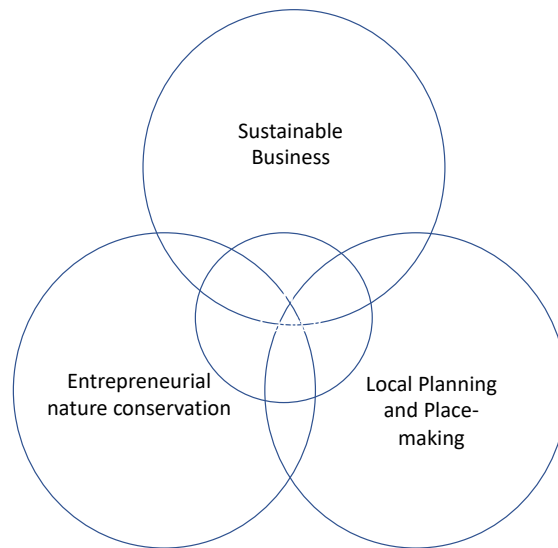





Figure 14: Promising ‘arenas’ for operationalising the natural capital approach (adapted from van Egmond and Ruijs⁶³)

Within the Sussex context, embedding natural capital approaches in these three areas will require changes in how decisions are made and how resources are allocated but will have very positive consequences for natural capital, for example:

<p>Sustainable Business</p> 	<p>Businesses invest in natural capital in Sussex that they rely on</p> <p>Businesses protect natural capital they have an impact on</p> <p>Businesses invest in the local area they operate in (the idea of ‘corporate social responsibility’)</p> <ul style="list-style-type: none"> • The LNP strategy helps to locate these assets and to start the conversation about corporate investment • This is an exciting way to broaden investment in nature and develop innovative partnership projects
<p>Local planning and ‘place making’</p> 	<p>Natural capital assets of value to society and the economy are protected through spatial planning</p> <p>Mechanisms evolving from the planning system, such as net gain, green infrastructure and the Community Infrastructure Levy, are used strategically to achieve improvements in natural capital where they are needed most</p>

⁶³ *ibid*

	<p>Natural capital investment evolving from national government funds, such as flood risk management and agri-environment schemes – is also used strategically to secure assets and deliver multiple benefits</p> <ul style="list-style-type: none"> • The LNP investment strategy provides the strategic and spatial information needed to properly inform local decisions that influence natural capital assets • The strategy provides the framework for more targeted and coordinated use of resources
<p>An entrepreneurial approach to nature conservation</p> 	<p>Nature conservation organisations find a broader focus through delivery of benefits to society and the economy via ‘natural solutions’</p> <p>They develop joint visions and projects with new partners and investors to deliver multiple benefits</p> <p>They have a key role in collating and progressing knowledge needed to inform natural capital investments</p> <ul style="list-style-type: none"> • The LNP investment strategy identifies where nature can be used to deliver things of value to others & thus flags new funding opportunities • The strategy also illustrates how and where nature underpins the economy and society – and provides a strong platform for advocacy and influence

The LNP has a role to play, through advocacy, knowledge sharing and partnership working, to try to embed natural capital in the above arenas at the local level. LNP members sit across all three groupings, and so if each was to embed the natural capital approach within their own ‘way of working’, much progress would be made.

At the project level, the nature conservation organisations within the LNP also have the opportunity to widen the focus of traditional ‘nature conservation funding’ to seek new and innovative ways to ‘supply’ natural solutions to new markets. Much of this will involve partnership working and collaboration, but there is already a strong history of this within Sussex which provides a strong platform for the future.

Some of the above will also be aided by changes in national government policy (e.g. the adoption of natural capital as the basis for the 25 Year Plan for the Environment) and by a movement within business towards more sustainable working practices. But much more can be done to keep this momentum going and to drive natural capital into the key decision-making and planning processes locally. Providing all with a common ‘natural capital’ framework to work within will help to coordinate efforts and target investments in mutually beneficial areas.

3. Understand more about the ‘value’ of our natural capital – and communicate this widely

A core part of this strategy has been the creation of the first ever ‘asset register’ for natural capital in Sussex. This has pulled together spatial data for all asset types and made some progress towards assessing their condition and the broad flow of benefits they provide. But this assessment of condition and flows is very ‘broad-brush’ and is not complete. For example, it describes many of the

‘physical flows’ we receive from natural capital, but does not quantify these and it does not contain any information about the economic ‘value’ of the natural capital of Sussex.

There is thus a need for ongoing work to complete and refine the asset register as more information becomes available and as methodologies for assessing physical and economic flows from natural capital evolve. This strategy did not rely on modelled information, but as time goes by, the models that are being developed to assess ecosystem services are becoming more sophisticated and reliable, and so could be used to help fill these gaps.

With complete and reliable physical flow information in place, it is then possible to take the step towards creating a ‘natural capital account’ to reflect the economic value of natural capital of Sussex. This is often done at the organisational level (see the figure below – which was developed by the RSPB when assessing the natural capital value of its reserves) but may also be useful at the Sussex level, particularly when working with business and industry to encourage natural capital investment.

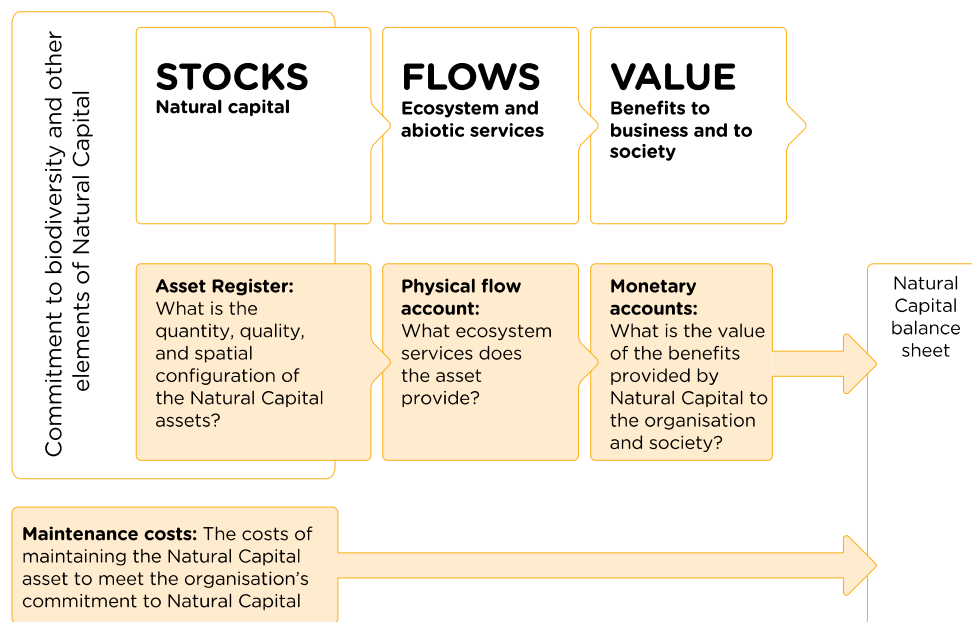


Figure 15. Steps involved in developing a natural capital account⁶⁴

With more information in place, the LNP may also want to consider the creation of a ‘natural capital index’ to provide an annual report on the state of natural capital and to enable tracking of this status from year to year. Methodology on the preparation of such an index has been developed and applied in Scotland⁶⁵ and provides a useful indicator not only for progress being made in protecting and enhancing natural capital assets, but on how the condition of the asset base is ‘moving’ in relation to other indicators, such as GDP. There is certainly a potential role to be played by the LNP to use these sorts of reports to hold planning authorities and other decision-makers to account on their impact on natural capital.

As the understanding of the role of natural capital in Sussex grows, it will be important to start to disseminate and communicate this to a range of audiences, both within LNP membership, and more widely to other decision makers, potential investors, communities and local people. Very useful

⁶⁴ RSPB (2017). Account for Nature. A natural capital account of the RSPB’s estate in England.

⁶⁵ <https://www.nature.scot/sites/default/files/2019-04/Scotland%27s%20Natural%20Capital%20Asset%20Index%202019%20-%20Summary.pdf>

work has already been done to develop a 'plain English' interpretation of marine natural capital in Sussex. Work to continue this process for terrestrial and coastal natural capital would be very valuable and would provide the foundation for the subsequent development of 'Comms' messages and products. The LNP, as potential users of this work, should have a role supporting and driving it forward.

4. Learn from other pioneers in the field

As noted above, the methodology for assessing and valuing natural capital is in its infancy. Also evolving are the financial mechanisms for investing in natural capital and the markets within which this takes place. While this strategy process has focused on mapping and understanding its asset base, other work within the UK has placed more emphasis on developing 'investible' projects and figuring out how best to create completely new funding streams for natural capital. Surrey Nature Partnership has been leading the way in this⁶⁶ and Sussex LNP will continue to collaborate and learn from them. The experience of Surrey Nature Partnership in developing and funding projects will be invaluable in the next phase of this work.

There has also been work done across the country on various natural capital 'pioneer' projects in conjunction with Defra. At the national level, the Natural Capital Committee continue to provide guidance and in Scotland, Scottish Natural Heritage and the Scottish Wildlife Trust are leading the way in the development of a range of applications of the natural capital approach. The lessons from all of this work will be useful, as will the internal experience in natural capital within the LNP, such as that held by the South Downs National Park.

Ongoing engagement with this 'community' of organisations and individuals pioneering new approaches in natural capital investment will be an important task for the LNP to ensure that it can identify and apply new methodologies developed by others and stay at the forefront of this emerging discipline.

5. Share knowledge and develop expertise within Sussex

Many of the LNP partners are exploring the application of natural capital and they are doing it from various angles. For example, the nature conservation organisations are exploring new partnerships to attract new revenue streams for nature, while water companies are developing their own natural capital accounts and are making commitments to investment in natural capital as part of a package of methods for securing clean water supply. There are different projects going on across Sussex that are helping to increase our knowledge and understanding of many aspects of natural capital. Much more can be done to share this knowledge as it emerges, and to develop a collective 'internal' expertise within the LNP. An important part of this will also be to keep abreast of the work being done elsewhere, for example by other LNPs, government and the private sector.

'Natural capital knowledge sharing' should therefore be brought forward as a potential major work stream for the LNP going forward.

6. Influence emerging policy and practice

Whilst also learning from emerging methodologies happening elsewhere, it will also be important to use the experiences gained from preparation of this strategy to influence the development of new policy and practice. In part, this will help to create an enabling policy environment for implementation of the strategy, but will also contribute to the general forward development of the natural capital approach.

66 Surrey Nature Partnership (2015). Naturally Richer: a natural capital investment strategy for Surrey. Surrey Nature Partnership (2018). A Natural Capital Investment Plan for Surrey. <https://surreynaturepartnership.files.wordpress.com/2018/03/natural-capital-investment-plan-for-surrey.pdf>

In terms of policy, the most critical need at present is to influence the local delivery of the various initiatives coming out of the Defra 25 Year Plan for the Environment, such as local natural capital delivery plans, application of mandatory biodiversity net gain and the creation of local Nature Recovery Networks. New 'Environmental Land Management Systems' are also being created to replace existing agri-environment schemes. Development of a natural capital asset register and spatial mapping of assets would provide a useful foundation for all of these new policies and initiatives. It would also provide a common framework which would in turn promote a more joined up approach to local delivery for the environment. The LNP should also consider trying to 'position' LNPs as the logical home for natural capital approaches at the local level, through engagement with Natural England and Defra.

In terms of practice, there is also a need to 'translate' and interpret the natural capital approach for application at the project or site level. For example, if we want developers and planners to understand the benefits of natural capital approaches in the creation of new housing and infrastructure proposals, it will be necessary to provide guidance and demonstration projects to illustrate these. The LNP is well placed to collate best practice and to use this to develop practical 'site based' guidance for a range of applications.

7. Develop capacity

The implementation of this strategy will require a level of capacity and expertise in natural capital approaches across LNP members and wider partners, local government, potential investors and communities. A plan to identify and develop the required capacity across Sussex to implement this strategy and embed natural capital approaches in key decision-making processes will have to be developed as part of the next phase of this work.

8. Develop a project pipeline

One of the key mechanisms for achieving investment in natural capital is to develop a 'pipeline of investable projects' – ready to match with potential investors. These are well designed projects, targeted to a specific 'need' and accompanied by a set of sound metrics which will enable any investor to track and monitor the outputs (or returns on investment).

As for much else in the natural capital field, there is no shortage of potential project ideas, but what is still missing are the markets, funding mechanisms and metrics (ways of measuring the 'returns' on investment they provide) to enable them to be brought forward in practice. These need to not only provide 'capital' funds, but the vital sources of revenue required to ensure management and delivery of projects. However, that does not mean it isn't possible at present to develop some detailed project proposals that can tap into those markets and funding streams that do exist at present. Some of these ideas have already been flagged in section 3 of this document.

Figure 10 below provides a useful analysis of the investment opportunities that currently exist, and the ones that are on the short and longer term horizons. Things will move fast, and so the secret will be to have a number of projects in the pipeline and 'ready to go' once they can be matched with existing funding mechanisms or when new funding mechanisms come on-stream.

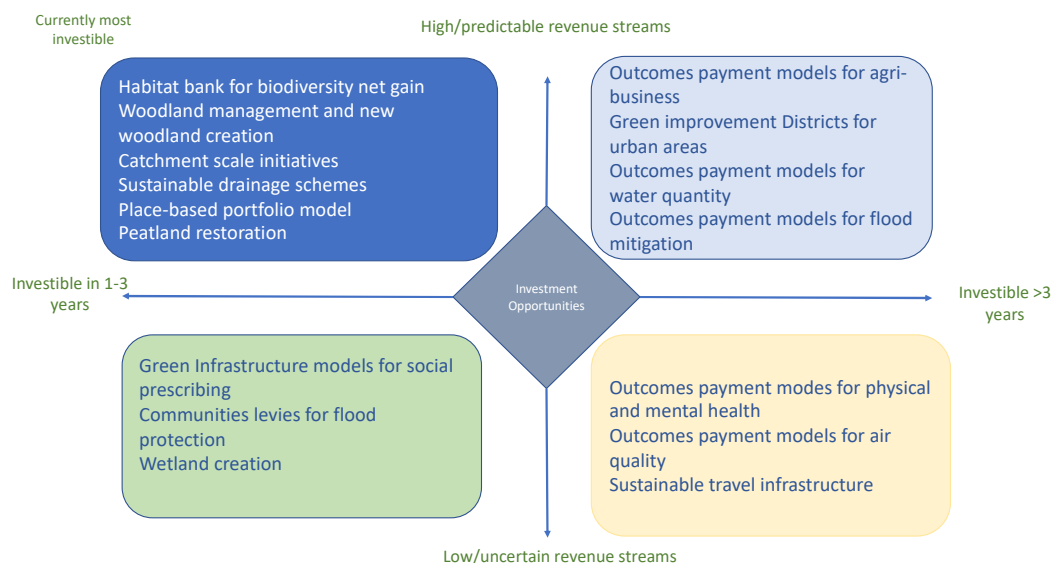


Figure 16. Analysis of natural capital investment opportunities (current, short and medium term)⁶⁷

In the short term, the LNP can therefore work collectively, and across sectors within Sussex to start to develop project plans that could be matched with some of the existing funding streams or those that are more likely to emerge in the short term. It can then act as a sort of ‘investment broker’ – matching projects with funding sources.

But in the longer term, it will be necessary for the LNP to become much more ‘literate’ on investment mechanisms, markets and investor needs if it is to move from the more traditional sources of funding, to the creation of new and innovative investment pathways. As above, Surrey Nature Partnership is leading the way on this and thus the Sussex LNP should learn what it can from its neighbour through continued partnership and collaboration.

9. Develop the metrics needed to confirm project outputs

One of the main obstacles to attracting new investment for natural capital, is the difficulty in identifying the precise flow and value of benefits from investment in natural capital. In other words, what return they will provide on investment. There is a lot of work going on on this topic, as this is the ‘key’ to unlocking the potential of natural capital investment. Investment vehicles (like the Green Bank) and corporate organisations are leading the way, but nature conservation organisations can also play their part. Much more could be done to monitor existing conservation projects against a range of indicators which reflect the flows of services and benefits they provide. This sort of information could be used to start to build an understanding of the likely returns from investment particular types of project can deliver.

Developing metrics to accompany investible projects is not likely to be a core role for the LNP, but careful thought should be put into how it can contribute, and how it can collate best practice in this area for application in Sussex. One obvious role for the LNP is to scrutinise projects that are brought forward, to ensure that they protect existing natural capital assets and provide a net gain for biodiversity (i.e. that they fulfil the biodiversity ‘double lock’). Some sort of local LNP accreditation could be developed for this. This would provide assurances to any investors, government agencies, local governments or others that the project will have a positive effect on nature.

⁶⁷ Greater Manchester Natural Capital Investment Plan. Executive Summary. January 2019. <https://naturegreatermanchester.co.uk/wp-content/uploads/2019/01/eftec-GM-NCIP-Summary-A4-16pp-v3-LoRes2.pdf>

10. Develop data sets and data management services needed to support natural capital investment in Sussex

The work undertaken by the Sussex Biodiversity Record Centre (SxBRC) to assess the natural capital assets of Sussex and map services and benefits, has resulted in new framework of natural environment data in Sussex. This data has been compiled using groupings and definitions proposed by the UK Natural Capital Committee and Natural England. The data is so extensive that handling it is cumbersome and inefficient and work needs to be undertaken to transfer data formats to a more utilitarian framework. This means embedding the data into the existing Sussex Habitat Framework (an in-house SxBRC system using the UK Hab. HIS classifications) and ensuring that all data licencing and histories are fully documented. Ultimately as the Sussex Local Nature Partnership develops its agenda, it will need data products, definitions and LNP wide services. These will add value to the data already held. The Sussex Biodiversity Record Centre is staffed by data professionals and works to standards and procedures that ensure that any future Natural Capital data products for Sussex could be defined, created and shared in the most professional and appropriate way possible. The Work of SxBRC has been invaluable to the Sussex Natural Capital work to date and will continue to be so.

11. Prepare a more detailed investment plan

As the points above have demonstrated, taking this strategy forward and ‘operationalising it’ will require a lot more detailed work and understanding, particularly of how to develop the funding streams needed for investment in natural capital in Sussex and who the potential investors might be. Thought will also need to be given to the role of the LNP in facilitating this, and the resources and capacity needed to make it happen.

An important next step will thus be the preparation of a more detailed implementation plan (Natural Capital Investment Plan for Sussex) which will set out some of the answers to these questions. This should be done in collaboration with a much wider stakeholder group, embracing Local Enterprise Partnerships, health and wellbeing interests, local businesses and others so that it becomes a credible and inclusive plan to underpin both a healthy environment and a sustainable economy for Sussex into the future.

12. Establish the LNP governance, structures and functions required to implement the Investment Plan

Implementing this strategy, and any detailed investment planning that arises from it, will require a change of role for the LNP. The LNP has the potential to move from broad forum for discussion and joint working (with no formal staff resources or funding streams), to becoming the catalyst for application of the natural capital approach across Sussex, supported by the staffing and funding streams required to do this. The role as catalyst will involve the many points noted above – from developing knowledge and expertise, communications, engagement with other sectors right through to developing investable projects and attracting and distributing finance for these. Much work has been done by Surrey LNP on how an LNP can act in this role and a detailed plan detailing the governance, structures and functions required to make it happen. The existing close relationship between Sussex and Surrey LNPs provides a very positive foundation for future cooperation, learning and implementation of what could be an exciting new role for the LNP.

Appendices

Appendix A: Sussex Local Nature Partnership: Members (2019).

Sector	Organisations
Farmers & Land Managers	National Farmers Union Country Land & Business Association
Local Authority	Brighton & Hove City Council East Sussex County Council West Sussex County Council
Government Body/Agency	Natural England Environment Agency Forestry Commission Inshore Fisheries & Conservation Authority
Protected Landscapes	South Downs National Park Authority High Weald Area of Outstanding Natural Beauty
Business	Southern Water Portsmouth Water South East Water
NGO	National Trust Royal Society for the Protection of Birds Campaign for the Protection of Rural England Sussex Wildlife Trust Woodland Trust Action in Rural Sussex Sussex Community Development Association Arun and Rother Rivers Trust
Research	Kew at Wakehurst Sussex Biodiversity Record Centre

Appendix B: Summary of analysis of ‘Natural Capital At Risk’

Table 1: Asset-benefit relationships at risk as identified by the Natural Capital Committee⁶⁸

Terrestrial and coastal assets only

Asset type	Benefits they provide that are at risk
Very High/ High Risk\ (where the current status of natural capital assets is poor and is placing specific benefits at high risk)	
Mountains, Moorland and Heaths	<p>Very High risk to provision of clean water, due to widespread loss of this habitat and degradation in its quality</p> <p>Very High risk to equitable climate (carbon storage) due to degraded condition of these assets which have the potential for much greater carbon storage. The poor quality of these assets also place aesthetics and hazard regulations benefits from these assets at risk .</p> <p>The high level of risk is largely the result of significant loss and degradation of blanket bog over the last 60 years. Historic air pollution combined with unsuccessful attempts to convert this habitat to productive agricultural land has left a legacy of soil erosion, impoverished vegetation and associated impacts on wildlife, carbon storage and clean water provision.</p>
Freshwater habitats	<p>Very High risk to: wildlife in freshwater habitats due to poor quality of habitat and unfavourable spatial configurations.</p> <p>Other benefits at risk: recreation, aesthetics, hazard protection, equitable climate.</p> <p>Despite protection under the EU Water Framework Directive, freshwaters continue to be affected by activities in other land-use categories. Only 33% of water bodies in England are classified as being in good ecological status.</p> <p>Freshwaters continue to suffer because they are affected by activities across other major land use categories. Rivers, lakes, wetlands and ground-waters are sinks for sediments and pollutants arising elsewhere (for example, from agriculture and urban runoff) as well as being intensively managed themselves in order to provide clean water, manage flooding and to deal with waste.</p>
Coastal habitats	Medium risk to aesthetics, hazard protection, wildlife and equitable climate.
Woodland	Low risk: to benefits provided by woodland most due to increases in woodland cover over the years, but risk does still remain to benefits provided by woodland due to low quality and poor spatial configuration of woodland areas.
Farmland	<p>Very high risk to wildlife (due to poor habitat quality of farmland)</p> <p>Low risk: to food production from farmland, but with caveat that this doesn’t adequately reflect the impact of poor soil quality. Soil is a continuing concern in the UK because of additives and pollutants, and it is affected by erosion; around 2.2 million tonnes of topsoil is eroded annually in the UK.</p>
Urban areas	Growth in this land use type is placing provision of clean water at high/very high risk, due to deterioration in freshwater, soils and natural water purification processes in these areas
<i>Sussex LNP analysis of how this can be interpreted for Sussex</i>	
	<ul style="list-style-type: none"> Heathland habitat in Sussex is largely represented by the Ashdown Forest which provides headwaters for several rivers. Investment in preventing loss or further degradation of heathland habitat in this area and seeking improvement in habitat quality would help to address risk to the benefits provided by this asset type.

⁶⁸ Natural Capital Committee (2014). The State of Our Natural Capital: restoring our natural capital. Second Report to the Environment Affairs Committee.

	<p>West Sussex heaths are smaller and more vulnerable to development and lack of management and the LNP must work collectively to address this.</p> <ul style="list-style-type: none"> • Sussex has a large extent of freshwater habitats, which are also included in the high-risk category. Action to improve the quality and spatial configuration of these assets could deliver great increases in associated benefits across the area. • Benefits received from coastal margin habitats are at medium risk nationally. Given the pressure on the coastal margins in Sussex and the extent of the coastal area found in the Sussex, this will be at least the case in Sussex. It is important to note that coastal areas in Sussex include the Downs and therefore the aquifers (and the water) beneath them. Particular focus should be given to these areas to identify local level of risk and to prioritise this in the strategy. • Given the local importance of natural capital in urban areas (and the precautionary approach advised due to lack of information) – developing a greater understanding of the contribution of natural capital to urban environments will be important going forward. A precautionary approach to protection of these assets in urban environments should be taken. • Sussex has a large extent of woodland, thus a focus on improvement of the quality of existing woodland would be beneficial to the delivery of benefits, whilst ensuring any new woodland also includes a focus on management for its long-term quality, will be important.
--	--

Table 2: Headlines from the asset-benefit relationships at risk in Sussex (taken from Evidence base, produced by Sussex LNP to accompany this document. It is based on available data and expert knowledge of the assets in Sussex and the pressures they currently face. This analysis will be updated regularly as data improves).

Table 2a. Terrestrial Assets

Asset	Benefit at risk	Rationale
Freshwater Assets	<p>The role of freshwater assets – and in particular rivers, reservoirs, aquifers and springs, in the provision of water supply in Sussex is at high risk from climate change.</p> <p>Agriculture and adjacent land use is having a significant impact on the water quality of rivers, lakes, grazing marshes and ponds in Sussex, placing their role in supporting wildlife, fish nursery habitat and providing clean water at medium risk</p>	<p>In Sussex, climate change is likely to result in reduced summer rainfall with larger seasonal variations in river flow and groundwater levels. This will affect available resources for abstraction by water companies and will place greater risk to the ecosystems of rivers if water levels drop below certain levels. This has to be understood within the context of a significant future projected increase in the Sussex population, which will result in increased demand on water supply.</p> <p>Diffuse pollution from agriculture and increased siltation due to land management practices are having detrimental impacts on the water quality in freshwater habitats. A high proportion of water bodies in Sussex are in poor condition as monitored under the Water Framework Directive. The quality of water abstracted for public supply is also at risk due to these factors.</p> <p>In terms of supporting wildlife, a very large proportion of ponds are in poor condition due to poor management and adjacent land use, with shallow ponds under additional levels of risk from climate change (they are more likely to dry up) and</p>

Asset	Benefit at risk	Rationale
		<p>succession of surrounding vegetation due to lack of management.</p> <p>The functioning of many freshwater habitats within flood plains in Sussex (e.g. reed beds, grazing marsh) is already highly compromised by the small remaining areas, poor condition and highly fragmented nature of these habitat types. In many cases this is exacerbated by 'disconnection' of areas of flood plain by hard flood defences.</p>
Heathland	<p>The role of heathland in the provision of clean water in Sussex is probably limited to where the habitat is found in any significant amount, which is in the Ashdown Forest. In this area it is at medium risk due to impacts of agriculture.</p> <p>Both in the Ashdown Forest and in other fragments across Sussex, it continues to provide support for important wildlife communities although this function is at medium risk due to losses from development</p>	<p>Poor habitat condition in Sussex heathlands due to lack of management, under grazing (losing heathlands to woodland/scrub) and nitrogen enrichment from nearby agriculture and existing atmospheric nitrogen, is reducing its role in provision of clean water. The Ashdown Forest contains the largest area of heathland in Sussex and supplies the headwaters of several rivers. Its role in provision of clean water is thus critical.</p> <p>Outside the Ashdown Forest only small areas of heathland remain in Sussex and as such it is an already fragmented habitat. Further losses due to lack of management or nearby development will severely threaten its ability to support its specialist wildlife.</p>
Grassland	<p>The role of chalk grassland in the provision of clean water is at high risk due to impacts of agriculture.</p> <p>Its role in the support of wildlife and pollinators is at medium risk, again due to impacts of agriculture, scrub encroachment and losses to development.</p> <p>The loss of areas of chalk grassland coupled with pressures on the habitat quality, is placing the role of chalk grassland in water supply and carbon sequestration/storage at low risk.</p>	<p>Chalk grassland is found on chalk soils and is distributed in Sussex on areas of downland aquifer. Chalk grassland in good condition is likely to have a positive impact on aquifer recharge (due to reduced run-off rates) and the filtration of impurities from water when soil compaction is low⁶⁹. Agricultural practices are a major contributory factor in the degradation of these habitats and poor management results in scrub encroachment.</p> <p>Losses of areas of this habitat, for example, through destruction or lack of management, is also increasing its fragmentation.</p> <p>Rough/unimproved grassland is also important for a range of benefits and should not be overlooked in this analysis as it experiences similar risks to chalk grassland. Development pressure is higher on species rich grasslands off the chalk as sites are isolated and more prone to development and lack of management</p>
Farmland	<p>The production of food by farmland in Sussex may be under risk (medium) from loss of land to development in the future.</p>	<p>Losses of farmland (both arable and improved grassland) may increase in the future due to the increasing demand for space for housing and infrastructure); conversion of farmland from production of food to energy crops, solar arrays and</p>

69 <http://sussexlnp.org.uk/SouthDownsNCA.php>

Asset	Benefit at risk	Rationale
	<p>As per the national assessment, wildlife on enclosed farmland is at high risk due to the degradation and fragmentation of wildlife habitat</p> <p>The many services provided by hedgerows, most of which are found on farmland, are at low/medium risk due to loss from agriculture and development. Of particular concern are their role in supporting wildlife pollinators and clean water</p>	<p>viticulture may also increase risk to food production in future</p> <p>Loss of agricultural land to development also underpins the medium/low risk to their delivery of ecosystem services such as water supply, flood risk regulation, erosion regulation and carbon storage (although this does depend on how the land is being managed as farmland can have a net negative impact on other values if it results in soil loss, erosion, destruction of wildlife habitat and diffuse pollution).</p> <p>The greatest risk to hedgerows in Sussex comes from removal/ loss of hedges and degradation of their structure, connection and wildlife value due to poor/no management. Development also poses a threat to hedgerows, even when a hedgerow is retained its ability to fulfil its role as a wildlife corridor can be curtailed.</p>
Woodland	<p>The variety of benefits provided by woodland in Sussex (clean water, wild species diversity, hazard regulation, carbon storage) is at medium risk due to losses of areas of woodland to development (e.g. infrastructure development, housing) and poor condition of woodland areas.</p>	<p>Woodland is a very important natural capital asset in Sussex, given the large area of the county under woodland cover. Yet its distribution is important – as it is found more in certain areas and less so in others. Most of the ancient hedgerows and shaws are themselves remnants from assarted fields. In Sussex, the density of woodlands and hedgerows creates extensive networks of wildlife, so no one piece of woodland or hedgerow can be looked at in isolation.</p> <p>The impact of any losses of woodland cover may therefore be increased when it is in strategically important areas (which affect the spatial configuration of woodland areas – e.g. connectivity; loss of woodland in sensitive parts of river catchments; loss of valued areas for recreation).</p> <p>An additional risk factor for woodland in Sussex is condition, which is very important in the delivery of many of the benefits associated with woodland. Much of the woodland in Sussex is in poor condition due to lack of management and so is underperforming in terms of delivery of services.</p>

Coastal assets

Asset	Benefit at Risk	Rationale
Mudflats and Saltmarsh	<p>Mudflats and saltmarsh are under threat from climate change. Destruction of these habitats places their role in the</p>	<p>These habitats are found in small pockets, often within the narrow coastal strip between the sea and inland development. They are already highly fragmented and are under severe pressure from sea level rise and storm events which are reducing their</p>

Asset	Benefit at Risk	Rationale
	<p>support of wildlife at very high/severe risk</p> <p>These pressures also place their role in coastal erosion protection and cultural services at high risk.</p>	<p>area further. The confinement of the habitats within a narrow coastal area means they do not have anywhere to migrate to (coastal squeeze).</p> <p>These habitats have a significant value for biodiversity, reduce the impact of waves on the shoreline and help to prevent coastal flooding. They are also an important part of the coastal landscape. Their loss or degradation thus places many benefits at risk.</p>
Saltmarsh	<p>The role of saltmarsh in providing clean water in the estuarine environment is at medium risk from development and agriculture.</p>	<p>Saltmarsh plays an important role in pollution control, waste disposal and the maintenance of water quality. This value is based on its extent and quality and thus factors which influence this (e.g. loss of area due to development) and/or reduction in quality from pollution from new urban areas and agriculture undermine its ability to provide this function.</p> <p>This habitat is often found in areas of the Sussex coast which are under increasing pressure for urban development – and where upstream development and land use is contributing to pollution levels. Salt marsh in Sussex is at high risk from agriculture and increased nutrients from landuse/ pollution which leads to eutrophication. It is thus very vulnerable to these impacts and cumulative impact over time will increase risk.</p>
Sand Dunes and Sea Cliffs	<p>The role of Sand dunes and sea cliffs in coastal erosion protection is at high risk from climate change</p>	<p>Sand dunes also provide a role in protection from coastal erosion by protecting inland areas from coastal water intrusion and by absorbing the impact of high energy waves and storms. They are only present in a small areas at a number of places along the Sussex coast. Although nationally only classified as ‘medium’⁷⁰ climate sensitivity, the examples in Sussex are very vulnerable to the impacts of climate change (sea level rise and storm events) due to their small size and the extent of coastal squeeze.</p>
Vegetated Shingle	<p>The biodiversity and cultural services supported by vegetated shingle, and its role as a feature of beaches in Sussex, is at from development and visitor pressure and coastal protection measures. This risk is localized/ low.</p>	<p>This habitat is of very high significance in Sussex due to the proportion of the national and European extent found along the Sussex coast. It supports very specialised biodiversity. Pockets are being lost to development and trampling by visitors. Invasion of shingle by other species also threatens this habitat.</p> <p>Vegetated shingle is more stable and provides greater protection to the shoreline than non-vegetated shingle.</p> <p>Loss of this habitat will reduce its presence on Sussex beaches – and thus its contribution to this</p>

70 Natural England and RSPB (2014), Climate Change Adaptation Manual.

Asset	Benefit at Risk	Rationale
		landscape, and the many cultural services it provides.
Coastal Lagoons	The various benefits provided by coastal lagoons (wildlife, clean water and coastal erosion protection) are at risk from development and agriculture. This risk is localized/ low .	This risk level is due to loss of areas of this habitat to development and degradation of quality by upstream agricultural pollution.