

**Visit. Sleep. Cycle. Repeat -  
opportunities to enhance Natural Capital and  
Nature Connectedness**

**Main Report**



# Contents

## Preamble

## Introduction

### What is Natural Capital?

#### Section 1 - Where are we now?

- 1.1 A general picture of decline
  - 1.2 An optimistic future?
  - 1.3 The changing picture in the VSCR Programme Area
  - 1.4 Policy as a mechanism for change
    - 1.4.1 25 Year Environment Plan
    - 1.4.2 Changes to legislation
      - 1.4.2.1 Environment Act
      - 1.4.2.2 Agriculture Act
  - 1.5 Derbyshire's Natural Capital and Biodiversity Strategy
- Section 1 – Summary

#### Section 2 - What benefits can natural capital and nature connectedness provide?

- 2.1 General discussion
  - 2.2 Health, wellbeing, and social cohesion
    - 2.2.1 Health and Wellbeing
    - 2.2.2 Education and social cohesion
  - 2.3 Benefits to human environments and mitigating the impacts of climate change
    - 2.3.1 Improving air quality
    - 2.3.2 Improving drainage and reducing flooding
    - 2.3.3 Water quality
    - 2.3.4 Mitigating the impact of climate change and increasing carbon sequestration
    - 2.3.5 The heat island effect and heatwaves
  - 2.4 Direct economic benefits
    - 2.4.1 Visitor economy
    - 2.4.2 Investment
    - 2.4.3 Agriculture, food trends, farming and farmers
    - 2.4.4 Food waste, food poverty and local supply chains
  - 2.5 Attaching a notional value to ecosystem services
- Section 2 – Summary

#### Section 3 - Best Practise – How can change be delivered?

- 3.1 General Discussion
- 3.2 Best practice – a framework and economic principles for change
  - 3.2.1 Sustainability Goals
  - 3.2.2 Regenerative economics - donut economics and the circular economy

- 3.3 Best practice - good design, asset management and communication
  - 3.3.1 An asset-based approach
  - 3.3.2 Communication and branding
    - 3.3.2.1 The role of participatory arts
- 3.4 Best Practice – things we could do
  - 3.4.1 Rewilding
  - 3.4.2 Renaturing
  - 3.4.3 Natural Flood Management
  - 3.4.4 Nature Recovery Networks
  - 3.4.5 The changing nature of agriculture
    - 3.4.5.1 Regenerative agriculture
    - 3.4.5.2 Agroforestry
  - 3.4.6 Other suggested methods
    - 3.4.6.1 Roadside verges
    - 3.4.6.2 Yellow rattle
    - 3.4.6.3 Letting areas grow wild - Ecological Tidiness Disorder
    - 3.4.6.4 Pictorial meadows
    - 3.4.6.5 Micro-forests
  - 3.5.7 Best Practice – organisations already working in the area
    - 3.5.7.1 Bolsover Countryside Partnership
    - 3.5.7.2 Bolsover Woodland Enterprise
    - 3.5.7.3 Derbyshire Countryside Service
    - 3.5.7.4 Derbyshire Wildlife Trust
    - 3.5.7.5 Groundwork Greater Nottingham
    - 3.5.7.6 The Land Trust
    - 3.5.7.7 National Trust
    - 3.5.7.8 Pleasley Vale Outdoor Activity Centre
    - 3.5.7.9 Rhubarb Farm
    - 3.5.7.10 Forestry Commission
    - 3.5.7.11 GreenSPring – green social prescribing Test and Learn Project
  - 3.5.8 Best Practice – nature conservation priorities
    - 3.5.8.1 Magnesian Limestone Area
    - 3.5.8.2 Rother and Doe Lea Valleys Area

### Section 3 – Summary

## **Section 4 – What do we want to do next?**

- 4.1 Where are the gaps
  - 4.1.1 Fragmented natural capital
  - 4.1.2 Space to enhance natural capital
  - 4.1.3 Resources and capacity
  - 4.1.4 Engagement and nature connectedness
  - 4.1.5 Summary of gaps
- 4.2 SWOT analysis
- 4.3 Who pays?

- 4.3.1 Public expenditure
  - 4.3.2 Private sector opportunities
    - 4.3.2.1 Biodiversity Net Gain and credit schemes
    - 4.3.2.2 Green bonds
    - 4.3.2.3 Corporate Social Responsibility and Environmental, Social and Governance factors
  - 4.3.3 The third sector
  - 4.3.4 External funding
  - 4.3.5 Personal responsibility
  - 4.3.6 Crowd funding
  - 4.3.7 Summary of funding
  - 4.4 Developing a regenerative economic model for the VSCR Area
  - 4.5 Opportunities for the Pleasley Hub
    - 4.5.1 Developing the Pleasley Hub concept further
- Section 4 – Summary

## **Section 5 – Action Plan**

## **Section 6 - Conclusion**

## Preamble

If we do too little, too late, children growing up today will live to see a much-changed climate and impoverished global environment. What we now face is perhaps the greatest existential challenge of our age, and of any age. The scale of the transformation needed across all sectors of civic life and the economy is an enormous undertaking.

In August 2021 the UN International Panel on Climate Change (IPCC) released the first part of its sixth assessment on climate change. The report states that:

‘It is unequivocal that human influence has warmed the atmosphere, ocean and land.....the scale of recent changes across the climate system are unprecedented ....human-induced climate change is already affecting many weather and climate extremes in every region across the globe.’

Globally, temperatures are already estimated to be around 1.1°C higher than the pre-industrial baseline. We have all witnessed recent catastrophic weather events on newsfeeds, including flooding, wildfires, and droughts; scientists predict these will become more frequent and intensify in a warmer world.

The Global Carbon Project <https://www.globalcarbonproject.org/> is tracking current carbon emissions and reports the following upward trajectory:

Year	Millions of tonnes of carbon
1960	2,500
1980	5,000
2000	6,700
2019	9,900

This demonstrates that emissions are still growing, albeit at a slightly slower rate than in previous decades.

In 2015 196 countries signed the Paris Agreement agreeing to limit global warming to below 2°C and preferably limiting it to 1.5°C. The IPCC report suggests that the threshold will be passed in little over a decade at current rates of carbon emissions.

The UK is taking a global lead on climate change and hosted COP26, the UN Climate Change Conference, in Glasgow in November 2021.

The Government’s Net Zero Strategy <https://www.gov.uk/government/publications/net-zero-strategy> published in October 2021, sets out the Government’s vision of how the UK will deliver its commitment to reach net zero emissions by 2050. It builds on the Prime Minister’s [10 point plan for a green industrial revolution](#), to lay the foundations for a green economic recovery from the impact of COVID-19. Widely welcomed by many as the first step on how to achieve the transition to net zero, some critics outline gaps, such as, absence of any commitment to end new licences for oil and gas exploration, the Government’s £27 billion road programme and little new thinking for nature recovery outside the Nature for Climate Fund, which concentrates only on woodlands and peatlands.

However, the Climate Change Committee (an independent advisory body set up under the 2008 Climate Change Act to advise the UK government) has recently warned that the prime minister's 'remarkable' climate leadership is undermined by inadequate policies and poor implementation.

The climate and the natural world are inextricably linked. Working with nature and enhancing the role of ecosystem services will help reduce the impacts of climate change and increase resilience. Such an approach can deliver multiple benefits for biodiversity, human health and support a more sustainable economy.

Whether you're environmentally minded or not, the facts are stark: in the last 80 years the global human population has tripled, wilderness has declined by a third, and carbon in the atmosphere has increased from 280 to 415 parts per million. Scientists refer to the age we live in as the 'Anthropocene', as a result of the huge geological-scale impact we are now having on the planet. Since the 1950s, population growth and increased rates of consumption - referred to as the 'Great Acceleration' - have had a significant impact on the viability of global ecosystems: four of nine key planetary boundaries have been exceeded according to the Planetary Boundaries Model

<https://stockholmresilience.org/research/planetary-boundaries.html>.

It is now not just environmentalists that are concerned, HM Treasury recently commissioned an influential report – The Economics of Biodiversity: The Dasgupta Review – which outlines the crisis and compelling evidence for investment in nature-based solutions:

<https://www.gov.uk/government/collections/the-economics-of-biodiversity-the-dasgupta-review>. The government has stated it is committed to delivering a 'nature-positive future'.

During the pandemic many more people discovered local parks, countryside and greenspaces - for recreation and exercising, socialising, to find solace, and connect with nature. There is, therefore, a significant and prescient appetite for a post-COVID nature-based recovery. And, as pessimistic as the situation can appear, there is now a broad consensus of the need for action.

This report aims to outline the science, the economic rationale and some simple steps that can be taken locally to improve natural capital and nature connectedness within the VSCR Area. And in so doing, it is designed to help define the local response to wider national and international issues, such as climate change and the biodiversity crisis, which can often appear daunting and too large to tackle.

I hope that the report stimulates debate to support the transition that is now needed.

Ours is the first generation to understand the damage we are doing and probably the last with a chance to do something about it. What will our children (and their children) say if we fail to act?

## Introduction

Visit. Sleep. Cycle. Repeat. (VSCR) is a cross-cutting programme - developed by partners and stakeholders from North Derbyshire and North Nottinghamshire – which, through the adoption of regenerative economics, is seeking to develop the local visitor economy, encourage active travel, support carbon reduction, improve health and wellbeing, and enhance biodiversity and nature connectedness.

The programme covers the area between Chesterfield, Worksop and Mansfield, see figure 1, below.

In 2018, D2N2 provide £30,000 of funding to develop the VSCR Destination Plan. The Plan identified that 8 million day and 900,000 overnight visitors visit the area each year. This is worth £455M to the local economy and supports 6,200 jobs. It also estimated that with the right investment an additional £85M could be added to the economy, which could support 650 new jobs.

Since 2018, a further £100,000 has been invested in additional feasibility studies to help unlock VSCR's potential. These studies complement the findings of the Destination Plan, and specifically: strengthen the business case for the development of the Pleasley Hub (see section 4.5), outline a marketing plan, provide a comprehensive audit of cycling infrastructure, and assess the viability of developing a camping pod site at Pleasley Pit Country Park.

The Destination Plan and non-commercially sensitive feasibility studies are available at [www.derbyshire.gov.uk/vscr](http://www.derbyshire.gov.uk/vscr).

Following on from recent discussions with partners, this report hopes to scope a future environmental transformation programme for the VSCR Area, in support of a nature-based recovery, in response to the COVID-19 pandemic and the climate and biodiversity crisis.

Section 1 of the report looks at where we are now. Section 2 assesses the benefits from natural capital and nature connectedness. Section 3 discusses how change can be delivered. Section 4 addresses what we want to do next. Section 5 outlines future actions and finally Section 6 provides a conclusion.

During writing this report Derbyshire County Council commissioned a Natural Capital and Biodiversity Strategy, which will cover the whole of Derbyshire. The county-wide Strategy should be completed by September 2022. The Strategy complements this report and will provide invaluable monitoring and assessment tools to optimise the spatial distribution of natural capital in the future. Further details of the County Strategy are outlined in section 1.5.

This report differs from the County Strategy, however, in that it has a specific focus on the VSCR Area and explores in detail how the adoption of a regenerative economic model could help stimulate growth. By bringing together the development of a sustainable local visitor economy, with other pro-environmental business-related initiatives, any surplus generated could be used to help enhance local natural and social capital, in a virtuous economic cycle.

VSCR could play a significant role in the transition to a low carbon and more nature-rich environment, providing a physical corridor between the Peak District and Sherwood Forest, to support regional growth.

This report also emphasises the importance of nature connectedness and the role it could play in enhancing health and wellbeing in some of the most deprived communities in the region.

The Area's natural capital should be seen as a key asset in the development of the visitor economy that complements outstanding world-class local heritage. From large semi-natural woodlands, rolling farmland with surrounding vistas, limestone gorges and babbling brooks, newly renatured country parks and greenways rich in wildlife, the Area has many hidden treasures to explore.

The Area's untold story, of reclaiming and renaturing 10 km<sup>2</sup> of land (equivalent to 1,250 football pitches), planting tens of millions of trees and creating 100km of multi-user trails is a great springboard on which to build a positive, sustainable, and greener post-COVID future.

However, it must be recognised that, as positive as the reclamation programme has been, the Area's nature-rich sites are in a landscape where habitats and food for wildlife are scarce, and biodiversity is pushed into small, disconnected islands. As is the case in much of the rest of the Country.

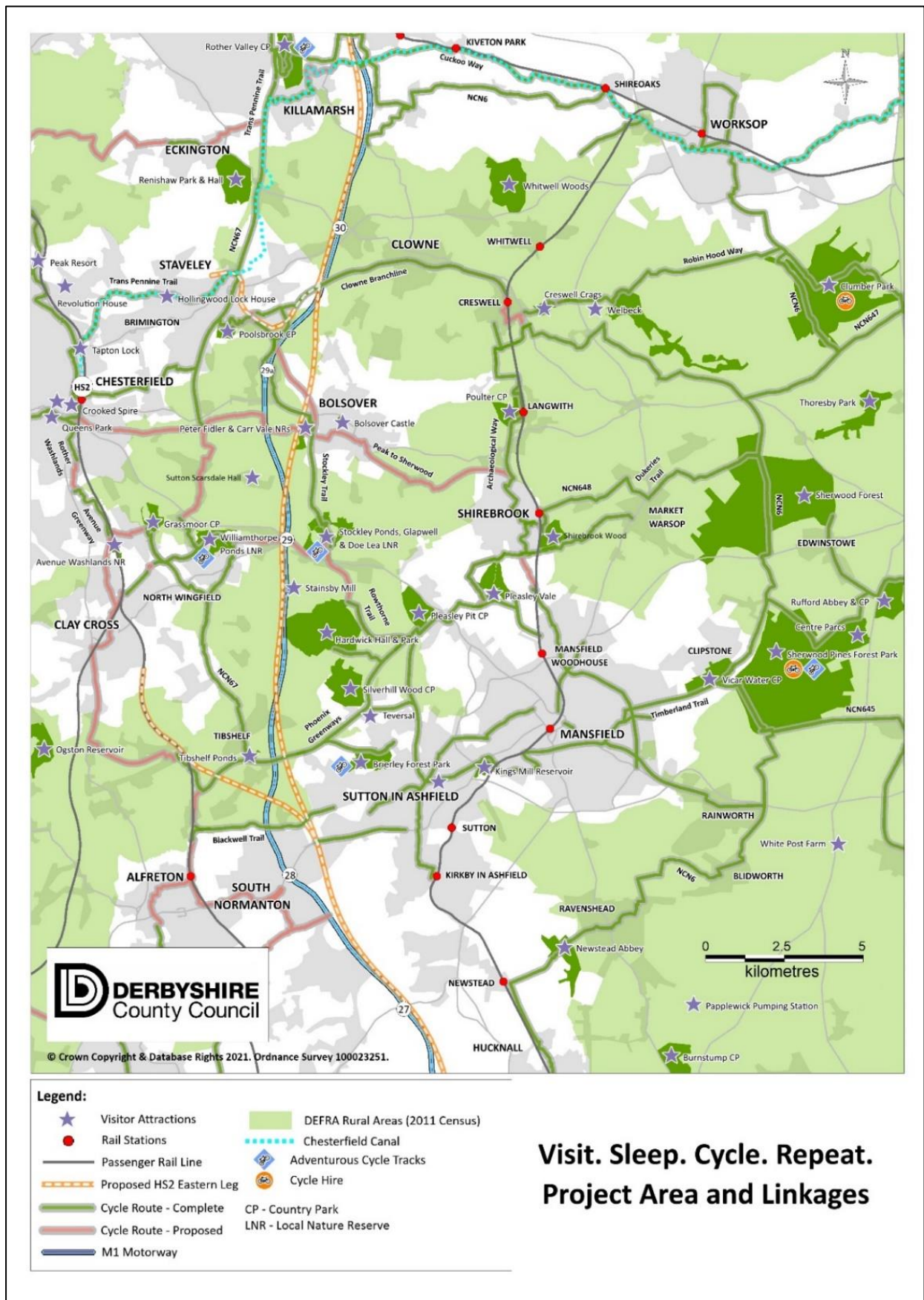
It will require a coordinated effort to fully restore several centuries of mining and industry, and more latterly, address the impacts of intensive agriculture. And action will require the active engagement of a range of organisations, communities, landowners, and individuals to ensure success.

There is now a significant policy shift to support the enhancement of natural capital. Most notably the 25 Year Environment Plan, which will be delivered through the legal frameworks of the Agriculture and Environment Acts (see section 1.4). These create new opportunities to fund environmental works through mechanisms such as: Nature Recovery Networks, Environmental Land Management Scheme (ELMs) and Biodiversity Net Gain.

To summarise, this report outlines why natural capital is positive for the Area and the many benefits improved ecosystem services would provide, particularly as we adapt to climate change. And, it is hoped, it will help to galvanise future action, to enhance the Area's natural capital, and provide greater opportunities for people to connect with nature.



Figure 1 – the VSCR Programme Area



**Visit. Sleep. Cycle. Repeat.  
Project Area and Linkages**

## **What is Natural Capital?**

At its simplest natural capital is about thinking of nature as an asset that can provide wider benefits to people. There are many definitions for natural capital, here is a sample of some of the more common ones:

### **Wikipedia**

Natural capital is the world's stock of natural resources, which includes geology, soils, air, water, and all living organisms. Some natural capital assets provide people with free goods and services, often called ecosystem services. All of these underpin our economy and society, and thus make human life possible.

### **Natural Capital Committee**

Natural capital is that part of nature which directly or indirectly underpins value to people, including ecosystems, species, freshwater, soils, minerals, the air and oceans, as well as natural processes and functions. Natural capital underpins the four types of capital (manufactured, financial, human and social). In combination with other types of capital, natural capital forms part of our wealth; that is, our ability to produce actual or potential goods and services into the future to support our wellbeing

### **25 Year Environmental Plan**

Natural capital is the sum of our ecosystems, species, freshwater, land, soils, minerals, our air, and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large. They do this in many ways but chiefly by providing us with food, clean air and water, wildlife, energy, wood, recreation, and protection from hazards.

# Section 1 - Where are we now?

## 1.1 A general picture of decline

The general picture of decline in biodiversity, both globally and in the UK, is alarming. The UK is one of the most nature-depleted countries in the World. Half of UK wildlife has decreased since 1970, with one in seven species now at risk of extinction.

Here's a sample from a range of sources to highlight the current situation, both globally and in the UK:

*Humanity stands at a crossroads with regard to the legacy it leaves to future generations. Biodiversity is declining at an unprecedented rate, and the pressures driving this decline are intensifying. Last year countries across the world spectacularly [failed to meet 10-year targets](#) (the Aichi Targets - 20 time-bound targets outlined within the IUCN Strategic Plan for Biodiversity) to improve our natural world, including the UK – **Global Biodiversity Outlook 5, United Nations***

*We are facing a global crisis. We are totally dependent upon the natural world. It supplies us with every oxygen-laden breath we take and every mouthful of food we eat. But we are currently damaging it so profoundly that many of its natural systems are now on the verge of breakdown - **David Attenborough***

*The situation is incredibly urgent. Nature in the UK is in freefall – we are losing species and the habitat they need every year. We also know that a restored and healthy natural world underpins a resilient economy - **Beccy Speight, chief executive of the RSPB***

*In the last fifty years we've witnessed the gradual disappearance of wildlife in our country. Hedgehogs, cuckoos, red squirrels and turtle doves are now a rare sight – and birdsong is quieter every year - **Craig Bennett, chief executive of The Wildlife Trusts***

*15% of the 8,431 species assessed in the UK are now at risk of extinction. And the most significant pressure to biodiversity currently comes from agricultural management, climate change, hydrological change, urbanisation, pollution, woodland management and invasive non-native species - **The State of Nature 2019 Report, (compiled by 50 leading UK conservation organisations)***

## 1.2 An optimistic future?

On 5 June 2021 – World Environment Day – the UN launched its Decade on Ecosystem Restoration with a target to restore 3.5 million km<sup>2</sup> of land over the next 10 years, at an estimated cost of about \$1 trillion – there was little fanfare and the event largely passed unnoticed.

Analysis has already shown commitments from existing restoration projects, from across 115 countries, which, on paper, are committing to 10 million km<sup>2</sup> of restoration.

The UK Government has, for example, pledged to protect 30% of land and sea for nature by 2030.....the 30 by 30 pledge.....as part of the High Ambition Coalition for Nature and People, which consists of more than 50 countries and is co-chaired by the UK.

In 2021 and 2022 there are two significant international conventions which will have a huge impact on raising the post-COVID environmental platform:

- COP26 - UN Climate Change Conference – hosted by the UK in Glasgow
- Convention for Biological Diversity – hosted by China in Kunming

There is clearly a significant opportunity in the coming decade and beyond to redefine our relationship with the natural world.

### **1.3 The changing picture in the VSCR Programme Area**

The East Midlands is one of the most nature-depleted areas of the UK. As the birthplace of the industrial revolution, the footprint from industry has had an impact longer than in most other places. There is therefore a need to continue to address the issue of legacy environmental justice created by past activity.

In Derbyshire alone, (outside the Peak District National Park), although it is predominately rural, only 8.4% of land is designated as Local Wildlife Site (LWS). LWS's are amongst the most valuable wildlife areas in the country but the last estimate by Derbyshire Wildlife Trust (DWT) showed that only 41% of these sites were positively managed and a further 20 - 25% were declining due to neglect. Between 1984 and 2007 around 130 sites were destroyed, and another 63 sites were damaged.

However, at the same time, there has been a significant land reclamation programme, particularly within the VSCR Area, and much of this has been actively managed for nature. Over the past three decades tens of millions of trees have been planted on former industrial sites, hundreds of hectares of woodland, grassland and wetland have been created, which now form a network of new country parks and countryside sites.

For example, the Derbyshire Countryside Service landholding in Bolsover District alone is 2.9% of the total land area of the district, which amounts to some 464ha of new habitat - a mosaic of semi-natural grassland, wetland and woodland.

And these new nature rich sites are often connected by a network of greenways - multi-user trails reclaimed from old-disused railway lines that provide trails for walking, cycling and horse-riding, often along green, nature-rich corridors. Today, within the VSCR Area (Figure 1), there are 100km of trails in a 20km-by-20km area. Arguably one of the best networks in the Country for the scale of landscape.

There is also an abundance of social capital, particularly evident through the network of partnerships, voluntary, community and social groups, many of which helped coordinate the emergency response to the pandemic.

In summary, there has been a catastrophic decline in nature over a relatively short period of time, but this should be balanced against some reversal in fortune, through the landscape-scale land reclamation that has benefited wildlife throughout the area.

Figures 2 and 3, below, show priority habitats and restorable habitat fragmentation Action Zones, respectively. Figure 2 illustrates the isolated nature of current sites; these are often widely dispersed and lack habitat connectivity. The future challenge, as Figure 3 demonstrates, is how these habitat fragments become connected to allow wildlife to thrive and communities to benefit from a more resilient environment.

This habitat restoration work, as this report outlines, has the potential to provide multiple social, economic, and environmental benefits. This could be at the heart of the Area's adaptation to climate change and would help support the transition to a low-carbon economy, and enable communities to have greater connection with nature, if the effort, energy, and resource, were made available to do so.

Not to undertake this work, is likely, in the long run, to become more economically damaging to the Area and its people in the years to come.

Figure 2 – Priority Habitats and Figure 3 - Priority Habitats including restorable habitat fragmentation action zones (courtesy of DEFRA)



## 1.4 Policy as a mechanism for change

### 1.4.1 25 Year Environment Plan

In 2018 the UK Government published an ambitious 25 Year Environment Plan [25 Year Environment Plan](#), which articulated a transformational agenda to tackle the environmental crisis.

At its heart of the Plan the aim is to:

*‘become the first generation to leave the environment in a better state than we found it and pass on to the next generation a natural environment protected and enhanced for the future’.*

The plan outlines a number of key targets, which if implemented, would create restorative environmental improvement, including:

- creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats
- taking action to recover threatened, iconic or economically important species of animals, plants and fungi
- increasing woodland cover in England to 12% by 2060: which would involve planting 180,000 hectares by end of 2042
- making sure that decisions on land use, including development, reflects the level of current and future flood risk
- boosting the long-term resilience of our homes, businesses and infrastructure
- improving our approach to soil management: by 2030 we want all of England’s soils to be managed sustainably
- ensuring that food is produced sustainably and profitably
- making sure that there are high quality, accessible, natural spaces close to where people live and work, and encouraging more people to spend time in them to benefit their health and wellbeing

The Government publishes an annual account to outline progress -

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

The latest account states:

*Overall, there is much more to do, both in our country, and with international partners, to halt and reverse the decline of nature and address climate change. These global challenges are inextricably linked, for it will be impossible to improve nature without stabilising the climate. Similarly, we cannot avert climate change, or build resilience to its impacts, without restoring nature. Recently, COVID-19 has had a profound and sudden impact across this country and the rest of the world, and our everyday lives have changed dramatically. Rightly, the priority for government is to limit the health and economic effects of the pandemic, thereby saving lives and livelihoods. As we prepare for recovery from the crisis, we will*

*pursue a rebuilding of our economy and society in ways that are green, just and inclusive. The government's environmental programme will play its full part in securing a sustainable and resilient recovery. At the same time, this will ensure that we also recover our precious natural environment and diverse ecosystems.*

## **1.4.2 Changes to legislation**

There are three key pieces of legislation which support the delivery of the ambitions outlined in the 25 Year Environment Plan. These are - the Environment Act, the Agriculture Act and The Fisheries Bill. Because of the Area's geographic location only the first two are discussed, the latter has no significant relevance.

### **1.4.2.1 Environment Act**

The Environment Act became law in November 2021, (towards the end of the COP26 Conference).

*This makes the UK the first country to enshrine in law a legal target to halt wildlife decline by 2030.*

The Act effectively outlines a new domestic framework for environmental governance.

The Environment Act sets out a legal framework to deliver:

- A target to halt the decline of nature by 2030
- To strengthen biodiversity duty, which now makes it incumbent on local authorities (and other public bodies) to conserve and enhance the natural environment
- Biodiversity net gain to ensure developments deliver at least 10% increase in biodiversity
- Local Nature Recovery Strategies (LNRS) to support a Nature Recovery Network - the Government has stated that they expect 50 LNRS to cover the whole of England without gaps or overlaps, more detail will be outlined in secondary legislation, but it is likely that Derbyshire County Council will take a lead role in Derbyshire
- The Office for Environmental Protection will be empowered to uphold environmental law
- A duty upon Local Authorities to consult on street tree felling
- Strengthened woodland protection enforcement measures
- Conservation Covenants
- Environmental Improvement Plans, including interim targets
- A cycle of environmental monitoring and reporting
- Protected Site Strategies and Species Conservation Strategies to support the design and delivery of strategic approaches to deliver better outcomes for nature
- A prohibition for larger UK businesses from using commodities associated with wide-scale deforestation



- A requirement for regulated businesses to establish a system of due diligence for each regulated commodity used in their supply chain, requires regulated businesses to report on their due diligence, and introduces a due diligence enforcement system

### 1.4.2.2 Agriculture Act

The Agriculture Act came into law in November 2020. One of the central principles of the Act is how farmers and land managers in England will be rewarded in the future with ‘public money for public goods’ – such as better air and water quality, thriving wildlife, soil health, or measures to reduce flooding and tackle the effects of climate change.

At its heart is a seven-year, post-Brexit, transition away from the current programme of subsidies governed by the Common Agriculture Policy (CAP). Beginning in 2021, a new agricultural payments system called the **Environmental Land Management scheme (ELMS)** will be introduced, to replace the Basic Payment Scheme (BPS), which pays farmers based on the size of their landholding and is about 5%+ of income on an intensive arable holding in the Area. Instead, ELMs will incentivise payments to farmers and land managers to enter into agreements that deliver aspects of the 25 Year Environment Plan, including actions that provide:

- clean and plentiful water
- clean air
- thriving plants and wildlife
- protection from environmental hazards
- reduction of and adaptation to climate change
- beauty, heritage and engagement with the environment

ELMs will consist of three new schemes, which will be funded by gradual reductions in BPS payments from 2021 to 2027, these are outlined below:

1. **Sustainable Farming Incentive (SFI)** - SFI will pay farmers to manage their land in an environmentally sustainable way, there was a pilot in 2021 before the launch in 2022 – the initial phase of SFI was launched in December 2021 to mixed reviews from both farming and environmental organisations. The SFI sets out plans to support soil health, agriculture’s contribution to net zero carbon emissions, moorland assessment and restoration, and animal health and welfare. Further SFI programmes will be announced between 2023 – 2025. The following is the current list of planned programmes from the government’s website, but these could be subject to change:

2022 (confirmed)

- arable and horticultural soils
- improved grassland soils
- moorland and rough grazing (introductory level)
- annual health and welfare review

2023 (indicative)

- nutrient management

- integrated pest management
  - hedgerows
- 2024 (indicative)
- agroforestry
  - low and no input grassland
  - moorland and rough grazing (all levels)
  - water body buffering
  - farmland biodiversity
- 2025 (indicative)
- organic
  - on-farm woodland
  - orchards and specialist horticulture
  - heritage
  - dry stone walls
2. **Local Nature Recovery** - will pay for actions that support local nature recovery and meet local environmental priorities, it will be piloted in 2022, and launched in 2024
  3. **Landscape Recovery** - will support landscape and ecosystem recovery through long-term projects, such as - restoring wilder landscapes, large-scale tree planting, peatland and salt marsh restoration. The scheme will be piloted around 10 projects in 2022 and launched in 2024.

This is seen as the biggest change in agricultural policy in the last half a century and could present a real opportunity to support biodiversity improvements. And again, will provide a significant mechanism to fund future environmental restoration projects.

## 1.5 Derbyshire's Natural Capital and Biodiversity Strategy

During the preparation of this report Derbyshire County Council commissioned a Natural Capital and Biodiversity Strategy for the County. This work should be completed by September 2022. It will provide an invaluable tool for assessing the spatial distribution of future priorities and should complement the findings of this report. It should be particularly useful for administering Biodiversity Net Gain and the development of Nature Recovery Strategies. Initial discussions have, however, highlighted a number of differences that should be noted, including this report's:

- obvious focus on the north of the County within the VSCR Area
- integration with the VSCR programme, with the aim to develop a regenerative economic model that supports the development of a sustainable visitor economy and pro-environmental business initiatives, where any surplus is used to enhance natural and social capital
- recognition of the importance of nature connectedness, which could have significant benefits to peoples' mental health and wellbeing in some of the most deprived areas of the County
- focus from a practitioner's viewpoint

## Section 1 - Summary

Decline in biodiversity is alarming, the UK is one of the most nature-depleted countries in the World and the East Midlands is one of the most nature-depleted areas in the UK. There is a legacy of environmental justice still to resolve for much of the Area, resulting from previous economic activity. Currently, some agricultural practices are having a significant impact on the Area's natural capital.

There is, however, some scope for optimism. Over the last 30 years there has been landscape-scale renaturing on many post-industrial sites as tens of millions of trees have been planted, alongside the creation of hundreds of hectares of semi-natural habitat. Within the VSCR Area alone, it is estimated that over 10km<sup>2</sup> of land has been reclaimed for nature.

Globally the 2020's is seen as a decade of environmental transformation and habitat restoration, there are plans to renature millions of km<sup>2</sup> of degraded land around the World. The UK has pledged to lead on this transformation and is co-chair of the High Ambition Coalition for Nature and People which pledges to renature 30% of land and sea by 2030.

There are a number of significant shifts in policy and legislation to support this transformation, including: the 25 Year Environment Plan and the Agriculture and Environment Acts. These will create new opportunities to fund environmental improvement works through the development of Nature Recovery Networks, the delivery of the Environmental Land Management Scheme (ELMs) and Biodiversity Net Gain.

This report should complement the recently commissioned county-wide Natural Capital and Biodiversity Strategy, which will be published in September 2022.

## Section 2 - What benefits can natural capital and nature connectedness provide?

### 2.1 General discussion

Nature-based solutions need to play a central role in transforming our communities and supporting future resilience, as we adapt to the impacts of a rapidly changing climate and environment.

Individual actions often appear insignificant when addressing the wider existential threats of the climate and environmental crisis, but as the concept of the 'butterfly effect' illustrates tiny actions can trigger wider change.....hope can trigger a cascade of positive actions and generate wider regenerative and restorative feedback loops.....who would have thought, for example, that a lone 15-year-old Swedish schoolgirl could start a global movement of tens of millions of people, demanding action on climate change, climate justice and improvements to the environment!

Local habitat improvements have the potential to inspire local people by connecting them to the wider web of life and creating spaces that encourage physical health, mental wellbeing, whilst supporting the local economy and transforming communities.

And, as we adapt to life after COVID-19, efforts to improve natural capital will help to provide a positive counterpoint to the pandemic.

Benefits from nature are often referred to as ecosystem services. This section outlines the benefits of working more closely with nature and explains how enhanced nature-rich human environments can support resilient communities.

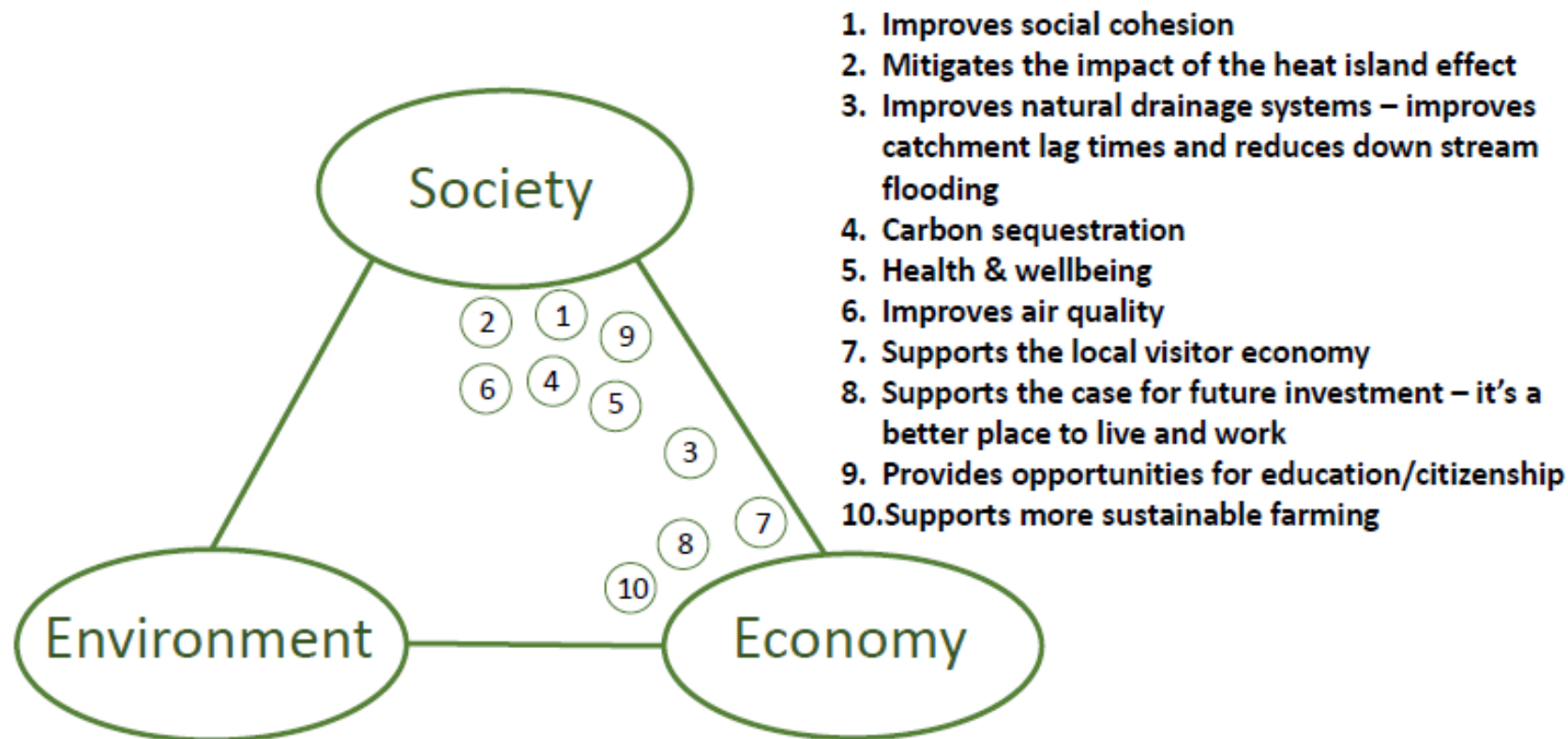
Figure 4 summarises some of the wider benefits that nature-based solutions can provide. As well as homes for wildlife, nature contributes significant cross-cutting social and economic benefits that are largely overlooked and not costed into today's economic rationale.

To continue with this course of action and not benefit from nature-based solution will end up costing more in the long run.

The future challenge is how maintenance and enhancement of natural capital is funded.

And as indicated in sections 1.4.2.1 and 1.4.2.2, there are now significant policy changes that should support future opportunities to enhance the Area's natural capital.

Figure 4 – The social and economic benefits of adopting nature-based solutions



N.B. 1. The position of each ES indicates its relative importance to a specific aspect of sustainability.

2. Environmental benefits, such as landscape value or spiritual connection, are not included, as these are considered intrinsic rather than direct benefits.

The ten Ecosystem Services (ES) outlined in Figure 6 have been categorised into three broad headings:

1. Health and wellbeing, and social cohesion (ES: 1, 5 and 9)
2. Benefits to human environments and mitigating the impacts of climate change (ES: 2, 3, 4, 5 and 6)
3. Economic benefits (ES: 7, 8 and 10)

These are discussed in more detail below:

## 2.2 Health, wellbeing, and social cohesion

### 2.2.1 Health and Wellbeing

In general, when we are more connected with nature, we tend to be happier and are more likely to flourish and function well psychologically. There is a growing body of evidence which outlines that exposure to nature and natural environments is good for us and reinforces pro-environmental and pro-nature behaviours (PEB):

- The term 'biophilia' was first used by psychoanalysts in the 1970's to describe our innate connectedness to nature, which, the theory states, developed over hundreds of thousands of years throughout our evolutionary past.

More recent research has found that:

- exposure to non-threatening natural environments elicits a variety of stress reduction responses and restores attention levels by stimulating our involuntary attention, by surrounding us with stimuli. It's been shown to improve self-esteem, self-regulation, self-competency, as well as vitality. This in turn leads to improved cognitive functions such as memory, creativity and children's' performance at school - in children, attention fatigue causes an inability to pay attention and control impulses. The part of the brain affected by attention fatigue (right prefrontal cortex) is also involved in Attention-Deficit/Hyperactivity Disorder (ADHD). Studies show that children who spend time in natural outdoor environments have reduced attention fatigue and children diagnosed with ADHD show a reduction in related symptoms.

How does this work? - Attention Restoration Theory (ART) states that time spent in nature can renew our attention spans when they are flagging. There are four stages of attention restoration through contact with nature:

- i. our minds clear of the things we've been focussing on and worrying about
- ii. the mental fatigue begins to lift
- iii. after that we experience a soft fascination, which involves paying attention without any real effort
- iv. finally, we find ourselves relaxing to the point that our attention is restored, and we can think of our lives in a more constructive manner

The active pathways to nature connectedness are - sense, emotion, beauty, meaning and compassion and have synergy with aspects of the Five Ways to Wellbeing.

- Contact with trees and plants in nature has also been found to expose the recipient to a diversity of environmental microbes which trigger an immune response that leads to a healthy human micro-biome.

For example - plants produce phytoncides, airborne chemicals given off to protect themselves from insects. Phytoncides have antibacterial and antifungal qualities which help plants fight disease. When people breathe in these chemicals, our bodies respond

by increasing the number and activity of a type of white blood cell called natural killer NK cells. In one study, increased NK activity from a 3-day, 2-night forest bathing trip lasted for more than 30 days.

Research has also found that contact with a soil-borne bacterium *Mycobacterium vaccae* could cause the brain to release serotonin – a neurotransmitter which helps regulate mood.

- Patients recover from surgery faster and better when they have a ‘green’ view, they have shorter postoperative stays, take fewer painkillers, and have slightly fewer postsurgical complications.
- One in six of the UK population suffers from depression, anxiety, stress, phobias, obsessive compulsive disorders or panic attacks. The cost to the NHS is £12.5 billion, to the economy it is £23.1 billion, and the social cost is £41.8 billion in reduced quality of life. Studies show that symptoms of all these disorders can be alleviated by spending time in nature – measurements of blood pressure, pulse rates and cortisol levels (the stress hormone) are all lower after time spent in nature.

And people with a lower baseline - often those from lower-income families, as is the case in much of the VSCR Area, will get greater benefit.

The likely lasting impacts of the COVID-19 pandemic are that:

peoples’ mental health will continue to be impacted as individuals come to terms with loss, social isolation, and the economic fallout of the pandemic

and

people impacted by the effects of long-COVID will need continued support (it is currently estimated that 5% of the population could be suffering with symptoms)

As the above research suggests, nature-based recoveries could play a significant and cost-effective role in helping people recover from the pandemic.

- Social prescribing creates a formal way for primary care services such as GPs to refer patients to a variety of non-clinical services. Green social prescribing has recently received a great deal of attention. The UK has low levels of both nature connectedness and wellbeing – some experts are now suggesting there could be a causal link. Research has shown that 80% of people rarely notice nature, so miss out on the health and wellbeing benefits described above. Green-social prescribing aims to tackle some of this by promoting nature connectedness through GPs surgeries and other health professionals. **Derbyshire and Nottinghamshire were recently selected as one of eight localities nationally in which to conduct a two-year test and learn pilot to better understand the effects of green social-prescribing – The GreenSpring Programme.**

## 2.2.2 Education and social cohesion

There is a long tradition of using the environment for education and Schools often use it to provide an integrated context for learning. There is a substantial body of evidence that demonstrates the positive association between learning in the natural environment.

- a wide range of learning processes and outcomes including cognitive, attitudinal, social, and development outcomes, for people of all ages, have been found to improve from learning experiences in nature.

Research has shown that children welcome the opportunity to do more learning in natural environments. However, as children spend less time outdoors than their parents the 'extinction of experience' may have a long-term impact on environmental attitudes and behaviours. Research undertaken during the pandemic showed that children from ethnic minority and low-income backgrounds spent considerably less time outdoors than before the pandemic.

In the UK children currently spend twice as long looking at screens as they do playing outside, which has led to the term 'Nature Deficit Disorder' being coined. There is a need to provide good quality local environments to support Schools to tap into the many benefits of educating children in natural environments.

- Social cohesion is often described as the social connections, trust, and/or overall solidarity among residents. Well managed greenspaces in urban areas are shown to contribute to social ties and pro-social activity and can reduce social inequalities in health, reduce crime and improve community cohesion.

Well managed greenspaces are attractive and inviting, they provide a range of activities for different ages and are often a focal point for communities. They therefore provide the most accessible and commonly visited areas for establishing a connection with the natural world.

Although the link between social cohesion and the quality of greenspace is not well researched or understood, as it relies heavily on anecdotal evidence, some social scientists suggest that measuring volunteering activity could provide a good proxy for gauging the level of social cohesion accrued from specific greenspaces. Arguing that the act of volunteering shows a level of ownership, commitment, organisation and participation towards a specific area.

- Conversely, the opposite is likely to be true - poorly managed greenspaces are likely to illustrate a lack of social cohesion.

Good design and long-term management of local greenspace is therefore critical if the benefits from nature are to be more widely and equitably shared.



## 2.3 Benefits to human environments and mitigating the impacts of climate change

### 2.3.1 Improving air quality

The UK has national emission reduction commitments for emissions of five damaging air pollutants:

- fine particulate matter (PM<sub>2.5</sub>)
- ammonia (NH<sub>3</sub>)
- nitrogen oxides (NO<sub>x</sub>)
- sulphur dioxide (SO<sub>2</sub>)
- non-methane volatile organic compounds (NMVOCs)

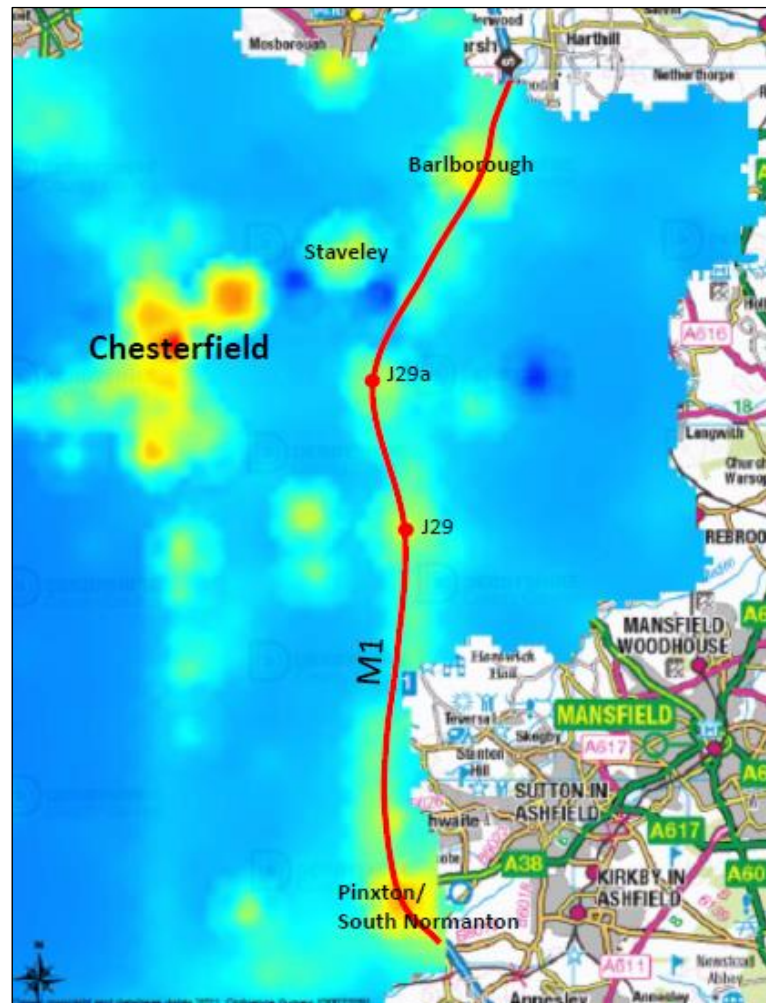
Air quality continues to be a primary health concern as most of the world's population currently lives in urban areas. A quarter of homes are in areas with dangerous levels of pollution according to a nationwide study of air quality.

As the case of the nine-year-old, Ella Kissi-Debrah illustrates (who is the first person in the UK to have air pollution recorded on her death certificate), there is now a precedent for a seismic shift in the pace and extent to which the country tackles the air pollution health crisis.

There are calls on the Government to improve the current legal standards, which are below World Health Organisation's (WHO) guidelines, for example the current UK legal limit for PM2.5 is an annual mean of 20 micrograms per cubic metre, twice that of the WHO's guidelines.

Figure 5, below, contains a map of the air quality in Derbyshire in the VSCR Area. The map shows areas of concern along the M1 corridor, particularly around Barlborough and Pinxton/South Normanton, J29 and J29a and in and around the centre of Chesterfield, and along the corridor from Chesterfield to Barlborough, through Staveley.

Figure 5 - Air quality in the VSCR area in Derbyshire



Nature-based solutions can play a role in improving air quality on a local level. Plants absorb gaseous pollutants that are in the air and release oxygen into the atmosphere. Using green infrastructure to create a barrier or maintain separation between sources of pollution and receptors can help address the impacts of air pollution. For example, research in Strasburg has shown that public trees reduce 7% of PM10 in the city's atmosphere.

Careful design is a key element of the implementation of planting schemes to mitigate the impacts of air pollution, for example:

- planting low hedges close to roads has been found to reduce the impact of pollution from vehicles in cities where there are large buildings, far more effectively than taller trees. (In some environments, trees actually make the pollution more concentrated depending on prevailing wind conditions and the location of surrounding buildings).
- in open road conditions, thick, dense and tall vegetation barriers restrict vehicle emissions from reaching roadsides in high concentrations where people walk, cycle or live nearby.
- taller trees have been found to have more impact in reducing air pollution in areas which are more open and are less densely populated by taller buildings.

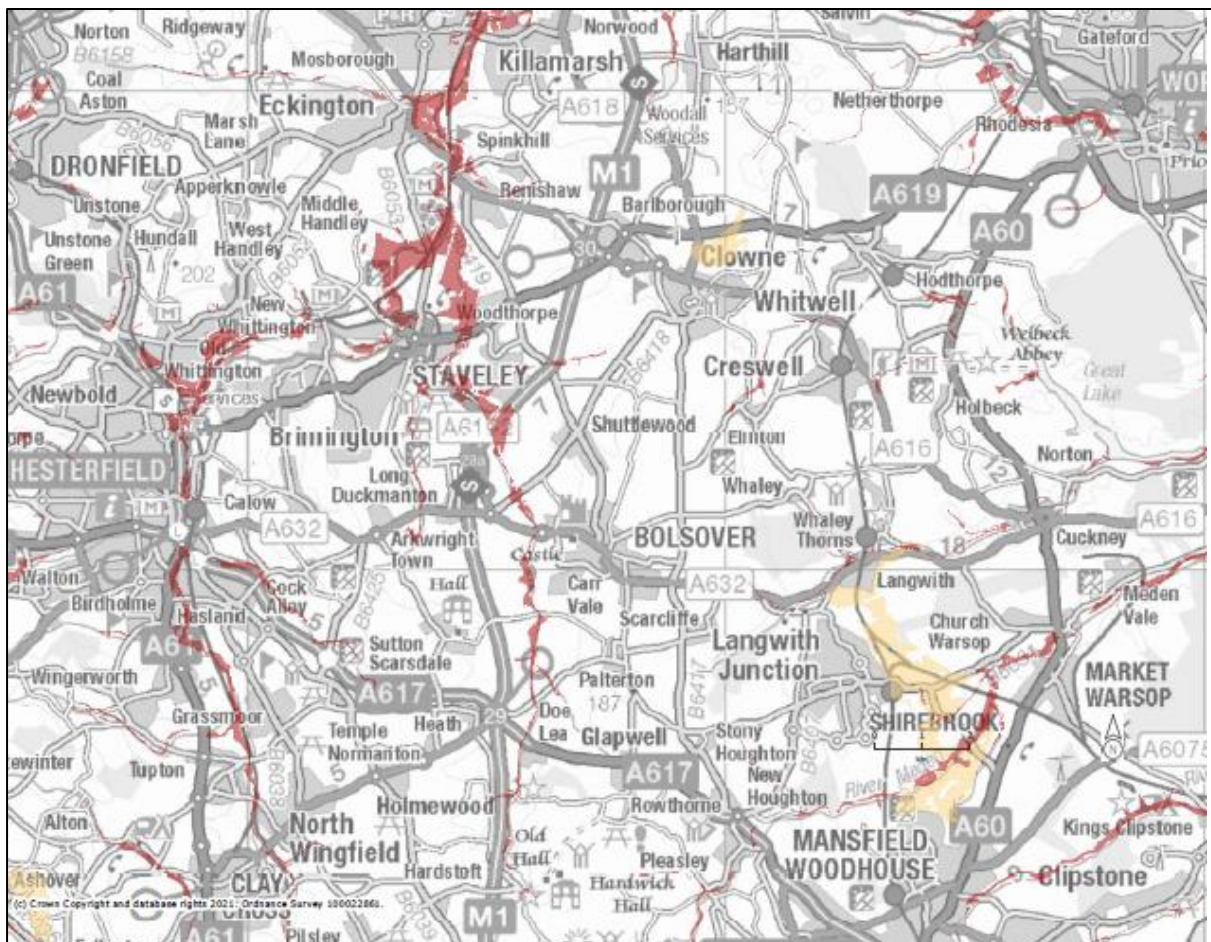
### 2.3.2 Improving drainage and reducing flooding

In 2015 -2016 flooding cost the UK an estimated £1.6 Billion. Landscape scale drainage improvements can help manage rainfall by using natural processes, making use of the landscape and natural vegetation to control the flow and volume of surface water.

Landscape scale drainage solutions could deliver many benefits to alleviate some of the damage caused by flooding alongside the provision of other services, such as:

- improved water quality
- opportunities for habitat creation and enhanced biodiversity
- supporting wellbeing by bringing people closer to green and blue community spaces

Figure 6 – Areas at risk from flooding in the VSCR Area



On a sub-regional level, the main areas at risk from flooding in and around the VSCR Area are - Chesterfield, Staveley, Eckington, Killamarsh, to the West of Bolsover, Pleasley and Worksop.

However, there are likely to be many more surface water flooding events at a local level throughout the Area, because of increasing urbanisation, which will be compounded by the impacts of climate change.

It is highly likely over the coming decades that the effects of flooding will become exacerbated as the climate warms, giving rise to more frequent and intense storm and rainfall events.

The Met Office has modelled that, days with extreme rainfall accumulations will become more frequent through the century - 1 in 300-year events are now 1 in 100-year events in the current climate and by 2100 (under a medium emissions scenario) this level could be experienced every 30 years, making it 10 times more likely than under a natural scenario.

Research found that human-induced climate change, has and will continue to result in more variation in rainfall across the UK. This means that rather than many moderate rain events, we are more likely to see very wet or very dry spells.

**Figure 7 – Flood risk management priority areas**

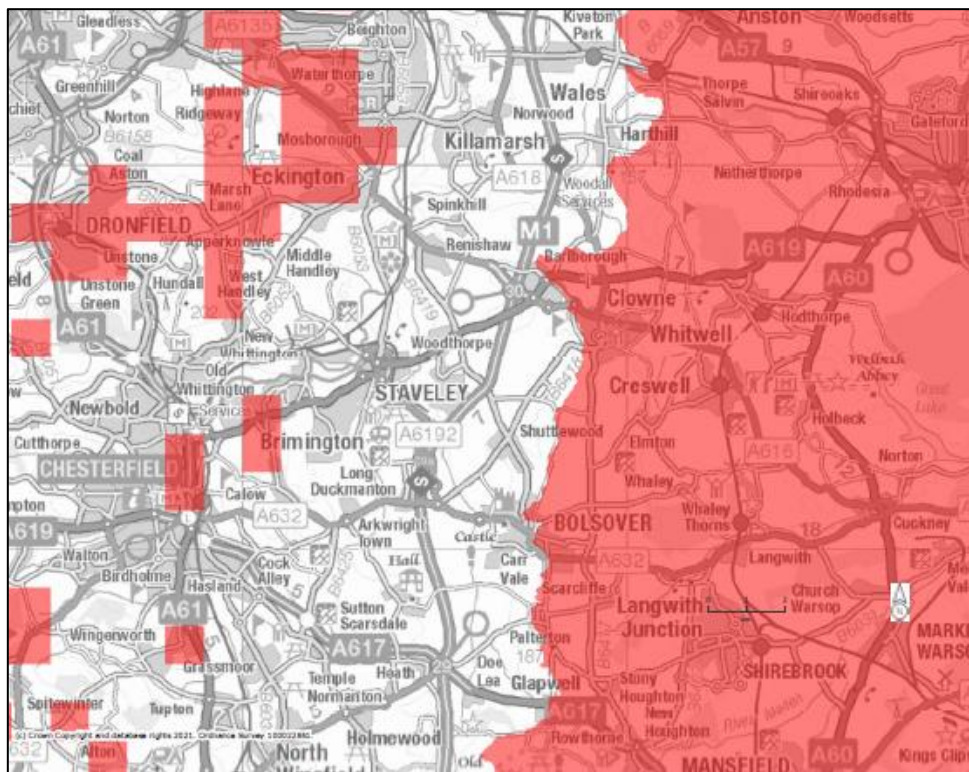


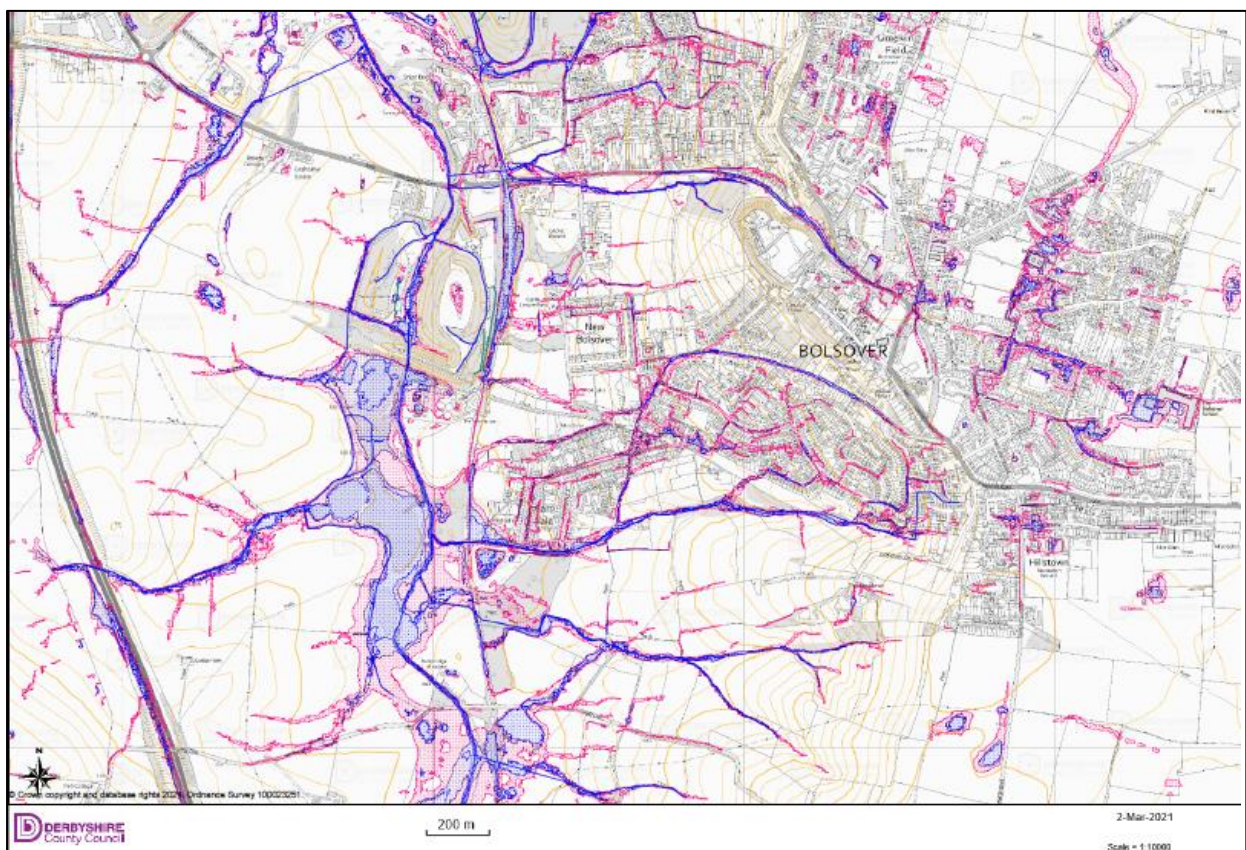
Figure 7 highlights areas where management, including the use of nature-based solutions, could have a significant impact on improving flooding.

What is striking in Figure 7 is how significant the magnesian limestone area is, to the east of the M1, where many springs and streams naturally rise within the landscape as part of the Trent and Don Catchments. As a result, the Southern Magnesian Limestone is classed as a ‘Principal Aquifer’ by the Environment Agency. The geological formation provides a high level of water storage capacity and supports water supply and river base flow on a strategic scale. Areas of Bolsover therefore provide a strategic water resource and could help slow the speed of water as it flows through catchments.

Much of the Area is dominated by intensive arable farming rather than being given over to more catchment sensitive farming practices. The National Trust has in the past tried to engage partners and stakeholders in catchment partnerships in both the Doe Lea (which feeds into the Rother and then the Don) and the Poulter (which feeds into the Idle and then the Trent), with mixed success. But without overarching support for catchment sensitive farming and the financial incentives to support anything other than voluntary participation, these projects were only ever going to provide a modicum of short-term success. The opportunity now presents itself, through the aspirations outlined in the Agriculture and Environment Acts, to incentivise greater participation and ensure flooding downstream becomes better managed from Malton to Retford and beyond (along the Poulter-Idle system) and Renishaw northwards into Rotherham and Sheffield (along the Doe Lea-Rother system).

Open-source data mapping tools are now widely available and can provide an accurate picture of areas that should be prioritised if nature-based solutions are to be implemented. Using Bolsover Town as an example, Figure 8, below, illustrates just how complex surface water drainage movements can be through communities. Further work should be carried out at this granular level to determine the efficacy of introducing possible nature-based solution to improve the flow of water. This should be mapped against an index of deliverability based on land ownership/control, access to the land, other land-use priorities, and the level of buy-in from the community etc. to ascertain the feasibility of delivering any given scheme. The County Strategy's assessment tools should help support this work.

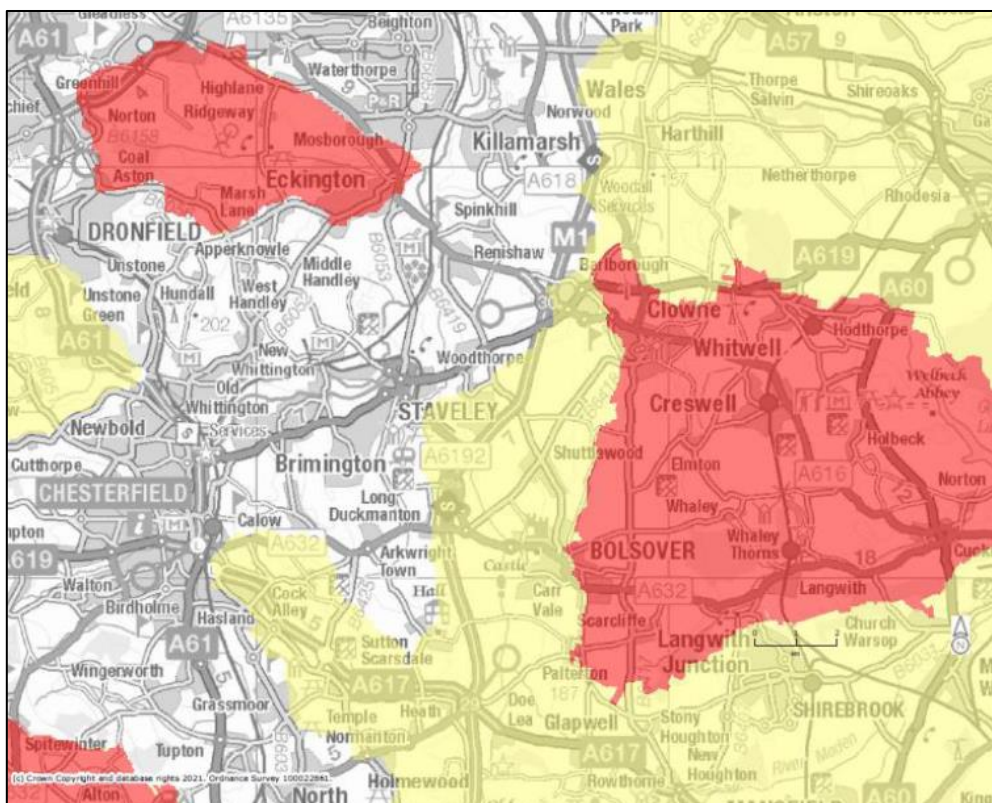
**Figure 8 – a granular look at flooding and surface water in an around Bolsover Town**



### 2.3.3 Water quality

Figure 9 identifies where improvements to specific water quality should be prioritised within the VSCR Area. This again highlights the importance of the magnesian limestone area within Bolsover District and into North Nottinghamshire as well as an area north of Dronfield.

**Figure 9 - Priority areas for water quality, sediment issues and phosphate runoff**



As previously stated, magnesian limestone is a Principal Aquifer, it is one of only 11 such aquifers in the UK. It is an unconfined aquifer within the VSCR Area (i.e., there is no overlaying geology to confine it), which makes it more vulnerable to pollution. It is also within a high ground water vulnerability area and a Nitrate Vulnerable Zone (NVZ).

Table 1 outlines the condition of the seven main rivers within the VSCR Area. None of the condition of these rivers is classed as good and two are currently considered poor.

**Table 1 – Rivers and their condition in the VSCR Area**

River name	Condition	Reasons for condition
Millwood Brook Catchment	Poor	Sewage discharge, urbanisation, agriculture
River Poulter	Moderate	High concentration of zinc, no identifiable source
River Doe Lea	Moderate	Sewage discharge
Pools Brook	Moderate	Agriculture, recreation, abandoned mining, contaminated land
River Rother	Moderate	Sewage discharge
River Meden	Moderate	Sewage discharge, agriculture, urbanisation
Spital/Calow/Muster Brook	Poor	Agriculture, contaminated land, sewage discharge, urbanisation

There is a significant issue of diffuse pollution from agriculture in both surface water and groundwater throughout much of the Area.

The Humber Catchment Management Plan, (which covers the VSCR Area) states that

*‘dealing with pollution from rural areas will help society reap the benefits of a healthy water environment. Farmers will benefit from making sure soil and nutrients are retained on the land rather than losing them, through run-off, to water. Controlling this run-off will help reduce localised flooding, reduce the sedimentation of lakes and harbours, improve fisheries and reduce the amount of harmful chemicals entering water bodies. Water companies will spend less money treating water for colour, pesticides and nitrate contamination. A reduction in nutrients will also benefit water quality and habitat in estuaries and coastal waters.’*

Legacy issues from previous coal mining and secondary processing activities are also significant in the Area, within both minewater and in sediments of rivers like the Doe Lea.

Nature-based solutions could have an important role in improving the Area’s water quality. Similar solutions as those outlined for flooding (and those discussed in the section on Natural Flood Management NFM) could be introduced to help filter water and reduce sediment flows, particularly within agricultural land (see also sections 2.3.2 and 3.4.3, the latter for details of NFM).

The two local catchment partnerships (The Don Network and The Idle Catchment Partnership) have a significant role to play in addressing the profile of the issues raised.

### **2.3.4 Mitigating the impact of climate change and increasing carbon sequestration**

The impacts of climate change on the UK could be severe. Scientists now think we are in the crosshairs of several conflicting warming and cooling phenomena. The position of the jet stream, (a high-altitude funnel of air created at the interface between the Polar and Ferrel major global air cells), which dictates much of our weather, is now thought to be key to our understanding. The Arctic is warming faster than anywhere else on the planet. As it warms it has reduced the north-south air temperature contrast between these cells, which results in a weak and wavy jet stream. Depending on its position a meandering jet stream can either be locked-on or just to the east or the west of the UK. The net result, when locked on, is that we experience storm after storm at the same location, which results in catastrophic flooding and damage. When the jet stream moves either side of the UK, it can lead to blocked weather patterns over a significant period of time, which depending on its position can either drawn down cold air from the Arctic (as in the Beast from the East) or warm air up from the tropics (as in recent heatwaves and other record-breaking warming events).

It is therefore imperative that action is taken to reduce future impacts. Hence achieving 'net zero' greenhouse gas (GHG) emissions by 2050 is now a statutory requirement for the UK.

Scientists currently calculate that we need to make cuts of 45% by 2030, if we are to become net zero by the middle of the century.

Before COP26, Nationally Determined Contributions (NDCs) from all signatories of the Paris Agreement put the global temperature rise on a course of 2.7 °C by the end of this century. The pledges agreed at Glasgow now put this at 1.8 °C. Implementing these commitments will be key over the coming decade.

The global response to climate change comes against a backdrop of the COVID-19 pandemic, which has shone a light on the scale of the challenge now faced. During the pandemic there was a 7% drop in emissions, which now needs repeating year on year until at least 2030, if we are going to meet the targets set out in the Paris Agreement. However, emissions have bounced back quickly and are now only about 0.5% lower than before the pandemic.

The UK Government also announced a more radical cut in April 2021, to reduce emissions by 78% by 2035, bringing forward the current target significantly, with the net effect likely to be pandemic size cuts until 2035.

Commitments to reduce emissions will require a great deal of focussed effort across all sectors of the economy, and over the next decade there will need to be large-scale transformation, supported by significant funding, if rapid decarbonisation is to be delivered. This will require major changes in the way we manage land, alongside rapid decarbonisation of the economy.

The government published its Net Zero Strategy in October 2021 to show where carbon cuts will be applied. This was widely welcomed by many as the first step on how to achieve the transition to net zero, but some critics outlined gaps including the need to end licences for new oil and gas exploration, the continued emphasis on road building and little new thinking for nature recovery.

There is much talk about scientific and technological mechanisms for dealing with emissions, but, at present, Carbon Capture and Storage (CCS) is in its infancy and will need to be scaled up many tens of thousands of times if it is to become part of the transformational managed low-carbon economy.

Direct air capture of CO<sub>2</sub> currently costs an eye-watering £600 per tonne (UK Government high end estimates for Carbon in 2050 are only £300 per tonne) and all the world's CCS facilities have, to date, only captured 260 million tonnes – less than the UK emits in a single year or 1.1% of global annual emissions.

Currently the capacity of CCS at Drax Power Station is about 1 tonne of carbon per year, and, as there is no mechanism to store this, it is fed back into the power station and vented into the atmosphere.



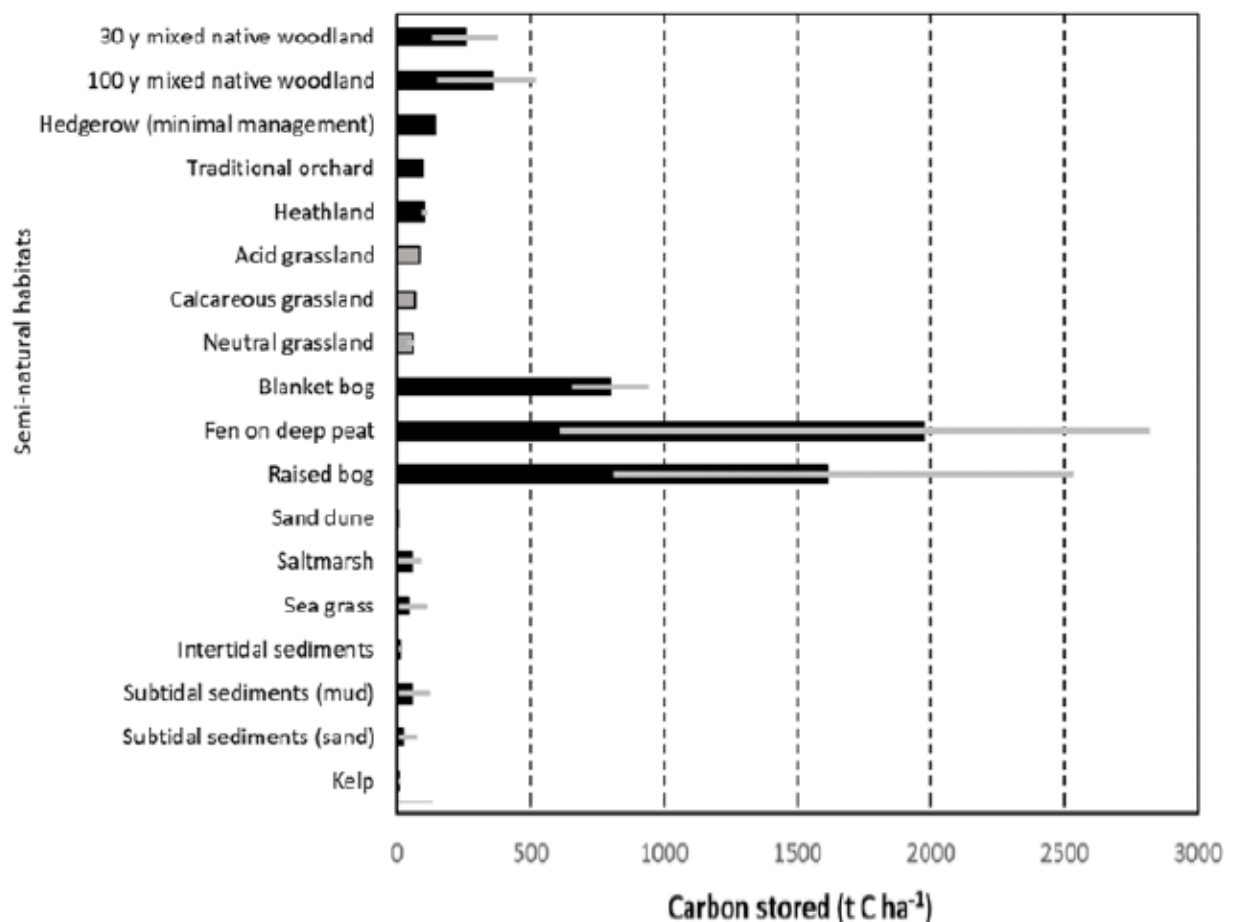
It is, therefore, likely that CCS will only start making a significant impact from the 2040's onwards.

Climate change is seen as the most significant threat currently facing humanity and often eclipses the biodiversity crisis. They are often discussed as separate issues, when in fact they are inextricably linked.

Nature-based solutions could provide a cost-effective and simple alternative tool in the fight to limit the impact of climate-change. And at the same time, as this report illustrates, they have the potential to provide significant additional ecosystem services.

Figure 10 outlines the carbon storage capacity of different habitats.

**Figure 10 – Carbon storage capacity of different habitats (courtesy of Natural England)**



Peatland habitats hold the largest carbon stores of all habitats, when in healthy condition They sequester carbon slowly but are unique in that they can go on doing so indefinitely.

There is perhaps evidence in local place names like Grassmoor, Heath, Whaley Moor, Danesmoor, Mastin Moor, etc. - that habitat with peat may have been present throughout the VSCR Area at some point in the past, but sadly no such relics remain except in the eastern extent of the Area around Sherwood Forest.

Woodlands, therefore, provide the greatest opportunity for carbon storage from the management of semi-natural habitats across most of the Area. Native broadleaved woodlands are reliable carbon sinks that continue to take up carbon over centuries, benefit biodiversity and provide other ecosystem services. Rates of carbon sequestration vary greatly with tree species and age; this is strongly influenced by soil type and climatic factors. Rates decline over time, but old woodlands are substantial and important carbon stores.

Tree planting has the potential to provide significant opportunity for carbon sequestration if managed correctly, but:

- Research has shown that trees generally only start to capture carbon after about 20 years from planting (this will vary between species and provenance)
- Choice of species is complex, but research suggests for conservation, adaptability to local conditions, biosecurity etc - UK provenance would be best suited, and long-lived broadleaved species would store carbon for a greater length of time

The Government currently operates the Woodland Carbon Guarantee - <https://www.gov.uk/guidance/woodland-carbon-guarantee> - which is a £50 Million incentive scheme, operated through a series of reverse auctions, taking place between 2020 – 2025, that provides a guaranteed price for carbon up to 2055 - 2056.

In addition, the Woodland Carbon Code (WCC) - <https://woodlandcarboncode.org.uk/> - is a voluntary scheme that provides independent validation and verification to ensure clarity of the amount of carbon sequestered.

The UK Land Carbon Registry - <https://www.woodlandcarboncode.org.uk/uk-land-carbon-registry> - is a database of Woodland and Peatland carbon sequestration projects.

Other habitats can also play an important role in storing carbon and it will be important that the drive for tree planting to sequester carbon is not at the expense of other biodiversity objectives. For example, semi-natural grasslands sequester and store more carbon than modern agricultural landscapes and it would be a great shame if these important habitats were lost to tree planting when reversion of unproductive and marginal agricultural land could be prioritised - particularly when you consider that 97% of wildflower meadows have been lost since the Second World War. Carbon is almost entirely stored in the soils and complex root systems of grassland habitats. Storage capacity depends on a number of variables including climate, soil and management, but can be significant.

An analysis of the Derbyshire Countryside Service's estate in Bolsover District, below, shows that there is already significant carbon sequestration from previously restored land, and this is now having an important role in the fight against climate change.

## Carbon sequestration

Using figures from a recent Rewilding Britain Report\*, the current market price for carbon#, and using examples from Bolsover District, the carbon sequestration potential of nature recovery could be significant to the area –

Estimates outline the following sequestration potential for various habitat types

- Woodland - 12.81 tonnes CO2 equivalent/ha/yr
- Species rich grassland – 3.6 tonnes CO2 equivalent/ha/yr
- Wetland – 5.12 tonnes CO2 equivalent/ha/yr

Derbyshire Countryside Service manages 464 ha in Bolsover District (2.9% of the total land area of the District). This consists of a mosaic of habitat types throughout the District, which, it is estimated, helps sequester around 3,300 tonnes CO2 equivalent/yr - equivalent to 17.6 million air miles, worth over £100,000 in ecosystems services to the local economy.

If just 20% of Bolsover District Council's 197 ha of greenspace was similarly renatured it could sequester around 142 tonnes CO2 equivalent/yr, equivalent to over 750,000 air miles (or flying around the earth 30 times).

\*REWILDING AND CLIMATE BREAKDOWN

# Current carbon market price as of February 2021 of £32.70/tonne

If nature-based solutions are to make a significant contribution to achieving net zero by 2050, implementation needs to increase significantly and immediately – noting that for many habitats there is a lag between habitat creation and its capacity to store carbon.

### 2.3.5 The heat island effect and heatwaves

Urban greenspaces can help relieve the impacts of the urban heat island effect, which occurs in towns and cities as additional heat is generated from houses, shops, industry, vehicles, and people. Temperatures can increase by 1-3 degrees in comparison to surrounding rural areas.

The urban heat island effect can be extremely dangerous to public health particularly during protracted heatwave events - a period of at least three consecutive days with daily maximum temperatures meeting or exceeding the heatwave temperature threshold – this varies across the UK but is currently 26 – 27 °C in Derbyshire/Nottinghamshire.

It is considered likely that heatwaves will become more common in the future as we experience the impact of a warming climate. The Met Office now predicts that the likelihood of experiencing a heatwave similar in intensity to Summer 2018 is now 1 in 10, which is 30 times more likely to occur now than pre-industrial levels, as a result of higher concentration of carbon dioxide in the atmosphere.

Urban greenspaces can help mitigate the impact of the heat island effect and heatwaves in two ways: the provision of shade and moisture through evapotranspiration - moisture is carried from the roots to the leaves and is released into the atmosphere which helps reduce temperatures.

## **2.4 Direct economic benefits**

On average, it is calculated that for every £1 spent on ecosystem restoration there is a £10 return on the investment through ecosystem services. With the right support the VSCR Area could directly benefit from increased tourism, become more attractive to investors, contribute to sustainable agriculture, and engage with local food production and supply chains. These topics are discussed in more detail below.

### **2.4.1 Visitor economy**

Improving natural capital will support the growth of the local visitor economy by helping to enhance the visitor experience, creating welcoming environments in which visitors wish to stay and spend their money.

VSCR's visitor economy is worth around £455M to the local economy and supports 6,200 jobs, with investment it is estimated that an additional £85M could be added to the economy, supporting a further 650 jobs.

The main driver for current visits is the Area's world-class heritage and other attractions. Hardwick Hall, Bolsover Castle, Creswell Crags, Welbeck Estate, Clumber Country Park and Sherwood Forest are all within a 10km radius of each other (from around Langwith).

These honey-pot sites tend to attract most of the visitors to the Area with little dispersal of spend. The Area's towns and villages, therefore, tend not to benefit from the current visitor economy.

However, the Area itself is not a recognised destination and very few visitors currently consider anything more than half day visits to honey-pot sites. Unless visiting friends or relatives (VFR) few visitors choose to stay overnight. The Area is also somewhat hampered by being flanked on either side by two of the East Midlands iconic destinations - the Peak District and Sherwood Forest - so often misses out on critical investment and marketing. As a result, the Area has been described as the 'hole in the donut' between these two destinations.

But, in reality, the Peak District and Sherwood Forest are only 25km apart - less than two hours cycling on a pedal bike and far more accessible (and less challenging) on an ebike. More could also be made of - the Area's concentration of world-class heritage (which is unparalleled in the East Midlands), impressive trail networks, and pockets of natural capital (outside the National Forest the Magnesian Limestone Area has the greatest concentration of both biodiversity and woodland of anywhere in Lowland Derbyshire).

Market failures within the current visitor economy include the lack of a cohesive product, the need for further investment in infrastructure, and better marketing and promotional activities.

To overcome some of these challenges interested partners and stakeholders from across North Derbyshire and North Nottinghamshire have joined together under the programme title of Visit. Sleep. Cycle. Repeat (VSCR) to improve the visitor economy in the Area.

VSCR has the potential to create a model for the development of a sustainable visitor economy and valued community asset - promoting cycling as a mode of zero-carbon transport, connecting people to nature and the outdoors, and helping introduce new audiences to the Area's world-class heritage - with any surplus recycled into the maintenance and development of the Area's social and natural capital, in a regenerative economic cycle.

The Area's natural capital is a key asset within the drive to develop a sustainable visitor economy. From large semi-natural woodlands, rolling farmland with surrounding vistas, limestone gorges, renatured country parks and greenways rich in wildlife, the Area has a lot of hidden treasures to offer those prepared to venture off the beaten track.

Time spent in the natural world provides large benefits to the visitor economy, with around a third of visits involving some form of expenditure. In 2015, the total spent while visiting natural places in England was estimated at £5.8 billion.

Even before the COVID-19 crisis, people were spending more time outside in the natural environment and time spent in nature is even more important to the majority of people in England since the pandemic.

But the Area's natural capital is often in isolated pockets, as figure 4 demonstrated.

And more needs to be made of urban realms, which often feel disconnected from their rural hinterland. Improving natural capital in towns, villages and in rural settings would support the local visitor economy, as well as providing wider ecosystem services. It is within the Area's towns and villages that the greatest cross-cutting benefits from adopting enhanced nature-based solutions are likely to be achieved.

### **2.4.2 Investment**

Investment in the natural environment has the potential to produce a range of benefits including boosting the local economy, creating jobs, and providing longer-term economic and environmental resilience. It would also make the Area a more attractive place to live and work, and this should, in turn, help attract further investment.

There is a growing trend towards more ethical and sustainable investment. Growth in the sector is particularly strong amongst the millennial and Gen Z demographics. This trend is likely to grow rapidly over the coming decade as our response to climate change and environmental challenges start to become embedded in every aspect of social and commercial life. It is likely that Corporate Social Responsibility (CSR) and brand positioning

will increasingly mirror this trend. Areas that understand and face this transformation rapidly will be better able to capitalise on a first adopter bonus, but equally are likely to bear greater risk.

One of the much-heralded successes of COP26 was the agreement that 40% of the world's private capital assets would shift investments to move towards zero carbon, such as renewable energy and shifting investment away from damaging to more sustainable activities.

By putting investment in natural capital within plans to reboot the economy, local and national government decision makers have a chance to deliver a green recovery from COVID-19 that sets us on the path towards a fairer society and more sustainable economy.

The 'public money for public good' mantra, Nature Recovery Networks and Biodiversity Net Gain at the heart of the 25-Year Environmental Plan, the Agriculture and Environment Acts will undoubtedly provide investment opportunities. Subsidies will shift away from owning land to providing public benefits. And new development will have to pay for its impact. These changes will provide future opportunities to enhance local biodiversity.

What is also noteworthy is the scope of the ambition this new suite of legislation and policy documents outlines, by daring to envisage a greener more biodiverse world, they effectively pose the question – what do we want the world of 2050 and beyond to look like?

The conservation lobby estimates the cost of transformation to a greener more biodiverse economy is around £1 Billion per year. This is an eye-watering sum, but to put this into context, we currently spend £2 Billion on agricultural subsidies alone. When the costs of disbenefits associated with the lack of investment in natural capital are considered, such as the cost of flooding or the increased burden on the NHS, then other sources of investment should be levered into the sector, shifting focus of investment towards natural capital and ecosystem services. But current funding does not match the level of ambition.

In 2016, the partial asset value of UK natural capital was estimated to be nearing £1 trillion (£958 billion) and living within 500 metres of green and blue space was estimated to be worth £78 billion to UK homes.

The VSCR Area is often viewed through a narrow prism of its traditional, working-class, mining, and industrial past. It would therefore be an unexpected and eye-catching market position if we started to promote the story of the landscape scale transformation that has taken place over the past 30+ years:

- the dramatic decarbonisation of its economy from the 1980's
- the subsequent widespread renaturing programme
- the extensive sustainable walking and cycling network

Whatever the politics behind past decisions, the legacy of the rapid transformation is all around and written into the landscape we see today.

It is a bold stance and one that is likely to attract a lot of attention, and therein lies the proposition. But to get it right requires simple and consistent messaging, a coordinated

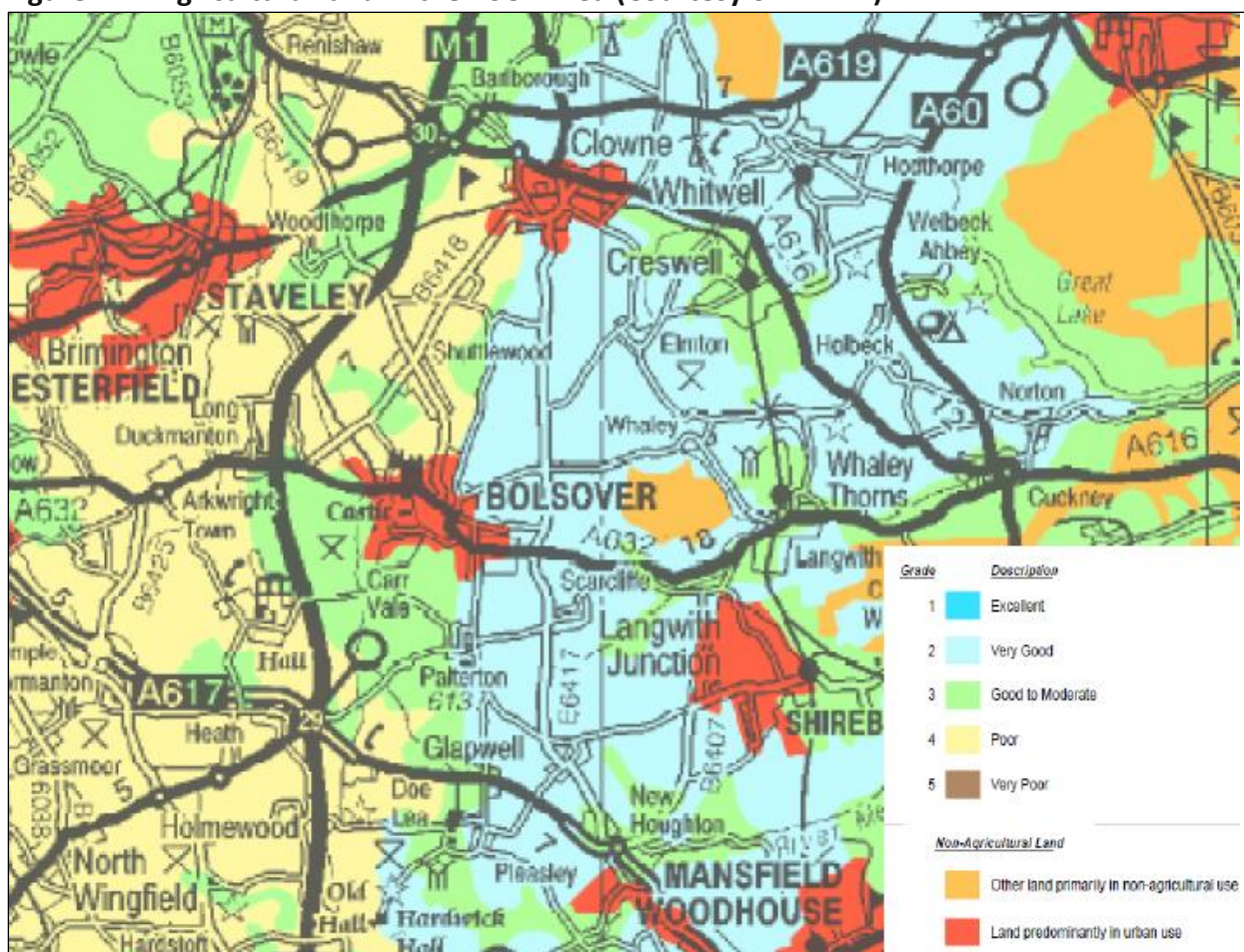
approach across many partners and stakeholders, and robust business planning and risk management.

Finally, as the impact of the cost-of-living crisis deepens, it would be a shame if investment in nature became seen as a luxury that the communities in the VSCR Area cannot afford. The choice should not be binary, and the long-term health and wellbeing of our communities may well depend on the choices made. Section 2.4.4 touches on the theme of food poverty in more detail, just one of the factors at the heart of the current cost of living crisis.

### 2.4.3 Agriculture, food trends, farming, and farmers

The landscape in the UK is shaped by farming. More than 70% of the UK's land is managed as farmland. Figure 11 shows the significance of agriculture in the VSCR Area.

Figure 11 – Agricultural land in the VSCR Area (Courtesy of DEFRA)



Much of the VSCR Area, particularly on the magnesian limestone, is dominated by very good quality agriculture land, shown in light blue. This land supports a wide variety of arable uses and is therefore important for food production.

Farming is a business like no other, farmers must demonstrate resilience and self-reliance as they work, often in isolation. They operate in an environment where profit and loss are

largely controlled by the vagaries of the British weather (farmers are therefore acutely aware of the impacts of climate change) and the impact of global market fluctuations (often with non-comparable economies of scale compared with the prairies of America and Canada or the Eurasian steppes).

However, farmers today produce fewer foods for human consumption, but plentiful raw materials for the processing and intensive livestock industries. It is estimated that half the cropland in the UK is used to produce feed crops for animals, yet we only produce 17% of the fruit and 53% of the vegetables consumed.

At the same time, in response to environmental, health and ethical concerns, the UK has seen a general decline in red and processed meat consumption of nearly 30 percent over the last decade, according to the Food Standard Agency's National Diet and Nutrition Survey (NDNS).

There is major growth in shoppers adopting vegan, vegetarian or meat reduced (flexitarian) diets, up by 43% year on year, and the total plant-based market has seen growth of 29% year on year, nearly twice the rate of the overall food and beverage market. A new climatarian diet is also growing in popularity and carbon labelling on food is likely to become increasingly common over the coming decade.

These trends, and the changes in legislation outlined in section 1.4.2, are likely to have a huge impact on local farmers' decision making, now and in the future.

Post war agriculture was dominated by a drive to produce as much food as possible, it often involves the use of very intensive methods and the application of fertilisers, pesticides, antibiotics, and the use of imported animal feed.

A knock-on effect of this intensification is that soil health begins to deteriorate, and soils become depleted. At the same time agricultural run-off leads to the degradation of water courses.

Research has found that 90% of conventional topsoil has thinned, with a third now thought to have a productive lifespan of less than 200 years. This is a constant worry for farmers.

Soil degradation is particularly significant in arable areas (and driving around the VSCR Area after heavy and prolong rainfall, one can often see topsoil washed off fields into nearby lanes).

There is evidence that soil degradation is now threatening future UK food production - bearing in mind that carbon locked up in the soil represents 25% of the potential for sequestration, this is of considerable concern with regard to climate change and future food security.

It is also striking that after heavy rain there are significant areas of farmland still waterlogged several weeks after storm events.

At the same time, farmers are one of the professional groups at highest risk of suicide in England and Wales and a recent survey found 88% of farmers under 40 had poor mental health. There is also evidence that rural decline and economic deprivation is a contributory



factor in male suicide, as well as the traditional belief that farmers do not like to complain or ask for help.

Post-war agricultural intensification, and particularly since the 1980s where winter cereals and intensive pesticide use became the norm, has given rise to a catastrophic collapse of once common farmland species.

In summary, the current situation is one of: biodiversity in crisis; an industry struggling with a mental health crisis; intensive production methods which are degrading soils and polluting water courses; and a change in consumer preference towards a more plant-based diet.

There has to be a better way, and as pragmatic economic rationalists, many amongst the farming community would welcome the opportunity to take out unproductive areas of land impacted by soil erosion or waterlogging, if the right support was available. These areas are prime targets on which to improve the Area's natural capital.

#### **2.4.4 Food waste, food poverty and local supply chains**

It is often stated that we can't reduce the amount of land in agriculture because it will drive down food production and push up prices. But everyday across the UK we waste 4.4 million potatoes, pour 3.1 million glasses of milk down the sink, and throw away 20 million slices of bread.

We throw away about 30% of all the food produced.

Not only is this a waste of money it is bad for the environment. Every month UK households throw away an average of £60 worth of food that could have been eaten.

- If we stopped throwing away the 714,000 tonnes of potatoes it would reduce CO2 equivalent gases emissions by 326,000 tonnes
- Each year UK households throw away 4.5 million tonnes of food that could have been eaten – a huge waste of money as well as food
- 30% of manmade global CO2 greenhouse gases are created from the production and consumption of food
- We often think that it is the supermarkets that waste food whereas in fact 70% of all food wasted in the UK is created by households.

How much land could be taken out of intensive agriculture if we wasted less food? How many additional ecosystems services could this land provide?

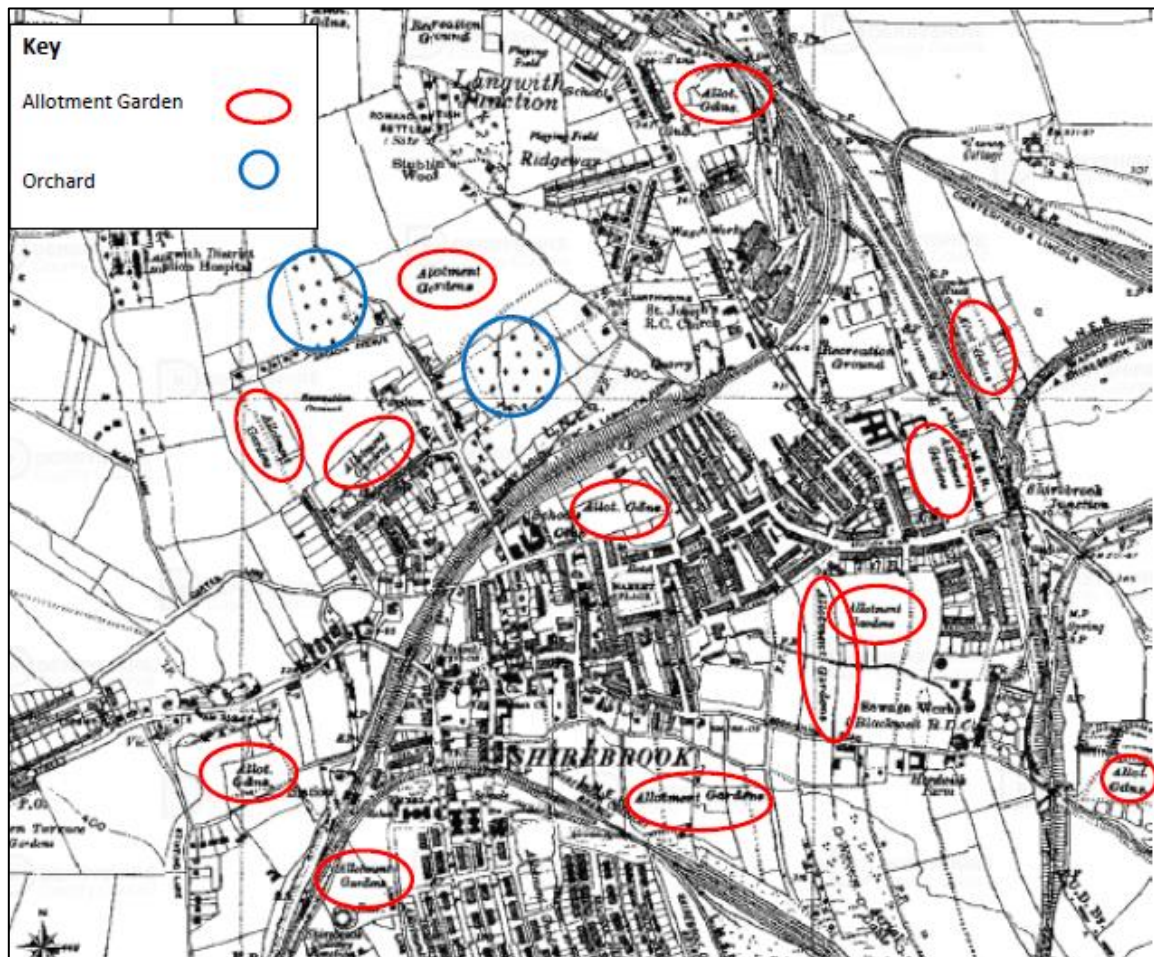
At the same time as raising the issue of food waste, the pandemic has highlighted a significant problem of food poverty.

Around 32% of households with children saw a drop in household income between March and August 2020 and 10% of parents say their children experienced food insecurity during lockdown. And the current cost of living crisis is likely to impact poorer households more severely.

COVID-19 disproportionately affected lower-income families and applications for Universal Credit surged, and pre-existing social inequalities were exacerbated.

Local food economies used to be at the heart of communities, as the example from Shirebrook shows, Figure 12.

**Figure 12 - a historic map of Shirebrook highlighting allotment gardens and orchards**



Could we develop a more regenerative and engaging model of food production to address the issues raised and support nature at the same time?

The Incredible Edible Network <https://www.incredibleedible.org.uk/> could provide inspiration. The original group started in Todmorden in 2008. This was soon copied by neighbouring area's and then further afield and grew into an established network in 2012. It is now a worldwide movement, with the vision to create kind, confident and connected communities through the power of food. There is an incredible Edible group in Chesterfield. Could this be replicated in areas like Shirebrook?

## 2.5 Attaching a notional value to ecosystem services

Attaching a notional value to the benefits that nature provides is not easy and some would argue that the intrinsic spiritual, aesthetic or landscape value of nature can never be costed.

There is merit in this stance, but for this approach to work it requires a shared, commonly held belief system which effectively creates value. Many traditional societies have such belief systems that help protect species or forests. For example, Madagascar has 'Fady', which is both taboo and sacred and can apply to people, places, actions, or objects, with the net effect of offering protection for specific animals or places, for the greater good.

We do not have such a value system, and in some schools of thought, where areas have no value, they can be subject to the 'Tragedy of the Commons', and become prone to exploitation by self-interest, contrary to the common good.

Natural capital has been described as the ultimate public good, providing a free resource for everyone to benefit from, and by attaching a financial value it can help show what will be lost if self-interest exploits or destroys the asset.

The philosophical, ethical, economic, and political debates around this subject are endless and beyond the realms of this report. However, by providing a notional value for natural capital, and more precisely values for some of the ecosystem services it provides, it is hoped it will illustrate the value of the benefits we'd hope to gain from more natural capital.

In recent years there has been a significant, yet largely unnoticed renaturing programme throughout the Area, with an estimated 10km<sup>2</sup> of new semi-natural habitats created over a relatively short period of time.

The textbox, below, provides a simple analysis to illustrate the value of just two ecosystem services, to illustrate the value natural capital has for the local communities and the economy.

What would the true value be if reduced flooding, or benefits to health and wellbeing, or other ecosystem services were also calculated?

The analysis is deliberately limited in its scope because there is no true value of the services provided by natural capital, due to the complexity of the subject and the rigor required to provide base data. The County Strategy will provide access to much more detailed modelling of the value of the services that could be provided, so it is pointless for this report to duplicate this work.

But it is hoped that the example illustrates the significant sums involved in the services that natural capital provides annually to the Area, noting that this is likely to be a gross under estimation of their true value.

## The notional value of ecosystem services

What is the value of the estimated 10km<sup>2</sup> of land reclaimed and renatured in the VSCR Area?

- applying a Biodiversity Net Gain (BNG) market value to appraise the land through an analysis of future local BNG markets, where Biodiversity Units (BU) are 0.25ha<sup>1</sup> in size and are valued at £25,000<sup>2</sup> over 30 years

$$10\text{km}^2 = 1,000\text{ha} = 4,000\text{BU} \times £25,000/30\text{yrs} = £100\text{M}/30\text{yrs} = £3.33\text{M}/\text{yr}$$

- applying a value for carbon sequestration based on a mosaic of habitats<sup>3</sup> and a market price for carbon<sup>4</sup>:

$$10\text{km}^2 = 1,000\text{ha} \times 7.12 \text{ tonnes CO}_2 \text{ equivalent/ha/yr} \times £32.70 = £232,824$$

### Combined value for these two ecosystem services ≈ £3.5M

1. Based on 10km<sup>2</sup> of renatured land across the VSCR Area. An analysis of the BNG market suggests that Biodiversity Units (BU) will be around 0.25ha (but figures could be as low as 0.01ha as quoted for Nationally Significant Infrastructure Projects).
2. Values of BU units again could vary from £14,000 - £70,000 depending on the value of habitat, land availability and other market forces. A value of £25,000 over 30 years has been assumed based on recent discussions with colleagues and the market price from a pilot project near Whaley Bridge. This equates to £3,333 ha/yr
3. Based on a mosaic of habitats, using figures from Rewilding Britain of:
  - Woodland - 12.81 tonnes CO<sub>2</sub> equivalent/ha/yr
  - Species rich grassland – 3.6 tonnes CO<sub>2</sub> equivalent/ha/yr
  - Wetland – 5.12 tonnes CO<sub>2</sub> equivalent/ha/yraggregating these together to assume an average of 7.12 tonnes CO<sub>2</sub> equivalent/ha/yr
4. Current carbon market price as of February 2021 of £32.70/tonne

## **Section 2 - Summary**

Nature-based solutions could transform our communities and support future resilience, as we adapt to the impacts of a rapidly changing climate and environment.

Enhancing opportunities for wildlife in the area has the potential to inspire people by connecting communities to nature, creating spaces to encourage physical health and mental wellbeing, whilst supporting the local economy.

The benefits that nature provides are called ecosystem services, which this section explored in detail. Restoring nature could deliver a phenomenal array of benefits, including - improving health and wellbeing, providing a resource for education, improving social cohesion; improving air quality, reducing flooding and improving water quality, helping capture carbon and reducing the heat island effect; supporting the local visitor economy, increasing the Area's investment potential, supporting regenerative agriculture, long-term food security and local food supply chains.

As we come to terms with the COVID-19 pandemic we have an opportunity to rethink the way we do things, this must include consideration for how we improve natural capital and optimise the potential benefits for communities throughout the VSCR Area.

Not to undertake this work now will cost more in the long run.

## Section 3 - Best Practise – How can change be delivered?

### 3.1 General Discussion

The post-war period has seen a significant decline in nature throughout the UK, largely because of the intensification of farming practices, development, pollution, and climate change.

Over this period, Britain has lost 97% of its species rich grasslands and 50% of its ancient woodlands and hedgerows.

Since 1966 alone we have lost 44 million individual birds. With once common species such as turtle dove (96% decline), corn bunting (90% decline), tree sparrows (97% decline), grey partridge (93% decline), lapwings (80% decline), yellow wagtails (60% decline), snipe (62% decline), nightingales (90% decline) and willow tits (88% decline). These species are all now a rare sight in our countryside.

The State of Nature report showed that nearly 60% of invertebrate species are declining, higher than any other taxonomic groups - a shocking 2.5 per cent rate of annual loss over the last 25-30 years. The number of widespread butterfly species fell by 58% on farmed land in England between 2000 and 2009 and two-thirds of 340 species of moths declined between 1968 and 2003. Britain has more than 1,500 species of pollinating insects and 75% of crop plants require pollination by insects and animals - the economic value of pollination by bees to the food business in the UK has been estimated at over £650 million per year.

Invertebrates are the building blocks of a healthy ecosystem, so these declines also result in the decline of other species higher up the food web. This insect apocalypse helps to explain the catastrophic decline in many once common bird species, as the trophic cascade becomes broken. Effectively there is now little to no food for wildlife to eat in much of the UK's intensively managed farmland.

However, this is not the whole picture. Across the country there has been high profile success stories of species bouncing back in specific well-managed locations – storks, spoonbills, cranes, bitterns, great white egret, red kites, buzzards etc., are all examples of species that have recently reemerged or thrived.

And UK residents have a significant interest in nature, demonstrated by the percentage of the population who are members of conservation charities, (8 million people are members of one or more of the conservation charities – about 12.5% of the population). The plethora of wildlife documentaries, literary and publications dedicated to the field, also shows the general support for nature amongst the population.

Yet, the reality is bleak. Much of our countryside now lacks the capacity to support even modest populations of once common species. The few success stories are the result of a lot of hard work and investment and have tended to create islands of high-biodiversity, surrounded by a wider species-poor countryside.

## **3.2 Best practice – a framework and economic principles for change**

The United Nation's Sustainability Goals provide a framework on which to design change and adopting a new regenerative economic model for VSCR could support implementation of that change.

### **3.2.1 Sustainability Goals**

The [Sustainable Development Goals](#) SDGs (Figure 13) are the blueprint to achieve a better and more sustainable future for all. These were adopted in 2015 by 193 countries and deliver 17 separate goals built around the three core principles of sustainable development – the economy, society, and the environment. They address the global challenges faced, including poverty, inequality, climate change, environmental degradation, peace, and justice. Targets have been set to achieve progress by 2030.

They are a call for action by all countries – poor, rich and middle-income – to promote prosperity while protecting the planet. They recognise that ending poverty must go together with strategies that build economic growth and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection.

More important than ever, the goals provide a critical framework for COVID-19 recovery.

Research found that 71% of business surveyed planned to develop measures to meet the SDGs and 78% of consumers stated they would be more likely to make a purchase of goods and services from companies that formally adopted the SDGs.

There is also a shift within the investment chain towards longer-term investments and sustainability and a growing movement of investors wanting to know where their money is going, and markets are responding to this shift.

We should now look at designing programmes and projects that meet as many of these goals as possible – a well-designed VSCR Programme could present such an opportunity.

Figure 13 – United Nations 17 Sustainability Goals



### 3.2.2 Regenerative economics - donut economics and the circular economy

At its core regenerative economics looks to provide wealth creating opportunities, whilst growing social and natural capital. Thus, regenerating and not depleting the environment or having a negative impact on society, these include such factors as pollution and social justice.

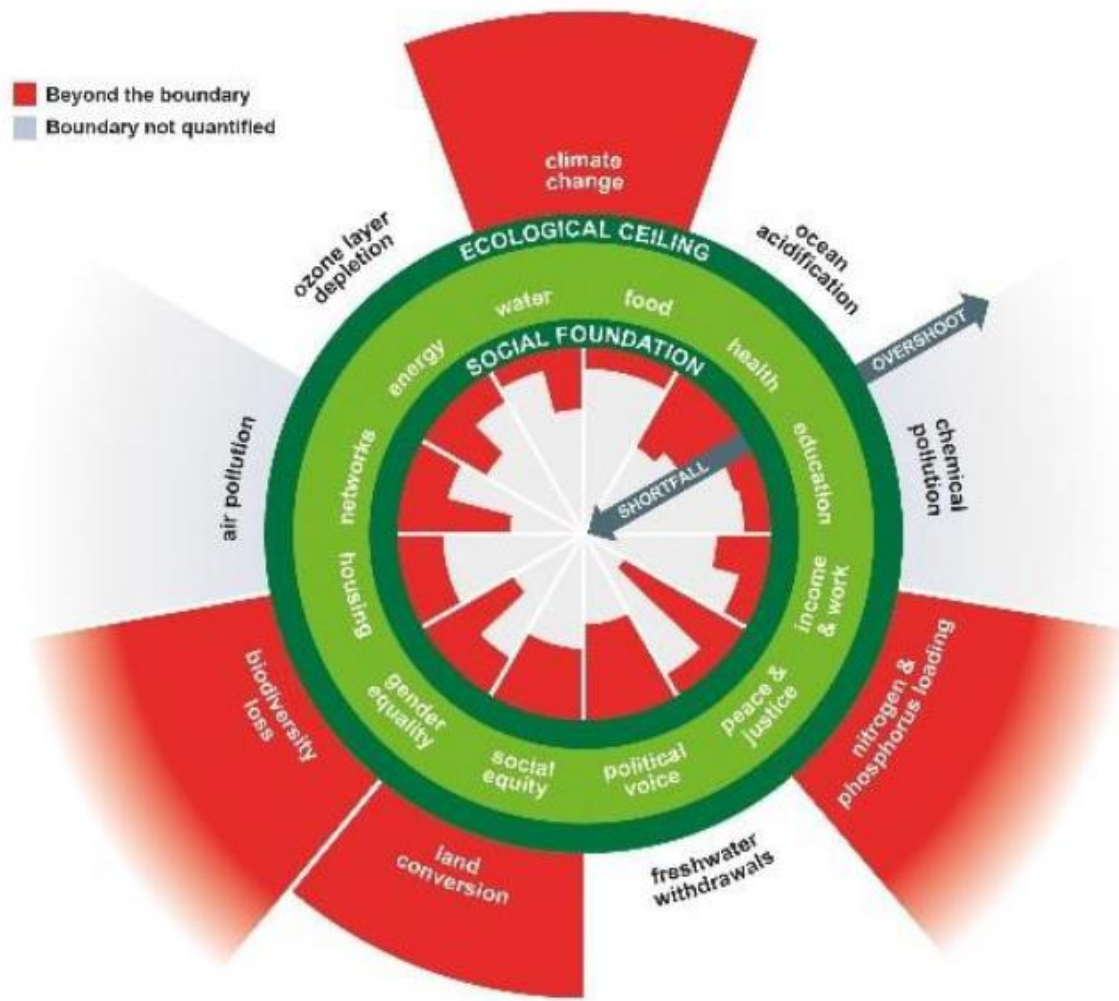
Donut economics (Figure 14) is one such regenerative economic model. The concept of Donut Economics was developed by the Oxford University Economist Kate Raworth and is based on the principles of living within our ecological means and within fair and equitable social structures – the outer and inner edges of the donut. Being outside either leads to unsustainable environmental exploitation (with overshoot of the ecological ceiling) or living within an unfair and unjust society (with a shortfall in the social foundation).

At the heart of Donut Economics is the formation of a restorative and redistributive economy.

The challenge this model sets out is both simple and formidable: to improve the lives of people whilst radically reducing our current impact on the environment.



Figure 14 – Donut Economics (courtesy of Kate Raworth)



The concept of the circular economy, (championed by the Ellen MacArthur Foundation - <https://www.ellenmacarthurfoundation.org/circular-economy/concept>) is a framework for an economy that is restorative and regenerative by design.

It looks beyond the current take-make-waste extractive industrial model and aims to redefine growth, focusing on positive society-wide benefits – to build social and natural capital.

Again, both the concepts of Donut Economics and the Circular Economy could be applied to the ongoing development of VSCR, to create a regenerative and sustainable income that supports growth in social and natural capital.

### **3.3 Best practice - good design, asset management and communication**

Section 2 outlined the possible benefits from improving the Area's natural capital. But spatially, where should these improvements be sited to maximise the returns from ecosystem services? Who owns or controls the land, and will they support the transformation? Will communities buy-in to the aims of the transformation? And how will the transformation be managed, funded, and maintained?

These are fundamental questions which need to be addressed if natural capital is to improve the resilience of communities.

Adopting good design, around an asset-based communication led approach, is the best way to achieve change and communicate this effectively with partners, stakeholders and to the wider public.

#### **3.3.1 An asset-based approach**

Our understanding of earth sciences has increased rapidly because of recent technological innovations over the last couple of decades. Satellite imagery, aerial photography, Geographic Information Systems (GIS) and increased computer capacity etc., are all now easily accessible and can provide data to help optimise future management. And often these are available as open-source data sets.

Adopting a scientific rationale to appraise and manage 'assets' in an area, and assessing long-term outputs, as a part of a wider portfolio of sites or a landscape setting, is referred to as an asset-based approach. By understanding an areas assets one can optimise management to provide the greatest future utility, or to put it another way, to provide the greatest commercial, social, or environmental benefits to the widest number of people.

An asset-based approach would look at the benefits from ecosystem services as assets. Initially, mapping and logging what already exists to understand the spatial relationship of the current provision, including deficits, to understand gaps and identify future opportunities.

This effectively will be the output of the County's Natural Capital Strategy. Accompanying the strategy will be an invaluable tool which will help analyse the potential to optimise natural capital in specific landscapes.

Good design will ensure adoption is appropriate, well thought through and considers other possible conflicting demands.

At the heart of the adoption of nature-based solutions, a balance needs to be struck between maintaining the current status quo or seeking opportunities to enhance natural capital.

Therefore, a well-designed and communicated asset-based approach is key to delivering meaningful change.

Optimisation needs to be adopted cautiously to ensure it can be successfully implemented. For example, nature-rich areas may provide greater multiple benefits but if poorly managed can feel imposed on communities and may lead to the perception of neglect, and raise concerns of safety, particularly amongst women, younger people, disabled people, and people who experience racism. Rather than encouraging opportunities for nature connection, an intervention could unwittingly become less visited because of poor initial design.

Benefits will be reduced where natural areas are poorly managed. Which effectively means that long-term maintenance needs to be considered within the design phase.

In addition, several other societal considerations need to be integrated. Landownership and/or other permissions, wider buy-in from the public, political support and/or funding, etc., will all have an impact on whether optimal scientific-management can be introduced. They may conflict with the perceived scientific rationale but have bearing on any given action and need factoring into delivery plans.

Research shows the importance of carefully designed programmes that develop a close relationship with nature, rather than simply providing an outdoor environment or facts and figures about nature. Factors such as cleanliness and good management may well, therefore, be more important than size and overall quality.

Community buy-in is essential, whether this is through such activities as green social prescribing, local walking for health groups, community gardening or food-growing projects, or environmental conservation projects. These greatly increase opportunities for social contact and inclusion, as well as providing opportunities to communicate the wider aims of the project.

### **3.3.2 Communication and branding**

Clear and simple communication is key to the delivery of any planned transformation. This must articulate the goals and explain the benefits of the transformation in as simple a manner as possible.

An effective strategy that is now being adopted by some conservation and environmental organisations, is to project a positive and hopeful vision for the future, effectively conjuring up an image of where we would like to be living in 2050 by adopting the transformation (it's worth noting here the similarity of intent with the 25 Year Environment Plan).

This moves away from a more traditional 'catastrophe narrative' often used by the environmental movement, which tended to portray conservation and environmental issues within a frame of this is what's being lost. As real as the science is behind the catastrophe narrative, the articulation of decline and loss of species, habitats, wild spaces etc., has largely failed to bring about the collective change it was intended to engender, mainly because such large existential threats are difficult to comprehend in increasingly busy lives.

Since the 1970s there has been a long tradition within the 'punk' genre to articulate outsider narratives. This started with the dissatisfaction of the teenage experience and spawned a world-renowned lexicon of cultural activity, which still holds significant resonance to this day. What is perhaps less well known are the sub-genres born out of this 1970s youth-culture, in particularly 'Steam Punk' and more latterly 'Solar Punk'. Whereas 'Steam Punk' is a cultural expression that harks back to the age of steam and Victorian industry, 'Solar Punk' is an expression of what a future, post-fossil-fuels and nature-rich world could look like. It is useful to this debate in that it is looking to provide a vision of the future. It is, therefore, similar in intent to the ambitions of the 25-Year Environment Plan and the new positive vision that some conservation organisations are beginning to adopt.

So, what is the future vision we want to create for the VSCR Area, what do we want 2050 to look like?

Ultimately, it is not the place of this report to answer that question, simply because it needs to be developed through a collective effort that captures the wishes of as wide a spectrum of partners and stakeholders as possible.

However, this report does highlight the importance of natural capital to the future, in particular the benefits that ecosystem services could provide for the greatest utility (benefits to the largest number of people) and how this would support resilient communities.

There are several positive attributes in the area on which to build the vision of the future:

- an abundance of world-class heritage
- arguably one of the best multi-user trail networks in the country
- the remarkable landscape transformation over the last 30 years, which includes re-naturing over 10km<sup>2</sup> of post-industrial land and planting tens of millions of trees
- a central, accessible location, which connects Sherwood Forest and the Peak District
- 3.7 million residents within a one-hour drivetime catchment, (which provides a high base to develop a market for leisure tourism)

Currently, Fred Marketing <http://fredmarketing.co.uk/> are developing a marketing plan for the VSCR Area to support this process. Their work is centred around the development of a new destination brand for the area that articulates the collective focus of VSCR on:

- **Environmental** responsibility, vision, and values to tie in with wider environmental targets and aspirations
- **Social** value and capital, to unify and enrich communities with a meaningful and lasting impact, and address the challenges currently faced within the Area
- **Commercial** value and potential, for the short, medium, and long term to elevate the offer to visitors, both inside and outside of the area, and reinvigorate the region's economy

In response to COVID-19, more visitors are choosing to spend their leisure time closer to home and/or source UK destinations that they are yet to explore, other key drivers are:

- Environmental credentials and 'good' ethical decisions
- Local/responsible sourcing
- 'Hidden gems' and new experiences
- Food and drink offers that run from 'healthy choices' to 'occasional treats'
- Picturesque/image friendly destinations that lend themselves to sharing online

A bold message or brand, which simply articulates what we hope to achieve in the transformation, will be key, as will, communicating this effectively to the audience or target market. This will require a great deal of buy-in from partners and stakeholders, who may already have clear communication pathways, which may need modifying to provide a clear, consistent and unified message. It may be challenging for specific partners to engage and could create unintended conflict, which will need to be resolved to ensure success. It is, however, likely that these pressures will lessen over time, as failure to act on the climate and environmental emergency will increasingly become harder to ignore and perceived wisdom will ultimately need to recognise the need to act multilaterally, across different sectors, with clear and consistent messaging.

### 3.3.2.1 The role of participatory arts

Participatory arts can provide a useful and fun means to engage people and communities in the communication challenges ahead. Junction Arts, a local participatory arts provider, specialises in community-led engagement projects. This has proved successful on many occasions in the past and their role should be considered carefully in the design of any future programmes. The textbox, below, outlines a previous successful collaboration.

#### Participatory Arts

Using participatory arts can be a great way to connect people to the landscape. For example, this has been used successfully to promote the Archaeological Way and encourage nature connectedness to the restored wildflower meadows on Poulter Country Park – see Bolsover Grassland Project.



The 'Top of the World', pictured, was constructed by artist Ewan Allinson in 2015. The sculpture consists of the horns of a woolly rhino and the jawbone of a hyena – to reinforce landscape connections with ice age caves at nearby Creswell Crags (and elsewhere within the landscape) and to illustrate the changing nature of our climate.

## 3.4 Best Practice – things we could do

There are many practical applications and operations that can be introduced to optimise the benefits from ecosystem services, some of these are discussed below.

### 3.4.1 Rewilding

Rewilding is a relatively new concept for enhancing nature conservation, initially developed in the 1980s and 1990s, it is becoming increasingly popular. A number of high-profile books have been written on the subject, including the best-selling *Wilding*, by Isabella Tree and *Feral*, by George Monbiot.

At its heart, rewilding challenges some fundamental and long-held beliefs within nature conservation, including the need for human intervention to ensure target species and habitats are protected and enhanced for biodiversity. Rewilding emphasises the role of megafauna (animals above 40kg), as ecosystem engineers or ‘keystone species’, and the role they play in modifying habitats. It therefore questions the notion that most habitats transition towards a climatic climax, suggesting that animal disturbance makes habitats far more dynamic than earlier ecological wisdom perceived. Dr Frans Vera’s work *Grazing Ecology and Forest History* (2000) is the seminal text on this theory.

The ‘wildwood’ may therefore not have been a dense, closed-canopy climatic-climax forest, but a more open, wood-pasture type habitat created by aurochs (wild cattle), bison and tarpans (wild horse), amongst other species. There are new fields of scientific research that support this thesis – phytoliths (small silica particles) are adding to our understanding of the role of grasses in ancient habitats. The fragility of grass pollen has led to an under representation within our understanding of paleo-environments, which the study of phytoliths is now redressing.

Although most wild megafauna in Europe are now extinct, in rewilding practice these species are substituted for others, to deliver a similar ecosystem engineering function. So, for example, aurochs are substituted for primitive breeds of cattle.

In rewilding’s original construct, species are left to fend for themselves without human intervention, but this raised significant animal welfare concerns and many rewilding projects do not practice this approach.

There are many examples of successful rewilding projects around the world, and it is likely that interest will grow, as solutions are sought to combat biodiversity loss.

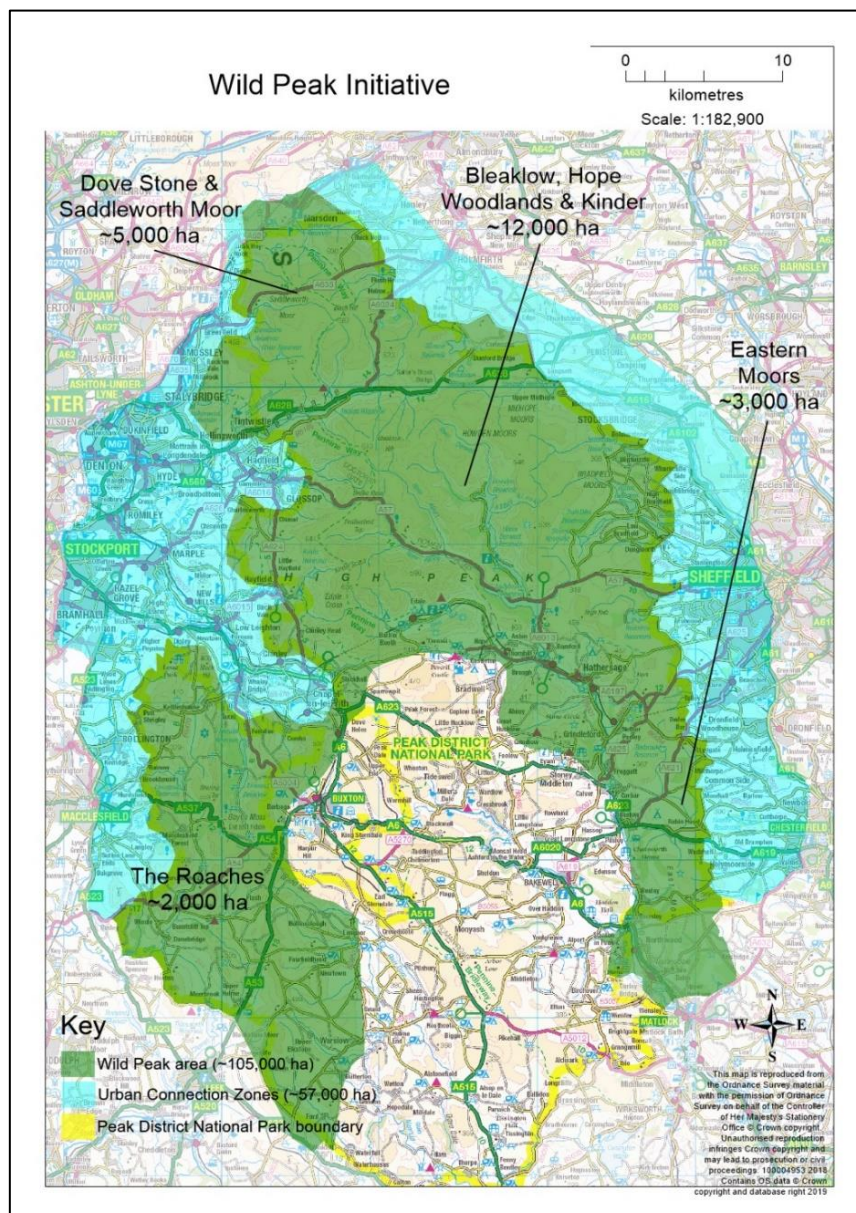
In the UK the Knepp Estate [www.kneppestate.co.uk](http://www.kneppestate.co.uk) and Wild Ken Hill [www.wildkenhill.co.uk](http://www.wildkenhill.co.uk) are two examples of rewilding projects, which have successfully transformed the way land is managed more sensitively for nature and transitioned to a largely eco-tourism based economy. These projects have taken previously farmed environments and through the introduction of keystone species, have, over a very short period of time, created species rich habitats which are now more biodiverse than many

nationally acclaimed nature reserves. So much so, rewilding is now challenging the perceived orthodoxy on how areas are best managed for biodiversity, and this is starting to create a seismic shift in the industry.

There can also be wider economic benefits from rewilding - an analysis of over 20 sites across England, covering over 30,000 hectares, revealed a 47% increase in full-time equivalent jobs and a nine-fold increase in volunteering opportunities.

Wild Peak is an aspirational rewilding project in Derbyshire, with the aim of creating a partnership of local landowners, community groups, businesses, etc., to rewild the land on the map outlined, below. The project aims to restore habitat for golden eagles, ospreys, black grouse, pine martens, red squirrels, and beavers, amongst other species.

Derbyshire Wildlife Trust (DWT), who are leading on the Wild Peak project, have recently recruited a new Rewilding Officer.



Rewilding can offer a positive vision of the future, but it needs land, buy-in, supportive policies and funding to be delivered at scale.

There are high-profile cases where local communities have rejected aspects of rewilding, including the ‘Summit to Sea’ project in Wales, where local hill farmers thought outside influences were trying to undermine their culture, language, and way of life. There has also been some confusion as critics homed in on the re-introduction of apex-predators, such as wolves (successfully introduced in wilderness areas like Yellowstone National Park in America) instead of focusing on the role less dangerous large herbivores play, as ecosystem engineers (which often out ways that of apex predators – as the plains of the Serengeti illustrate).

Careful consideration needs to be given to the design, implementation, and communication around rewilding, but where this has been successfully achieved rewilding has demonstrated a new way of creating wildlife-rich habitats, whilst offering significant support to the regeneration of rural economies.

### **3.4.2 Renaturing**

In its simplest terms, renaturing is about the restoration of habitats to enhance biodiversity. As such, rewilding could be considered one aspect of renaturing, (which may be more appropriate as a tool for restoring and protecting natural processes and wilderness areas).

However, as much of our landscape (and its biodiversity) is a product of thousands of years of human intervention, particularly in lowland areas, renaturing, where human intervention is an integral part of the management-mix, may be more appropriate.

Many traditional forms of agriculture and land-use unwittingly emulated natural processes so our farmed environment remained relatively high in biodiversity up until recently. It is only in the last few decades, through the rapid intensification of agriculture (amongst the other pressures mentioned in this report – development, climate change etc.), that biodiversity has been affected so catastrophically.

Cycling along the Archaeological Way from Poulter Country Park into the surrounding intensively managed agricultural land, one is struck by how empty the landscape is of butterflies and birds etc., compared to the nature rich island of the Country Park – which was renatured between 2008 – 2011 (see textbox below).

Renaturing, therefore, is concerned with traditional, less-intensive forms of management such as coppicing, hay-meadow or water-meadow management, as well as some newly defined techniques such as Natural Flood Management (see section 3.4.3 below).

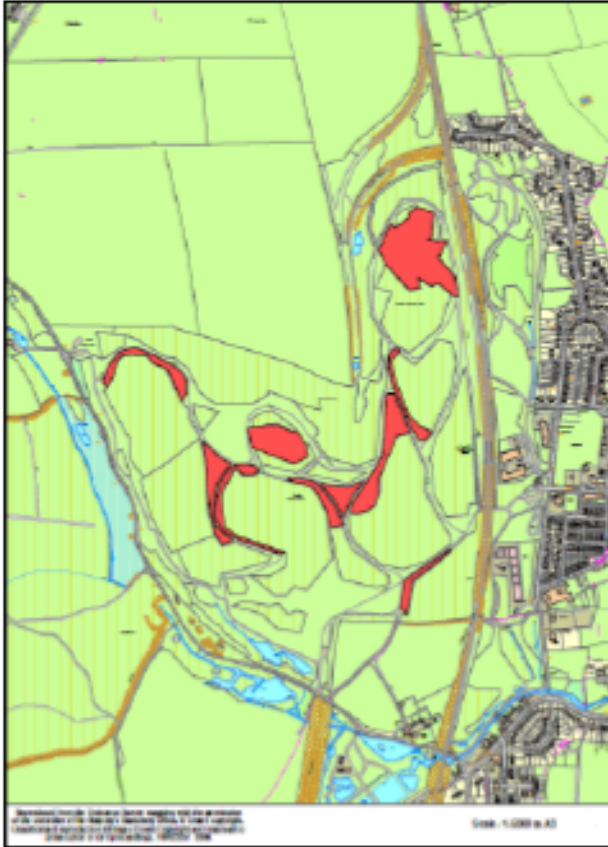
There have been significant efforts to renature specific sites within the VSCR Area, as the Bolsover Grassland Project textbox, illustrates. But more needs to be done if the current trends in biodiversity loss are to be reversed and fragmented sites reconnected.

Much of the land where this could take place at scale, is within the farmed environment outside the control of local authorities and other agencies.



## Bolsover Grassland Project

The Bolsover Grassland Project was a SITA funded Landfill Tax Credit project, managed by the Bolsover Countryside Partnership, which operated between 2008 – 2011.



The aim of the project was to increase the floristic composition of a number of Derbyshire Countryside Service (DCS) and other partners' sites. The project carried out 12ha of wildflower seed oversowing, mainly on Poulter Country Park, see map, and improved the grassland management on a further 17ha of sites.

The project only cost £25,000 to deliver and contributed 1.72% to the UK Biodiversity Action Plan Target for the restoration of lowland meadow.

The management element of this work is now mainstreamed into the DCS Higher Level Stewardship portfolio of site work.

10 years on and Poulter Country Park now contains some fantastic species rich wildflower meadows and is a wildflower seed donor site.

Seed collected from the Country Park and has been used to improve nearby Brook Park in Shirebrook, with the help of The Land Trust, Groundwork Creswell and Bolsover Woodland Enterprise.

### 3.4.3 Natural Flood Management

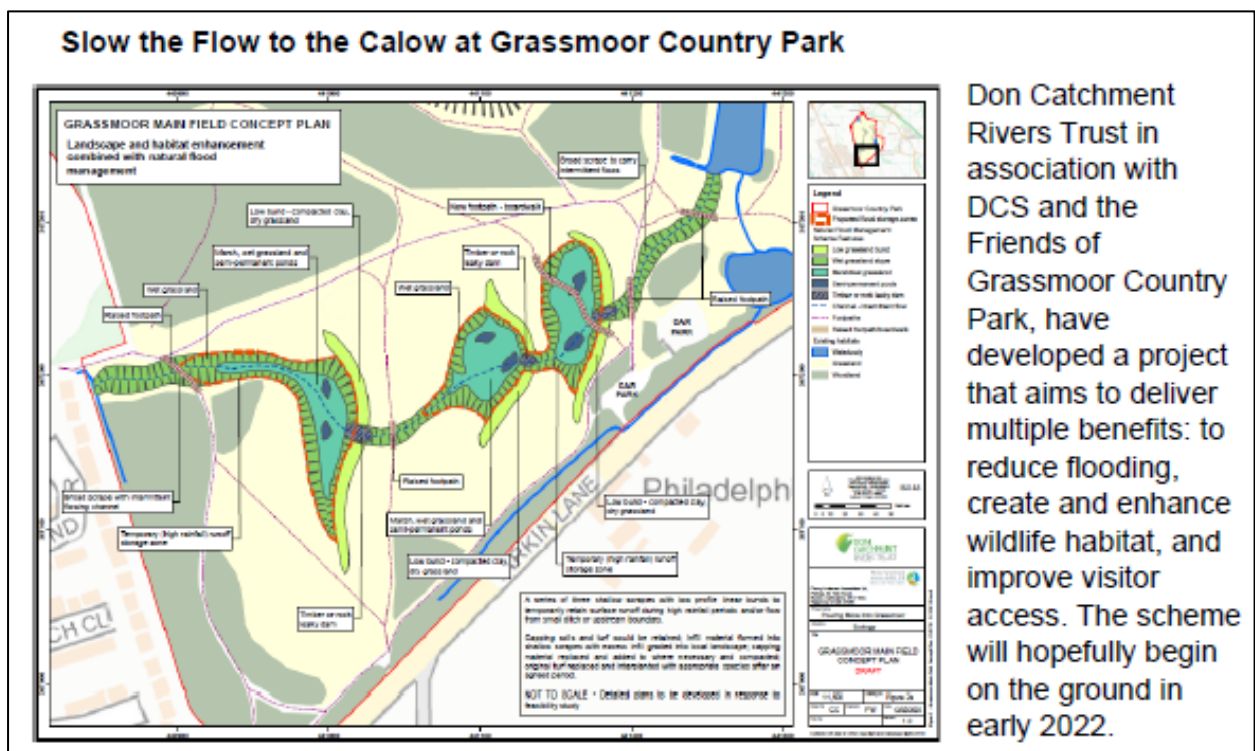
Incorporating Natural Flood Management (NFM) into catchments could provide a cost - effective solution to water management and flooding. NFM identifies four ways of holding water further up in the catchment:

1. Slowing water – increasing the roughness of vegetation increases the resistance to water flow - so planting trees, creating buffer strips in fields, managing areas of semi-natural grassland and hedgerows will all have a positive impact. Structures such as leaky dams ([https://en.wikipedia.org/wiki/Leaky\\_dams](https://en.wikipedia.org/wiki/Leaky_dams)) or spiling (coarsely woven willow structures) will also slow water. These help to trap sediment and in part emulate the ecosystem engineering function of beavers. Beavers, as a keystone landscape engineer, are now being reintroduced in several locations throughout the UK, in part to slow the movement of water through catchments.

2. Storing water – temporary ponds and scrapes can be created within the landscape to hold water at key locations – often after heavy rain many pockets of farmland can remain under water for several weeks, these are likely to be agriculturally underproductive and would be ideal as ponds, even if ephemeral in nature, to improve water holding capacity and provide habitat for wildlife.
3. Increasing water infiltration – many farmed soils are compacted either by farm machinery or farm animals. Improving soils' structure would improve water infiltration, this can be achieved either by mechanically ripping the soils or planting deeply rooted herbal leys or flood plain meadow mixes of grasses, legumes, and herbs.
4. Intercepting rainfall – vegetation can intercept rainfall, for example, research has shown that up to 45% of rainfall will be captured in the canopy of trees and evaporates away.

Any future NFM works should be co-ordinated and sanctioned through the relevant drainage authority to ensure a consistent approach that prioritises areas where such flood prevention measures are likely to have the greatest impact.

By incorporating NFM solutions into a whole catchment approach, more water could be retained for longer during storm events, this would help to reduce the intensity of downstream flooding. The textbox below outlines an example soon to be implemented at Grassmoor Country Park, through the work of the DCS and the Don Catchment Rivers Trust.



Don Catchment Rivers Trust in association with DCS and the Friends of Grassmoor Country Park, have developed a project that aims to deliver multiple benefits: to reduce flooding, create and enhance wildlife habitat, and improve visitor access. The scheme will hopefully begin on the ground in early 2022.

### 3.4.4 Nature Recovery Networks

In nature conservation circles the need to work on a landscape scale has been seen as good practice for at least two decades or more, as it became obvious that nature recovery needed interconnected habitats of high biodiversity, connected by wildlife rich corridors. These networks provide the space for species to move through the landscape, so they don't become genetically isolated and more prone to extinction. With the right mix of habitats and management they can provide food and shelter for wildlife throughout the year.

In fact, this thinking inspired many of the founding concepts of Limestone Journeys, a cross-cutting landscape-scale conservation project, which delivered many environmental benefits throughout the Magnesian Limestone Plateau of Bolsover District (see textbox below).

In many ways, Limestone Journeys was ahead of its time, as policy frameworks were not in place to help address wider biodiversity declines, such as improving conditions for farmland birds or engaging landowners to manage Local Wildlife Sites.

Thankfully, these policy gaps are in the process of being addressed and sit at the heart of the Government's 25 Year Environment Plan, which will be delivered through the Agriculture and Environment Acts (see sections 1.4.2.1 and 1.4.2.2).

The Department for Environment, Farming and Rural Affairs (DEFRA) and Natural England are bringing together partners, legislation, and funding, to create the Nature Recovery Network (NRN).

Together, they will deliver the Network by restoring and enhancing England's wildlife-rich places. By 2042 the Government aims to:

- restore 75% of protected sites on land (including freshwaters) to favourable condition, so nature can thrive
- create or restore 500,000 hectares of additional wildlife-rich habitat outside of protected sites (an area nearly twice the size of Derbyshire)
- recover threatened and iconic animal and plant species by providing more diverse and better-connected habitats
- support work to increase woodland cover
- achieve a range of environmental, economic, and social benefits, such as carbon capture, flood management, clean water, pollination and recreation

Habitat recovery will be delivered through Nature Recovery Network Partnerships and Local Nature Recovery Strategies (LNRS). The latter are a new system of spatial strategies which will cover the whole of England. It is anticipated that there will be roughly 50 LNRS, which together, will cover the whole of England, with no gaps and no overlaps. The details of these networks will be set out in secondary legislation, but it is likely that Derbyshire County Council will be the strategic lead in the development of the area's LNRS.


Figure 3 (section 1.3) outlined the Priority Habitats including restorable habitat fragmentation action zones. These areas are the priority for action if we are to create interconnected habitats that have a wider social and environmental function.

Over the coming years, it will be important to map and ground truth where Nature Recovery Networks can be developed throughout the VSCR Landscape, in order to maximise the opportunities for wildlife and optimise the benefits from ecosystem services.

And it is equally as important to note some of the failings of Limestone Journeys, particularly with regard to longer-term sustainability around issues of ongoing engagement, maintenance and management. These will be essential to the success of future Nature Recovery Networks.

### Limestone Journeys

Limestone Journeys (LJ) was a very successful Landscape Partnership, which ran between 2011 – 2015 in much of Bolsover District, with a £2M grant from the Heritage Lottery.



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The Partnership delivered - £220,000 of conservation grants, looked to increase farmland bird populations (through the provision of enhanced food & nesting habitats), improved 12 local sites, planted trees & hedgerows, managed plantation woodlands & wildflower meadows, created a sand martin wall, & trained an army of local volunteers.

These works included a huge hedgerow planting & restoration programme which reconnected 40km of hedgerow & enhanced 7.4ha of species rich grassland.

However, the programme failed to deliver:

- Long-term sustainable engagement
- Key environmental improvements – it was an aspiration to enhance the Local Wildlife Site network, but landowner engagement proved difficult
- Conditions for farmland birds improved very little, again through the lack of landowner engagement
- No long-term jobs were created

Limestone Journeys Scheme Area  
Your landscape Your heritage Your journey

### 3.4.5 The changing nature of agriculture

The challenge for agriculture is both simple and yet difficult to achieve. Effectively, how can future systems be designed to reduce current environmental impacts, provide ecosystem services, whilst maintaining yields.

Agriculture's response needs to include climate-smart land management that takes account of variations in soil and water processes, options are available to increase productivity if innovation in management practices and technology are adopted.

Future climate change scenarios will lead to changes in cropping patterns and management practices to adapt to changing crop/land suitability. Some agricultural systems are already transitioning through the adoption of more-precise use of technology and inputs, partly as a response to climate change, but mainly to respond to markets.

Unfortunately, slow-onset risks of human-induced land degradation, (e.g., soil erosion and diffuse rural pollution), may not be perceived as urgent short-term priorities. But they are issues that are persistent and difficult to reverse once degradation has taken place.

Applying the 'precautionary principle' and the 'polluter pays principle' would ensure harmful practices are quickly costed out of current production systems and enable land to be managed for optimal natural capital and ecosystem services (which would provide the greatest social and environmental utility).

The 25 Year Environment Plan and the Agriculture and Environment Acts now provide a framework to support the transition, under the mantra of 'public money for public goods.' But it will need to be properly resourced, managed and enforced.

There are effectively two polarised end state scenarios to consider:

- Maintaining the status quo – intensive agriculture – where soil degradation and loss, use of chemicals and its impact on diffuse rural pollution etc. are not costed into the model and over time the farming environment becomes denuded and provides few ecosystem services
- Transition – which involves a range of options including the introduction of alternative management systems (such as regenerative agriculture, natural flood management, agroforestry etc.) and the use of smart technologies to provide real-time digital information and AI to calculate optimal outcomes

Future land use is likely to contain a gradation between these two states, as landowners embrace or oppose change and adjust to future market forces.

But ultimately, it is incumbent on us all, whether it's through the food we purchase, or the land use decisions we make, to ensure we work towards a landscape that provides both the ecosystem services we require and has space for biodiversity to thrive.

Not to do so will cost more in the long run.

### 3.4.5.1 Regenerative agriculture

The policy framework and market trends all point to a transition in agriculture over the coming decade. With the right support there is scope for farmers to diversify, to both maximise profits and provide wider social and environmental benefits.

The 'public money for public goods' mantra at the heart of the new Agriculture Act presents a real opportunity to support the farming community and bring about a transformation in the agri-environment.

As subsidies are removed for purely owning land towards the provision of public goods. And more critical real-world analysis becomes possible, to monitor and pinpoint non-costed externalities, such as the effects of silting and pollution on local waterways, (currently not borne by farm enterprises). Current economic models for agricultural are likely to be challenged in many areas.

Regenerative agriculture, which uses organic or low input methods to nurture the soil, support wildlife and capture carbon, is seen as one possible solution to the transformation. Under new subsidy plans, farmers would be offered up to £70 per hectare to take up regenerative techniques, including mixed farming systems, where crops are cultivated alongside livestock to help boost soil health.<sup>1&2</sup>

The transition will be challenged by some within agriculture. Post-war agriculture has focused heavily on intensive high input methods to maximise production. For three generations or more, farmers have been trained on methods which have undoubtedly yielded great returns from the land. But at what cost?

High input agriculture has been the focus of agricultural colleges' curriculum for most of the post-war period and considering the average age of farmers, (which now stands at 59), new methods such as regenerative agriculture may be too much of a radical departure for some.

Partly in response to this issue, the Government launched consultation on a 'lump sum exit scheme' in May 2021, which, if introduced, would incentivise older farmers to retire and leave the industry, to allow younger farmers to take up the challenges the industry now faces.

Some within farming will seek to protect the current orthodoxy, there are many vested interests that will be threatened by the transition, particularly within the agri-chemical sector, which has huge lobbying power. They will argue that the Nation's food security is a 'public good', when in reality it is governed by private interest. (Food security is of public interest but is not a public good, as the resources and benefits are controlled by private enterprise). And, considering the issues of food waste and changing diets, transition markets need to consider more plant-based crops for direct human consumption and direct local markets, to cut down on food miles.

Note: 1. Comparing the proposed £70/ha subsidy to the current wheat price of around £1,000/hectare in 2021, which is at a 20-year high, subsidies alone may not be enough to persuade arable farmers to transform their farming practices. 2. This mixed system of farming is more akin to the pre-war systems of agriculture that existed in the area before specialisation and the drive for intensification, as many place names in the area testify to: Hornscredit and Oxcroft etc.

There will always be a tradeoff between the need to grow food efficiently to feed the Nation and the provision of ecosystem services, but the current balance is out of step with the wider social and environmental benefits that the farmed environment could provide.

Over the last decade there has been a real shift in the debate around the effects of intensive agriculture on soil health and its long-term ability to produce sustainable food. Many may see farming as rolling fields, hedgerows, and small family-run farms. And this imagery forms the basis of many marketing campaigns. But the reality is often quite different, consisting of large intensively cultivated fields managed through high inputs, flailed stunted hedgerows, with little space for nature, and run by conglomerate enterprises and farm managers. But, in some extreme cases, these enterprises may have as few as 100 harvests left.

Early adopters are already advocating for a change towards regenerative techniques. In a response to market trends for lower meat consumption and the growth in corporate social responsibility, McDonald's has recently launched a regenerative farming project to transition its beef suppliers in the UK. Prince Charles has also called for a 'rapid transition to regenerative farming'.

Compared with cereals, the current economics of beef and dairy are more favourable to the adoption of regenerative agriculture. There may not, therefore, be wide adoption on the productive arable land of much of the VSCR Area, without competitive incentives. These will need to at least match current profit margins in order to compete. And should consider the cost of disbenefits from current management on the principal aquifer and adjoining river catchments, as well as the lost provision from other ecosystem services. Unless farmers are properly compensated for the transition, there will be strong market forces which may limit their engagement.

The end of subsidies for owning land and the rising cost of inputs, like fertilisers, are likely to push some farmers again to consider alternatives. But, as economic rationalists, many are unlikely to be easily persuaded away from production.

There is, however, opportunities on unproductive field corners and low-lying areas prone to ponding all around the Area. These areas are prime targets for initial discussions with farmers to help bring about the transition. And even on the most intensive agricultural holdings, farmers may be willing to engage, with the right support.

Ecotourism could also provide a possible solution. If profits from agriculture are compared to potential yields from ecotourism, then a combined wildlife rich regenerative agriculture/ecotourism model is attractive in many locations. Success will depend on the critical mass and quality of the eco-product. But rewilding projects on the Knepp Estate and Wild Ken Hill, discussed in section 3.4.1, have both demonstrated how this model can work.

To summarise, regenerative agriculture could play a significant role in transforming land use over the coming decades, but to be successful, new economic models need to be developed. Only if these include the true costs of disbenefits such as diffuse rural pollution, compensate farmers for participation, or incorporate new economies around tourism/ecotourism, will the transition be viable compared with the current intensive model.

This may not be easy, it will take time and will need proper, sustained funding to embed change within the farming community. But this work does need to be done. The agri-environment makes up 70% of the Country's land. There isn't really anywhere else for the wider transformation and massive tree planting programmes to go.

There are already a number of small-scale regenerative farming enterprise in the local area. Happy Roots Farm <https://happyrootsfarm.co.uk/> and Half Acre Farm <https://www.halfacrefarm.co.uk/>, for example. Both of which are on the Oxcroft Estate in Bolsover District, which itself has a fascinating history recorded in the film 'Settlers in England' <http://www.iannesbitt.co.uk/index.php?/short-films/settlers-in-england/>. These perhaps show the start of the shift towards regenerative agriculture.

### **3.4.5.2 Agroforestry**

Agroforestry is a term not commonly used in the British Isles, but interest is likely to grow in the subject in the coming years, as it offers another alternative that can enhance natural capital, whilst maintaining agricultural production.

In its simplest form it is a system that combines growing trees or shrubs with agricultural crops or livestock. It is a land management approach with multiple benefits - it can enhance farm productivity, benefit wildlife, improve soil health, enhance animal welfare, manage water flow, and sequester carbon, to mitigate against the impacts of climate change.

Traditional practices widely seen throughout the British landscape can be classed as agroforestry, such as: hedgerows, shelterbelts, estate parklands (where animals are grazed amongst trees, e.g., Hardwick Park), allowing sheep access to woodlands and pannage (pigs grazing in woodlands) etc.

There are five distinct types of agroforestry:

- Silvopastoral – growing trees with livestock
- Silvoarable – growing trees with crops
- Hedgerows and buffer strips
- Forest farming - cultivation within a forest environment
- Home gardens - small-scale, mixed, or urban settings

Growing two crops from the same land such as rows of fruit trees through arable crops, or combining livestock and timber trees, can increase total yield and on-farm productivity.

Farm businesses can benefit from the services that agroforestry supports such as increased habitat for pollinators and shelter for livestock and crops, which can support improved growth. As well as diversified agricultural products such as fruits, nuts, and timber.

Productivity can increase under agroforestry, in some cases up to 40%. For example, hens ranging on land with 20% tree cover have been found to increase laying and have higher



shell density, meaning higher output, fewer seconds eggs and reduced losses. It also produces a premium product that commands a higher market price.

Farm animal welfare and performance can also be improved in agroforestry settings. Shelter from wind, rain and sun can improve quality of life with increased infant survival rates, reproductive capacity, and milk production in cattle.

Agroforestry can also have positive benefits on wider issues such as water quality. Arable farming is a significant contributor to nitrate pollution, but research has found it can be reduced by introducing trees into a landscape, through silvoarable practices.

There are currently drawbacks to the implementation of agroforestry, besides the traditional separation of the two disciplines of agriculture and forestry. Recent trends in agriculture have given rise to larger fields, bigger machines, more intensive management practices and conglomerate enterprises. Many trees and hedgerows have been removed from the landscape over the last 50 years. The economies of scale created in such enterprises will be difficult to challenge unless there are market adjustments (through subsidies or the true cost of disbenefits such as diffuse rural pollution being borne at the farmgate).

So, it should be recognised, that:

- Introducing trees into the farmed landscape is a long-term investment and requires long-term thinking. Agroforestry systems typically have around 75-200 trees/ha and current tree planting grants don't pay for such low stocking densities.
  - In response to this concern the government is looking to introduce an incentive for agroforestry through the Sustainable Farming Incentive (SFI) in 2024.
- Farmers on short term tenancies would not get the benefits from their investment or may be prevented from introducing trees by their landlords and tenancy agreements.
- There is limited processing capacity in England for innovative crops that could prove highly lucrative in agroforestry systems, such as nut crops.

However, a farmer near the VSCR Area has already introduced agroforestry on to their farm, to help reduce soil erosion as the following example outlines:

#### **Haywood Oaks Farm, Blidworth Nottinghamshire**

Trees integrated into arable settings have been proven to reduce soil erosion by up to 65%. On a 1,000 hectares arable farm just south of Mansfield 30km of hedgerow were planted as windbreaks, field edges were converted to grass to increase soil water infiltration and 7,550 trees were planted in 10m wide shelter belts to reduce erosion. The work has also improved soil health and water holding capacity of the land as well as protecting soil and crops against the impact of intense rainfall and strong winds. Problematic areas around the farm were targeted and trees planted so when heavy rainfall occurs the trees will encourage infiltration and prevent the water gathering pace and causing damage.

Agroforestry systems can be designed in a way that avoids potential trade-offs between food production and other public goods that occur in many modern farming systems. But it should be recognised that the risks associated with the long-term investment of introducing trees on to the farmed landscape, cannot wholly be borne by the farm enterprise, and farmers will need to be incentivised and offered appropriate advice in order for agroforestry to be more widely adopted.

### **3.4.6 Other suggested methods**

The following is a short section outlining other possible methods to help improve natural capital, suggestions vary from introducing yellow rattle to the creation of micro-forests.

#### **3.4.6.1 Roadside verges**

Many roadside verges could provide additional ecosystem services if current management practices were altered.

Roadside verges could enhance biodiversity by contributing to Nature Recovery Networks. Many verges have nutrient poor soils, which are essential if wildflowers are to thrive. If the current 'cut and drop' management, (up to five cuts per year on urban roads) was relaxed and changed to a 'cut and collect', so arisings were removed, (with only one or two cuts per year), biodiversity could be enhanced on target verges. This change in management could also save annual mowing costs, although there would be an initial capital outlay on new machinery.

A number of 'Road Verge Reserves' have already been designated around the County (including within the VSCR Area – some in Bolsover District are linked to magnesian limestone grassland), but their current management needs to be improved.

In addition, longer vegetation on verges would also provide greater water holding capacity, so could help to reduce localised flooding in target areas.

Semi-natural verge management would also help sequester carbon.

This type of management isn't suitable everywhere and obviously issues around highways safety must always take precedent, but, with good design and a systematic rollout, this could provide a quick win and help enhance the Area's natural capital.

In December 2021 Derbyshire County Council hosted the 'Derbyshire Highway Verge Conference' to look at the benefits from changing the management of verges across the County. This demonstrates the strategic support for introducing more nature-friendly verge management. Next steps need to identify how this can best be implemented across the County.

### **3.4.6.2 Yellow rattle**

Yellow rattle is a parasitic plant commonly found in traditional hay meadows. It is extremely useful to nature conservation because it can parasitise grass species and help prevent the build-up of coarser grasses. Over time, these species tend to outcompete finer grasses and wildflowers, which, if left unchecked, will lead to sites becoming denuded of floristic interest and of less value to nature conservation.

The use of yellow rattle is of particular interest when the management of a grassland site is uncertain or the annual cutting regime is suspended, for whatever reason. Here, its parasitic character will help slow the spread of coarser vegetation, until a management regime can be re-established.

DCS and BCP have in the past, either harvested yellow rattle seed from a donor site (Poulter Country Park is a good example) or purchased seed from an approved supplier to over-sow trail margins and sites (e.g., BCP coordinated the oversowing of Brook Park in Shirebrook in 2018 with Bolsover Woodland Enterprise, Groundwork Creswell and the Land Trust).

### **3.4.6.3 Letting areas grow wild - Ecological Tidiness Disorder**

Simply allowing areas of parks to grow wilder would not only provide opportunities for wildlife but it could also deliver important ecosystem services, such as:

- flood reduction - longer grasses and scrub provides more surface area and a rougher surface to hold water
- provide cooling against the urban heat-island effect - longer grasses and scrub provides more evapotranspiration, and the resulting moisture would help cool the surrounding area
- improve air quality – longer grasses and scrub would again provide more surface area and opportunities to absorb harmful pollutants
- sequester carbon – all habitats sequester more carbon than mown amenity grassland and require less carbon inputs to maintain

This simple change in management could provide homes for wildlife and ecosystem services, and could also reduce maintenance costs, free up labour, and reduce carbon emissions.

The writer, Benedict MacDonald, has coined the phrase Ecological Tidiness Disorder (ETD) to describe the over tidying of shared public spaces and the subsequent loss of biodiversity.

More relaxed management practices are already employed in several Local Authorities, such as Sheffield and Dorset, and their adoption is becoming more common place. Recent high-profile campaigns such as 'No Mow May' have helped raise public awareness.

There may be genuine concerns from adopting a more relaxed management regime and careful programme design is essential. They should seek to educate and engage the public,

and address issues around personal security and vandalism etc. In some instances, these will need to out-way the adoption of a more relaxed nature-rich management regime.

If it can be implemented successfully, however, there are opportunities to benefit wildlife, provide ecosystem services, and reduce costs. To produce a possible Win-Win-Win!

#### **3.4.6.4 Pictorial meadows**

Pictorial meadows are native and non-native wildflower plantings, which combine some benefits to wildlife whilst enhancing the amenity value of a site. The introduction of native and non-native species compared solely to native species is appropriate in areas which don't have intrinsic semi-natural character. Their introduction will help create visual interest throughout the growing season. Several local authorities have adopted the practice successfully, including Rotherham Borough Council, who gained national media coverage and recognition for their efforts.

Anecdotally, where pictorial meadows have been introduced in Sheffield, there are reports of positive impacts - increased site use, improved social-cohesion and reduced anti-social behaviour.

They have also been successfully used in combination with semi-natural grassland. The combination of well-planned and designed greenspaces, where pictorial meadows help to frame areas of semi-natural grassland can overcome some of the issues around the perception of untidiness and safety, which some people may associate with semi-natural grassland.

#### **3.4.6.5 Micro-forests**

Micro-forests, also known as tiny forests, are small densely planted areas roughly the size of a tennis court. Hundreds of micro-forests have been established around the world relatively recently, for many of the ecosystem services previously described.

Micro-forests are densely planted with native species using the Japanese planting technique of Miyawaki, where a loose nutrient rich soil is planted to create a forest in just a few years. The UK government recently committed funding for 12 micro-forests.

### 3.5.7 Best Practice – organisations already working in the area

There is a great deal of positive work already happening to improve natural capital around the VSCR Area. But this tends to be relatively small-scale, low-key, and largely goes unnoticed by the wider public. The following section highlights some of the less well known and local organisation, such as the Bolsover Countryside Partnership, Bolsover Woodland Enterprise, and Rhubarb Farm, as well as summarising more well know organisations such as Derbyshire Wildlife Trust and the National Trust. Many of those outlined, below, are involved in VSCR or have worked alongside the BCP in the past. There are a host of other organisations that will have an impact on natural capital, such as the Environment Agency, which are not engaged in VSCR and have not been mentioned in the text. It is hoped, however, that there would be scope to engage these stakeholders at some point in the future, either directly through VSCR or through the shared ambition of wanting to enhance natural capital.

#### 3.5.7.1 Bolsover Countryside Partnership

Bolsover Countryside Partnership (BCP) was established in 2000 but it was not until 2004 that the constitution was formally adopted, and it took a further year before funding was secured to recruit staff. Since then, BCP has worked with over 50 groups and organisation to improve the local environment for both people and wildlife.

BCP is hosted by Derbyshire Countryside Service (DCS) and it is supported financially by DCS, Bolsover District Council and the Bolsover Partnership.



The mission statement of the Partnership is to - co-ordinate, develop and direct countryside management activity in the District of Bolsover and develop opportunities for sustainable tourism – including wildlife, conservation, trails, countryside sites, rights of way, and countryside information and events.

Over the years, BCP has helped secure £4.5M to improve the local environment and peoples' connection to it. Successful projects include: Limestone Journeys, Archaeological Way, the Bolsover Grassland Project, Grot2Green, Think Green! and Walking for Health.

The current focus of the partnership is the development of Visit. Sleep. Cycle. Repeat, with the aim of introducing regenerative economics to develop a sustainable visitor economy, that supports the enhancement of local natural and social capital.

### 3.5.7.2 Bolsover Woodland Enterprise

Bolsover Woodland Enterprise (BWE) is a social enterprise that over the last 20 years has helped manage and protect Derbyshire's woodlands through its team members, all of whom have a learning disability, and are supported by staff and volunteers.

BWE gives people with learning disabilities exciting opportunities to develop new skills, confidence and make a real difference to their communities.

The Enterprise delivers a wide range of projects and services, including - woodland management, creation of outdoor learning spaces, and installation of rustic furniture.

By-products from environmental enhancements are harvested to make indoor and outdoor furniture, other timber products and firewood.

BWE is largely funded by Derbyshire County Council and sales of products and services help offset costs.



### 3.5.7.3 Derbyshire Countryside Service

The Countryside Service is responsible for managing and promoting Derbyshire County Council's countryside sites and facilities. These include country parks, local nature reserves, countryside sites, other recreational facilities, and multi-user trails. The vision of the Service is to protect, enhance and promote the network of countryside sites across the county, for people, strong communities, and a healthy and nature-rich environment.

The three key areas of focus for the Service are:

- site management and access
- environment, biodiversity, landscape and heritage
- engagement and promotion

The Service is the largest single owner of semi-natural natural capital assets in the VSCR Area, with an estimated 7.5km<sup>2</sup> of land. These sites form a mosaic of reclaimed former industrial sites, which are now of considerable value to nature conservation and the provision of ecosystem services.

#### **3.5.7.4 Derbyshire Wildlife Trust**

Derbyshire Wildlife Trust (DWT) has been protecting wildlife and wild spaces in Derbyshire since 1962. As the leading conservation charity in Derbyshire, DWT works hard to support local wildlife through the work of a core team of staff, volunteers, and members.

Specifically, DWT has reserves at Carr Vale and the Avenue Washlands and has oversight of the Local Wildlife Site Network. DWT has Service Level Agreements with several councils for which they provide support for wildlife related planning matters.

DWT is also part of the wider countrywide network of Wildlife Trusts.

#### **3.5.7.5 Groundwork Greater Nottingham**

Groundwork Greater Nottingham (GGN) is the trading name of Greater Nottingham Groundwork Trust. GGN works with communities and partners to improve the local environment and seeks out opportunities to enable people to flourish.

GGN has an important role in the provision of volunteers in the VSCR Area and specifically helps manage the Clowne Branch Line and Archaeological Way through service level agreements with Derbyshire County Council and BCP.

#### **3.5.7.6 The Land Trust**

The Land Trust (LT) is a charity, which owns or manages open spaces restored from derelict land for the benefit of the public. Their vision is 'to improve the quality of people's lives by creating sustainable, high quality green spaces that deliver environmental, social and economic benefits'.

The LT owns and manages a number of sites in the VSCR Area, including The Avenue, Brook Park (in Shirebrook) and Pleasley Pit. The LT often manage sites in partnership with local organisations, for example they manage Pleasley Pit in partnership with the Pleasley Pit Trust.

#### **3.5.7.7 National Trust**

The National Trust is the largest conservation charity in the Country and leads on the conservation of places of historic interest and natural beauty, which are permanently protected for the benefit of the nation.

The National Trust has two significant properties within the VSCR Area: Hardwick Hall and Park and Clumber Park (which is one of their most visited pay to enter properties in the Country, with over 600,000 visitors a year).

The Trust is one of the largest landowners in the United Kingdom and recently joined forces with the RSPB, Woodland Trust, The Duchy of Cornwall, Church Commissioners, Soil Association, and the Wildlife Trusts to commit to renaturing a third of England's land.

It also has a significant lobbying role which supports advocacy for the sector.

Over the years the National Trust at Hardwick has been particularly active in engaging with local projects, in support of enhanced natural capital and peoples' connection to it.

### 3.5.7.8 Pleasley Vale Outdoor Activity Centre

Pleasley Vale Outdoor Activity Centre is in the Pleasley Vale Mills, on the Derbyshire and Nottinghamshire boarder, in a limestone gorge surrounded by ancient woodland and semi-natural grassland. The Centre was established 20 years ago and has developed a reputation for delivering a wide range of adventurous, outdoor and countryside activities, at both onsite and offsite locations.

Most of the adventurous activity is targeted at local school-age children or specialist intervention programmes, e.g., working with adults with a mental health diagnosis through the Naturally Positive programme. The Centre has the capacity to organise a range of activities related to natural capital and nature connectedness including forest schools/forest skills, conservation tasks, green gym activities and green social prescribing etc.

### 3.5.7.9 Rhubarb Farm



Rhubarb Farm is a community led social enterprise based in Nether Langwith, on the border of Nottinghamshire and Derbyshire, that specialises in horticulture as a therapeutic tool to help people with complex needs.

The Farm provides services for the unemployed, recovering substance misusers, ex-offenders, young people not in education, employment or training (NEET), excluded school students, people with learning disabilities, people with mental ill-health, ex-service personnel, older isolated people and people with dementia.

The Farm:

- Supplies fruit and vegetables to farm shops, restaurants, and weekly vegetable bags for local customers
- Runs a community café offering low-cost meals to older people
- Provides a flexible and economic gardening service for the local area
- Redistributes surplus food via food bags to local customers





### **3.5.7.10 Forestry Commission**

The Forestry Commission is a non-ministerial government department responsible for the management of publicly owned forests and the regulation of both public and private forestry in England.

The Central England Office is situated nearby at Sherwood Pines and the Commission owns or manages several significant pieces of mature woodland and new plantations in the VSCR Area including Pleasley Park, Whitwell Wood, Shirebrook Wood, Oxclose Wood and Silverhill Wood.

### **3.5.7.11 GreenSPring – green social prescribing test and learn project**

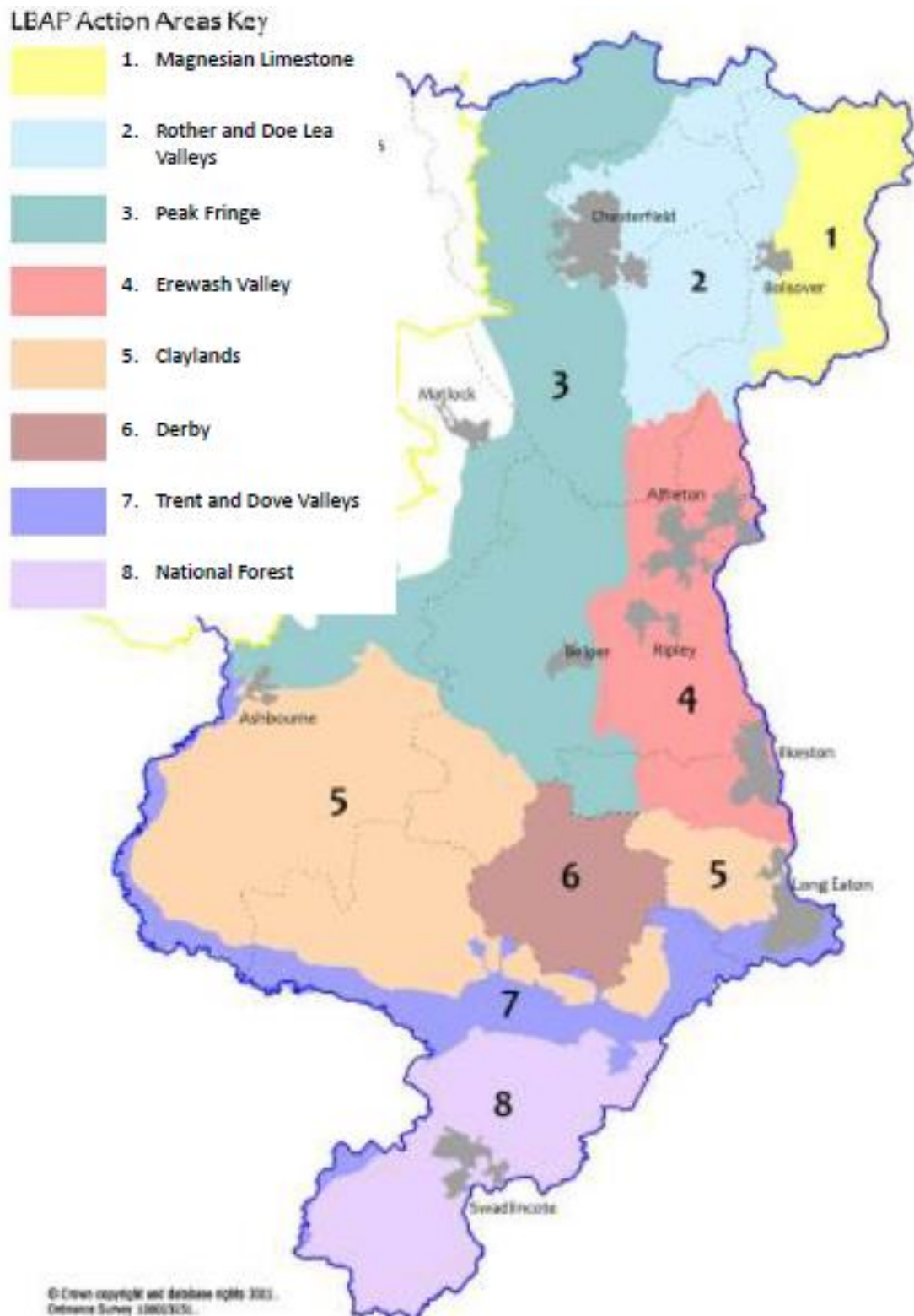
Derbyshire and Nottinghamshire secured £500,000 of Government funding to deliver GreenSPring, a test and learn green social prescribing project, which will run until June 2023. Green social prescribing is the practice of supporting patients to engage in nature-based activities to support their physical and mental health and wellbeing.

The project will test how to embed green social prescribing into communities to:

- improve mental health outcomes
- reduce health inequalities
- reduce demand on the health and social care system
- develop best practice in making green social activities more resilient and accessible

### 3.5.8 Best Practice – nature conservation priorities

In 2011 the Lowland Derbyshire Biodiversity Partnership (LDBP) produced Biodiversity Action Plans for eight discrete landscape areas within Lowland Derbyshire. These plans cover the period 2011 – 2020, but are still the most detailed and relevant analysis of local biodiversity priorities.



**Table 2 Lowland Derbyshire Action Plan Areas - Summary Statistics**

Name	Area/ha	% Biodiversity	% Woodland Cover
1. Magnesian Limestone	8,713	15	10.4
2. Rother and Doe Lea Valleys	17,824	6.8	6.3
3. Peak Fringe	37,988	10.5	7.6
4. Erewash Valley	17,580	5.3	4
5. Claylands	34,825	4.8	2.8
6. Derby	7,803	5.9	1.4
7. Trent and Dove Valleys	12,211	4.7	3.6
8. National Forest Area	15,283	18.2	14.6

The VSCR Area is covered, for the most part, by two of the eight landscape areas:

- Magnesian Limestone Area
- Rother and Doe Lea Valleys Area

These two areas are highlighted above and summarised in further detail, below.

### **3.5.8.1 Magnesian Limestone Area**

The Magnesian Limestone Area is a gently rolling plateau dissected by a series of narrow streams (including the Millbrook, Poulter and Meden). These streams often have rocky gorges, including the internationally renowned Creswell Crags.

The wider landscape consists predominately of large, open arable fields often enclosed by hawthorn hedgerows, which are intensively flailed and are of little biodiversity value.

There are several large ancient woodland sites (Whitwell Woods, Scarcliffe Park, Langwith and Roseland Woods, and Pleasley Park), many of which were used in the medieval era to breed deer for the royal hunting forest in nearby Sherwood.

There is a plethora of former colliery sites, reclaimed over the last 30+ years, which are now of high biodiversity value. These contain a mosaic of habitats including species rich grassland, young plantations, scrub, and a range of wetland habitats from scrapes, reedbeds, ditches and areas of open water.

Notable habitats in the area include the remaining fragments of calcareous grassland and limestone woodland, see Figure 15. The calcareous grasslands are of great ecological importance. Equally, some of the limestone woodlands are amongst the most species rich in the Area.

**Figure 15 - Priority habitats in the Magnesian Limestone Area**



15% of the 87km<sup>2</sup> of land in the Magnesian Limestone Area has some value for biodiversity. Tree cover is around 10.5%, compared with the target for England of 12% by 2060, however, it is above the current England average of 10%. The Magnesian Limestone Area is the second smallest landscape type in Lowland Derbyshire but has the second highest percentage of biodiversity and woodland cover (with only the National Forest having more of both).

Generally, the Area's biodiversity is now constrained to isolated pockets with restricted opportunity to migrate, due to the barrier intensively managed farmland poses to many species. Over time this could impact on the genetic diversity of isolated species, which may already be on the brink or passed the threshold for local extinction. And even more mobile species, such as once common species of farmland birds, are now all but considered locally extinct. Intensive farming has led to a loss of the trophic cascade and a breakdown of food webs. In particular, the use of insecticides, pesticides and herbicides and the move to the cultivation of winter cereals has meant there is often sparse food reserves left throughout the winter to ensure breeding success.

The priority for biodiversity must be to reconnect fragmented habitats through the creation of a network of corridors of high biodiversity, largely within the intensively farmed landscape.

In addition, enhanced natural capital could address - soil degradation, leading to loss of fertility and sedimentation of water courses; diffuse rural pollution, particularly important on the magnesian limestone aquifer; localised flooding; and issues related to health and wellbeing, which limits more than a quarter of peoples' daily lives.

To maximise the natural capital value of the landscape, beyond purely enhancing the landscape for biodiversity, new corridors should be developed:

- along footpaths, bridleways, green lanes, and multi-user trails
- adjacent to water courses, areas where springs rise or where run-off could lead to flooding, loss of topsoil or where there are issues with diffuse rural pollution
- alongside field margins and across contour strips within fields, again to reduce run-off. And on wet less-productive hollows
- in urban greenspaces to enhance opportunities to connect people with nature and maximise the benefit from other ecosystem services, such as improved air quality or cooling from the heat island effect
- around existing sites with high biodiversity

Landownership in the area is dominated by several large landowners, notably Chatsworth Estates, Welbeck Estates and the National Trust, and the land is generally sub-let to tenant farmers. Derbyshire Countryside Service (DCS) also has a significant landholding in Bolsover, which equates to over a quarter of their total landholding across the County.

Key sites within the area include - Creswell Crags (SSSI), Hollinhill and Markland Grips (SSSI), Pleasley Pit Country Park (LNR), Rowthorne Trail (LNR), Hardwick Park, Pleasley Park and Vale, Trails Networks – Archaeological Way, Phoenix Greenways and Clowne Branch Line,

Poulter Country Park, Scarcliffe Park, Langwith and Roseland Woods, Whitwell Wood, Wollen Meadow and a number of quarry sites.

## Magnesian Limestone Area – Priority Species

Group	English Name
Moss	Flamingo moss
Vascular Plant	See footnote
Amphibian	Great crested newt
Amphibian	Common toad
Reptile	Common lizard
Reptile	Grass snake
Reptile	Slow worm
Bird	Bullfinch
Bird	Corn bunting
Bird	Cuckoo
Bird	Curlew
Bird	Dunnock
Bird	Grasshopper warbler
Bird	Grey partridge
Bird	Herring Gull (not breeding)
Bird	House sparrow
Bird	Lapwing
Bird	Lesser Redpoll
Bird	Lesser spotted woodpecker
Bird	Linnet
Bird	Marsh tit
Bird	Reed bunting
Bird	Skylark
Bird	Song thrush
Bird	Spotted flycatcher
Bird	Starling
Bird	Tree pipit
Bird	Tree sparrow
Bird	Turtle dove
Bird	Twite (not breeding)
Bird	Willow tit
Bird	Yellowhammer
Bird	Yellow wagtail
Mammal	Brown hare
Mammal	Brown long-eared bat
Mammal	Harvest mouse
Mammal	Hedgehog
Mammal	Noctule
Mammal	Soprano pipistrelle

Group	English Name
Mammal	Water vole
Butterfly	Dingy skipper
Butterfly	Grizzled skipper
Butterfly	Small heath
Butterfly	Wall
Butterfly	White letter hairstreak
Moth	Beaded chestnut
Moth	Blood-vein
Moth	Brindled beauty
Moth	Broom moth
Moth	Brown-spot pinion
Moth	Buff ermine
Moth	Centre-barred sallow
Moth	Deep-brown dart
Moth	Dot moth
Moth	Dusky brocade
Moth	Garden tiger
Moth	Ghost moth
Moth	Grass rivulet
Moth	Green-brindled crescent
Moth	Grey dagger
Moth	Knot grass
Moth	Latticed heath
Moth	Mouse moth
Moth	Oak hook-tip
Moth	Powdered quaker
Moth	Rosy minor
Moth	Rosy rustic
Moth	Shaded broad-bar
Moth	Shoulder-striped wainscot
Moth	Small phoenix
Moth	Small square-spot
Moth	The cinnabar
Moth	The rustic
Moth	The sallow
Moth	The spinach
Moth	The streak
Moth	White ermine

### 3.5.8.2 Rother and Doe Lea Valleys Area

The Rother and Doe Lea Valleys Area forms part of the broader Derbyshire Coalfield, which has largely been influenced by the underlying coal measures geology and previously widespread mineral extraction and related industries. The area is characterised by mixed farming and habitat remnants are obviously associated with the two named rivers but also a mosaic of other habitats including meadow, heath, and woodland.

Similarly, to the Magnesian Limestone Area, there are a plethora of former colliery sites, reclaimed over the last 30+ years, which are now of high biodiversity value and contain a mosaic of habitats, including species rich grassland, young plantations, scrub, and a range of wetland habitats.

The Area's industrial history has resulted in a landscape which has one of the lowest amounts of priority grassland and ancient woodland in the whole of Derbyshire. Much of the remaining priority habitat is now fragmented and is associated with the river corridors.

A range of wetland habitats are found along the main named rivers and the Chesterfield Canal. These are ecologically significant for the area and include: reedbed, swamp, fen, and wet woodland.

6.8% of the 178km<sup>2</sup> of land in the Rother and Doe Lea Valleys Area has some value to biodiversity. Tree cover is around 6.3%, which is significantly below the current average for England. Tree planting needs to almost double in area by the middle of the century, with over 10,000ha of woodland, if the area is to contribute to national targets. The Rother and Doe Lea Rivers Area has average biodiversity and woodland cover compared with the rest of Lowland Derbyshire, but this is significantly below where it needs to be to optimise ecosystem services.

The priority for action must be to significantly increase the amount of natural capital in the area, with a specific focus on tree planting and improving wetland habitats along the river networks and the canal corridor. Figure 16, below, outlines the areas of remaining biodiversity value.

The lack of accessible semi-natural greenspace, tree cover and catchment management along the Doe Lea and Rother River corridors are significant. The availability of natural capital is low in the Area, and this will result in lower benefits from ecosystem services. This is a key issue for the area and will impact on: localised flooding (both within the area and further downstream in the Don Catchment), health and wellbeing, and localised issues with air quality (particularly along the M1 and Chesterfield-Staveley-Barlborough corridors).

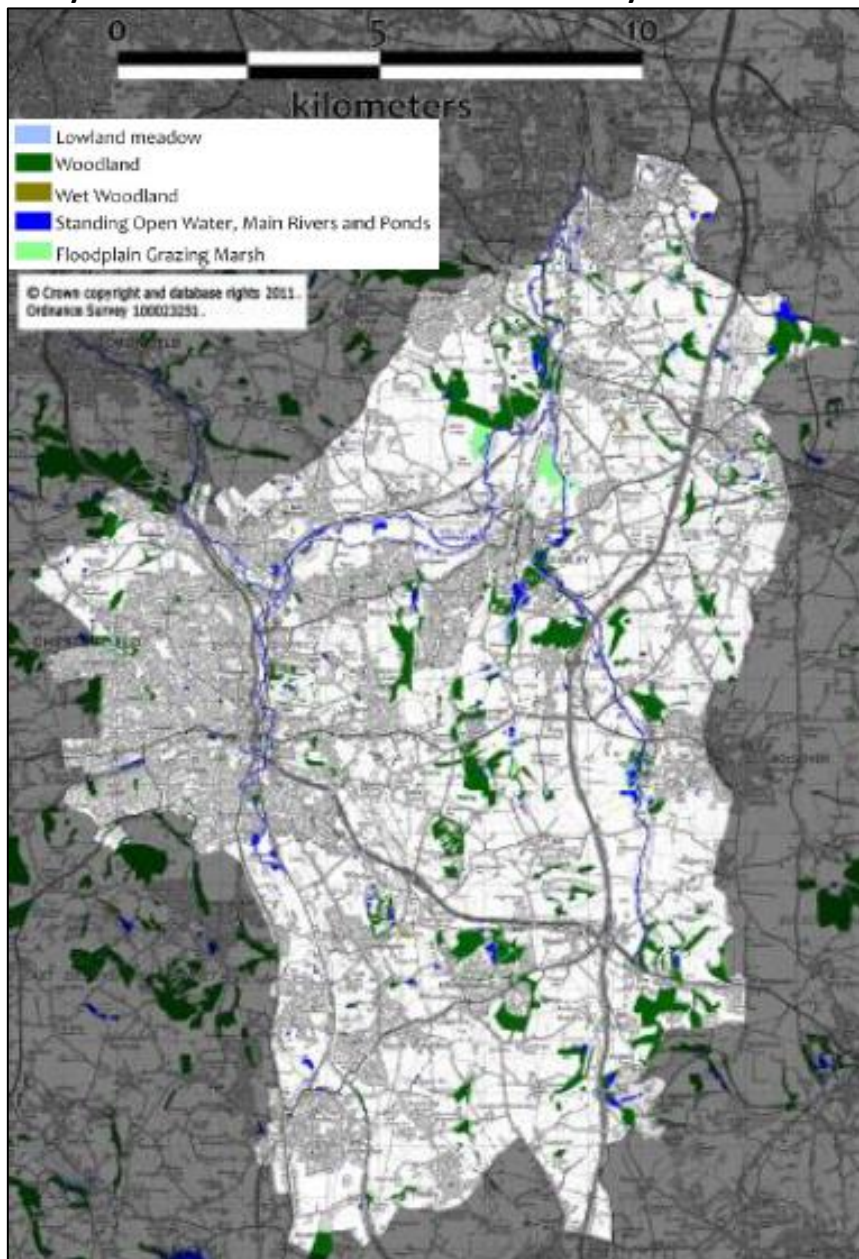
A significant coordinated effort is needed if the area is to increase the amount of natural capital. Work should be focused:

- alongside the Doe Lea and Rother River corridors and throughout their wider catchments

- along the Chesterfield Canal corridor (which presents a significant opportunity to link the centre of Chesterfield - the main centre of population - to a significant accessible natural capital asset)
- along footpaths, bridleways, green lanes, and multi-user trails
- in urban greenspaces to enhance opportunities to connect people with nature
- along the M1 and Chesterfield-Staveley-Barlborough corridors to mitigate issues around air quality
- around existing sites with high biodiversity

Key sites in the area include Crabtree Wood (SSSI), Duckmanton (SSSI), Brearley Wetland (LNR), Doe Lea (LNR), Norbriggs Flash (LNR), The Avenue and Avenue Washlands, Peter Fidler and Carr Vale Reserves, Markham Vale, Chesterfield Canal, Grassmoor Country Park, Holmebrook Country Park, Poolsbrook Country Park, the Five Pits Trails and West Wood.

**Figure 16 - Priority habitats in the Rother and Doe Lea Valleys Area**





## Rother and Doe Lea Valley Priority Species

Group	English Name
Amphibian	Great crested newt
Amphibian	Common toad
Reptile	Common lizard
Reptile	Grass snake
Reptile	Slow worm
Fish	Eel
Bird	Bullfinch
Bird	Corn bunting
Bird	Cuckoo
Bird	Curlew
Bird	Duncock
Bird	Grasshopper warbler
Bird	Grey partridge
Bird	Hawfinch
Bird	Herring gull
Bird	House sparrow
Bird	Lapwing
Bird	Lesser gedpoll
Bird	Lesser spotted woodpecker
Bird	Linnet
Bird	Marsh tit
Bird	Reed bunting
Bird	Skylark
Bird	Song thrush
Bird	Starling
Bird	Spotted flycatcher
Bird	Tree pipit
Bird	Tree sparrow
Bird	Turtle dove
Bird	Willow tit
Bird	Wood warbler
Bird	Yellowhammer
Bird	Yellow wagtail
Mammal	Brown hare
Mammal	Brown long-eared bat
Mammal	Harvest mouse
Mammal	Hedgehog
Mammal	Noctule
Mammal	Polecat (unconfirmed)
Mammal	Soprano pipistrelle
Mammal	Water vole
Butterfly	Dingy skipper

Group	English Name
Butterfly	Small heath
Butterfly	Wall
Butterfly	White letter hairstreak
Crustacean	White-clawed crayfish
Moth	August thorn
Moth	Autumnal rustic
Moth	Beaded chestnut
Moth	Blood-vein
Moth	Brindled beauty
Moth	Broom moth
Moth	Brown-spot pinion
Moth	Buff ermine
Moth	Centre-barred sallow
Moth	Dot moth
Moth	Dusky brocade
Moth	Dusky thorn
Moth	Dusky-lemon sallow
Moth	Feathered gothic
Moth	Figure of eight
Moth	Flounced chestnut
Moth	Garden dart
Moth	Garden tiger
Moth	Ghost moth
Moth	Green-brindled crescent
Moth	Heath rustic
Moth	Knot grass
Moth	Latticed heath
Moth	Minor shoulder-knot
Moth	Mottled rustic
Moth	Mouse moth
Moth	Oak hook-tip
Moth	Powdered quaker
Moth	Rosy minor
Moth	Rosy rustic
Moth	Shaded broad-bar
Moth	Shoulder-striped wainscot
Moth	Small phoenix
Moth	Small square-spot
Moth	The cinnabar
Moth	The sallow
Moth	White ermine

## Section 3 - Summary

Section 3 outlines current best practice and future priorities for the VSCR Area.

The initial focus of the section looked at the application of the United Nations Sustainability Goals and regenerative economics. A discussion on best practice design principles followed, based around asset management and communication.

The section also looked at a range of practical applications that could be adopted, including - rewilding, renaturing, natural flood management, nature recovery networks, changes to agricultural practices - regenerative agriculture and agroforestry, and other possible practices such as: changes to how roadside verges are managed, the use of yellow rattle, the impact of ecological tidiness disorder, the use of pictorial meadows, and the introduction of micro forests.

A summary of the main organisations involved in VSCR and BCP, who contribute to the management of the Area's natural capital followed, this was not an exhaustive list, and it is hoped that other stakeholders with an interest in the Area can be engaged in the future. A particular focus was given to local organisations, who are on the front line of service delivery and are often overlooked.

Finally, section 3 outlined the priorities for nature conservation. The Area's biodiversity is now largely constrained to isolated pockets with restricted opportunities for migration. The Lowland Derbyshire Biodiversity Action Plan, which, to date, is the most significant piece of work to identify nature conservation priorities in the Area, categorises two landscape types: the Magnesian Limestone Area and the Rother and Doe Lea Valleys Area. The Magnesian Limestone Area contains remaining fragments of calcareous grassland and limestone woodland, whilst the Rother and Doe Lea Valleys Area is significant for a range of wetland and riparian habitats, along the river networks and canal corridor.

Addressing habitat fragmentation through enhanced natural capital is a priority for the Area, particularly if communities are to optimise the benefits from ecosystem services and become more resilient to the likely impacts of climate change.

There is also a significant deficit of natural capital in the Rother and Doe Lea Valley Area, particularly wildlife-rich habitats and tree cover are significantly below where they should be to provide related ecosystem services.

## Section 4 – What do we want to do next?

### 4.1 Where are the gaps

Gaps in the current provision exist in the following areas:

#### 4.1.1 Fragmented natural capital

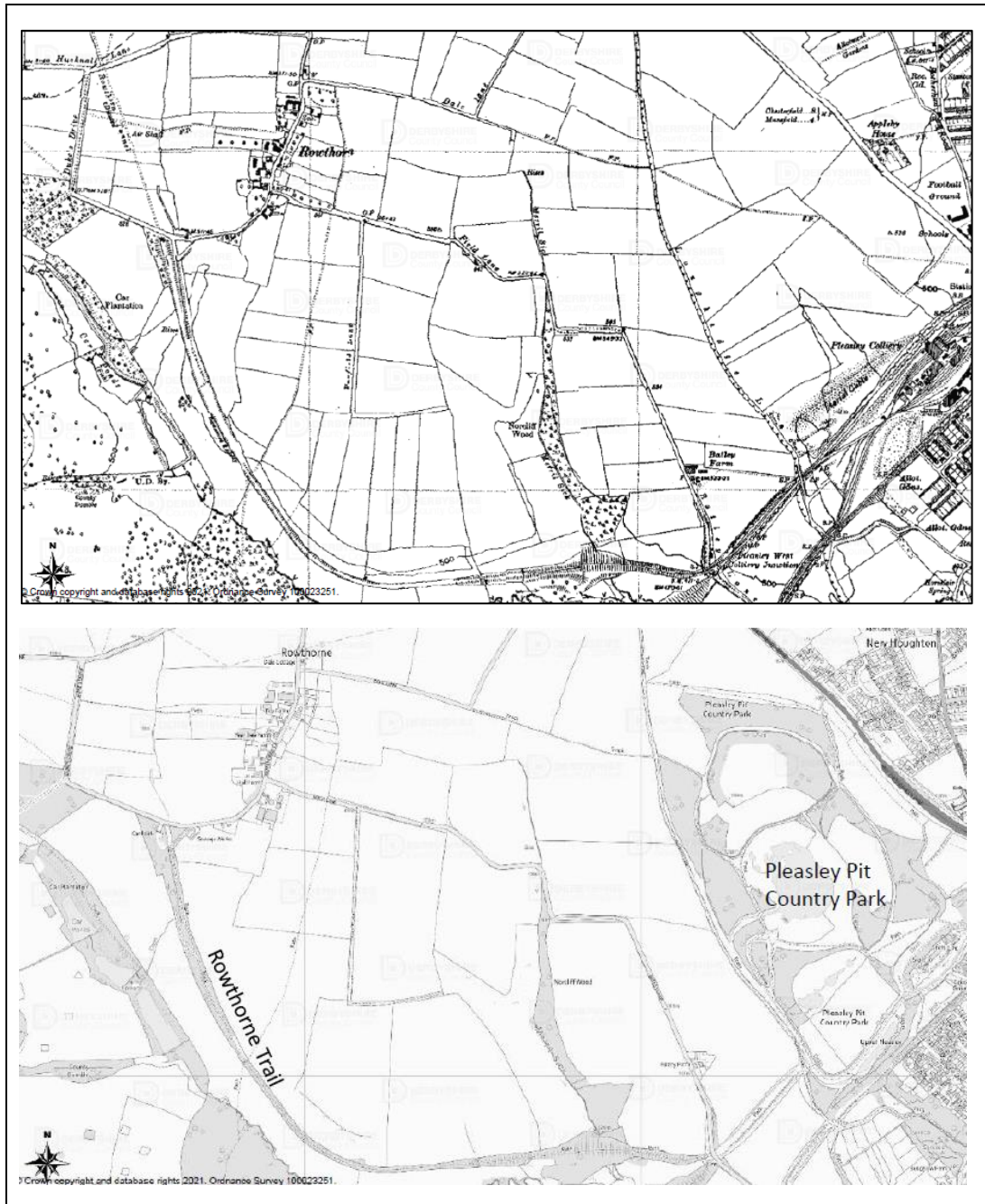
Often islands of relatively high natural capital lie within areas of intensively managed agricultural land, which provide few ecosystem services, sometimes to the detriment of wider social and environmental benefits that could be provided in the landscape. This is likely to be of increasing concern as communities adapt to the impacts of climate change, particularly with regard to the increased frequency of severe weather events.

Agriculture, which is the major land use in the Area, has had a significant impact on natural capital. Changes in the intensity of post-war agriculture are highlighted in Figure 17. Inevitably, larger fields have fewer field boundaries (such as drystone walls and hedgerows), field margins and unproductive field corners. All of which could provide ecosystem services and create space for wildlife. In addition, the increased use of chemicals (fertilisers, pesticides, fungicides, insecticides and herbicides) and a shift towards winter cereals and crops such as maize, have had a dramatic impact on the natural capital that was once part of the farmed landscape.

Many former colliery sites and mineral lines have been reclaimed and renatured, the former as country parks and countryside sites and the latter as wildlife rich trail corridors. But these often lack basic infrastructure to engage people (such as toilets, visitor centres, cafés, shops, event spaces etc.). As well as creating more opportunities to engage communities, these spaces could also provide an income stream to support ongoing maintenance costs. The legacy issue of lack of investment in sites needs to be resolved if more people are to engage with the Area's natural capital and benefit from the free physical and mental health and wellbeing benefits that can be offered.

From a nature conservation perspective, habitat fragmentation has created a significant downward ecological pressure on wildlife. This has led to population instability or local extinction of specific species. The lack of once common farmland birds illustrates the point and provides a barometer on the overall decline in local habitat quality. This decline has affected the trophic cascade across many food webs and has occurred, (as in much of the rest of the country), in a relatively short period of time since the 1960s. Without addressing the issue of habitat fragmentation, we are locking-in significant ecological pressure on species. The solution is to create nature recovery networks across the landscape, to provide wildlife refuges and other additional ecosystem services and to incentivise lower input systems of agriculture.

**Figure 17 - Agricultural field systems near the village of Rowthorne, Bolsover District - between the wars (top) and now (bottom)**



Note: The bottom map also shows the impact of recently reclaimed areas of natural capital, including Pleasley Pit Country Park and Rowthorne Trail.

### **4.1.2 Space to enhance natural capital**

A significant proportion of the reclaimed land in public ownership has been renatured and is therefore already valuable for both wildlife and the provision of ecosystem services.

However, not all the public estate is managed to optimise the provision of natural capital. In particular, more could be made of urban greenspace and highways land to support the increased provision of ecosystem services. It would also be worth investigating Bolsover District and Northeast Derbyshire District Councils' estates, as well as discussing the opportunities for parish or town councils to engage in the enhancement of natural capital. Similarly, it would be worth assessing the potential for land held by other departments within the County Council to contribute to the enhancement of natural capital.

As significant as the public estate will be in providing space for natural capital. It is on privately owned land where the space really exists, with the right spatial distribution, to optimise natural capital. Without private sector engagement the benefits from natural capital will be limited.

Much of the private land is currently intensively farmed and many perceived orthodoxies held within the farming community may need to be challenged to optimise the benefits from natural capital. Changes embedded within the Agriculture and Environment Acts support the creation of more nature-rich farmed land - with grants, subsidies and other mechanisms (such as Biodiversity Net Gain) - that support the objectives set out in the 25 Year Environment Plan.

But there are cogent arguments around food security and the need for intensive agriculture that will oppose land seemingly being taken out of agriculture. Climate change (amongst other considerations – such as the post-pandemic market rebound) will influence market prices, pushing up demand to offset production losses from more climate-vulnerable land. In general, this will create a trend towards price inflation and greater pressure on supply, to try and stabilise the market. This trend is likely to grow as the global population rises and more land becomes climatically vulnerable. This may lead to a very sound short-term economic argument to maintain intensive agricultural production, at the expense of longer-term sustainability.

The government is hoping, however, that the new package of Environmental Land Management (ELMs) subsidies, which includes the Sustainable Farming Incentive (SFI) will provide the stimulus to support the transition towards more sustainable and nature-rich agri-environments. Over the next seven years, as this new package of subsidies is phased in, the government is hoping to incentivise the introduction of management practices such as regenerative agriculture and agroforestry in order to maintain longer-term soil health and food production, as well as tying in the provision of more ecosystem services.

It remains to be seen if the new package of subsidies can offset current and future market trends, outlined above.

By engaging farmers, some of the inherent tensions created by these market forces can be overcome, particularly if the focus is on benefits to the farm enterprise. Most farmers are

critically aware of how important soil loss is to their enterprise and how this will be exacerbated by climate change. They will also be aware of the economic burden of farming marginal land, such as less-productive field corners and margins, and wet hollows etc. These areas are key targets for enhanced natural capital, in the farmed environment, in the first instance.

In addition, enhanced natural capital would help complement the growth of the local visitor economy. A critical mass of basic infrastructure is required to unlock the current market failures within the sector (i.e., the Area needs to address - where people are going to stay? what other services they need? what's does their itinerary look like? and how will this be marketed to them? etc.). Once a basic critical mass of product has been developed and positive returns demonstrated, the market should open and provide opportunities for farmers and landowners to diversify their enterprises. This has the potential to become a positive feedback loop, as returns from intensive agriculture are replaced by returns from the visitor economy, and demand to stay in nature rich agri-environments is stimulated.

There is also a role for enforcement to change the fortunes of the Area's natural capital. 32% of water bodies in the Humber catchment are impacted by rural pollution (this is twice as much as generated by all towns, cities and transport combined). Increased amounts of soil sediment and the impact of diffuse rural pollution are a significant concern. Eutrophication, caused by runoff from nitrate fertilisers and the use of pesticides, pose a risk to drinking water and wildlife. To date, these issues have been dealt with through nitrate vulnerable zones (NVZs), voluntary codes of practice and cross-compliance. But, if the real cost of this pollution was borne at the farmgate, through the adoption of the 'polluter pays principle', as some now advocate, then the true cost of intensive agriculture would become far less attractive.

One of the key priorities within the Idle and Torne Catchment Plan is to tackle diffuse rural pollution. There is growing concern that many of the chemicals used by intensive agriculture are tested and approved in isolation. What is less clear is how the cocktail of chemicals combine and impact future water quality supplies. If the 'precautionary principle' were applied, would an unconfined principal aquifer (i.e., the magnesian limestone within Bolsover and the surrounding area) be considered a sustainable environment on which to apply such land management?

To summarise, under the wider mantra of 'public money for public goods' farmers will be incentivised to manage the land more sympathetically to optimise benefits from ecosystem services. And, as economic rationalists, farmers will only engage when incentives (and the other market forces discussed) can compete with the profitability of intensively managed systems. It is critical, if the fortunes of the Area's natural capital are to be transformed, that farmers are supported through the transition and properly compensated for any loss of farm income, whilst at the same time agricultural markets recognise the true cost to wider social and environmental considerations. Only then will the complex forces at play truly reflect the current position and provide opportunities to enhance natural capital.

### 4.1.3 Resources and capacity

In the current system, there is very little capacity to maintain natural capital, let alone trying to enhance it. Largely the management of areas of higher natural capital fall within the remit of the public purse. Derbyshire Countryside Service (DCS) is the largest single public body to contribute to the Area's natural capital, with a significant portfolio of sites.

However, the capacity of DCS to manage these sites has become increasingly challenged, as it has faced cuts of £1.5M from its budget and had to reduce its workforce by 17 fulltime equivalent posts.

Similarly, the advisory role of Natural England has somewhat diminished over the last decade and budget cuts have meant that they rarely work on a local level. And the Forestry Commission tend to concentrate their efforts at the heart of their beat around Sherwood Forest.

More recently the third sector, which includes Derbyshire Wildlife Trust, The Land Trust and the National Trust (all of which have landholdings in the Area) have seen their incomes impacted by COVID-19, which is now further compounded by the current inflationary pressures within the market. These organisations would all like to work in partnership, (and in the case of the National Trust have in the past taken a lead role in coordinating two short-lived Catchment Partnerships), but they require the resources to support this ambition.

This has been a difficult decade for the management of natural capital in the Area and current resources will need to be increased if the benefits from ecosystem services are to be optimised.

It is hoped that the longer-term funding situation will improve, however, for the following key reasons:

- the profile of nature and the role it can play in helping to tackle climate change and provide other ecosystem services has never been higher - the terms natural capital and ecosystem services may not be well-known or understood but the function they perform generally is. The real test of future leadership will be to deliver opportunities to optimise natural capital and ecosystem services.
- there are several important policy changes that help increase the support available to enhance natural capital, including: the 25 Year Environment Plan, the Agriculture and Environment Acts. These will create new opportunities to fund environmental improvements through the development of Nature Recovery Networks, the delivery of the Environmental Land Management Scheme (ELMS) and the creation of markets for Biodiversity Net Gain.

These changes should help deliver a shift in the current fortunes of the sector and hopefully make more resources available to support the transformation required.

However, it does need to be acknowledged that the current resources to manage assets are at a low starting point, because of the historic lack of investment in the sector and the previous decade of funding cuts.

There are also several fundamental issues with the current model, most notably:

- there is no overall control or coordinated approach to delivery
- there is limited accountability for decline or bad practise (e.g., diffuse rural pollution)

These issues of governance will need to be addressed if the transformation is to take a coordinated and systematic approach. Some current practices may well have to be challenged; and there is likely to be opposition from vested interest and people opposed to the proposed transition.

A significant opportunity for the future could be through the development of a regenerative economic model that brings together natural capital, with wider social benefits, and growth in the local visitor economy. This could be designed in such a way to support delivery around the three core principles of sustainability: economy, environment, and society.

This is not easy, but VSCR could have the capacity to deliver this with the right investment and governance. How this model could operate is outlined in further detail in section 4.3.

#### **4.1.4 Engagement and nature connectedness**

Currently, it is estimated that 80% of people rarely notice nature, in lockdown this increased but it is still at a low level. Often people cite that they are just too busy to notice nature. But, noticing nature or nature connectedness, is important because of the range of positive benefits it can deliver, including increased levels of physical health and mental wellbeing, and a strong association with fostering more pro-environmental behaviours (PEB).

There is clear clinical evidence that improving nature connectedness can have significant benefits on mental health and wellbeing. A recent study by the UK Government calculated the mental health benefits of visiting woodlands alone was £185M

<https://www.gov.uk/government/news/mental-health-benefits-of-visiting-uk-woodlands-estimated-at-185-million>.

Again, recent research has shown that greater benefits are gained by the strength of the nature connection, and that this is more significant than the amount of time spent in nature.

The pathways of nature connectedness are:

- sense – using our senses of touch, taste, smell, looking and listening to engage with nature
- emotion – having an emotional connection – feelings of calm, joy, awe, and wonder
- beauty – noticing how beautiful many aspects of nature are
- meaning – exploring and celebrating how nature can bring meaning
- compassion – how nature can foster a connection to ourselves each other and the wider world

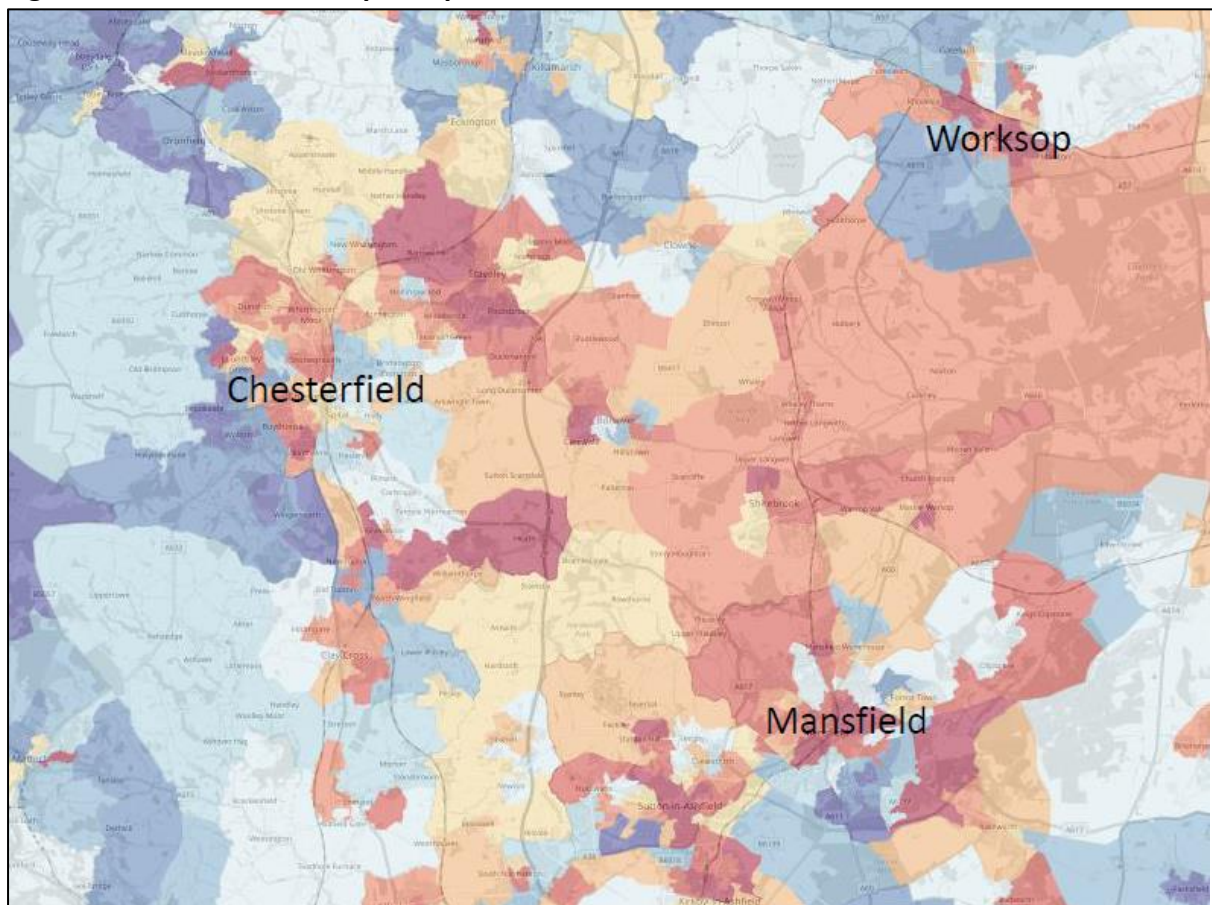


There is a great deal of synergy between the pathways for nature connectedness and the Five Ways to Wellbeing:

- Connect
- Keep learning
- Be active
- Give
- Take notice

VSCR's greenspace and countryside is currently underutilised compared to other parts of the region, more commonly associated with green exercise and outdoor lifestyles (most notably the Peak District and Sherwood Forest). Whilst at the same time it is subject to some of the highest health inequalities in the region. Figure 18 shows the regional distribution of the indices of multiple deprivation.

**Figure 18 – Indices of multiple deprivation**



Research has shown that participation in outdoor activities varies with peoples' age, life stage and where they are from. Generally, young people want to engage with lifestyle sports, to spend time with friends or on something that may lead to personal development; families want easy access to a range of facilities, that are supported by good promotional

information; and older people want more leisure-based activities that have some element of social, learning, and/or keep fit.

There needs to be a real understanding of the specific barriers to increase participation levels. Some of the reasons for low participation include:

- Poor marketing and promotion
- Lack of opportunity, in part related to the lack of facilities
- Time available to participate in outdoor activity
- The Area's image problem in parts of its outdoor environment and this can be compounded by neglect or poor management
- the 'Fear Factor' or 'Stranger Danger' - 80% of parents report their children do less independent outdoor physical activity compared to when they were children
- Digital lifestyles
- Lack of access to a car to travel to more traditional and better promoted countryside areas such as the Peak District or Sherwood Forest
- General negative perceptions of the countryside – young people often see it as for older people, as traditional and uncool (although this perception is changing with the focus on climate change and wider environmental issues)
- The confidence to participate
- People to participate with
- Gender – countryside is often associated as a place for boys
- Ethnicity - countryside is often associated as a place for white-British people
- Deprivation – people from deprived backgrounds are six times more likely to have no experience of outdoor activity
- Weather
- Costs associated with specific activities

And there needs to be recognition of gaps in the current provision in the Area, including:

- A lack of facilities
- A lack of activities currently offered
- A lack of promotion and marketing
- A lack of capacity and resources

#### **4.1.5 Summary of gaps**

Section 4.1 has highlighted some of the current gaps in the provision of natural capital and ecosystem services in the Area, these include: the fragmentation of current natural capital, the availability of land for new natural capital, current issues of resourcing and capacity within the sector; and issues relating to engagement.

These need to be overcome if wider environmental, social, and economic benefits are to be delivered from the optimisation of natural capital.

## 4.2 SWOT analysis

<b>STRENGTHS</b>	<b>WEAKNESSES</b>
<ul style="list-style-type: none"> <li>• Land reclamation has significantly enhanced the areas natural capital. This is a great springboard on which to base further work</li> <li>• The Area has abundant world-class heritage and enhanced natural capital would complement the growth of a sustainable visitor economy</li> <li>• The Area has one of the best trails' networks in the Country</li> <li>• There is a strong track record of partnership working in the Area</li> <li>• There is a growing awareness of the impacts of climate change, loss of biodiversity and the need to enhance communities' health and wellbeing. This should help galvanise support for enhanced natural capital and nature connectedness</li> </ul>	<ul style="list-style-type: none"> <li>• The area has islands of relatively high biodiversity within a landscape of limited natural capital</li> <li>• Most areas where natural capital can be improved are outside the public or third sectors control</li> <li>• Over the last decade there has been significant cuts in the public sector's ability to manage natural capital. The third sector's ability to deliver natural capital projects has also been impacted by COVID-19 and current inflationary pressure</li> <li>• There is no overall coordination to the current management of natural capital. Governance needs to be improved if progress is to be made</li> </ul>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>• Enhancing natural capital will deliver a range of ecosystem services that would help local communities become more resilient to the impacts of climate change, provide opportunities for wildlife, nature connectedness and health and wellbeing</li> <li>• The opportunity exists to develop a regenerative economic model which ties together the development of a sustainable visitor economy and enhanced natural and social capital - to create a virtuous economic cycle and establish positive feedback loops</li> <li>• Recent policy changes now support opportunities to enhance natural capital</li> <li>• Climate change and environmental issues are now more high-profile than ever before, and this trend is likely to grow over the coming decade. Finding local solutions will help galvanise hope and optimism</li> </ul>	<ul style="list-style-type: none"> <li>• Modern lifestyles are more sedentary and spent indoors, so people are generally less nature connected than a generation ago</li> <li>• Often the people who could benefit most are the hardest to engage due to a range of complex issues - health inequalities are significant in some disadvantaged communities and research suggests such communities are less-likely to have had previous experience of nature connectedness</li> <li>• There is a lack of resources to deliver current maintenance demands let alone enhance natural capital or nature connectedness</li> <li>• It is likely that public finance will continue to be squeezed due to the cost of dealing with COVID-19, at the same time as we experience a cost-of-living crises and post-pandemic inflationary pressure. Historically, investment in natural capital is difficult to justify in such circumstances</li> </ul>

### **4.3 Who pays?**

Finding ways to manage the current stock of the Area's natural capital, let alone trying to improve the offer is not an easy and straight forward task.

Many of the austerity cuts over the last decade have impacted on the public sectors maintenance of assets and ability to engage on specific nature-based projects. Derbyshire Countryside Service (DCS) and Natural England are examples of organisations that have been affected by cuts. Their ability to deliver maintenance let alone enhancements has been severely impacted.

More latterly the impact of the coronavirus pandemic has hugely affected revenues in the third sector, with examples like the Wildlife Trust and the National Trust, which both lost significant revenue from lost commercial activity.

These two models of how public goods can be delivered are fundamentally different in that the former largely provides the asset for free and is funded directly by the public purse, whereas the latter relies on membership and commercial activity.

How can current public funding models provide the wider public benefits that are now needed from the Area's natural capital?

Public sector models of delivery will always be limited by the size of the budgets available, and it is likely that downward pressure on public finances will continue for some time, in-part, to pay for the eye watering sums of money that have been used to tackle the pandemic. This may preclude a public sector response, unless a 'Keynsian' style stimulus package is adopted to fund this kind of work!

Could another model be developed to resolve current issues? Possibly, but it is not easy. And could the private sector have more of a role in contributing to solutions? Again, possibly, but how would this fit within current delivery models.

This section discusses the current situation and looks at possible alternative mechanisms to support the growth of natural capital. Initially looking in more detail at public sector expenditure and what private sector engagement could look like.

The best mechanism to fund this work is likely to be a fusion of public and private sector finance alongside additional contributions from the third sector and concerned individuals.

It is therefore suggested that everybody has a role to play in the future funding of works to enhance local natural capital.

#### **4.3.1 Public expenditure**

There are currently many strands of public sector spending on the Area's natural capital, either directly or indirectly, and not all of these have a positive impact on the overall asset (as is the case with some spending on current agricultural subsidies).

All organisations within the tiers of government, from central, to county, to district, and parish, directly or indirectly spend money on activities that have an impact on local natural capital.

Direct expenditure is on such activities as biodiversity, grounds maintenance and highways maintenance and indirect expenditure is on such activities as subsidies and enforcement.

The current mantra of 'public money for public goods', which is embedded in the 25 Year Environment Plan, and the Agriculture and Environment Acts, is useful to benchmark current public spending against.

Within the VSCR Area, Derbyshire Countryside Service (DCS), perhaps more than any other public sector body, has the largest impact on the areas natural capital. DCS manages hundreds of sites covering around 7.5 km<sup>2</sup>, (two-thirds of which is in Bolsover District alone). Through the efforts of a dedicated, experienced, and well-educated workforce, these post-industrial sites are managed primarily for nature conservation and access. The sites, however, largely lack facilities for the public to use – there are very few visitor centres and toilet blocks – these were never constructed when the sites were first reclaimed and there has never been the funding to redress this issue. DCS has had to make budget cuts and reduce staff, which has had a significant impact on service delivery. Most of DCS's sites are supported by Higher Level Stewardship grants from the Rural Payment Agency. But largely the work of DCS is funded directly through Derbyshire County Council's budgets.

District and Parish Councils also have significant areas of greenspace, but these are largely managed for their amenity value and often have limited semi-natural character. The potential exists to enhance natural capital on these sites, through the delivery of rewilding or renaturing projects etc. This could provide significant additional ecosystem services and warrants further consideration.

There are potential win-win scenarios within the public estate, if intensive management regimes were to be adjusted, e.g., if areas currently subject to gang-mowing were left to renature, there could potentially be a financial and carbon saving, as well as enhanced opportunities for the delivery of additional ecosystem services. (Careful consideration needs to be given to design and implementation, as discussed in section 2.2.2).

For example, if just 20% of Bolsover District Council's 197 ha greenspace landholding was renatured it could sequester around 142 tonnes CO<sub>2</sub> equivalent/year (equivalent to 750,000 air miles or flying around the earth 30 times). This would provide habitat for wildlife, opportunities for nature connectedness, as well as providing other ecosystem services.

The potential also exists for this win-win scenario to be extended to the management of roadside verges and other council or public land. Obviously, any health and safety implications, such as the provision of sight lines, would take precedent, but certain areas are cut because they're on a maintenance schedule that may have never been reviewed to consider the potential savings and additional ecosystems services that could be provided. Some of which is discussed in more detail in section 3.4.7.1.

Public money indirectly spent on natural capital also presents an opportunity to enhance the current offer. One such area, discussed on several occasions throughout this report, is the provision of agricultural subsidies. As previously stated, subsidies are transitioning away from compensating landowners for land area to a system based on the provision of 'public goods', many of which will lead to improvements in natural capital. This transition will be completed by 2027, with payments to farmers increasingly tapered towards the new system over the interim period. The net effect will be the creation of new nature-based markets on agricultural land. This is the real prize if natural capital is to be enhanced in any meaningful way, as agriculture occupies most of the land in the Area and has the space to deliver the scale of the transformation now needed.

Changes to subsidies could also have a knock-on effect on other indirect public spending, particularly the cost of enforcement and clean-up by the Environment Agency (EA) after incidents of pollution. For example, if the true costs of intensive agriculture are considered with regard to water quality and the silting of local waterways, particularly on the magnesian limestone escarpment of Bolsover, (both a principal aquifer and part of the catchment for two major rivers, the Trent and Don), then changes in land-use practice could reduce the EA's overall costs and provide greater public utility through the enhancement of natural capital (and also reduce water bills as water companies' clean-up costs would potentially be lower).

Such a whole systems approach may prove economically attractive to the public purse and highlight the true costs associated with intensive agriculture. If costs were attributed according to the 'polluter pays principle', so borne by the farming enterprise, would intensive agriculture be such an attractive economic proposition on the magnesian limestone plateau?

The challenge will be to create the governance arrangements that can penetrate the current silos of resource, to optimise the benefits that public money can bring.

In summary, direct and indirect public sector expenditure has a mixed effect on the Area's natural capital, some positive in the case of DCS's investments in renaturing a mosaic of reclaimed post-industrial sites and some negative in the case of certain agricultural subsidies, which in part supports intensive agricultural on a principal aquifer within the catchments of two major rivers.

If public money is truly to be used for public good, then some current budgets would be redirected to optimise ecosystem services and enhance natural capital.

### **4.3.2 Private sector opportunities**

There is an increasing need for the private sector to engage in the climate and ecological emergency. And with the announcement at COP26 of a shift in a further 40% of the world's private capital assets, some £95 Trillion, towards zero carbon activities, there appears to be a strong platform for future engagement.

Opportunities to improve the Area’s natural capital through private sector involvement comes in several forms, outlined below, from biodiversity net gain to innovative financing that could support sustainable growth.

This section outlines ways the private sector could support creative solutions.

#### **4.3.2.1 Biodiversity Net Gain and credit schemes**

As section 1.4.2.1 outlined, one of the core tenets of the Environment Act is Biodiversity Net Gain (BNG). This effectively invokes the ‘polluter pays principle’ to provide enhancements for biodiversity. BNG will operate through the relevant planning authorities and from 2023 it is likely to become mandatory.

Developers will have to survey development sites and assess their impact on biodiversity and convert this to biodiversity units (BU) using Natural England’s Biodiversity Metrics Tool. Developers will either, have to create new habitat with a 10% uplift on the development site, or purchase BUs from an offsite BNG market. BUs will vary in size and price, but their value will need to reflect the cost of 30 years of ongoing maintenance. As an indication of the scale of the potential market, recent discussions and research indicate BUs could be anything from 0.01ha to 0.25ha in size and have a value of anywhere between £14,000 and £70,000, and a fare local market price is considered to be around £25,000/BU. There could be an interesting link established between developers and the public estate, as the following example illustrates:

##### **A simple analysis of the possible benefits of creating BUs on BDC Greenspace**

In section 2.3.4, in the Carbon Sequestration Text Box, it was assumed that, of the 197ha of BDC greenspace, 20% could be renatured to help sequester carbon. It may also present an opportunity to create BUs to provide a return to the Council, to cover the cost of the transformation needed:

BDC Greenspace = 197ha assume 20% renatured i.e., ≈ 40ha

40ha ≈ 160 BUs @ £25,000 per BU

≈ £4M over 30 yrs

≈ £135,000/yr

≈ £3,400 per ha/yr

It should be noted that changing the way greenspace is managed throughout the District would involve capital investment in machinery. Using the example of changing the way grounds maintenance currently mow amenity grassland, a shift to semi-natural grassland management may result in a 60% increase in capital expenditure on new ‘cut and collect’ machinery but there could also be a saving of 68% on staff time and a 97% reduction in Greenhouse Gas emissions (figures from similar work carried out by Dorset County Council).

If BNG can be stacked with other initiatives, e.g., Environmental Land Management Scheme (ELMs), see section 1.4.2.2, this could present a unique opportunity to reverse some of the recent declines in natural capital that have taken place over the last five decades.

The VSCR Area, due to its rural nature, may also be able to create BNG partnerships with other surrounding more urban areas. This could be of particular interest for Sheffield City Region if future BNG projects could demonstrate a positive impact on the upper reaches of the Don Catchment, to help reduce the impact of flooding further downstream.

Recently, the Government issued the £10 million [Natural Environment Investment Readiness Fund](#) (NEIRF) as a challenge for pilot projects to look at innovative ways that private finance could be drawn down to support future project activity. Successful projects to receive funding include several credit schemes:

- The Wildlife Trusts' Habitat Banking Investment Model – the scheme secured £100,000 of NEIRF funding to develop a new habitat banking investment model to deliver biodiversity net gain at scale. The project is a consortium of Wildlife Trusts and will define habitat restoration and creation of grassland, wetland, and woodland at three sites for carbon storage, improved flood resilience and visitor well-being. The project will monetise potential for revenue generation through biodiversity credits.
- Warwickshire Carbon and Environmental Markets – managed by Warwickshire County Council, who secured £72,000 from NEIRF to build and broaden the scope of the Warwickshire biodiversity net gain market, to bring in wider ecosystem benefits including carbon and catchment services.

#### **4.3.2.2 Green bonds**

Green bonds are designed to raise funds to invest in environmental or climate change mitigation projects. They give investors an opportunity to meet their environmental, social and governance (ESG) objectives by creating low-carbon investments.

The International Capital Markets Association (ICMA) consolidated the Green Bond Principles (GBP), these were last updated in 2021 <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/green-bond-principles-gbp/>

The principles are voluntary and act as guidelines that serve as a starting point for issuers and investors in promoting and ensuring the integrity of the green bond.

There is now a thriving market for green bonds, the most obvious advantage of green bonds is that they provide finance at relatively lower rates for environmentally friendly projects. In return investors can promote their role as part of corporate social responsibility and brand profile. There may also be tax breaks given for making these investments.

However, considerable investment maybe required upfront and the process of getting bonds issued is described as onerous and would involve multiple parties, some of which would need paying. This tends to limit issuing bonds to larger projects.



NEIRF again funded several projects that will analyse potential green bond development, including:

- East Devon District Council's - Crystal Clear Clyst Bond - which secure £100,000 to develop a model to convert farmland to woodland via an Environmental Impact Bond
- Norfolk Rivers Trust - secured £70,000 to developing an Environmental Impact Bond to reduce phosphates and other pollutants entering the River Stiffkey

Green bonds are an innovative idea to finance eco-friendly projects. However, they are still at a relatively early stage of development, and some argue that they may not be suitable for raising investment for some nature-based projects because of the inherent need to return dividends and pay back the initial capital on activity, where it is difficult to monetise growth.

This issue may be overcome in the VSCR Area by linking the enhancement of natural capital and the development of a sustainable local visitor economy.

### **4.3.2.3 Corporate Social Responsibility and Environmental, Social and Governance factors**

Increasingly, the private sector is realising that commercial decisions are embedded in a wider context than simple market dynamics and it is becoming important for brand reputation to be linked with a positive set of values.

Both Corporate Social Responsibility (CSR) and Environmental, Social and Governance (ESG), present opportunities to positively engage with the private sector to improve local natural capital.

CSR is a broad concept that will take different forms depending on the nature of the company involved. In its broadest sense it is an ethical framework in which the values of the business are expressed and their role within society is measured.

Similarly, ESG is an evaluation of a business's collective consciousness for social and environmental factors.

Both CSR and ESG can lead to philanthropy, charitable activities and/or volunteer efforts, which could be harnessed to improve the Area's natural capital.

### **4.3.3 The third sector**

Third sector partners could have a significant role to play in improving natural capital. Section 3.5.7 identified several organisations that are already involved in the delivery of the Area's natural capital. Derbyshire Wildlife Trust, The Land Trust and National Trust arguably have the greatest role in managing natural capital. These organisations are likely to be key partners in the development of Nature Recovery Networks and the delivery of other initiatives that enhance natural capital.

#### **4.3.4 External funding**

External funding could be important in the future to supporting improvements to the Area's natural capital. BCP has already supported the delivery of several significant programmes that have delivered improvements. For example, the Bolsover Grassland Project and Limestone Journeys (see sections 3.4.2 and 3.4.4, respectively, for further details) delivered significant improvements to natural capital with external funding.

Further funding should be sought to continue this work, specifically to help deliver some of the aspirations outlined in this report.

#### **4.3.5 Personal responsibility**

Individuals also have a role to play and can provide a valuable resource in improving natural capital. There is already a small but dedicated army of people who carry out voluntary work that improve specific aspects of natural capital, including the volunteers who help support the management of the Clowne Branch Line and the Archaeological Way. With a coordinated and well-designed programme, volunteers could provide a very valuable service. It must be observed, however, that volunteering is not easy to coordinate in the VSCR Area. There are a number of socio-economic and cultural reasons why this is the case: over a quarter of the population have health issues that impact their daily lives; many people have additional caring responsibilities; many people are on low incomes and may not have time to volunteer; there may also be reservations based on the assumption that people should be paid for carrying out such work. These (and other reasons) can present a real barrier to participation in volunteering.

Increasingly, as more people become aware of their own carbon consumption and impact on the environment, opportunities will open-up to develop mechanisms to offset emissions through a personal carbon allowance. Effectively people would pay to offset their emission by paying into schemes that sequester carbon, such as tree planting schemes. This is a relatively new idea but one that is likely to grow in traction over the coming decade. Again, for similar reasons outlined for participation in volunteering, this may be less successful for the inhabitants of the VSCR Area but could be supported by visitors, who seek to offset their journey to the Area.

Individuals can also use their economic power to support certain causes or projects. This could either be through direct donations or support for specific commercial activity.

There are interesting developments around 'Willingness to Pay' models. Where an enterprise leaves the decision of what to pay to the consumer, and particularly when this is an integral part of the enterprises brand, i.e., if you don't have money, you can effectively eat for free, consumers who can afford to pay often inflate the price of the goods/service by as much as 15%. Having seen the fantastic, coordinated response to foodbanks during the pandemic, I think this would be a popular service and may prove economically viable if tied into a regenerative economic model based around the development of a sustainable visitor economy.

Like CSR, individuals choose to support specific activities or projects because they support their values. Awareness of environmental issues has recently grown exponentially, and this will create future opportunities for projects and activities to harness this latent energy.

Increasingly, concerned individuals will look at ways they can contribute to their own environment, as they seek ways to make a positive contribution.

#### **4.3.6 Crowd funding**

Another potential source of funding could be through employing crowd funding campaigns to deliver specific projects, by raising money from a large number of people, typically through internet platforms. There are several different types of crowd funding, the most relevant for this discussion are:

- Rewards crowd funding - where entrepreneurs presell a product or service to launch a business concept without incurring debt or sacrificing equity/shares
- Equity crowdfunding – where the backer receives shares of a company, usually in its early stages, in exchange for the money pledged
- Donation-based crowdfunding – where a collective effort of individuals helps charitable causes.

#### **4.3.7 Summary of funding**

Future funding is key if natural capital is to be improved throughout the VSCR Area. Currently, most natural capital works are funded by the public sector. There is likely to be downward pressure on the public purse due to the cost of dealing with the pandemic. That said, there is a renewed recognition, largely due to the rapid growth in concern about the environment, the profile of COP26 and the solace many people sought during periods of lockdown, of how important the public sector is in managing and maintaining local natural capital assets such as countryside sites, parks and greenspace.

The private sector is increasingly becoming aware of the role it can play in improving the environment, whether this is as a result of Biodiversity Net Gains, or more altruistic activities generated through CSR or ESG, such as philanthropy, charitable activities and/or volunteering, or by supporting the development of new financial systems, such as green bonds or credit schemes.

The third sector also has a significant role to play, particularly organisations who already have natural capital assets in the Area, such as Derbyshire Wildlife Trust, The Land Trust, and the National Trust are likely to be important partners in future Nature Recovery Networks and other initiatives.

Finally, individuals who are concerned about the state of the environment may wish to contribute in many ways from: volunteering, to supporting projects through their purchasing power and other acts of altruism. Crowd funding could also provide initial capital for specific projects.

Each has an important role to play in ensuring that future opportunities to enhance the Area's natural capital are optimised. Without this investment the impacts from sub-optimal natural capital will be borne by future generations.

#### **4.4 Developing a regenerative economic model for the VSCR Area**

This report has outlined the importance of the transformation of natural capital in the VSCR Area and explained many of the ecosystem services which we are now not benefiting from. The science behind this transformation is very clear. But how can we add value to the current provision, which is currently not well resourced and doesn't have the capacity to maintain assets, let alone work strategically to enhance further natural capital.

There are significant policy changes which support the enhancement of natural capital, and, at the same time, some of the issues that natural capital can address have never had such a high-profile.

One option for the future has to centre around the development of a new model of delivery based around the principles of regenerative economics (as summarised in section 3.2.2). This could be designed in such a way as to support the maintenance and enhancement of the Area's natural capital, help communities to take advantage of enhanced ecosystem services, including supporting opportunities to enhance health and wellbeing, whilst stimulating the development of the local visitor economy, with any generated surplus used to support the costs of enhancing natural capital. Figure 19 outlines a simple representation of the feedback loop at the heart of this model.

Using capital investment or seed money from external funding (or a combination of both), future activity should focus on creating opportunities to monetise some aspects of projects to generate a surplus, and for this surplus to be recycled into the provision of enhanced natural capital and ecosystem services (the provision of social capital is also an important aspect of this model in order to ensure communities are engaged and to deliver on the core principles of sustainability).

By creating a range of paid for products and activities or 'goods', that, once whole costs have been met, present the opportunity for surplus to be used to support the delivery of 'services' that enhance natural and social capital.

So,

**goods – whole costs = surplus = services**

E.g., surplus from the development of a camping pods site at Pleasley Pit Country Park could support the maintenance of the Country Park and local trails network. The pods could be discounted in the off-season to provide voluntourism opportunities or give local people a short break on a health and wellbeing boot camp, or to host biodiversity, forest schools or nature connectedness workshops. The aim would be to create a virtuous cycle, creating a not-for-profit model to support enhanced natural and social capital, to create positive

feedback loops, e.g., through the development of local supply chains or behaviour change 'nudges' and positive promotion etc. to stimulate the market. And as more people become aware of their local environment, it could help foster a greater desire to contribute to the stewardship of the Area's natural capital.

Taking a coordinated systems approach and using money as the key measurement of flow, all opportunities should be explored to monetise activity, as long as they pass key sustainability tests (or are working towards the principles of sustainability). So, for example VSCR activities could include: bike hire, guided rides/walks, hospitality, catering, support a local maker economy, support a local food economy, support a food waste economy, provision of visitor accommodation (as in the case of camping pods on Pleasley Pit), provision of voluntourism, an events and festival programme, learning opportunities, volunteering, training and employment opportunities, befriending and buddying services, green social prescribing, and/or other sustainable commercial activities etc.

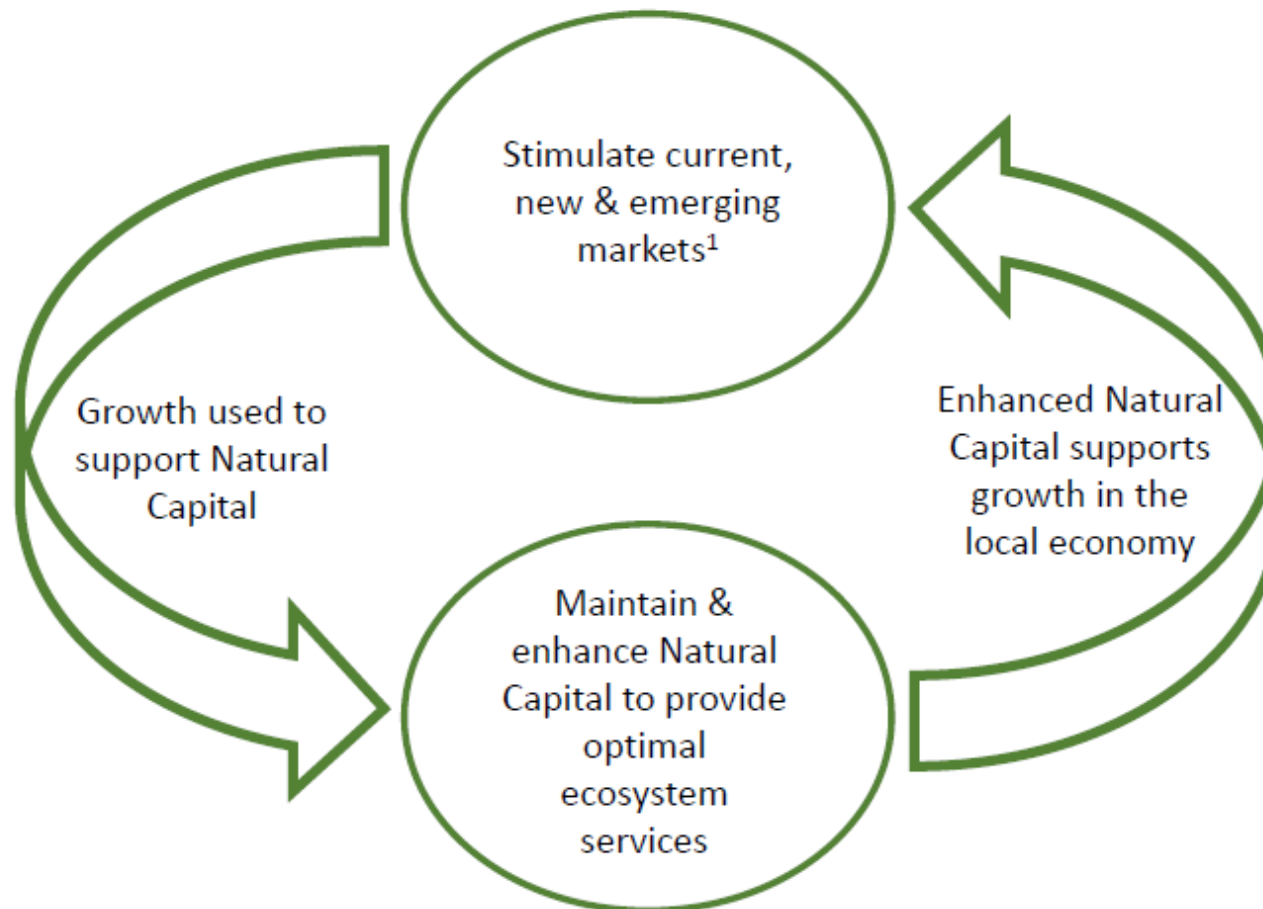
Creating a strong brand will clearly be an advantageous position to take for such an enterprise. This should embrace the core principles of sustainability within the brand position, as discussed in section 3.3.2.

Initially, such an enterprise would have to work out how the business would operate. There are a number of key challenges that need to be resolved, including governance arrangements – what would the optimal status of the enterprise be? which partners would be involved and in what capacity? how would communications operate outside existing corporate structures? how would procurement operate? how would cash flow be managed through the enterprise? and how would risks be mitigated and shared? etc.

There is a great deal of work involved in examining what the optimal enterprise model would look like for the VSCR Area. This work is outside the scope of this report but will be included within the development of the wider business case for VSCR.

The initial phase of the business case will seek to draw together all the learning from the current feasibility studies and destination plan, which, to date, has cost £130,000, and will include the findings of this internally authored report.

Figure 19 - Creating a positive feedback economy to support Natural Capital maintenance and enhancement



<sup>1</sup> This report has highlighted a number of key policy changes which will stimulate investment in natural capital, these include biodiversity net gain, nature recovery networks and changes to future agricultural subsidies. The development of a local sustainable visitor economy would also support enhanced natural capital. Increasing health & wellbeing benefits through nature connectedness would also help to stimulate growth through greater participation. Finally, addressing long standing issues related to who bears the cost for pollution, through the 'polluter pays principle' would also create a market adjustment.

## 4.5 Opportunities for the Pleasley Hub

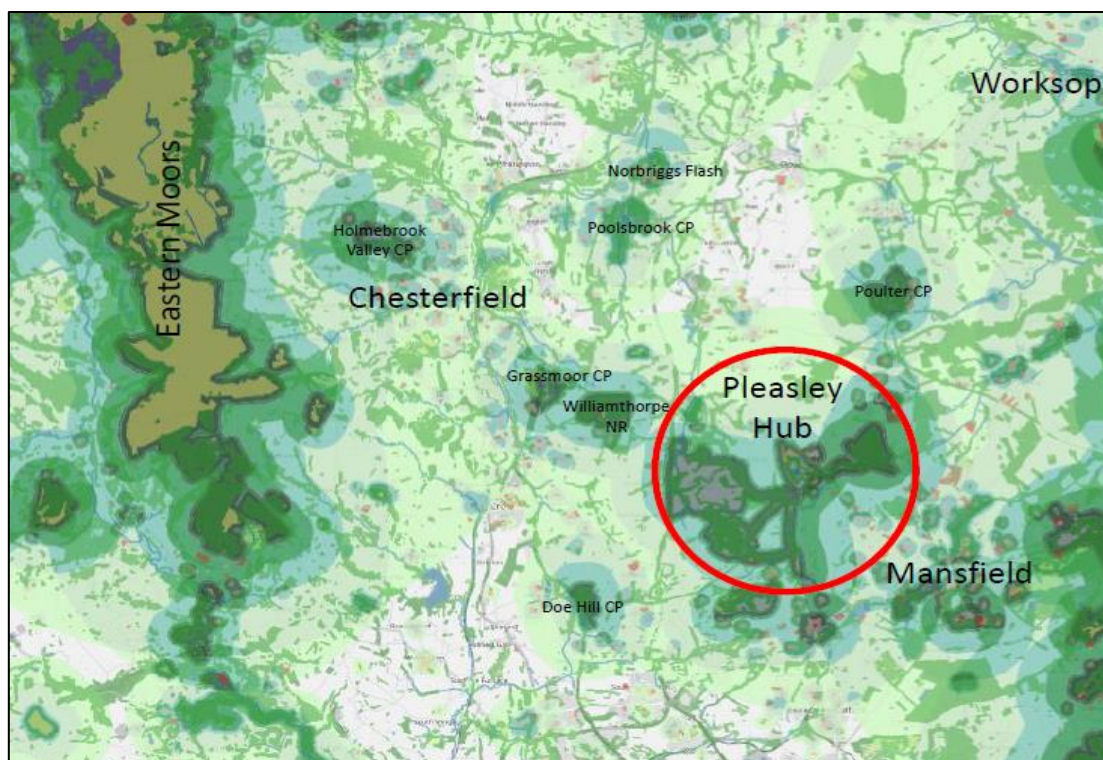
The Pleasley Hub was initially identified in the VSCR Destination Plan as one of three areas where partners and stakeholder suggested growth could be maximised. Additional developmental work further supports this assumption, and the area is now a significant focus for development.

There are a number of partners and stakeholders which have interests in the Pleasley Hub, who are actively engaged in VSCR. Many of these are public bodies or third sector partners, including Bolsover Countryside Partnership, Bolsover District Council, Derbyshire County Council, the Land Trust, National Trust and Pleasley Pit Trust. So, they could be prepared to mutualise their interests and operate on a shared not-for-profit basis.

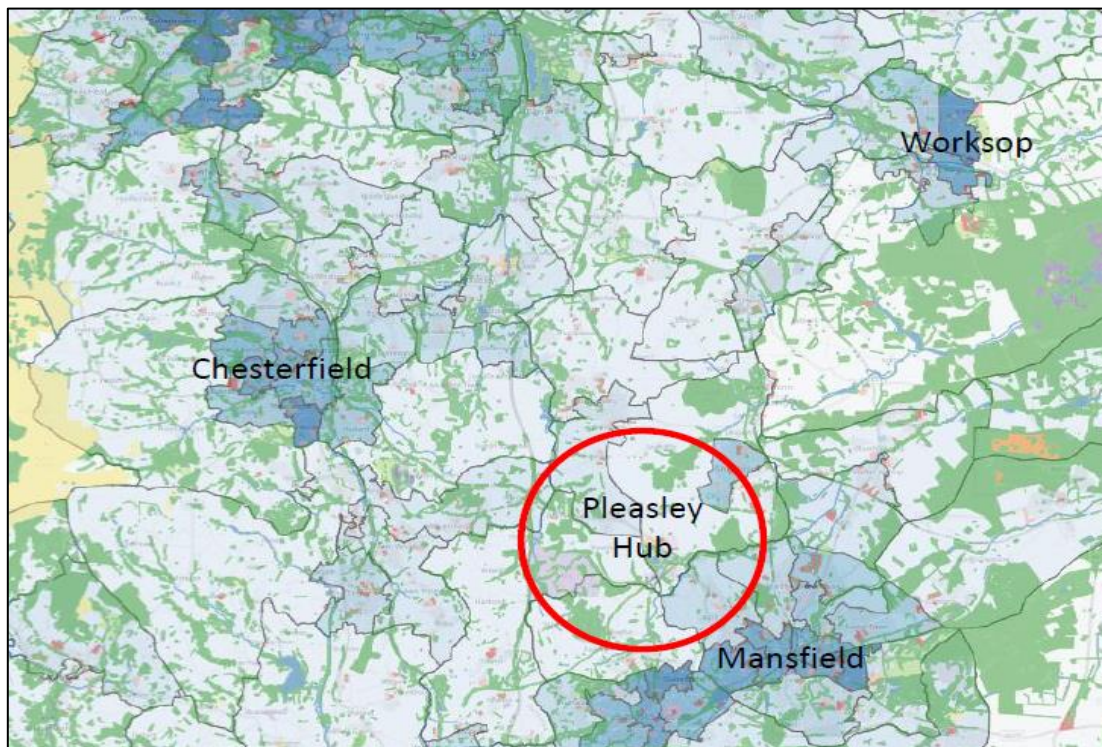
Strategically, the area is sub-regionally significant for the provision of accessible semi-natural greenspace (as Figure 20 illustrates).

And finally, the Pleasley Hub, although rural in character, is connected via the trails network to a significant urban population, with around 300,000 people living within 10km, particularly in the Ashfield - Mansfield conurbation, as Figure 21 illustrates.

**Figure 20 – Accessible semi-natural greenspace (courtesy of Natural England)**

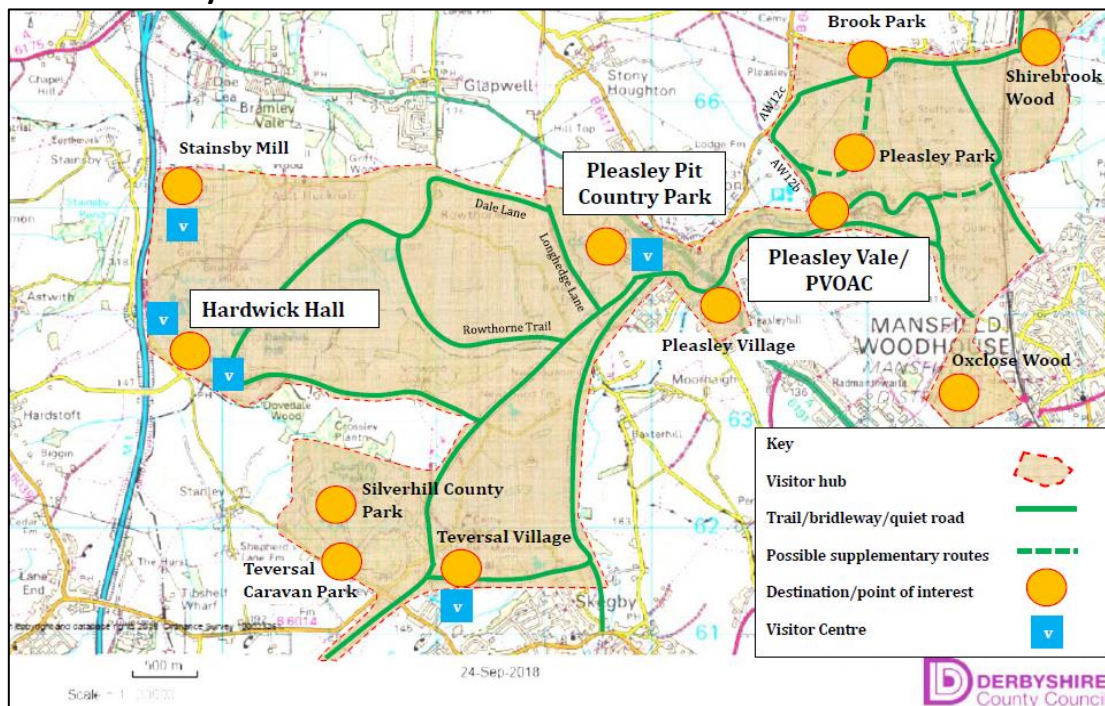


**Figure 21 – Population in and around the Pleasley Hub**



There are several key assets in the Pleasley Hub (Figure 22) which lends the area to future development.

**Figure 22 – Pleasley Hub**

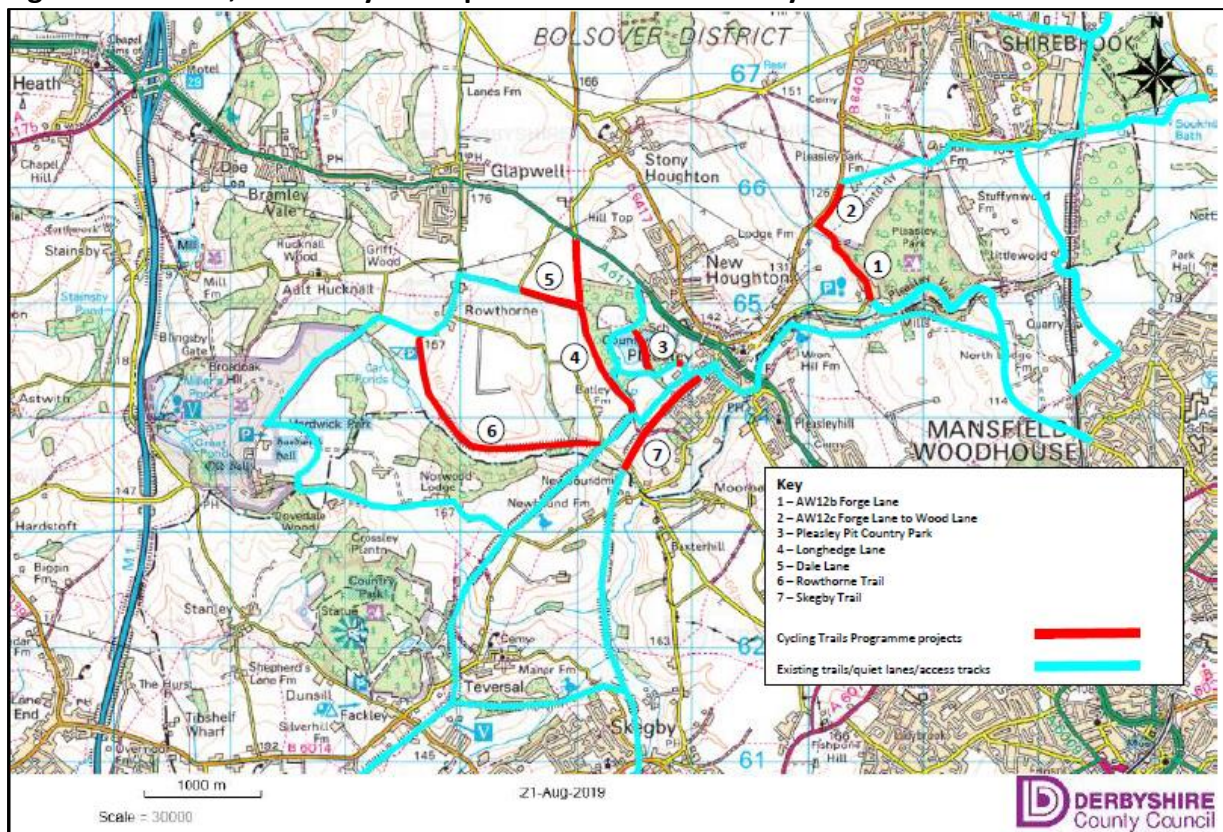




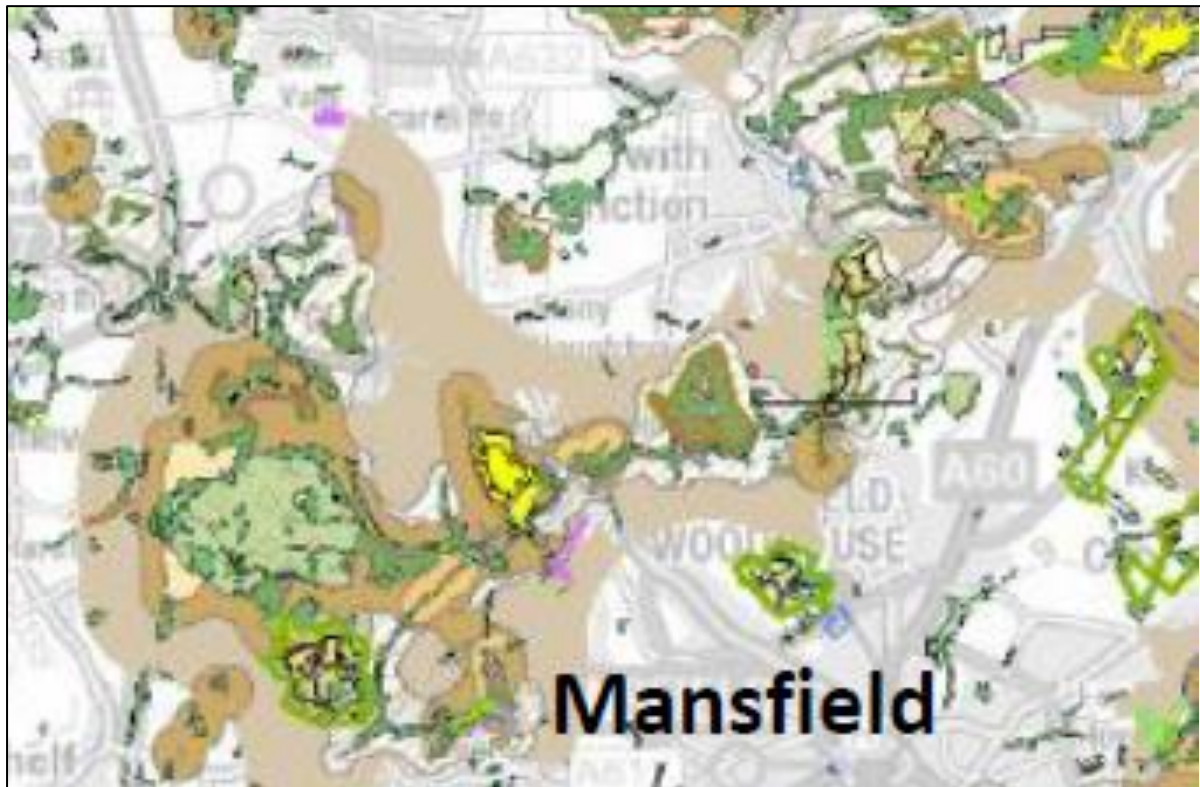
The main attributes of the Pleasley Hub are:

- There is a significant visitor resource in the area with the capacity for growth – Hardwick Hall (considered one of the best properties in the whole NT portfolio, attracting around 500,000 visitors a year), Pleasley Pit Country Park (a growing destination with a new visitor centre and significant network of resurfaced paths), and Pleasley Mills - a potential destination which contains a well-regarded Outdoor Activity Centre.
- A quarter of the VSCR Trails Network is within or immediately adjacent to the hub – there are nearly 25km of trails within the Pleasley Hub including parts of the Phoenix Greenways and the Archaeological Way, which intersect at Pleasley Pit Country Park. Figure 23 outlines the network.
- There is also significant nature conservation interest in the area – about a third of the area is either designated for nature conservation, or as part of a historic landscape, or is classed as priority habitat. Notable sites include: the ancient parkland of Hardwick, five Sites of Special Scientific Interest (Dovedale Wood, Teversal to Pleasley Railway, Teversal Pastures, Pleasley Vale Railway, Sookholme Brook), three Local Nature Reserves (Meden Trail, Rowthorne Trail and Pleasley Pit Country Park), a plethora of priority habitat sites including Pleasley Grasslands, Pleasley Park and Brook Park, other post-industrial reclaimed site including Brook Park, Shirebrook Wood, Silverhill Country Park and Oxclose Wood. Figure 24 outlines the nature conservation interest in the area.

**Figure 23 – Trails, bridleways and quiet lanes in the Pleasley Hub**



**Figure 24 – Nature conservation interest in the Pleasley Hub**



#### **4.5.1 Developing the Pleasley Hub concept further**

The Pleasley Hub feasibility study culminated in the development of an action plan <https://www.derbyshire.gov.uk/site-elements/documents/pdf/business/economic/visit-sleep-cycle-repeat/pleasley-hub-stage-3-action-plan.pdf>

The plan presented the following vision:

To create a community-led sustainable destination that develops, refines and presents an authentic responsible tourism product with a focus on environmental and community benefits. The area will be known as a premier outdoor cycling and walking destination of choice, where visitors will receive a genuine welcome and enjoy outstanding experiences of our countryside and heritage. The area will have an enhanced reputation and support from its neighbouring destinations, who appreciate and benefit from its complementary offer.

The following aims were identified to deliver the vision:

- Secure industry and community leadership to guide strategic direction and participate in delivery
- Maximise the outdoor product and focus on excellent service for the local community and visitors
- Embed sustainability best practice - create regenerative economies that reinvest in local social and natural capital
- Raise spend levels particularly by encouraging visitors to stay longer, staying overnight, visiting midweek and in quieter months
- Share the benefits of tourism more widely and enable visitors to explore the wider area with new infrastructure such as trails and visitor experiences
- Improve the cycling and walking experiences and capitalise on opportunities to diversify the product offer
- Stimulate local and community enterprises to invest in sustainable communities and the visitor economy
- Optimise wider leverage from planned major investments
- Proactively market the area as a sustainable and responsible destination

The following six themes were identified as the focus of the action plan:

**Theme 1: Destination Connectors** - build on the existing destination hubs - Hardwick Hall, Pleasley Pit and Country Park, and support the future regeneration of Pleasley Vale - to develop a cluster and critical mass of visitor products and experiences

**Theme 2: Improving the visitor infrastructure** - the provision of high quality, sustainable visitor infrastructure and information with a particular focus on developing, enhancing, and maintaining an exemplar trails network

**Theme 3: Branding and Marketing** - to develop a clear brand profile and identity for the area

**Theme 4: Product Development** - to design and deliver a quality outdoor active product which will encourage residents and visitors to responsibly enjoy and use the area as a destination for physical activity

**Theme 5: Community Engagement** - help communities direct, develop and deliver cross-cutting - visitor economy, health and wellbeing and environmental improvements

**Theme 6: Governance and Partnership** - success will also be dependent on the plan being 'owned' and driven forward by a partnership of the key stakeholders. It will be important to develop sustainable models for ongoing marketing, operations, maintenance, and investment.

## **Section 4 – Summary**

Section 4 asks the question, what do we want to do next?

The section starts by analysing gaps, looking specifically at the fragmentation of the current provision of natural capital, the space needed to enhance natural capital, the resource and capacity needed to maintain and enhance natural capital, and issues around engagement and nature connectedness. The section continues with a SWOT analysis.

Section 4 then discusses who would pay for future natural capital works, looking at the public sector, the private sector, the third sector, personal responsibility, and crowd funding campaigns.

Finally, section 4 discusses how a regenerative economic model could be developed, specifically looking at opportunities in the Pleasley Hub, which is the current priority of the VSCR Programme.

## Section 5 - Action Plan

VSCR is a cross-cutting programme in North Derbyshire and North Nottinghamshire, which aims to grow a sustainable visitor economy, to enhance local natural and social capital, by using regenerative economics.

The VSCR Area consists of former mining communities, with a high population of lower socio-economic groups and pockets of deprivation. The Area's industrial past has depleted natural capital, and it is amongst the most nature depleted landscapes in the UK. More latterly, intensive agriculture has had an impact on natural capital.

However, over the last 30 years, former collieries have been reclaimed and new multi-user trails constructed, which are now rich in wildlife. This mosaic of interconnected sites and trails is a great platform on which to build the recovery of natural capital and nature connectedness.

The Area has significant world-class heritage, which attracts hundreds of thousands of visitors a year to honey pot sites. Visitors do not disperse through the landscape and wider opportunities to capitalise on this market are lost.

Tying natural capital and nature connectedness to the visitor economy provides the opportunity to develop an innovative approach to fund future natural capital works, whilst creating opportunities to develop a brand rooted in sustainability for the visitor economy, to demonstrate a clear response to the climate and biodiversity crisis. Developing a regenerative economic model for VSCR will help to unlock the Area's latent potential but will require further investment and comes with risks.

There are two landscape types identified in the VSCR Area.

In the Magnesian Limestone Area, 15% of the 87km<sup>2</sup> landcover has some value for biodiversity. Tree cover is around 10.5%, which is above the current England average of 10%. The Magnesian Limestone Area is the second smallest landscape type in Lowland Derbyshire and yet has the highest percentage of biodiversity and woodland cover outside of the National Forest.

In the Rother and Doe Lea Valleys Area, 6.8% of the 178km<sup>2</sup> landcover has some value to biodiversity. Tree cover is around 6.3%, which is significantly below the current average for England. The Rother and Doe Lea Rivers Area has average biodiversity and woodland cover compared with the rest of Lowland Derbyshire, but this is significantly below the level it needs to be to optimise the benefits from ecosystem services.

The following areas of focus are recommended, to optimise ecosystem services:

- footpaths, bridleways, green lanes, and multi-user trails
- around existing sites with high biodiversity
- adjacent to water courses, where springs rise, field margins, across contour strips within fields and less-productive wet hollows - where run-off could lead to flooding, loss of topsoil, or issues with diffuse pollution,
- urban greenspaces - to enhance opportunities for nature connectedness and services such as improved air quality or cooling the heat island effect
- the Doe Lea and Rother River corridors and throughout their wider catchments – to reduce the risk of flooding
- the Chesterfield Canal corridor - which presents a significant opportunity to link Chesterfield to accessible natural capital
- the M1 and Chesterfield-Staveley-Barlborough corridors - to mitigate air quality issues

## **Outcomes to enhance natural capital and nature connectedness**

- 1. Develop a regenerative economic model for VSCR around natural capital**
- 2. Develop opportunities for nature connectedness**
- 3. Ensure clear communication, consistent promotion, and marketing**
- 4. Clarify governance arrangements**

To deliver these outcomes the following draft plan is outlined to illustrate what now needs to be achieved in order to benefit from the provision of greater natural capital:

## Develop a regenerative economic model for VSCR around natural capital

Build a regenerative economic model for natural capital as part of VSCR. This would seek to clarify financial implications, whilst maximising environmental and social utility; targeting projects in priority areas, ensuring future markets work effectively, and helping to manage risk

Actions	Rationale	Partners	Resources
Carry out feasibility works to analyse the potential for a local natural capital market	Policies including Biodiversity Net Gain & ELMs (Sustainable Farming Initiative, Nature Recovery Networks & Landscape Recovery grants) & other land use grants need modelling to assess their economic potential to support the wider regenerative economic model. Local natural capital markets & the appetite for engagement need to be assessed		
Identify opportunities to enhance natural capital and map against benefits	Priorities for future natural capital programmes (and their associated ecosystem services) need modelling to understand how best to optimise future benefits throughout the VSCR landscape		
Identify opportunities to fund future works	Consider ways to bring the potential generated in the new nature markets to support the wider regenerative economic model		

Actions	Rationale	Partners	Resources
<p>Integrate findings into the VSCR Business Case (which will be developed around a regenerative economic model)</p>	<p>The analysis of the new nature market &amp; its impact on natural capital are key elements of the VSCR Business Case, which will also model &amp; integrate growth of the visitor economy &amp; other potential economic activities into the wider regenerative model (with a particular focus on activities which promote pro-environmental behaviours (PEB) - such as Incredible Edible, Precious Plastic and the development of food waste cafes)</p>		



## Develop opportunities for nature connectedness

Nature connectedness has the potential to deliver cost effective health and wellbeing benefits, whilst fostering pro-environmental behaviours (PEB). Green social prescribing (GSP) is currently a hot topic & the GreenSPring pilot, which covers Derbyshire and Nottinghamshire, is one of eight national projects to assess the viability of GSP

Actions	Rationale	Partners	Resources
Map out current levels of nature connectedness & identify gaps	Current surveys indicate that most people (80%) rarely notice nature, missing out on possible health & wellbeing benefits. We need to understand the local picture		
Work with the GreenSPring pilot	GreenSPring has the potential to provide learning in the locality & participation in the programme will provide an opportunity to help frame future GSP work		
Seek funding or identify other resources to increase opportunities for nature connectedness (possibly through the regenerative economic model)	Funding will be required to ensure nature connectedness is rolled out, particularly to pay for trained leaders to coordinate activities		
Develop programmes of nature connectedness	To maximise the benefits from nature connectedness tailored programmes will need to be developed that appeal to different audiences in a variety of localities		

Actions	Rationale	Partners	Resources
Seek to integrate nature connectedness into place-based pilots	A number of place-based pilots are starting to be identified, which should be targeted to integrate nature connectedness (e.g., pulling together cross-cutting programmes in Creswell, Shirebrook/Pleasley & Bolsover to tackle inactivity)		
Seek to integrate nature connectedness into other mainstream provisions	A clear and concise methodology with local opportunities to engage in nature connectedness (throughout the seasons) should be developed for different communities to identify the doorstep offer available locally		

## Ensure clear communication, consistent promotion, and marketing

Clear communication amongst partners, stakeholders and the wider public will have to be properly resourced with timely & seasonal messaging that appeals, informs & engages

Actions	Rationale	Partners	Resources
Develop a strategy for communications across partners & stakeholders specifically for natural capital & nature connectedness (this should be integrated into a wider VSCR Communication Strategy)	Communication will be key to the future coordination and success of the new economies that will be created by recent policy changes & how the wider public benefit from new nature-rich local environments		
Ensure communication is owned and properly resourced	Resource & ownership will enable effective & timely communication & help to develop fun & engaging content. Rather than an addendum to peoples' current roles, content should be responsive & complement partners corporate communications		
Develop content which outlines local points of interest, identifies seasonal content & supports active campaigns for change	Effective content will grab peoples' imagination & hold their attention, addressing different community's' needs. Options for seasonal content will be key to success		

## Clarify governance arrangements

Success will depend on the plan being 'owned' and driven forward by key partners and stakeholders. This will be important in the development of a regenerative economic model which aims to maintain & enhance local natural capital

Actions	Rationale	Partners	Resources
Develop effective governance and partnership structures both at a strategic and operational level, to ensure that the plan is 'owned' and driven forward by key partners & stakeholders	Clarifying governance arrangements will help ensure ownership & accountability of actions, & will help maintain focus on delivery		
Investigate & develop a shared ownership model with partners & stakeholders committing resources, as part of the regenerative economic model	There are many potential partners who could contribute to a shared ownership model, particularly if they have natural capital asset within their portfolios of work (e.g., parish councils contributing to a general trails maintenance pot, as is the case of the Archaeological Way, the maintenance of which is currently supported by Langwith Parish & Shirebrook Town Councils)		

## Section 6 - Conclusion

We need a society that facilitates regular and sustained engagement with nature within more biodiverse spaces, to maintain population wellbeing and resilience against climate change.

Creating new natural capital and opportunities for nature connectedness in the VSCR Area has the potential to create jobs and support the transition to a low-carbon economy.

This report has outlined a vision for the VSCR Area of creating a regenerative economic model that combines the development of the local visitor economy with opportunities to enhance natural capital and support social capital, through nature connectedness.

We need to create a network of green corridors throughout the VSCR Area, which helps to reverse the declines in biodiversity, to optimise the value of ecosystem services, and create opportunities for people to connect to nature.

Nature needs to be brought into peoples' daily lives by ensuring opportunities in our streets, verges, parks, open spaces, and farmland are optimised for the role they play in supporting the enhancement of local natural capital, nature connectedness, and the provision of other ecosystem services.

So, for example, the Archaeological Way (AW) through Shirebrook becomes a nature-rich corridor which connects the town to its local countryside and people to their local environment. Town Park, which is on the route of the AW, has a small magnesian limestone grassland remnant, this becomes valued for its rich nature rather than being seen as a neglected unmanaged eyesore.

The economic case for investment in natural capital is clear, on average for every £1 spent there will be a return of £10, for example, the 10km<sup>2</sup> of reclaimed and renatured land in the VSCR Area annually provides £3.5M of benefits on just two ecosystem services. The true value of these sites is likely to be much higher when all the services they provide are considered.

Despite the continued decline in the state of nature, 2021 was a year of enormous change with COP 26, the UN launch of a Decade on Ecosystem Restoration, the ongoing work of the High Ambition Coalition for Nature and People, (where 50 countries pledge to renature 30% of their territories by 2030 - the 30 by 30 pledge – co-chaired by the UK), the G7 Summit in Cornwall, which had a strong environmental component, as well as a new Environment Act. All against a backdrop of the ongoing collective experience of the coronavirus pandemic, which spurred something of a renaissance in our relationship with nature and the outdoors.

Significant ecosystem restoration now needs to follow in the coming decade.

By working towards a common goal of developing natural capital and nature connectedness we can maximise the benefits from nature, through a range of ecosystem services, whilst gaining greater understanding of how intrinsic our connection to the natural world actually is.

Inaction on the issues raised within this report will show a failure of leadership and governance to embrace the transformation that is now needed, and this will inevitably cost more in the long run.

It will be our children and their children who write the histories of this period. And as the first generation to know what we are doing to the environment and the last with a chance to help mitigate the climate and biodiversity crisis, what do we want them to say?