







Natural Capital Strategy for Derbyshire

Final report



February 2023



Report prepared by:
Dr. Katie Medcalf
Dr. Gemma Bell
Elsa-Kristen Naumann
Jacqueline Parker
Dr. Louise Soanes
James Rugg
Environment Systems Ltd.
9 Cefn Llan Science Park
Aberystwyth
Ceredigion
SY23 3AH
Tel: +44 (0)1970 626688

www.envsys.co.uk

Sophie Neupauer
Ian Dickie
David English
eftec
Economics For The Environment Consultancy Ltd
10F Printing House Yard
Hackney Road
London E2 7PR
tel: 44(0)2075805383
www.eftec.co.uk

Ellen Miller
Bob Edmonds
Charlotte Dawson
Dan Brennen
Stewart Lenton
SLR Consulting Limited
2 Newton Business Centre,
Newton Chambers Road,
Sheffield S35 2PH



Table of Contents

Contents

Chapter 1: Introduction to Derbyshire's Natural Capital Strategy	10
Chapter 2: Natural Capital Baseline Assessment: Mapping for Nature Recovery	13
Introduction	13
Natural capital	13
Nature Recovery Network (NRN)	13
Local Nature Recovery Strategies	14
Creating a habitat map of Derbyshire	14
Choice of classification system for the habitat map	14
Creating the habitat map of Derbyshire	15
The habitat map of Derbyshire	17
Baseline ecological networks	19
Habitat Condition	24
Summary	24
Chapter 3: Spatial Distribution of Ecosystem Services, Risks and Opportunities	26
Ecosystem services	26
Factors that influence ecosystem services	27
Nature-based solutions	28
Irreplaceable habitats	29
Outputs and analysis: ecosystem services – stock, opportunity and risk	30
Agricultural production	30
Biodiversity and irreplaceable Habitats	38
Surface water regulation (Natural Flood Management)	58
Water quality regulation	66
Carbon storage and sequestration	7(
Recreation	76
Tourism	84
Contribution of agriculture to landscape character	88
Chapter 4: The Natural Capital Accounts	95
Natural Capital Accounting	95
Scope of the account	97
Materiality assessment	99
Outputs	103
Asset Register	103
Physical and Monetary Flow Account	105



Derbyshire Natural Capital Strategy

Natural Capital Asset Account	108
Breakdown of results within Derbyshire	109
Summary	109
Chapter 5: Natural Capital Baseline Assessment - landscape character	111
Baseline landscape character	111
The key characteristics of Derbyshire's landscape	111
The landscape character attributes	117
Using landscape character to inform decision making	117
Chapter 6: Cultural Historic Heritage	138
Chapter 7: Monitoring plan	140
Chapter 8: The impacts of climate change	142
Rainfall and temperature changes	142
Impacts on agricultural land quality	150
Chapter 9: Identification of further funding mechanisms	156
Biodiversity	156
Water quality	158
Flood risk	158
Carbon	158
Recreation and public health	159
Tourism	160
Natural Environment Investment Readiness Fund	160
Obtaining the most funding for land	160
Other websites which help find funding	161
Chapter 10: The Natural Capital Strategy: conclusions and recommendations	162
Conclusions	162
Recommendations	164
Implementation priorities for nature recovery	164
Keeping the Natural Capital Strategy up to date	166
Improving the Natural Capital Account	166
Communication of the Natural Capital Strategy:	167
List of appendices	168
Appendix 1 - UK Habitat Classification Habitat Definitions	168
Appendix 2 - Input datasets and conflation order used to produce the Habitat Ass	et Register 168
Appendix 3 - UKHab classes mapped in the Habitat Asset Register	168
Appendix 4 - Input datasets used in production of the ecosystem service stock, risk opportunity maps	and 168

168



Derbyshire Natural Capital Strategy

Appendix 5 - Methodology used in the production of individual SENCE and climate chan	ige
maps	168
Appendix 6 – Natural Capital sub regional accounts	168
Appendix 7 – Natural Capital accounting methodology	168
Appendix 8 - Baseline landscape character	168
Appendix 9 – Tables of habitat priorities according to Landscape Character Type and National Character Area	168
Appendix 10 – Maps of habitat priorities according to Landscape Character Type and National Character Area – Derby City	168
Appendix 11 - Cultural historic features and their relationship to the natural capital assets ecosystem services	and 168
Appendix 12 – Monitoring plan	168



Figure 1: Rationale for the Natural Capital Strategy for Derbyshire	11
Figure 2: Area covered by the Derbyshire Natural Capital Strategy, showing Local	
Administrative Districts	12
Figure 3: Merging data to create the habitat map	16
Figure 4: Extract of habitat map showing hedgerow and woodland classes	17
Figure 5: Habitat map showing Level 1 classification	18
Figure 6: Woodland network	20
Figure 7: Heath network	21
Figure 8: Wetland network	22
Figure 9: Natural grassland network	23
Figure 10: Identification of living systems, their management and the flow of ecosystem	
service for detention time of overland flow	28
Figure 11: Agricultural Land Classification	32
Figure 12: Agricultural production: current provision (stock)	33
Figure 13: Risks to agricultural production: potential conflicts with woodland objectives	34
Figure 14: Risks to agricultural production: ground-mounted solar PV	35
Figure 15: Risks to agricultural production: small wind generation	36
Figure 16: Risks to agricultural production: large wind generation	37
Figure 17: Biodiversity: current provision (stock)	40
Figure 18: Biodiversity hotspots / coldspots	41
Figure 19: Opportunities for establishing species-rich grassland	42
Figure 20: Opportunities for establishing species-rich grassland in relation to Natural	
England national grassland NRNs	43
Figure 21: Opportunities for establishing heath	44
Figure 22: Opportunities for establishing heath in relation to Natural England national	
heathland NRNs	45
Figure 23: Opportunities for establishing wetland	46
Figure 24: Opportunities for establishing wetland in relation to Natural England national	
wetland NRNs	47
Figure 25: Opportunities for establishing woodland	48
Figure 26: Opportunities for establishing woodland in relation to Natural England nation	
woodland NRNs	49
Figure 27: Risks to biodiversity	51
Figure 28: Distribution of irreplaceable habitats	52
Figure 29: Process Diagram for Dealing with Irreplaceable Habitats in Development	
Planning and BNG Projects	53
Figure 30: Natural Flood Management: current provision (stock)	60
Figure 31: Hydrological catchment zones	61
Figure 32: Channel Network	62
Figure 33: Hydrological connectivity	63
Figure 34: Natural Flood Management: all NFM opportunities	64
Figure 35: Natural Flood Management: targeted opportunities	65
Figure 36: Water quality regulation: current provision (stock)	67
Figure 37: Water quality regulation: risk areas	68
Figure 38: Water quality regulation: areas where nature-based solutions will improve wa	
quality	69



Figure 39: Current carbon storage (stock)	72
Figure 40: Current carbon sequestration (stock)	73
Figure 41: Carbon sequestration risks	74
Figure 42: Carbon abatement opportunities: relative gain in carbon storage/sequestr	ation
	75
Figure 43: Areas of high importance for recreation: input datasets	78
Figure 44: Areas of high importance for recreation in terms of visitor numbers	79
Figure 45: Recreation risks: urban areas with and without access to a 2ha recreational	l site
	80
Figure 46: Recreation risks: urban areas with and without access to a 20ha recreation	al site
	81
Figure 47: Recreation risks: urban areas with and without access to a 100ha recreation	
site	82
Figure 48: Recreation risks: urban areas with and without access to a 500ha recreation	
site	83
Figure 49: Areas of high importance for tourism: input datasets	85
Figure 50: Areas of high importance to tourism: current stock	86
Figure 51: Clustered tourism sites; groupings of sites of high importance for tourism	87
Figure 52: Relative contribution of agriculture to landscape character	89
Figure 53: Potential risks to landscape character from woodland planting within the	
ecological network	90
Figure 54: Potential risks to landscape character from solar and wind renewable ener	
projects Provision of multiple ecosystem service benefits for effective targeting of land	
management action	91
Figure 55: Biodiversity and water quality regulation multi-benefits	93
Figure 56: Biodiversity and Natural Flood Management multi-benefits	94
Figure 57: The structure of natural capital accounts	95
Figure 58. Asset extent Derbyshire, 2021 (produced at September 2022)	103
Figure 59: Natural England's National Character Areas in Derbyshire, with interpretation	
boundaries across the Derby City urban area	112
Figure 60: Landscape Character Types within Derbyshire (outside of PDNP, including a interpretation of NCA boundaries within Derby City	
interpretation of NCA boundaries within Derby City Figure 61: Landscape Character Types in Peak District National Park	114 115
Figure 62: Landscape Character Types where the Grassland broad habitat type is a processor various restoration or habitat greation (interpreted boundary great mappe	_
for conservation, restoration or habitat creation (interpreted boundary areas mappe partially transparent)	u as 123
Figure 63: Landscape Character Types where the Woodland & Forest broad habitat	
a priority for conservation, restoration or habitat creation (interpreted boundary area	
mapped as partially transparent)	124
Figure 64: Landscape Character Types where the Heathland & Shrub broad habitat t	
a priority for conservation, restoration or habitat creation (interpreted boundary area	J 1
mapped as partially transparent)	125
Figure 65: Landscape Character Types where the Wetland broad habitat type is a pr	
for conservation, restoration or habitat creation (interpreted boundary areas mappe	
partially transparent)	126



Figure 66: Landscape Character Types where the Sparsely vegetated land broad habi	
type is a priority for conservation, restoration or habitat creation (interpreted boundary	
areas mapped as partially transparent)	127
Figure 67: Landscape Character Types where the Urban broad habitat type is a priority conservation, restoration or habitat creation (interpreted boundary areas mapped as	y tor
partially transparent)	128
Figure 68: Landscape Character Types where the Cropland broad habitat type is a pri	ority
for conservation, restoration or habitat creation (interpreted boundary areas mapped partially transparent)	as 129
Figure 69: Landscape Character Types where the Rivers & Lakes broad habitat type is	а
priority for conservation, restoration or habitat creation (interpreted areas mapped as	
partially transparent)	130
Figure 70: Landscape Character Types (interpreted boundaries) within Derby City whe the Grassland broad habitat type is a priority for conservation, restoration or habitat	re
creation	131
Figure 71: Locations where grassland-based habitat restoration or nature-based solutic	ons
could support the Landscape Character Type (interpreted boundary areas mapped a	3S
partially transparent)	132
Figure 72:Locations where heathland-based habitat restoration or nature-based solution	ons
could support the Landscape Character Type (interpreted boundary areas mapped a	as.
partially transparent)	133
Figure 73: Locations where wetland-based habitat restoration or nature-based solution	
could support the Landscape Character Type (interpreted boundary areas mapped a	
partially transparent)	134
Figure 74: Locations where woodland-based habitat restoration or nature-based soluti	
could support the Landscape Character Type (interpreted boundary areas mapped a	
partially transparent); key to LCT regions shown in Figure 75)	135
Figure 75: Key to LCT regions as applied to woodland NBS actions (Figure 74)	136
Figure 76: Locations where grassland-based habitat restoration or nature-based solution	
could support the Landscape Character Type in Derby City (interpreted LCT boundary	
data)	137
Figure 77: Habitat map update process	140
Figure 78: Change in seasonality due to temperature between the present day and 20 (WorldClim ssp370)Impacts on habitats	
	145
Figure 79: Change in seasonality due to precipitation between the present day and 20 (World Clim sep 370) Impacts on habitats	
(WorldClim ssp370)Impacts on habitats Figure 80: Comparison of areas receiving at least 1200mm Annual Average Rainfall in t	146
present day (UKCP18 RCP 6.0)	148
Figure 81: Comparison of areas receiving at least 1200mm Annual Average Rainfall in 2	2080
(UKCP18 RCP 6.0)	149
Figure 82: Comparison of areas where the soil experiences at least 270 Field Capacity	
Days in the present day (UKCP18 RCP 6.0)	151
Figure 83: Comparison of areas where the soil experiences at least 270 Field Capacity	
Days in 2080 (UKCP18 RCP 6.0)	152
Figure 84: Predicted changes in Agricultural Land Classification grade between the	
present day and 2080 (UKCP18 RCP 6.0)	153



Figure 85: Areas where drought is a significant limiting factor for agriculture: present d	ay
UKCP18 RCP 6.0	154
Figure 86: Areas where drought is a significant limiting factor for agriculture: 2080, UKC	CP18
RCP 6.0	155

