

South of Scotland Regional Land Use Framework

Final draft for consultation

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EXECUTIVE SUMMARY

The South of Scotland is a large rural region with an extensive land-based economy including agriculture, forestry and tourism. However, as biodiversity loss and climate change impacts increase, so does the pressure on our natural capital assets – including our soils, water, habitats and wildlife. We will need to take new approaches to the ways in which we use and manage our land to help that finite resource deliver multiple benefits for our businesses, communities and visitors alike - including sustainable food and timber production, renewable energy generation but also wider public benefits such as spaces for recreation and tourism, for wildlife, carbon storage and clean water.

As the very first step on a longer journey towards more sustainable use of land across the South of Scotland, this document establishes the first Regional Land Use Framework (RLUF). This RLUF, developed as part of a pilot project and shaped by extensive stakeholder engagement including an interim Regional Land Use Partnership, seeks to raise awareness of the many issues impacting on land use across the region and to start to help people make better, more informed long-term decisions about land use to meet national, regional and local needs.

This RLUF sets out a concise vision and objectives for land use across the region before providing information on existing land use (and the benefits it provides) and drivers for land use change. It recognises and highlights the urgency of joined up action to begin to address the climate and biodiversity crises and identifies some of the priority changes in land use that are going to be needed. For example, significantly more native woodland creation and peatland restoration, renewable energy generation and more efficient and environmentally friendly food production that helps restore nature. It also starts to explore where these priority land use changes might be best delivered, drawing on the best available data.

The RLUF also recognises the need for inclusive engagement between those making decisions about land and the wide range of people and interests affected by such decisions. Transparency and debate about the evidence (e.g., on what uses are best suited to specific areas of land) and justifications for seeking specific land use changes in different locations will be critical, taking into consideration the full range of benefits provided by the land as part of a just transition.

The RLUF identifies principles to support decision making and existing funding opportunities to enable land use change. It also includes a list of short- and medium- term actions to support delivery of the RLUF's vision and objectives, linked to the Regional Economic Strategy (RES). Support from Scottish Government for a just transition in land use across the region will be critical, including access to better data to support land use planning and funding for landowners to incentivise and enable investment in the right land use change in the right places.

1. INTRODUCTION

The South of Scotland is a rural region spanning the two local authority areas of Dumfries & Galloway (D&G) and the Scottish Borders (SB). It covers more than 170 miles from east to west, with an area of more than 11,000 square kilometres and is home to over 260,000 people. As a rural area many of our communities live in small market towns and villages scattered across uplands, lowlands and coastal environments, surrounded by beautiful countryside. However, as biodiversity loss and climate change impacts increase, so does the pressure on our natural capital assets (including our soils, water, habitats and wildlife). We will need to take new approaches to the ways in which we manage our land, helping that finite resource deliver multiple benefits for our businesses, communities and visitors alike.

The South of Scotland has an innovative, but fragile, extensive agricultural and forestry base and, whilst delivering sustainable food and timber production is important, we need to consider how to manage land so that it also delivers wider public benefits, such as spaces for recreation and tourism, for wildlife, carbon storage and clean water. As the Just Transition for land use and agriculture report (Scottish Government, 2023) states: *“to achieve a nature-positive, net zero Scotland, our land and sea will need to balance competing demands and will require negotiation and compromise from all.”*

As the very first step on a longer journey towards more sustainable use of land across the South of Scotland this document establishes the first Regional Land Use Framework (RLUF). This RLUF seeks to raise awareness of the many issues impacting on land use across the region and to start to help people make better, more informed long-term decisions about land use to meet national, regional and local needs. It recognises and highlights the urgency of joined up action to begin to address the climate and biodiversity crises.

Policy context

The **National Strategy for Economic Transformation** sets out Scotland’s ambition for a Wellbeing economy, that thrives economically, socially and environmentally, is fairer, inclusive, wealthier and greener and delivers a just transition to a net zero, nature-positive economy, and rebuilds natural capital. Rebuilding Scotland’s natural capital is key to the long-term productivity of the many sectors of the economy which rely on the resources and services nature provides. The transition to a nature-positive economy, designed to help reverse biodiversity loss by 2030, will support our international responsibilities, while also offering enormous opportunities for Scotland’s prosperity and well-being. Increasing public and responsible private investment in Scotland’s natural capital, is both an important economic opportunity and essential to meet the pace and scale of our climate change targets, biodiversity goals and wider land use policy objectives. The Scottish Government is also committed to ensuring that local communities are empowered and gain Community Wealth Benefits from investment in natural capital.

Scotland’s third national Land Use Strategy sets out Scottish Government’s long-term vision for sustainable land use, their objectives and key policies for delivery. It acknowledges that we ask a lot of our land and that the demands are growing, recognising that the climate and nature emergencies are the most urgent challenges of our generation. These cannot be addressed without changes to the way we use, manage and live on the land. How we manage our land and terrestrial water bodies affects the marine environment. The strategy recognises that effective management of our natural capital needs to be integrated across land and seas and makes links to the Scottish National Marine Plan.

To achieve a **Just Transition to Net Zero** by 2045 it is essential that we understand where the costs and benefits from the way we use the land lie, recognising the economic prosperity that sustainable land management can provide to existing communities and future generations. The Land Use Strategy for Scotland recognises that our landscapes may look very different as a result, with significantly more, (and better) afforestation (albeit we note that parts of the South of Scotland are already heavily forested) and peatland restoration, and efficient and environmentally friendly food production that helps restore nature. It promotes a holistic systems approach to land use and management, rather than a sectoral approach, to help balance the competing demands placed on the

land in a way that protects and enhances our land, encouraging a wider range of interests to engage to enable meaningful debate about our priorities for land use.

This needs to be based on a “**natural capital approach**”, i.e. one that recognises land as a natural asset that provides a range of benefits to society through the provision of ecosystem services which underpin our economy and way of life. These include food and timber, freshwater, woodlands and peatlands, healthy soils, carbon sequestration, natural flood management, biodiversity and landscapes for access and tourism.

In a rapidly evolving policy landscape, the RLUF will align with Scottish Government’s emerging **Land Use and Agriculture Just Transition Plan**, providing a key delivery mechanism for a fair and inclusive approach to deliver a fairer, greener Scotland.

The Land Use Strategy identifies **Regional Land Use Partnerships** (RLUPs) and the National Planning Framework as key platforms for change to help achieve Scotland’s ambitions for sustainable land use. Scottish Government established five RLUP pilots, that are aligned with groupings of planning authorities developing Regional Spatial Strategies. The South of Scotland was one of the areas selected. The RLUPs are intended to help stakeholders work together to find ways to optimise land use in a fair and inclusive way. The South of Scotland pilot is being delivered through a partnership of South of Scotland Enterprise, Dumfries and Galloway Council and Scottish Borders Council.

The Convention of South of Scotland has agreed to position the region as the Natural Capital Innovation Zone to encourage and accelerate responsible investment across the region. This recognises how the region can positively address climate and nature impacts by strengthening business and community resilience, whilst growing the economy for future generations. The region will pioneer innovative methods of land and marine management built on partnerships and develop a pipeline of Natural Capital investment opportunities that identify nature-based solutions including regenerative agricultural projects, to deliver the Wellbeing Economy. Activity will also help halt loss of biodiversity by 2030 and reverse it with landscape scale restoration by 2045, including projects such as the Wild Heart Expansion Project in Southern Scotland.

Aims of the RLUP pilots

The aim of the pilots is to test options for establishing RLUPs, looking at governance and partnership working on a regional scale to understand how to:

- establish a **partnership structure** able to deliver a collaborative approach to land use change decision-making involving national and local government, landowners and managers, communities and stakeholders.
- outline in a Framework (RLUF) how to use a **natural capital approach** to identify and agree upon current and potential land use changes across the region that support the delivery of Scottish Government’s climate change targets and other environmental objectives, including improving biodiversity.
- signpost public and private **funding opportunities** for landowners and managers, or community groups to assist with land use changes based on RLUF priorities.

Why do we need a Regional Land Use Framework?

Climate change is going to have profound impacts on land use and livelihoods across the South of Scotland over the coming decades. Summers will become warmer and drier, winters will be wetter and milder and intense rainfall events will increase in both winter and summer¹. Food and energy supply security, water quality and availability, flood and fire risk, cultural heritage, recreation and human health are all likely to be impacted². Ultimately the amount of change that occurs will depend on how successful we are in reducing greenhouse gas emissions globally, but much change is already 'locked in' so adaptation is critical. We need to act now to adapt food and timber production and wider land use practices to a rapidly changing climate and to build resilience in our economy, environment and communities.

The **biodiversity crisis** is also of urgent concern both globally and within Scotland, where species and habitats are in long term decline. Currently nearly 50% of species within Scotland are in decline with others at historically low levels³. The latest State of Nature Report⁴ reveals 1 in 9 species is threatened with national extinction; a 15% decline in average species abundance across closely monitored wildlife since 1994; and bigger declines in some much-loved bird species. For example, since 1994, Swifts, Curlews and Lapwings have all declined in abundance by more than 60%, while Kestrels have declined by more than 70%.

Whilst climate change is the single greatest threat to Scotland's habitats, healthy ecosystems are vital to being able to combat the climate crisis with, globally, 50% of human-made carbon dioxide emissions each year being removed by ocean and land ecosystems. Not every solution to reduce climate change impacts is necessarily good for biodiversity and we must also be careful to ensure interventions do not have unforeseen negative consequences.

To achieve a '**just transition**' to a sustainable future that addresses the climate and biodiversity crises, significant land use change will be required. It is, therefore, essential that we understand the full range of benefits and adverse impacts from the different ways we use our land in different places. Weighing up the multiple and sometimes competing demands on our land, understanding the tensions and trade-offs and ultimately identifying the right land use changes in the right places to meet society's needs in a sustainable, equitable and efficient way will not be straight forward.

Seeking out opportunities to **deliver nature-based solutions** at landscape and site scales will be important. This process also requires **inclusive engagement** between those making decisions about land and the wide range of people and interests affected by such decisions. It needs transparency and debate about the evidence (e.g. on what uses specific areas of land are best suited to) and justifications for seeking specific land use changes in different locations. It will involve negotiation and compromise between people with different interests and objectives, and a shift in the way we think about land, taking a more holistic approach that considers the full range of benefits it provides and that recognises that all aspects of the environment are interrelated.

Key questions that the RLUF seeks to address are:

1. What does existing land use in South of Scotland look like and how is this changing?
2. What are the priority land use changes that need to be made in South of Scotland to deliver the benefits we need for the future, considering the climate change and biodiversity crises?
3. Where are these land use changes best targeted strategically, considering factors such as the suitability of the land and the opportunities for these land use changes to deliver multiple benefits (at landscape or site scale)?
4. What principles can be used to guide decision making about sustainable land use?
5. What funding opportunities are available now, or emerging, to support more sustainable land use in South of Scotland whilst sustaining viable land-based businesses?

¹ <https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections>

² <https://www.nature.scot/climate-change/climate-change-impacts-scotland>

³ <https://www.nature.scot/doc/framework-nature-networks-scotland-draft>

⁴ <https://www.nature.scot/state-nature-report-shows-scotlands-wildlife-continues-decline#:~:text=Centuries%20of%20habitat%20loss%2C%20over,terms%20of%20the%20biodiversity%20it>

This first Regional Land Use Framework (RLUF) for the South of Scotland aims to draw together the priorities for land use change across the entire region, with its focus being at a regional strategic level. The RLUF thus provides a foundation to enable future programmes to focus on more local scales within the region (e.g. catchment or local landscape scales) and help guide decisions at a local level.

Who is the RLUF for?

The RLUF is available for anyone with an interest in how land is currently used in the South of Scotland and how this must change in the future. In this first version we seek to raise awareness and understanding of a natural capital approach, the benefits that land provides us, and the priorities for sustainable land use change to address the twin crises of climate change and biodiversity loss.

Governance

Following earlier recommendations there was merit in aligning the Governance of the pilot with the Regional Economic Partnership (REP). The REP brings together wide and relevant representation aligning well with the requirements of the RLUF and is supported by a technical Advisory Group of community, land use and public body interests. The REP provides oversight to endorse the recommendations of the RLUF, with final approval by the two Local Authorities and SOSE mirroring a process established for the Regional Economic Strategy.

Development of the Regional Land Use Framework

The programme was structured around a 6-step process:

- building the baseline;
- understanding drivers of change in land use;
- exploring the opportunities for land use change to boost multiple nationally and locally needed benefits;
- investigating tensions and trade-offs between managing land for different benefits
- and then identifying land use change opportunities so that
- recommendations could be made for regional land use priorities/objectives for the RLUF.

The full findings of the report can be found at: <https://www.southofscotlandenterprise.com/RLUF> ,

The draft RLUF has built upon the social research findings of the stakeholder engagement which have been analysed against the existing national and regional policy framework. This also provides an opportunity to highlight regional and local preferences and any requirement to develop solutions that meet local needs.

2. VISION AND OBJECTIVES

Vision for South of Scotland RLUF

A South of Scotland region where we fully recognise, understand and value the importance of our natural capital. Our plans and decisions about land use – including more native woodland, more peatland restoration and more sustainable and regenerative farming - deliver improved and enduring benefits for all, delivering a Wellbeing Economy through a just transition to Net Zero and nature-positive outcomes.

Objectives of the RLUF

- To support and promote better, more informed, collaborative and integrated decisions about how we use land in the South of Scotland in a sustainable manner, addressing the climate and biodiversity crises whilst supporting a wellbeing economy.
- To identify and understand competing pressures on land and identify opportunities for land use to deliver multiple benefits of value to society.
- To inform the targeting of public and private investment in support of transparent, fair, sustainable investments in land use.
- To encourage land-based businesses to work with nature and communities, helping to contribute more to South of Scotland's prosperity, including jobs, skills development and a just transition.
- To enable urban and rural communities to be better connected to the land, with more people enjoying the land and positively influencing land use.

The vision and objectives for the South of Scotland RLUF are informed by a range of stakeholder consultation (including via the Regional Economic Partnership and RLUF Advisory Group) and literature sources, including the objectives in the 1st (and 3rd) Land Use Strategy for Scotland and the Scottish Borders Regional Land Use Framework pilot. Definitions of key terms can be seen in the Glossary at Appendix A1.

Targets for the RLUF

Specific targets for land use change have not been set in this first version of the RLUF as further research and stakeholder engagement, including with Scottish Government, is considered necessary to inform robust target setting. However, the scale of the challenge can be judged from key quantitative targets set by the Scottish Government for Scotland as a whole:

- protect at least 30% of our land and sea for nature by 2030 (30x30 Target; *the current area of land protected for nature across South of Scotland is estimated to be 8%*)
- plant 18,000 hectares of new woodland each year by 2024; and increase woodland cover to 21% by 2032 (Climate Change Plan; *woodland cover is already estimated to represent 22% of total land cover across the South of Scotland, see Appendix A5 for further details*)
- create 3000–5000 ha of new native woodland per year (Scottish Forestry Strategy)
- restore at least 250,000 hectares of peatland by 2030 (Climate Change Plan)
- achieve net-zero emissions of all greenhouse gases by 2045 (Climate Change Plan)
- double onshore wind power generation by 2030 (Draft Energy Strategy and Just Transition Plan)

At this stage the national targets have not been disaggregated to regional targets, but these could be used to inform the setting of regional targets in the next version of this RLUF. For example, national targets could be translated into targets for the South of Scotland region based on a simple pro rata basis (assuming the South of Scotland region represents 14.5% of the total land area of Scotland).

In practice, setting regional targets would also need to consider other factors such as existing woodland cover and renewable power generation as well as land use change opportunities and constraints. There are some sub-regional targets that can also help inform this e.g. the Climate Change Route map for Scottish Borders has milestones of 22% woodland cover by 2030 and 25% by 2045 from a 2021 baseline of 20%⁵.

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⁵ https://www.scotborders.gov.uk/info/20013/environment/1274/net_zero_and_climate_change

3. PRINCIPLES GUIDING THE RLUF

To assist RLUF development, Scottish Government has produced a set of draft RLUF Guiding Principles. These draw upon the approach, ambitions and principles of the Scottish Government in areas such as the Bute House Agreement, Just Transition – a Fairer, Greener Scotland, the Scottish Land Use Strategy as well as Forestry and Biodiversity Strategies, the Vision for Scottish Agriculture, National Strategy for Economic Transformation and framed by National Performance Framework Outcomes. The principles are summarised in the diagram below.

Figure 1: Guiding Principles

Regional Land Use Framework Guiding Principles

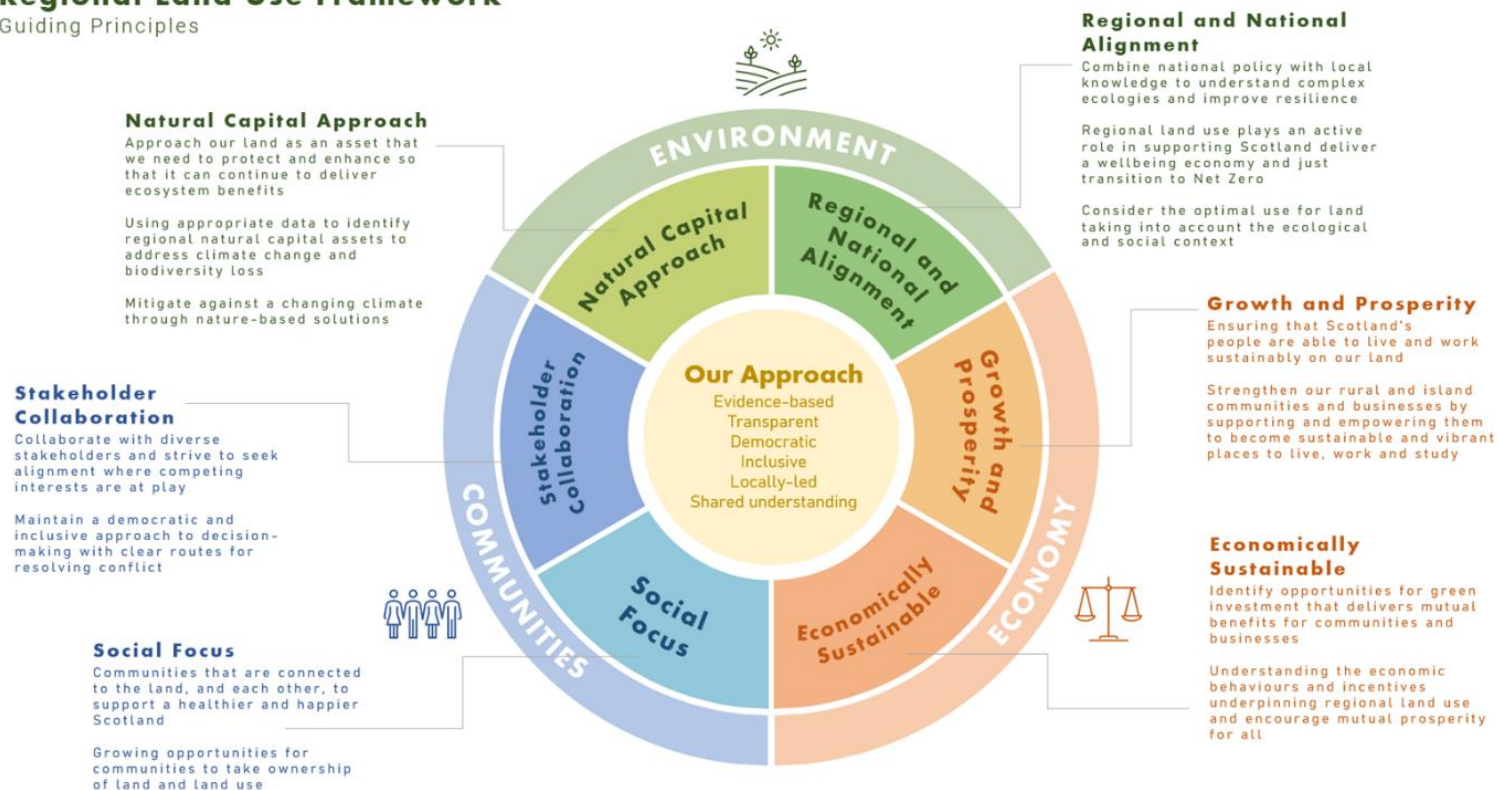
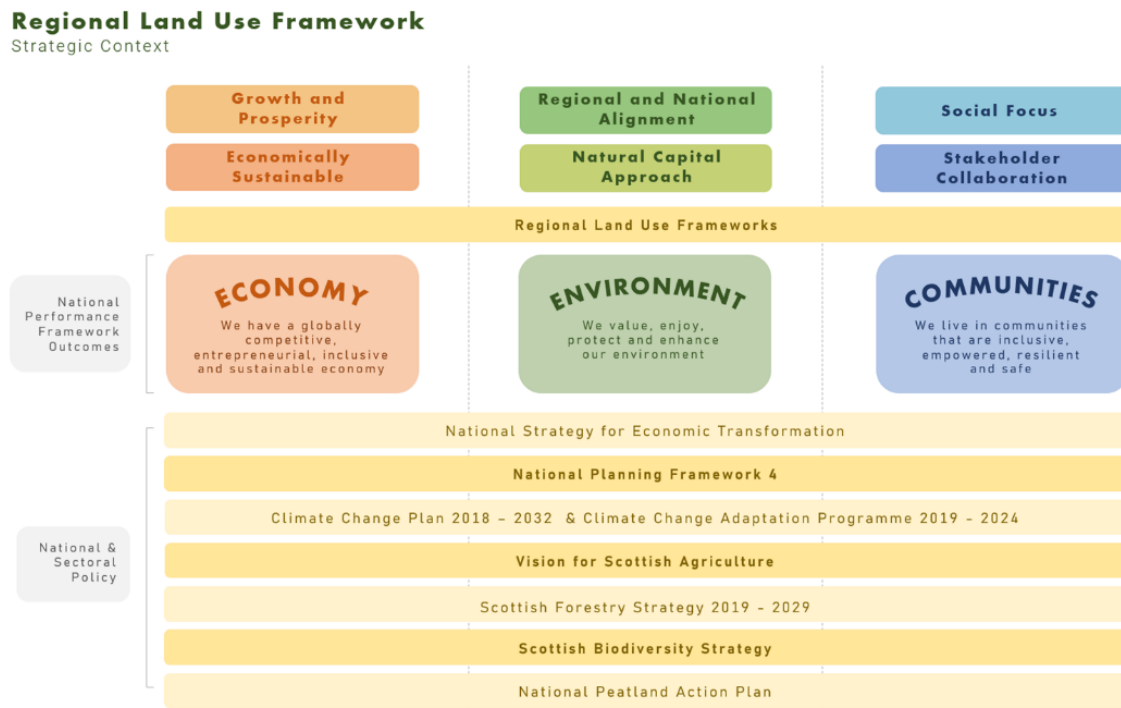


Figure 2: Strategic context



The guiding principles are based around the National Performance Outcomes for Economy (Growth and Prosperity), Environment (Natural Capital approach and Policy alignment) and Communities (Stakeholder collaboration and Social focus). The principles can be used to test whether the Framework is aligned with national outcomes. The plan of action can be matched against these principles to ensure that regional actions help deliver national outcomes.

At this stage, although setting out the priorities for land use change in the region, we are not proposing to develop a bespoke set of principles to guide land use decision making. However, we feel there is merit in making use of the existing Scotland Land Use Strategy principles to help inform decision making for land use and these are included in Appendix A2.

4. EXISTING LAND USES, BENEFITS AND TRAJECTORY OF CHANGE

This chapter provides an overview of existing land uses across the South of Scotland region and the benefits these provide to society. It then explores key drivers of change in land use including the biodiversity and climate crises.

Existing land cover and land uses

The South of Scotland region covers an area of more than 11,000 square kilometres. The area ranges from the Rhins of Galloway in the West to the Berwickshire coast in the East, and from south of the central belt of Scotland to the border with England. Within this, there is everything from high hills to coastal mudflats and from prime agricultural land to recognised “wildland”. Land cover is the vegetation type, which may be influenced by management decisions alongside key factors including soil, drainage, altitude and climate. How the land is used affects the current and future land cover. The Scotland Habitat and Land Cover Map 2020,⁶ created using AI to classify satellite data (developed by Space Intelligence in partnership with NatureScot), provides detailed mapping of existing habitats and land cover. The mapping is too large to include in this report but an interactive copy of the mapping for the South of Scotland region can be accessed on the Consultation Hub at: <https://tinyurl.com/t8ym84wp>

The land – one of our natural capital assets

The land and its distinct characteristics are the natural capital asset which supports a range of land uses. **Farming and forestry are the dominant land uses** in the South of Scotland. Whilst these land uses have a long history, the mid-20th century saw a rate of change for both land uses not experienced before, largely driven by policy supporting a desire to yield more food and timber. The resulting intensification of production was (and is) often at the expense of natural ecosystems, with more widespread uptake of more intensive, but very productive agricultural activities and more afforestation e.g. Dumfries and Galloway becoming the most heavily forested region in the UK⁷.

Dominant types of land cover across the South of Scotland now include grassland, woodland (particularly coniferous forestry) and arable and market gardens, as indicated by the land cover statistics in Table 1 below. The very limited area of wetland is also notable. A more detailed breakdown of land cover data is provided in Appendix A5.

Table 1: Summary land cover statistics for South of Scotland, 2022

Land cover type	Ha	%
Grassland	596,312	52.24
Woodland	254,096	22.26
Arable and market gardens	92,887	8.14
Heathland & scrub	79,705	6.98
Wetland	59,892	5.25
Built up & bare	47,756	4.18
Rock & scree	930	0.08
Coastal	9,949	0.87
TOTAL	1,141,527	100

Source: Analysis of Scotland Habit and Land cover map 2022 (Space Intelligence and NatureScot).

⁶ [SpatialData.gov.scot](https://spatialdata.gov.scot)

⁷ Dumfries and Galloway Local Biodiversity Action Plan (2009)

Provisioning services – the products we derive from the land.

Key types of farming across the region include dairy production primarily in Dumfries and Galloway, arable production in eastern Borders, beef and hill sheep in the Southern Uplands, Cheviots and Galloway hills. According to Government statistics⁸, in 2019 South Scotland had just under half of Scotland's dairy herd; a third of all cattle; about a third of the sheep; but only 10% of beehives (see table in Appendix 6).

In 2022, South Scotland produced 19% of all the cereals grown in Scotland and about a quarter of the winter barley, wheat and oats (see table in Appendix 6).

These activities support food and drink and materials production, known as 'provisioning ecosystem services'. The surrounding marine environment also supports fish production (as well as carbon sequestration).

The south of Scotland includes **many known salmon rivers**. Salmon are a key component of the rural economy, both through fisheries and wider nature tourism. Salmon also play a role in the ecology of aquatic ecosystems and are an indicator of high environmental quality⁹. Climate change is having a significant impact on river fishing, as highlighted in the River Tweed Commission report on the 2022 Atlantic salmon catch. This identified that the summer heatwave and reduced rainfall had significant impacts on the fish stocks in the river and resulted in advice to stop fishing on some of the hottest days. Despite these challenges, catch levels for 2022 were only slightly below the five-year average. One of the priorities for land use set out within the Wild Salmon Strategy is to improve the condition of rivers and give salmon free access to cold, clean water. River Basin Management Planning will be a key tool to achieve this, providing a statutory programme of measures for improvements to the water environment.

Land management practices can contribute positively to 'regulating ecosystem services' including natural flood management, carbon capture, soil management and biodiversity. The importance of pollination is increasingly understood. However, some farming activities may also have negative impacts on soil and water quality, biodiversity (e.g. due to clearance of scrub and draining of wetlands), or water abstraction for irrigating crops and greenhouse gas emissions.

A map of land capability for agriculture is included at Appendix A6. This highlights that currently large parts of the region are more suitable for supporting improved grassland rather than arable agriculture.

Land use and greenhouse gas emissions

[Scottish Greenhouse Gas Emissions 2021](#)¹⁰ show that agriculture is the second largest source of greenhouse gas emissions in Scotland, after transport, emitting 7.8 MtCO₂e of net emissions. However, all sectors have shown a general downward trend between 1990 and 2021. Land Use, Land Use Change and Forestry (LULUCF) is a net source of GHG emissions in Scotland in 2021, emitting 0.4 MtCO₂e of net emissions. Within this some sectors are emissions sources, and some are sinks, which remove carbon dioxide from the air. Forestry and harvested wood products are net sinks. Croplands, grassland, settlements and wetland are net emitters.

Extensive woodlands across the region support timber production. The National Forest Inventory dataset (2020) provides more detailed area data on woodlands broken down into numerous sub-categories such as felled, ground preparation and windblown. If all of these categories are included along with core woodland categories (e.g. broadleaved woodland) then it indicates the total woodland area across the region is approximately 273,000 ha¹¹, albeit this is a snapshot in time and the area is constantly changing.

⁸ <https://www.gov.scot/publications/economic-report-on-scottish-agriculture-tables-2020-edition>

⁹ Scottish Wild Salmon strategy (2022) <https://www.gov.scot/publications/scottish-wild-salmon-strategy/pages/4/#:~:text=Salmon%20play%20a%20vital%20role,of%20its%20complex%20life%20cycle.>

¹⁰ <https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-2021/pages/3/>

¹¹ This figure is slightly higher than the figure of 254,096 hectares based on the land cover data quoted on p.10.

Renewable and non-renewable energy is also a provisioning service. Such activities influence the landscape character and the cultural value associated with landscape features. Wind, water, waste, sunlight and biomass support **energy generation** across the region. The latest statistics from BEIS (2021)¹² indicate that the largest number of renewable energy installations (sites) are photovoltaic panels (3702 installed in D&G and 4474 in SB). In contrast the next largest figures for numbers of installations (sites) are onshore wind (300 and 126 respectively), hydro (84 and 11 respectively) and anaerobic digestion (20 and 5 respectively).

In terms of energy generation, the onshore wind farms generate most of the energy (799MW capacity in D&G and 641MW capacity in SB). D&G also has two offshore wind farms generating a further 174MW.

Land use, the economy and employment

The land cover statistics outlined above are broadly reflected in employment data on primary industries in the South of Scotland. Approximately 12,000 people are employed in crop and animal production and approximately 1,200 employed in forestry (see Table 2 below).

Table 2: Employment in primary industries in South of Scotland

	D&G	Scottish Borders
Crop & animal production	8000	4000
Forestry & logging	600	600
Fishing & aquaculture	175	75
Mining & quarrying	75	30

Source: South of Scotland Regional Economic Strategy. Technical Paper: Rural Development Best Practice Review (July 2021).

In 2019, the last year before the pandemic, there were 5.14 million visitors to the region and 12,761 FTEs total employment supported by tourism¹³. Farm and land-based business diversification is an increasingly important component of the visitor economy.

Output, in the form of Gross Value Added (GVA), is the most frequently used measure of productivity and economic scale and contribution. In 2021 (the most recent year for which data is available), total GVA in the region was £19.9 billion, 13% of Scotland's total¹⁴. GVA highlights the significance of the regional economy and provides a measure of how jobs and sectors translate economic output into individual wealth. However, it does not take account of the degree to which economic value generated in the region is reinvested within the region rather than elsewhere.

The distribution of GVA and what facets of the economy contribute to regional output is best set out in terms of the sector breakdown. The South of Scotland Regional Economic Strategy (2021) highlights how the agriculture, forestry, fisheries and mining and quarrying sector was the fifth most significant sector for GVA in the South of Scotland region in 2018 (see table overleaf). The forestry sector alone is estimated to contribute approximately £1/3 billion GVA per year in the region.

¹² <https://www.gov.uk/government/statistics/regional-renewable-statistics>

¹³ STEAM reports 2009-2020

¹⁴ <https://tinyurl.com/yjkcb3n6>

Table 3: Top 5 sectors by GVA in South of Scotland (2018)

Economic sector	GVA (2018)
Real estate activities	17.2%
Manufacturing	15.4%
Human health and social work activities	11.7%
Wholesale and retail trade; repair of motor vehicles	10.1%
Agriculture, forestry and fishing; mining and quarrying	8.9%

Wider benefits

Beside the 'provisioning services' highlighted above (e.g. food and timber production), the region's natural capital assets also provide a range of additional benefits including 'regulating services' such as flood management, 'supporting services' such as nutrient cycling and 'cultural services' such as spaces for recreation¹⁵. Sometimes the term 'nature-based solutions' is used to refer to actions to protect, sustainably manage, and restore ecosystems to address societal challenges such as increased flood risk and water scarcity resulting from climate change.

Water filtration, water scarcity and flood risk:

Water condition is variable across the region, for example, many rivers are rated as good or moderate status but there are more rated as poor or bad (see Figure 3 below), approximately 48% are of good or better status compared to a Scotland average of around 65%. Water pollution is an issue in some waterbodies, including freshwater, coastal and marine, mainly through diffuse agricultural pollution from rural sources like agriculture and forestry. Other pressures include obstacles to fish passage and morphological degradation of rural rivers and burns (i.e. straightening of waterways to drain water away from agricultural land) and forestry impacts. Diffuse pollution priority catchments have been identified by SEPA as catchments failing to meet environmental standards. In the South this includes the Upper and Lower Tweed, Eye Water, Whiteadder Water, Dee, Urr Water, Lochar Water and Annan Water, Galloway coastal, Stewartry coastal and Dumfries coastal areas.

Figure 3 below also shows Nitrate Vulnerable Zones (areas where the concentrations of nitrate in water exceed, or are likely to exceed, the levels set in the European Commission's Nitrates Directive. These are linked to Drinking Water protection and farmers have to take action to ensure they comply with relevant regulations e.g., regarding application of slurry and fertiliser use) and SEPA data on water condition for rivers and coastal waters. Livestock impacts, plus public and private sewage inputs can affect water quality at designated bathing waters¹⁶ with implications for public health and tourism.

Land uses such as native woodlands and ecosystems and habitat features such as wetlands and buffer strips can help to filter out pollutants and reduce flood risk by slowing the speed and volume of flows and store water so it is accessible at times of water scarcity. They can also help to encourage runoff to infiltrate into the ground and recharge groundwater. Flood risk mapping from SEPA can be used to help target such nature-based solutions where they will have most impact on reducing flood risk. Such measures can be a useful complement to 'hard' engineering solutions.

Riparian woodland can also bring significant benefits for biodiversity, providing additional shading to support the survival of key species such as salmon, which are vulnerable to higher water temperatures. This has been mapped as part of the Scotland River Temperature Monitoring Network (SRTMN)¹⁷. Riparian woodland can also intercept surface water runoff, helping to slow and clean flows.

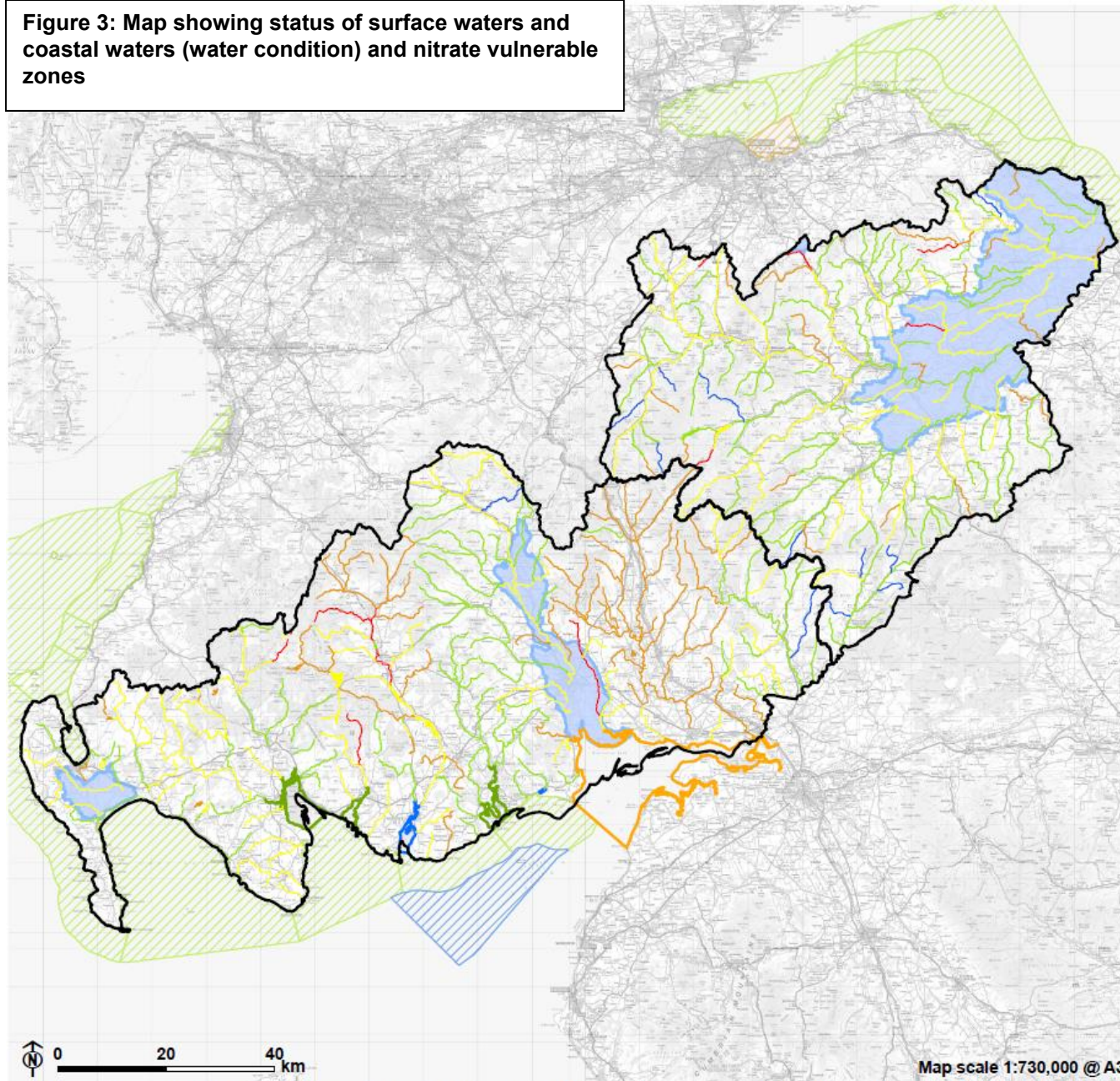
¹⁵ For further details on these different types of services see <https://tinyurl.com/mr2fnf38>

¹⁶ The South of Scotland has a number of designated bathing waters where SEPA monitor water quality from 15 May to 15 September and publish the results online: <https://www2.sepa.org.uk/bathingwaters/Locations.aspx>. The general water quality condition for each location is described as excellent, good, sufficient or poor, based on four years of monitoring data.

¹⁷ <https://www.gov.scot/publications/scotland-river-temperature-monitoring-network-srtmn/>

Figure 3: Map showing status of surface waters and coastal waters (water condition) and nitrate vulnerable zones

Figure : Water Condition



- Study boundary
- Nitrate Vulnerable Zone 2016
- SEPA Water Classification**
- River classification**
- High status
- Good status / ecological potential
- Moderate status / ecological potential
- Poor status / ecological potential
- Bad status / ecological potential
- Loch water classification**
- Good ecological potential
- Moderate status / ecological potential
- Poor status / ecological potential
- Estuary water classification**
- High
- Good
- Poor
- Coastal water classification**
- High
- Good
- Poor ecological potential

Map scale 1:730,000 @ A3

0 20 40 km

Carbon sequestration and storage:

The region has natural stores of carbon in peatlands, forestry and woodlands and saltmarsh. Extensive areas of deep peat are found in the uplands. These store significant amounts of carbon, as do the more fragmented areas of class 4, 5 and 6 soils. Figure 4 below illustrates the location of peaty soils. However, degraded peat acts as a source of carbon, oxidising to carbon dioxide.

Recently released data from the Peatland Action programme¹⁸ provides an indication of peat condition, with some areas of peatland being taken forward for restoration as part of the programme. Data for the South of Scotland shows many of the Peatland Action restoration areas are in a degraded condition, impacted by drainage, erosion or forestry and releasing carbon rather than locking it up. Peatland restoration presents a major opportunity to slow and reverse this loss. Re-wetting peat bogs can also improve water storage and this provides flood mitigation benefits.

Carbon dioxide emissions from degraded peat

“Emissions from degraded areas of peatlands are estimate at 24.5 million tonnes of CO2 equivalent per year, representing 4.5% of total UK GHG emissions” – Climate Change Committee

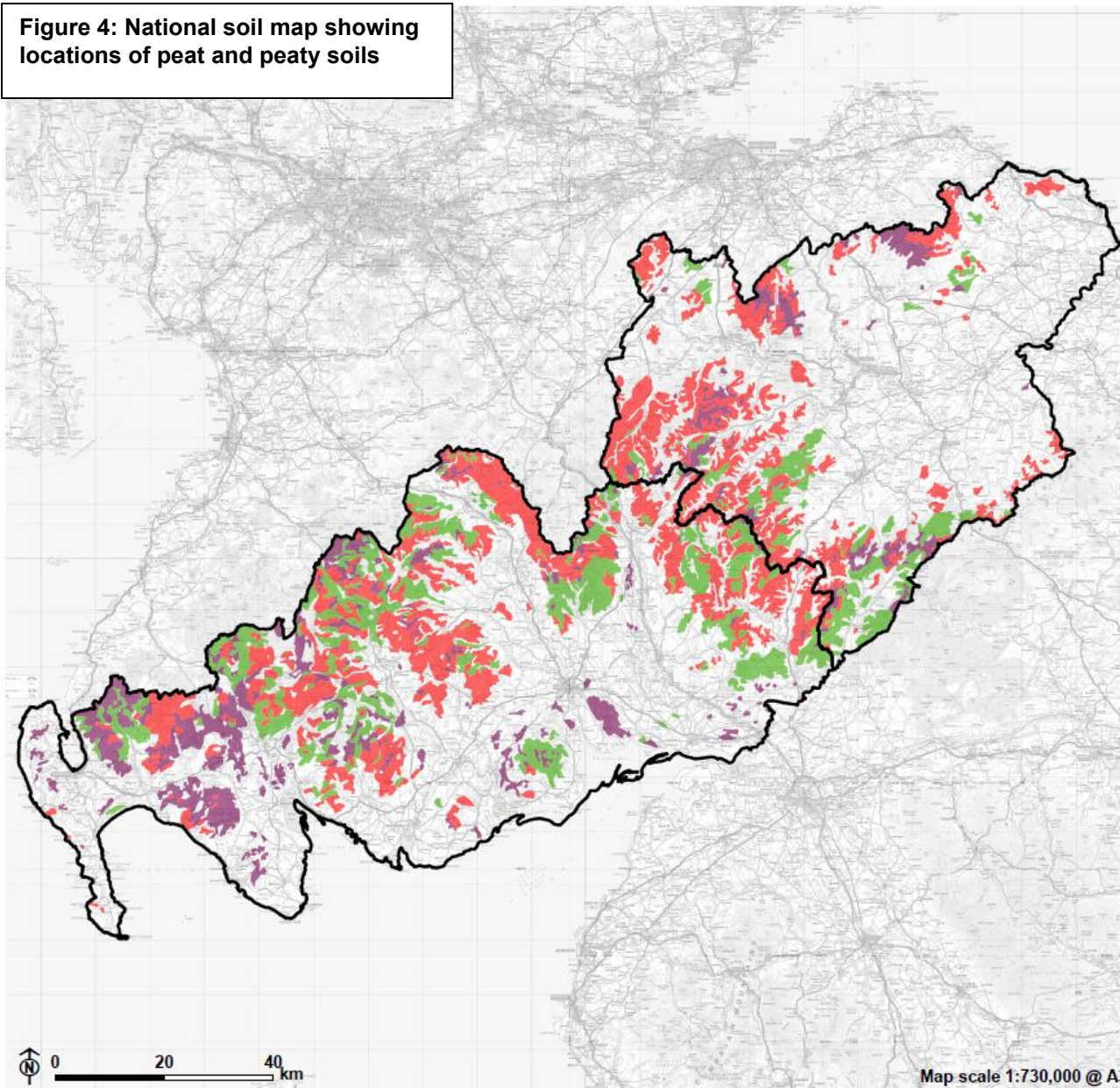
Carbon is also stored in vegetation, particularly trees, which are more widely distributed across the region. Woodland cover in the region is mainly conifer plantation and, whilst productive in terms of timber output, this land is often low in biodiversity and its potential to store carbon may be more short-term depending on end use of forest products. Nevertheless, it can be designed to deliver significant recreational value, for example Galloway Forest Park and Glentress.

The stakeholder engagement for this RLUF identified widespread support for native woodland creation and the range of benefits it can provide including improvements to water quality, flood protection through natural flood management, enhancement of biodiversity and integration with farming providing shelter and buffer areas. There was much less support for further coniferous forest, which many stakeholders perceived as having a negative impact on biodiversity, landscape, tourism and water management, carbon-rich soils and farm viability.

Saltmarsh habitat, especially along the coast of Dumfries and Galloway, stores plant debris from freshwater, forestry and woodland and marine sources and may act as an important carbon store.

¹⁸ <https://www.nature.scot/climate-change/nature-based-solutions/peatland-action-project/peatland-action-data-research-and-monitoring>

Figure 4: National soil map showing locations of peat and peaty soils



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Figure: Soil Types

-  Study boundary
- Peat Soils - National Soil Map of Scotland**
-  Peat
-  Peaty gleys
-  Peaty podzols

Recreation, tourism and landscape/heritage:

The region currently has a range of recreational assets including Galloway Forest Park, Glentress, the internationally recognised Galloway and Southern Ayrshire UNESCO Biosphere, Galloway Kite Trail, a number of long-distance walking routes (Southern Uplands Way, St Cuthberts Way and Borders Abbey Way) and an extensive network of core paths. There are currently no National Parks, but there are local campaigns in both Galloway and Scottish Borders. Scottish Government is undertaking a process to establish a new national park in Scotland by 2026, future updates of the RLUF would need to take account of any new national park in the South. The region also benefits from multiple national and regional scenic areas (see Figure 5 below), including beautiful stretches of coastline and upland areas, and charismatic wildlife species such as red deer, red kites, golden eagles and red squirrels.

The region also has a vibrant culture and heritage, including numerous scheduled monuments and listed buildings (the latter too numerous to map in this report) and multiple festivals, such as the D&G Arts Festival, the Borders Book Festival, the Wigtown Book Festival and summer festivals surrounding the common ridings when towns throughout the region celebrate the riding of their boundaries and commemorate local history.

The 'South of Scotland: Scotland Starts Here' online map and associated internet pages provide detailed information on a wide range of tourism facilities, routes and attractions including key cycling routes such as the 7Stanes mountain bike routes and Kirkpatrick C2C route. This can be accessed at: <https://scotlandstartshere.com/map/>

Management of moorland for grouse is another recreational land use. Moorlands are actively managed at different intensities by gamekeepers to provide these wild birds with favourable breeding and rearing habitats. Research as part of the SEFARI research programme¹⁹ has identified areas of strip burning of heather to support grouse moor management. The most intense area of burning in the South of Scotland is the Lammermuirs. Scottish Government established the Grouse Moor Management Group to research environmental impacts of its management including illegal killing of birds of prey. Its recommendations included increased legal regulation of muirburn²⁰. Following these recommendations a bill was introduced to Scottish Parliament in 2023²¹.

¹⁹ <https://sefari.scot/sites/default/files/documents/Part%203%20-%20GIS%20Mapping%20of%20Grousemoor.pdf>

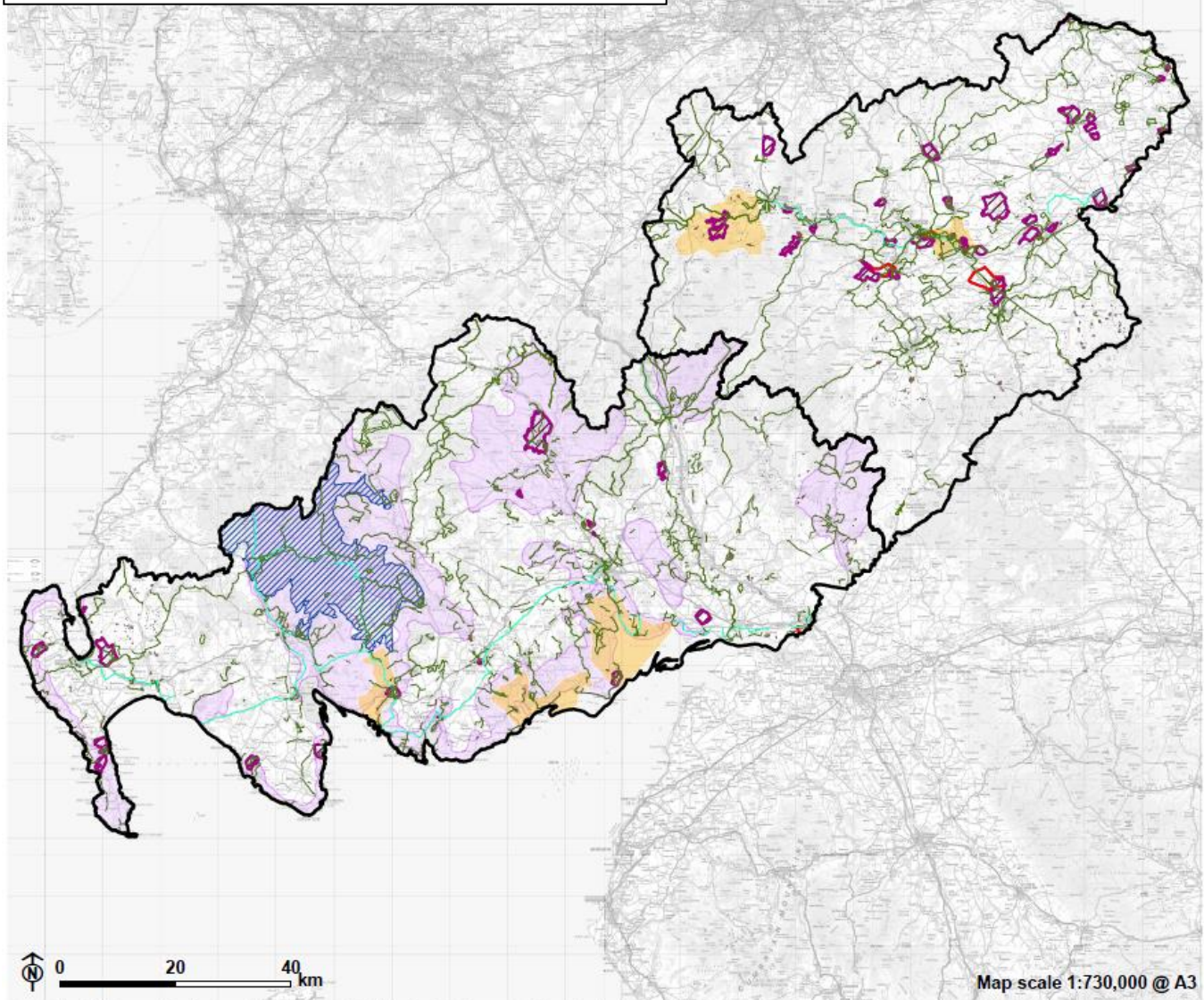
²⁰ <https://www.gov.scot/publications/grouse-moor-management-group-report-scottish-government/>

²¹ <https://www.parliament.scot/bills-and-laws/bills/wildlife-management-and-muirburn-scotland-bill#:~:text=The%20Bill%20aims%20to%20change,plants%20for%20land%20management%20purposes>

Figure 5: Map of key routes and key attractions including National Scenic Areas, Regional Scenic Areas, dark skies, scheduled monuments, battlefields and ‘gardens and designed landscapes’



Figure: Tourism and Recreation



- Study boundary
- Public national cycle network
- Core path
- National Scenic Area
- Regional Scenic Area
- Dark skies park
- Gardens and Designed Landscapes
- Battlefield
- Scheduled monument



Map scale 1:730,000 @ A3

Biodiversity:

As highlighted in Chapter 1 there is a **biodiversity crisis** with currently nearly 50% of species within Scotland being in decline with others at historically low levels²². Centuries of habitat loss, over-exploitation, the intensification of farming, development, invasive species and persecution (killing of wildlife) means Scotland is now one of the most nature-depleted countries in the world, ranking 28th from bottom out of more than 240 countries/territories in terms of the biodiversity it has remaining²³

Other drivers of change include climate change, hydrological change, woodland management, pollution, marine climate change and fisheries.

Biodiversity - the variety of living organisms - is integral to the functioning of ecosystems and supports the range of benefits provided by the land; for example, pollinators like bees are critical for producing many types of crops. The region contains a wide variety of natural and semi-natural habitats from remote moorlands, internationally and nationally important peatland and wetland habitats, species - rich grasslands through farmland to a diverse coastline and extensive intertidal estuaries.

According to the Ancient Woodland Inventory there are approximately 25,000 ha of ancient woodland in scattered fragments across the region, largely (over 80%) in Dumfries and Galloway. New mapping of surviving fragments of temperate rainforest across Britain included notable areas within Dumfries and Galloway.

A range of national and international conservation designations protect key sites and the region also benefits from the Galloway and Southern Ayrshire UNESCO Biosphere, as shown on Figure 6.

However, many designated sites are not in good condition. For example, the latest data from NatureScot (2023) indicates that in Dumfries and Galloway 75.3% of notified features of Sites of Special Scientific Interest (SSSIs) were in favourable condition; this compares to 71.5% of features in favourable condition in the Scottish Borders. If the figures are adjusted to exclude designated sites where there is no on-site remedy to the unfavourable condition, the totals change to 80.7% and 78% respectively.

As noted above, an intensification and expansion of farming and expansion of forestry from the mid-20th Century negatively impacted biodiversity. More recent policies seek to influence farming and forestry practices for the benefit of biodiversity. Key current pressures on biodiversity include habitat loss and fragmentation, farming, development, invasive non-native species, water pollution, persecution (killing of wildlife) and increasingly climate change.

Recent research on bird populations across Europe and the UK found that pesticide and herbicide use in farming was the main cause of bird population loss. Bird population numbers overall dropped by 25% since 1980, farmland birds declining by 57%, urban bird population dropped by 28% and woodland populations by 18%. There are encouraging signs of positive outcomes of agri-environment schemes in Scotland, with declines in some farmland birds being addressed, notably seed-eating birds and opportunities to enhance biodiversity in High Nature Value farmland in areas with semi-natural vegetation and low-intensity agriculture (approximately 40% of Scotland's agricultural area).

The extent of declines and loss of biodiversity is less clear within South of Scotland, limited by data availability over long time series. There is evidence of declines in iconic species such as black grouse (with a decline of 49% in south west Scotland and 69% in south east Scotland between 1995/6 and 2005), loss of rare and scarce plants within regions (e.g. Berwickshire²⁴) and changes in breeding bird populations and range in south east Scotland between 1988-94 and 2008-13; 52% of species showed range contraction (compared with 32% nationally) with a dramatic decline in distribution and numbers of breeding waders particularly in upland and hill fringe areas.²⁵ Partnership initiatives are underway in the region such as Peatland Action projects led by Tweed Forum, Working for Waders involving farmers, conservationists and gamekeepers, Black Grouse recovery programmes led by Southern Uplands Partnership, and exciting priority species recovery projects such as the South Scotland Golden Eagle project and a set of emerging projects under the Borderlands Natural Capital programme.

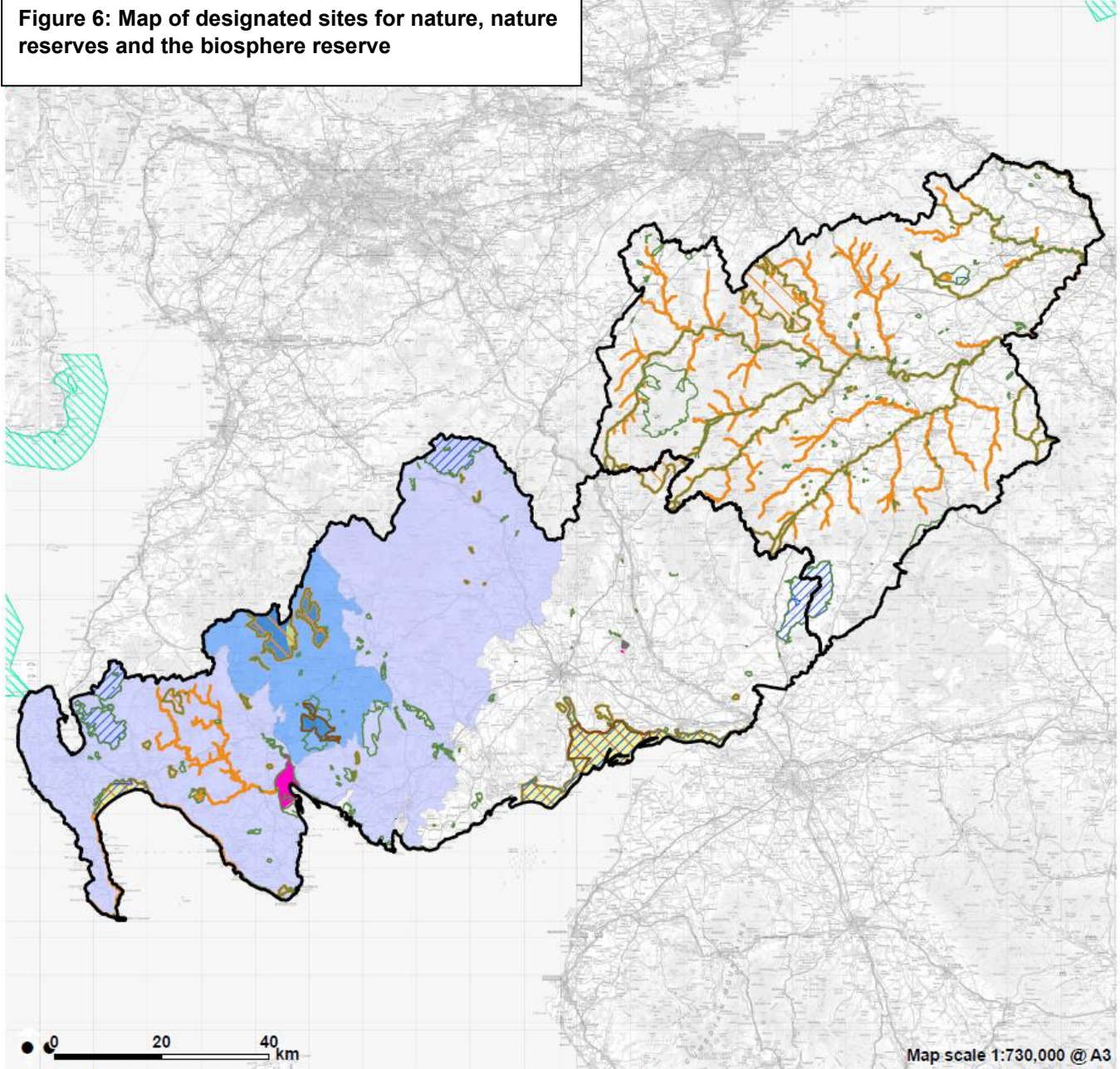
²² <https://tinyurl.com/5n8f28ku>

²³ <https://tinyurl.com/ywuctsu3>

²⁴ <http://archive.bsbi.org.uk/Wats28p129.pdf>

²⁵ <https://www.the-soc.org.uk/birds-in-south-east-scotland-2007-13>

Figure 6: Map of designated sites for nature, nature reserves and the biosphere reserve



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Figure: Nature

- Study boundary
- Local Nature Reserve
- National Nature Reserve
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area
- Ramsar site
- Marine Protected Area
- Biosphere Reserve**
- Core
- Buffer
- Transition

Note that in the Scottish Borders many of the SAC and SSSI overlap.

Urban land and development sites:

The South of Scotland includes settlements ranging in size from large towns such as Dumfries to a mixture of smaller scale market towns and many villages and hamlets. The National Planning Framework (NPF4) includes priorities to increase the population by improving local liveability, creating a low carbon network of towns and supporting sustainable rural development. Development needs, not least for new housing and new businesses, will require additional land to be released. However, the relatively low population density across the region limits the aggregate scale of impact from such development. The planning system plays an important role in ensuring that the right development comes forward in the right places. The Local Development Plans for Dumfries and Galloway and Scottish Borders set out the planning policy framework²⁶. D&G's plan identifies a target of 5,282 new homes to be delivered between 2017 and 2029; and the target for SB is 4800 homes between 2023/24 and 2032/33.

Deprivation:

When thinking about benefits from land and how to make best use of different areas of land it is important to consider local needs and vulnerability. This could include issues such as flood risk, access to greenspace and health and wellbeing. The Scottish Index of Multiple Deprivation (SIMD) is a relative measure of deprivation across data zones in Scotland. The SIMD looks at the extent to which an area is deprived across income, employment, education, health, access to services, crime and housing. Figure 7 below shows the index of multiple deprivation, with the darker red indicating the more deprived areas. The RLUF could use such data to help ensure that future land uses do not further disadvantage deprived communities and, where possible, create new opportunities for jobs, skills and training (e.g. as part of tree planting or habitat restoration projects), as well as enhancing quality of life (for example, by increasing access to natural greenspace) and minimising exposure to climate risks (e.g., by targeting woodland creation where it helps to reduce flood risk).

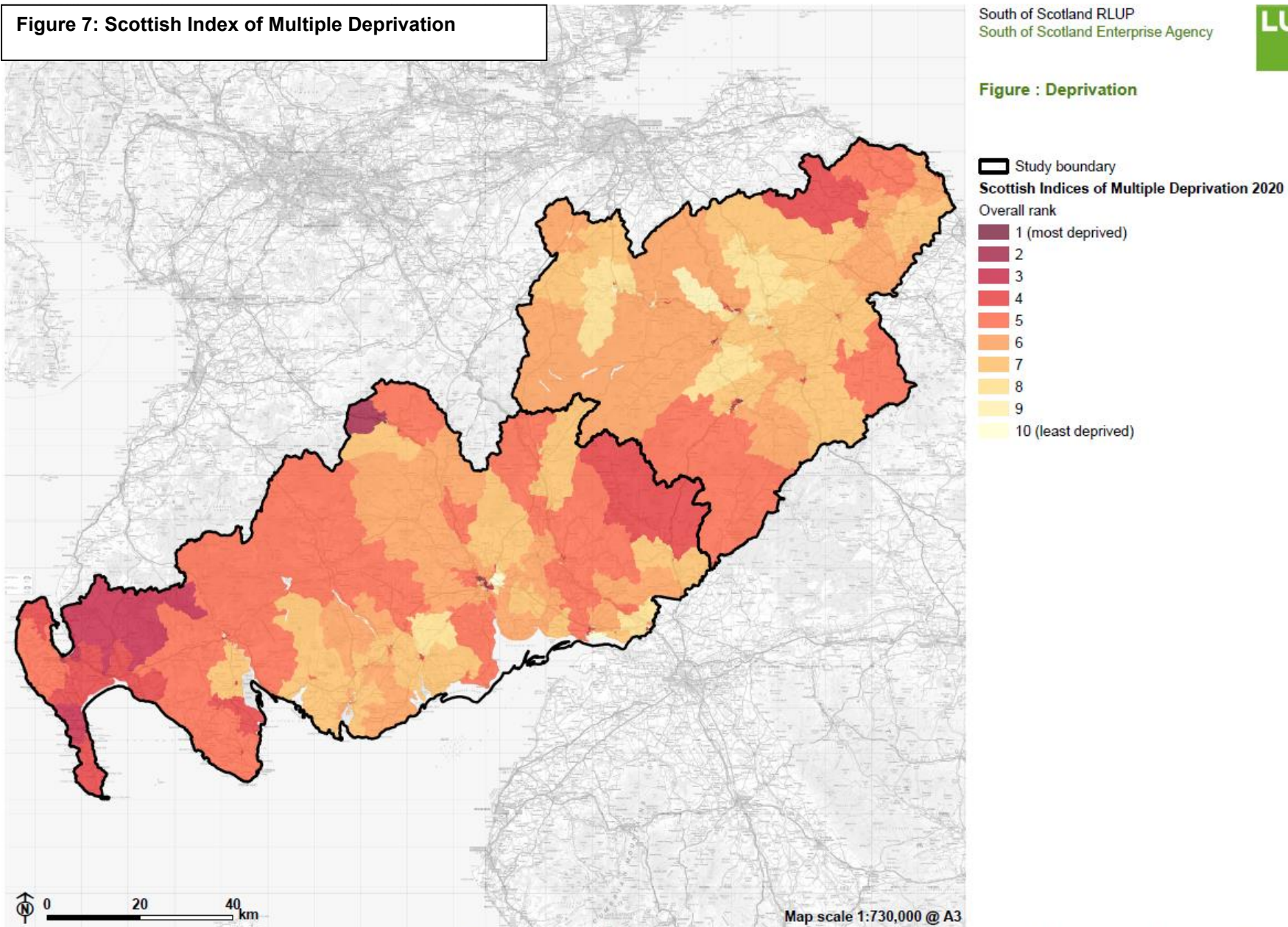
²⁶ See <https://www.dumgal.gov.uk/ldp2> and https://www.scotborders.gov.uk/info/20051/plans_and_guidance/121/local_development_plan/2

Figure 7: Scottish Index of Multiple Deprivation

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Figure : Deprivation



Key drivers of change in land use

The internationally agreed targets to reduce carbon emissions and support nature recovery means there is an urgent need to ensure that future land use decisions take greater account of their impacts on climate and biodiversity whilst maintaining production. For example, by seeking to reduce carbon emissions from farming activities (e.g., by optimising fertiliser applications to cut the amount needed without reducing yields), increasing carbon sequestration and storage (e.g., through well located tree planting and peatland restoration), increasing renewable energy generation and enhancing and creating new wildlife habitats and adopting nature-based solutions.

Beyond the Scotland Land Use Strategy (a key touchstone referred to previously), there are a range of other plans and strategies that are relevant to land use in South of Scotland. These include national strategies such as the National Strategy for Economic Transformation (NSET) with a focus on natural capital as a key pillar of a Wellbeing economy, the updated Climate Change Plan and National Planning Framework 4; as well as sectoral plans/strategies such as Scottish Government's Vision for Agriculture, Scottish Biodiversity Strategy and Scottish Forestry Strategy. There is also a regional scale tier of plans and strategies, including the Regional Economic Strategy and Local Development Plans which have a key role in maximising socio-economic benefits alongside environmental benefits. These are all summarised in Appendix A4.

Key policy objectives and policy documents relating to land use change in South of Scotland include:

- Mitigate climate change through protecting soils with high carbon content, creating new woodlands and delivering more renewable energy generation (Scottish Forestry Strategy, Update to the Climate Change Plan, Energy Strategy and Just Transition Plan, Onshore Wind Policy Statement)
- Halt the decline in biodiversity and drive nature recovery, including improving the management of high value sites including nature networks and the commitment to protect at least 30% of our land and sea for nature by 2023 (30x30 target; Scottish Biodiversity Strategy)
- Restore at least 250,000 hectares of peatland by 2030 (Climate Change Plan)
- Achieve good ecological status for water bodies (Scotland and Solway Tweed River Basin Management Plans 2021-27).
- Maintain sustainable food production and food security (Vision for Agriculture)
- Reduce the risk of flooding (Scottish Climate Change Adaptation Strategy and Flood Risk Management Plans)
- Management of water resources during periods of prolonged water scarcity (Scotland's National Water Scarcity Plan 2020)
- Increase woodland cover to 21% of Scotland by 2032 and ensure sustainable timber supply (Scottish Forestry and Woodland Strategies; Climate Change Plan)
- Increase renewable energy capacity, reflecting Scotland's ambition for 20GW of onshore wind by 2030, solar, hydro and hydrogen developments (Energy Strategy and Just Transition Plan)
- Protect and enhance cultural heritage (Historic Environment Policy for Scotland)
- Improve the efficiency of use of natural resources and move towards a circular economy (Making Things Last: a circular economy strategy for Scotland)
- Achieve net-zero emissions of all greenhouse gases by 2045 (Climate Change Plan)

Beyond implementation of legislation (including changes to support payments and funding, technical assistance, taxation, licencing and the planning system (NPF4)) and enforcement of regulation, other key drivers of land use change include market forces such as trade and food prices; changing technologies and consumer preferences; and access to relevant skills and expertise. Ongoing climate change is also a critical consideration.

Climate change and impacts on land use

The impacts of climate change on land use, and how to mitigate and adapt to climate change, are critical drivers for this RLUF. Recent research from James Hutton Institute²⁷ highlights some of the latest climate projections and implications for natural capital. This is summarised in the table below along with some key insights from additional identified sources. A key overarching message is that there is likely to be increasing variability in the climate, with some future years being potentially very good for primary production and nature, whilst others will be challenging, for a range of reasons including drought risk and also heavy rain - the impact varying depending on when these occur.

Table 4: Climate change projections and implications for natural capital

Climate variable	Climate projection	Implications for natural capital
Precipitation (winter)	Projections for the period 2020 to 2049 indicate Scotland's climate to be wetter in December to April (with February potentially seeing the greatest change of 45 – 55% wetter). The frequency and intensity of precipitation events is also likely to increase in the winter.	Increased flood risk and waterlogging in winter months, impacting on land use activities including loss or damage to soils (including peatland), changes in the range of crops and varieties of tree that can be grown and the ability to use heavy farm and other machinery.
Precipitation and water balance (summer)	For the 2020 to 2049 period, the months from August to October are projected to become drier with an increase in the number of 'consecutive dry days' when water may become limited and drought conditions occur. These patterns continue in the 2050 – 2079 period. Projections for mean monthly climatic water balance (precipitation minus evapotranspiration) over the period 2020-2049 illustrate significant areas of water deficit across southern Scotland between August and October. The projection for 2050-2079 illustrates an overall increase in water deficit across all of southern Scotland between May and August.	Reduced precipitation and water availability will impact agriculture and forestry (e.g. influencing what types of tree species and crops can be grown in which locations), drier soils may reduce growth of crops pasture and trees, hydro energy generation, and private water supplies for people and water supplies businesses. Reduced water quality during periods of low flow will impact biodiversity. Increased wildfire risk during drought conditions with particular impacts on woodland and peatland. Dry periods can reduce carbon sequestration by woodland, may cause young tree death and result in an increased probability of peat becoming a source of carbon due to drying, rather than a sink (if remaining wet).
Temperature	The observed warming trends in maximum and minimum temperature are projected to continue through the 2020 – 2049 and 2050 – 2079 periods. There is high agreement between all projections on continued warming, with all exceeding 2°C by the 2070s. There is a greater amount of warming between May and November (up to 4°C per month between 2020 – 2049), but also with substantial warming in the winter (approximately 2-3°C). Note	Crops grown in the region may change as a result of change to temperature (and rainfall) e.g. more sugar beet, oats and hops, apples and an increase in honey production. Research suggests production in cool, wet upland areas may benefit from warmer and drier conditions ²⁸ . Livestock may be more adaptable but management will need to adapt e.g. through providing shade and shelter, access to sustainable supply of water.

²⁷ See

https://www.hutton.ac.uk/sites/default/files/files/D2_1a%20Climate%20trends%20summary%20report%20FINAL%206-12-22.pdf and

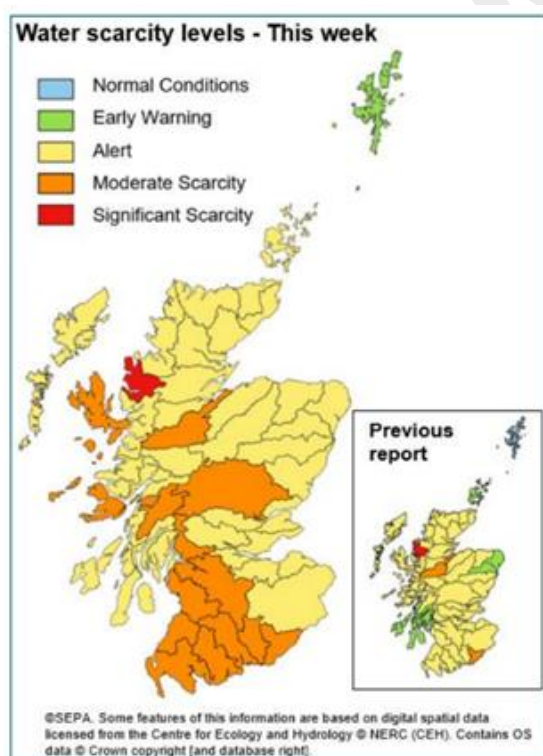
https://www.hutton.ac.uk/sites/default/files/files/D2_1b%20Climate%20extremes%20report%205-3-23%20FINAL%20submitted.pdf

²⁸ [131221-NERC-LWEC-AgricultureForestryClimateChangeImpacts-ReportCard2016-English.pdf](https://www.ukri.org/publications/131221-NERC-LWEC-AgricultureForestryClimateChangeImpacts-ReportCard2016-English.pdf) (ukri.org)

	there will also be increased annual variability in temperatures.	Heat stress may reduce productivity in dairy cows. ^{29, 19} Forestry productivity may increase slightly if water availability and other factors are not limiting. There are uncertainties as to how crop and forest pests and diseases may respond to future climatic conditions. Higher stream temperatures will impact aquatic biodiversity ³⁰ and reduced winter snow will impact high elevation biodiversity.
Sea level rise	Future coastal flood risk along the Dumfries & Galloway coastline is projected to increase to 914 homes, 413 Businesses, 49 Utilities, 66.4km of Road and 3305ha of Agricultural Land at a Medium Likelihood Coastal Flood Risk by 2100 ³¹ .	Loss of land , including agricultural land and designated wildlife sites, or degradation of benefits provided by that land, due to flooding and coastal erosion. Roads and other infrastructure may need to be relocated.

Figure 8 below from SEPA (15th June 2023) shows significant parts of Southern Scotland already experiencing moderate water scarcity in early summer, albeit this was a single snapshot in time.

Figure 8: Water scarcity levels for Scotland (SEPA, June 2023)



The impacts of these projected changes to the climate in our region could be significant. Forestry has expanded markedly in the last century and over recent years across the South of Scotland and any increase in drought, disease and wildfire risk is concerning. **Changes in tree species and locations may be needed** to adapt to the changing climate.

Impacts of forestry on water availability may also come under closer scrutiny. The amount of water that a forest uses remains an important subject of debate, but Forest Research indicates that conifer forests can have the most significant impacts on water availability. On a catchment basis in the wetter uplands, the additional water use by a complete cover of mature conifer forest can result in a 15 to 20% reduction in the annual volume of streamflow; and the impact on water supplies can be even greater in the lowlands, where a conifer forest can reduce the annual volume of water recharging a groundwater aquifer by 70% or more compared to grass³².

Likewise, the **impact of prolonged periods of water stress on peatland** could undermine current efforts to restore fully functioning wetlands and maintain water flows in our rivers, as well as potentially turning peatlands into sources of carbon emissions rather than sinks. Sites currently in

²⁹ <https://www.climatechange.org.uk/research/projects/adapting-scottish-agriculture-to-a-changing-climate/>

³⁰ <https://www.sciencedirect.com/science/article/pii/S0048969723028152?via%3Dihub>

³¹ Dumfries and Galloway Shoreline Management Plan, <https://www.dumgal.gov.uk/SMP>

³² www.forestresearch.gov.uk/research/forestry-and-water-resources/

good ecological condition may also be vulnerable to water stress and may require additional resilience measures to maintain their condition for the long term.

Many of our watercourses are already affected by excessive **siltation** and major rain events are likely to make this worse. More frequent and/or intense droughts could also negatively **impact aquatic ecology and important fisheries** as water levels drop and pollution is no longer diluted. Climate change is also likely to have **direct impacts on food production** (e.g. due to changes in precipitation patterns, increasing summer temperatures and a likely increase in the prevalence of pests and diseases) and flood risk (due to increases in winter rainfall). This may affect food production globally, placing increased importance on sustainable production in those areas that retain good food production capabilities.

Implications for land use change

Given the multiple drivers of change highlighted above, not least our changing climate, declining biodiversity, and the challenge of meeting the policy targets set out in Chapter 2, a business-as-usual approach to land use is not fit for purpose. As the 'Farming for 1.5' report³³ states,

“Doing the same thing next year as we did last year is no longer an option for farmers in Scotland.”

Changes are needed in the way land is used and managed and the report sets out a range of measures to help cut greenhouse gas emissions in line with the trajectory to net zero, whilst maintaining food production per capita. It also highlights the need for land use change to support nature recovery and the need to tackle these together through a structured process of land use change: *“Land use change should be planned rather than left to the market; and should be an inclusive transparent process guided by best available science.”*

In relation to forestry, the implications of climate change are more profound, given the timescales from planting to harvest, giving added urgency for the need to act sooner but also being aware of the implications on other land uses e.g. availability of water.

To give an indication of the scale of land use change that might be required to address the climate and biodiversity crises, for illustration only, we have included some example land use change maps in Appendix A3 from ongoing research by James Hutton Institute (JHI). This research is looking at what land use change might be required across Scotland to move towards net zero by 2050 and to meet biodiversity objectives. The example modelled dramatically illustrates the large-scale land use changes – including woodland creation, a shift to silvo-pastoralism and grazing deintensification - that may be required across the region as a minimum to achieve policy objectives. It also starts to highlight broad areas where this land use change might be best targeted, focusing specifically on woodland creation, silvo-pastoral and grazing de-intensification.

The outputs from the model included here are based on predetermined land uses (woodland, woodland & pasture and reduce livestock grazing) and do not model and compare different land uses. Changes to the objectives and assumptions used in the modelling will of course change the modelled outputs. Key trade-offs with other land uses and benefits would need to be carefully considered e.g. the impacts of a shift to a silvo-pastoral system on dairy production and farm viability and considerations about what support would be needed from Scottish Government and/or emerging natural capital markets to facilitate such a transition. It would be vital to involve producers and processors to ensure the continued viability of milk production in the region.

The climate projections indicate that we need to act now to adapt food and timber production to a rapidly changing climate and to build resilience in our environment. A strategic approach is needed to deliver a range of ecosystems services, providing multiple benefits to society including through nature-based solutions and, in doing so, ensuring that biodiversity, which supports such services, is enhanced.

This first version of the South of Scotland RLUF seeks to highlight the need for this strategic approach to managing land use for multiple benefits. The next chapter highlights the priority land use changes that have been identified through extensive stakeholder engagement across the region and reference to wider research and the national and regional policy context. It starts to identify how these land use

³³ [Home | Farming for 1.5 degrees \(farming1point5.org\)](https://www.farming1point5.org/)

changes could be targeted at broad areas across the region where the multiple benefits to society are optimised and enduring and negative impacts are avoided or minimised.

DRAFT

5. PRIORITY LAND USE CHANGES

Consultation across the South of Scotland (see Phase 2 engagement report for further details <https://www.southofscotlandenterprise.com/RLUP>) - identified a number of land-use changes that offered opportunities to sustain the local economy, address climate change and help nature recovery and future proof these land use changes.

These included:

- Native woodland (including riparian)
- Improved planning and design of commercial forestry expansion
- Agricultural viability and sustainability
- Access and tourism
- Renewable energy development

There is a finite amount of land, and increasing one land use reduces another. Different land uses also have effects on other services such as flood risk, water quality, landscape, nature and carbon. The RLUF needs to consider where change is likely to generate the multiple benefits society needs and seek the support of Scottish Government to encourage such changes.

Despite many uncertainties, it is possible to consider what needs to happen in the coming years to start imagining what sustainable land use in Scotland could look like in future (as described further in the following chapter). For example, tree planting rates (right tree in right place) and peatland restoration rates need to increase dramatically; and emissions from land uses such as livestock grazing and arable farming must fall significantly through careful management of soils, reduced inputs and regenerative approaches, whilst supporting our farmers on their journey to a just transition as they continue to produce high quality food, profitably.

In order to achieve our objectives, land use change must be supported and sustained by viable land-based businesses. The complex interrelationship between policy direction, public subsidy and market forces will require careful consideration involving collaboration and partnership between key stakeholders to ensure that the just transition sustains land-based businesses and their supply chains and helps engage communities and generate community wealth building.

Analysis shows that the priority land uses identified by stakeholders map onto key national policy objectives and targets (as highlighted in Table 4 and see Appendix A4). The scale of change (and challenge) implied by some of the quantitative targets should not be underestimated, for example, the target to protect at least 30% of our land and sea for nature by 2030.

Table 5: Priority land uses and national policy

Regional Land Use change identified in local research	National Policy Context	Fit between priority land use and policy objectives
Land-use generally	National Planning Framework 4 (NPF4) South Scotland https://www.gov.scot/publications/national-planning-framework-4/pages/6/	To deliver sustainable places, Regional Spatial Strategies and Local Development Plans in this area should protect environmental assets and stimulate investment in natural and engineered solutions to climate change and nature restoration, whilst decarbonising transport and building resilient physical and digital connections.
Native Woodland Expansion	Scottish Forestry Strategy 2019-2029 https://forestry.gov.scot/forestry-strategy	Target of 3,000–5,000 ha of new native woodland per year. Increase the amount of native woodland in good condition. Restore approximately 10,000 ha of new native woodland into satisfactory condition in partnership with private woodland owners through Deer Management Plans

Commercial Forestry	Ditto	Objectives include: Creating 18 000 ha per year from 2024/25 (area planted in 2021/22 was 10,500 ha) Increase forest and woodland cover to 21% of the total area of Scotland by 2032 (currently South of Scotland region is 22%, see Table 1) Enhancing the environmental benefits provided by forests and woodlands. Engaging more people, communities and businesses in the creation, management and use of forests and woodlands
Agricultural viability and sustainability	Agriculture Reform Route Map 2023 https://www.ruralpayments.org/topics/agricultural-reform-programme/arp-route-map/ Agriculture Bill Scotland	“We will establish a robust and coherent framework to underpin Scotland's future agriculture support regime from 2025 onwards, that delivers high quality food production, climate mitigation and adaptation, and nature restoration. High quality, nutritious food locally and sustainably produced is key to our wellbeing – in economic, environmental, social and health terms. We will support and work with farmers and crofters to meet more of our own food needs sustainably and to farm and croft with nature.”
Access and Tourism	Scotland Outlook 2030 https://scottishtourismalliance.co.uk/wp-content/uploads/2020/03/Scotland-Outlook-2030.pdf	Scotland is transitioning to a net-zero emissions country for the benefit of our environment, our people, and our prosperity and we have gained respect for our ambition and leadership on climate change. Our world-leading climate change legislation sets a target date for net-zero emissions of all greenhouse gases by 2045. Scotland's contribution to climate change will end, definitively, within one generation. Our natural assets – our landscape, scenery, natural and built heritage will be cared for, protected and invested in for our current and future generations to experience and enjoy.
	NPF4 (South Scotland) https://www.gov.scot/publications/national-planning-framework-4/pages/6/	The area has aspirations to become a prime outdoor recreation and green tourism destination. Key projects include the South West Coastal Path, and projects supported by the Borderlands Inclusive Growth Deal; the Mountain Biking Innovation Centre at Innerleithen, updating the cycling experience and facilities at some of the 7stanes sites, and Destination Tweed which will deliver a multi-user path and cycle route from Moffat to Berwick upon Tweed. More could be made of the area's border location and attractions to ensure visitors make better use of local services and support the economy and communities.
Renewable Energy	Draft Energy Strategy and Just Transition Plan https://www.gov.scot/publications/draft-energy-strategy-transition-plan/pages/2/	“In the Onshore Wind Policy Statement, published in December 2022, we set an ambition for a further 12 GW of onshore wind by 2030, increasing from 8.78 GW as of June 2022 to 20 GW by 2030, more than double our existing capacity.” “We have set an ambition for 2 GW of community owned energy by 2030. We will encourage developers to offer community benefit and shared ownership opportunities as standard on all new renewable energy projects – including repowering and extensions to existing projects.”

	NPF4 (South Scotland) https://www.gov.scot/publications/national-planning-framework-4/pages/6/	Proposals for consolidating and extending existing wind farms and associated grid improvements and supply chain opportunities will require a carefully planned approach.
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There is a good level of congruence between local people's perceptions of the key land use changes required and the national policy objectives. However, there are also clear differences. There was a strong preference from stakeholders for a higher proportion of native woodland and for the extent and design of commercial forestry to be more sensitive to local concerns. Both renewable energy and afforestation had potential to generate more local benefits which were currently being missed. The need to better integrate farming and forestry was voiced by many, as was the need to seek increased gains for nature and carbon adaptation and sequestration from future developments.

Where might these different land use changes be prioritised?

At present land-use change is largely in the hands of land managers who, understandably, largely base their decisions on best business practice in economic terms but also consider wider factors such as historic practices, identity and legacy. Decision making can be influenced, and it is possible, to encourage change through incentives, collaboration, partnership development and applying tools to understand the potential benefits that certain decisions could generate for land managers, the environment, wider community and the economy. We need to provide incentives to broaden the range of viable choices for land managers and stronger regulations might also be necessary.

One way of increasing understanding of the potential benefits is to provide better quality data often in the form of maps allowing these benefits to be more easily identified. For example, there are areas of valuable biodiversity across south of Scotland, some designated (and therefore mapped) but many are not and therefore, widely unknown. Knowledge of these is often held locally and care is needed to identify them before land use changes occur. Examples of this sort of map are given in this report. Several "decision support tools" are being developed that will help decision making at a local scale.

There are also existing plans and strategies that need to be considered. For example, there are woodland strategies for both Scottish Borders and Dumfries & Galloway and there are published strategies for some species such as black grouse. Other habitats have not been considered in this way and need an "open-ground" strategy to guide activities to ensure a balance of land uses is maintained. It is possible that the RLUP process will, in due course, be allocated resources that will enable it to incentivise appropriate decision making, but for now the RLUF can signpost a range of funds available for delivering beneficial projects (see Appendix A6) and seek to enable discussions within and across relevant sectors to promote solutions leading to effect necessary land use change.

Native woodland

Native woodland can be created in a wide range of locations, from hilltops to river valleys but it is likely to be most beneficial in a narrower range of locations. These would be in places where for example, it can create links between existing woodland habitats, where it can help with flood mitigation, where there are water quality issues and where landscape is especially important. There are a number of relevant case studies in Appendix 7 such as the Eddleston Water project led by Tweed Forum. Native woods can also screen more intensive forestry and play an important role providing shelter for livestock. There are clear guidelines to help ensure woodlands are not created on valuable existing habitats, historic sites or peat-rich soils, although this may not always occur in practice.

The Forestry Grant Scheme (FGS) has developed mapping for native woodland habitat, identifying core native woodlands but also, particularly relevant here, primary zones (within 500m of core native woodlands) and secondary zones (within 2000m) where native woodland creation should be prioritised; see Figure 9 below. This mapping can be used alongside maps of key constraints such as designated nature sites and high-quality agricultural land to help identify preferred locations for native woodland creation at a strategic scale (although note they should not be used to inform site level

planning). Investment in carbon through the woodland carbon code is increasingly important in native woodland creation.

The value of riparian woodlands is increasingly understood. Trees provide shade and food for fish, stabilise riverbanks and can help filter run-off from agriculture, reducing pollution and siltation. The Scottish Government has recently announced a new scheme to encourage riparian planting³⁴

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³⁴ <https://forestry.gov.scot/news-releases/boosting-tree-planting-around-rivers-and-streams>

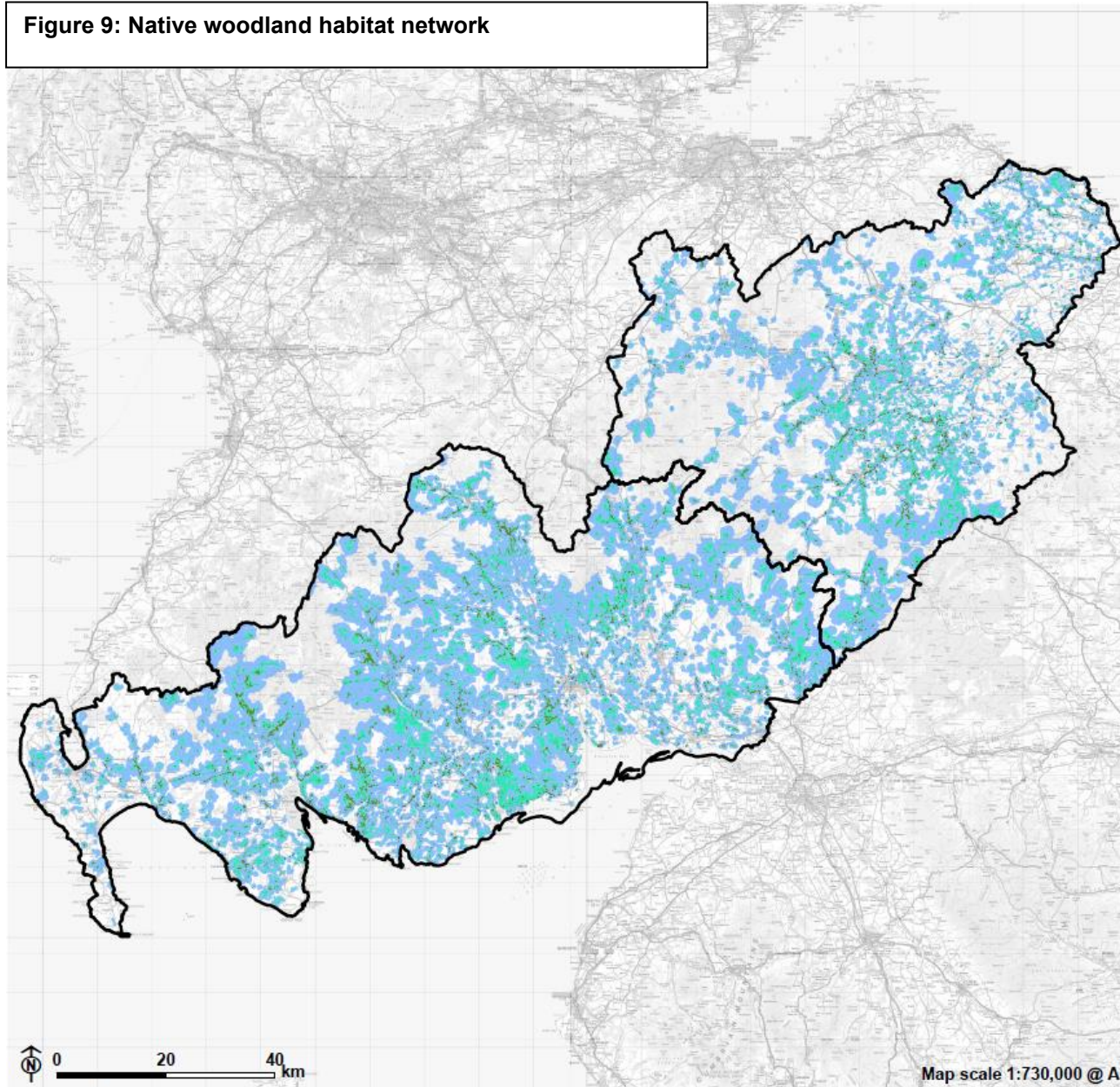
Figure 9: Native woodland habitat network

South of Scotland RLUP
South of Scotland Enterprise Agency



Figure: Native Woodland Habitat Network

-  Study boundary
- FGS Eligibility native woodland habitat network**
-  Core native woodland
-  Primary zone
-  Secondary zone



Map scale 1:730,000 @ A3

Commercial forestry

Commercial forestry tends to be a popular option on lower quality agricultural land (e.g. more remote and marginal areas, where agriculture is less profitable and other options restricted), although high timber prices are driving afforestation of higher value land in some locations. Changes to the Woodland Carbon Code in 2022 have meant that commercial conifer schemes are unlikely to be eligible for carbon funding. Changes in climate are likely to seriously impact large monocultural blocks which are vulnerable to drought, diseases and pests, and to fire (as seen recently across Europe and beyond) and windthrow due to the increased risk of intense storms.

Based on the stakeholder engagement, there was strong support for greater community involvement in forestry planning, where regulation and consideration of cumulative impacts were considered essential (see reference to Glenkens group in Appendix 7). There are opportunities to design commercial forestry so that it delivers other benefits (e.g. flood risk reduction, biodiversity, public access and recreation) and minimises negative impacts (e.g. on landscapes and acidification), and these need to be maximised. Planting commercial forestry on peaty soils (see Figure 4) should be avoided as this can lead to an increase in greenhouse gas emissions. The cumulative impact of afforestation on landscape can be a major issue as can the impact of forestry (and the predators it harbours) on ground-nesting birds, many of which need significant areas of open ground. A more diverse range of woodland types and design is likely to be better for biodiversity and communities and may also reduce the risk of disease and wildfire spreading,

The Woodland Expansion Advisory Group³⁵ developed land suitability mapping for all woodland expansion, updated by Forest Research, which could be used to help inform site selection. The green areas on Figure 10 below highlight the land most likely to have potential for woodland expansion. The analysis took into account data on existing woodland areas (note that many of the areas identified on Figure 10 as being “not available for woodland expansion” are existing plantations or woodland), peat depth maps, areas with conservation designations and catchments at risk of acidification. However, it did not exclude prime agricultural land, although the more productive agricultural areas may currently be less likely to be brought forward for significant amounts of tree planting This helps illustrate the complexities involved in decisions for and use change.

This mapping can, for example, be combined with other datasets to identify woodland creation opportunities where wider benefits could be maximised. For example, the Potentially Vulnerable Areas (PVAs) are geographical areas that are prioritised for flood management under the Flood Risk Management Act (Scotland) 2009. They show parts of catchments and coastal areas where nationally significant flood risk exists now or is likely to occur in the future. PVAs help SEPA and responsible authorities in Scotland understand and prioritise where work in relevant catchments could benefit the most. By overlaying such mapping with woodland expansion suitability, mapping opportunities to help mitigate flood risk could start to be identified (alongside investment in ‘hard’ infrastructure for flood risk management).

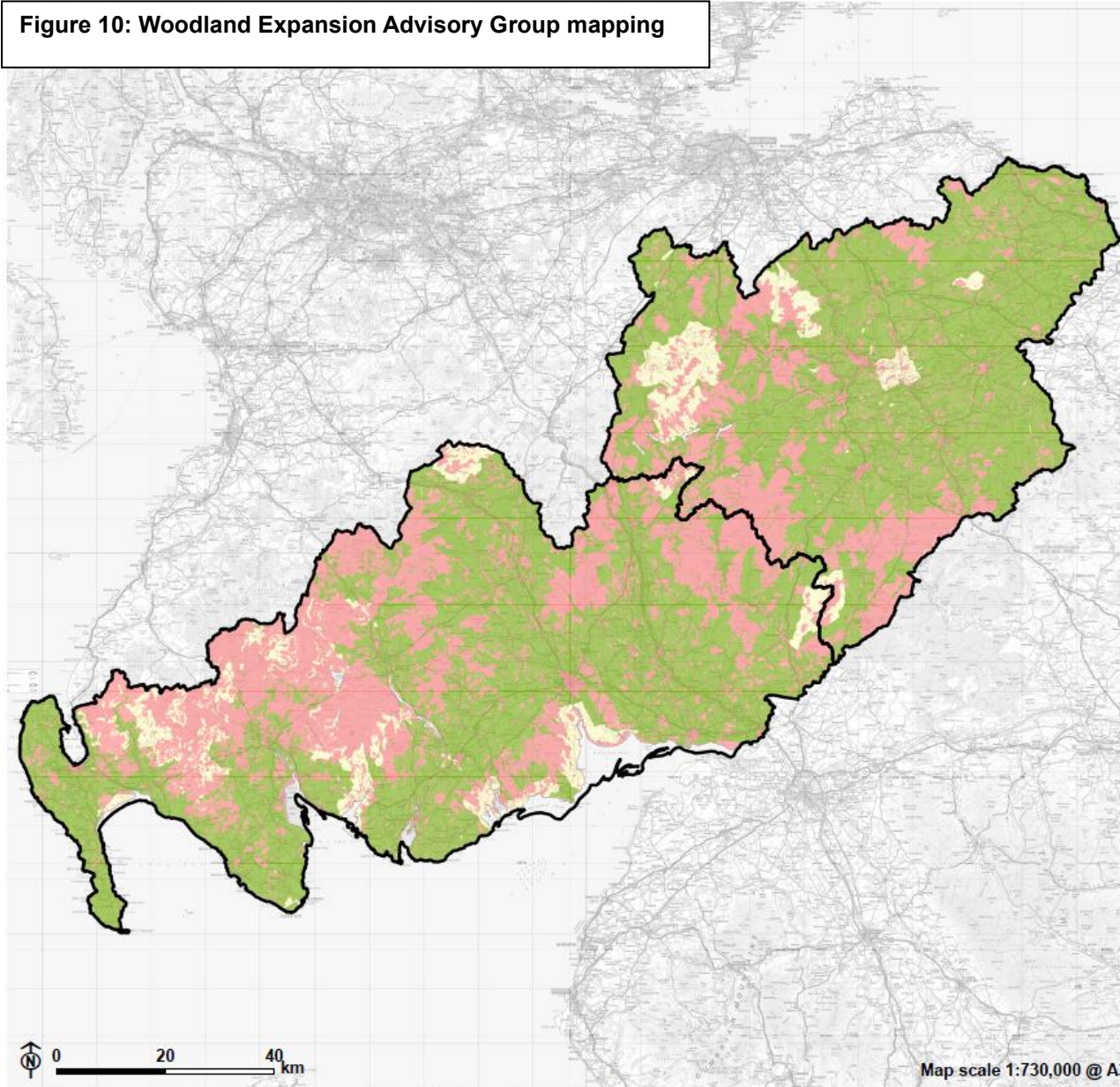
³⁵ <https://www.climatechange.org.uk/media/4201/analysis-of-land-suitability-for-woodland-expansion-in-scotland-july-2020.pdf>

Figure 10: Woodland Expansion Advisory Group mapping

South of Scotland RLUP
South of Scotland Enterprise Agency



Figure: Woodland Expansion



- Study boundary
- Woodland Expansion Advisory Group
 - Phase 1: Land predominantly not available for woodland expansion
 - Phase 2: Land affected by national designations and policies - constraint on woodland expansion
 - Phase 3: Land mostly likely to have potential for woodland expansion

0 20 40 km

Map scale 1:730,000 @ A3

Sustainable agriculture

Sustainable or regenerative agriculture is likely to be viable anywhere that farming is already practiced with a range of regenerative practices that could be adopted. Healthy soil is increasingly seen as vital for sustainability along with reduced stocking density, less soil-compaction and increasing soil carbon. Providing habitat and food plants for pollinators and beneficial organisms increases biodiversity and can reduce the need for chemical pesticides.

Making space for trees is also likely to be important, whether as shelterbelts, hedgerow trees or as wood-pasture. The James Hutton Institute modelling including a significant emphasis on a shift to silvo-pastoral systems (i.e. grazing systems that include trees for shade, shelter or soil protection) across the region (see Appendix A3). Trees can also play an important role in screening agricultural buildings.

Targeted government support will be required to promote transition to more sustainable farming practices recognising the importance of maintaining viable businesses and the needs of processors and buyers. There are a range of factors that could be used to help to spatially target such support. For example, the spatial data on nitrate vulnerable zones and poor surface water condition (refer back to Figure 3, page 15) could be used to target support for measures that will reduce pollution from agriculture and support biodiversity e.g. through reduced inputs and use of buffer strips. Similarly, SEPA holds data on bathing water quality and the catchments for different bathing waters so government support could be targeted in catchments where bathing water quality is poor. Priority catchments in our region include in Dumfries & Galloway, those associated with bathing waters at Mossyard, Carrick, Brighthouse bay, Dhoon bay, Sandyhills, Kippford, Rockliffe and Southernness and in Scottish Borders, Eyemouth and the lower Tweed at Spittal (in Northumberland).

There is a need to develop a local food economy that provides high quality, nutritious food that is accessible to all communities enhancing our wellbeing. This may include local food growing initiatives in our settlements including allotments, community market gardens and creative use of vacant and derelict land, but also seeking to generate local markets for locally grown food produced by farms in our region.

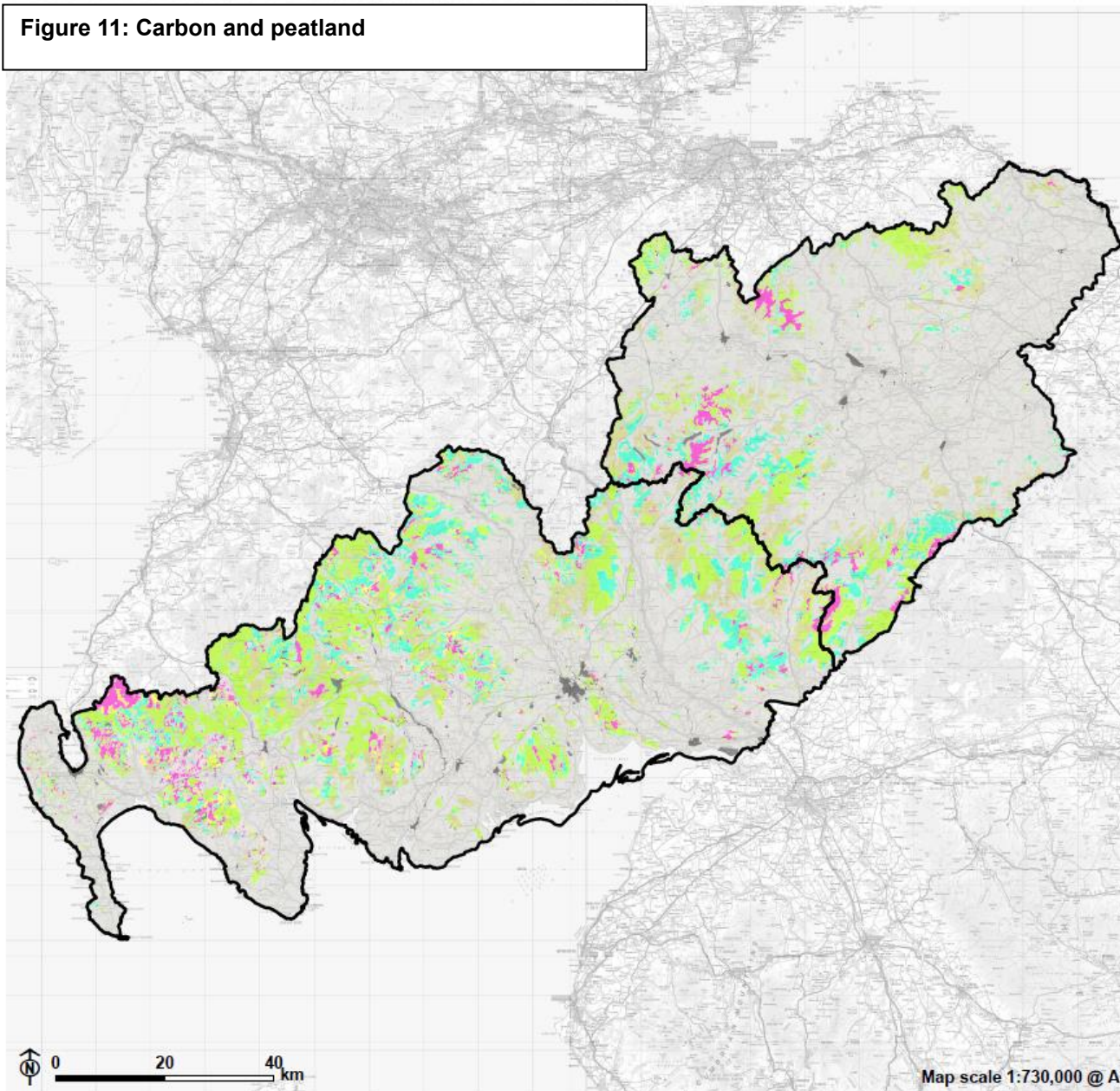
Efforts to restore peatlands degraded by agricultural and other practices should also be considered in this category, given the need to reduce greenhouse gas where degraded peatlands emit CO₂ and sequester carbon, slowly and over a long time period, when in good condition and providing wider benefits (see Chapter 4). There is a need to retain the existing stored carbon in peat and peaty soils. There is expertise on this in South Scotland (see Appendix 7). Again, existing spatial datasets are available that could be used to help target interventions. The Carbon and Peatland 2016 map³⁶ (Figure 11 below) highlights in pink and yellow respectively “Class 1 Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas likely to be of high conservation value” and “Class 2 Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas of potentially high conservation value and restoration potential”. More sophisticated technologies are also emerging, such as satellite-based measurement of peat depth/condition.

³⁶ <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>

Figure 11: Carbon and peatland

South of Scotland RLUP
South of Scotland Enterprise Agency

Figure: Carbon and Peatland



- Study boundary
- Carbon and peatland 2016**
 - Class 1 Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas likely to be of high conservation value
 - Class 2 Nationally important carbon-rich soils, deep peat and priority peatland habitat - Areas of potentially high conservation value and restoration potential
 - Class 3 Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat
 - Class 4 Area unlikely to be associated with peatland habitats or wet and acidic type - Area unlikely to include carbon-rich soils
 - Class 5 Soil information takes precedence over vegetation data - No peatland habitat recorded. May also show bare soil. All soils are carbon-rich soil and deep peat.
 - Mineral soils - Peatland habitats are not typically found on such soils.
 - Unknown soil type
 - Non-soil

0 20 40 km

Map scale 1:730,000 @ A3

Recreation and tourism

Much of our region's recreational and tourism industry rests on our natural capital assets, providing opportunities for developing local community-led tourism whilst enhancing biodiversity and increasing economic development. Changing the way land is managed, to become more resilient to climate change impacts, may require access to be adjusted and the sector has a key role to play in educating visitors and locals about the changes underway and the reasons for them. We may also see more visitors to regions that avoid the higher levels of heat stress.

Each land type offers unique types of access issues and much work has been done to promote this, for example, many of our forests already offer well developed trails and mountain biking opportunities. However, these come at a cost that are becoming increasingly expensive to maintain. Providing new, well-designed and better maintained access is beneficial to all and helps to overcome potential conflict which may arise with the requirements of a living, working countryside. It will also help people understand how access may have to be changed due to land management practices to address climate change impacts and biodiversity loss. Adding to existing local access networks makes good sense as longer "trails" are popular attractions, with the added benefit of retaining visitors in the local area for longer, with all the cultural and economic benefits that brings.

There are also significant opportunities to develop attractions based on local natural and cultural heritage, with farm diversification being an excellent example of that approach. Effort is needed to extend the current tourism season, offering opportunities for entrepreneurial business development and the outdoor offer in the South of Scotland is a considerable strength (see Appendix 7 for examples such a Talla Hartfell WLA).

Whether forests, open farmland or coasts people have a right to roam that needs to be facilitated in a way that benefits all. There is significant evidence that access to natural spaces improves people's mental and physical health and should be done in a way that also generates their engagement in the natural world to foster pride and responsibility. This is the focus of the South of Scotland Destination Alliance which is currently developing a Responsible Tourism Strategy, building on the work of the Galloway and Southern Ayrshire UNESCO Biosphere's sustainable tourism activity and Visitor Charter.

Renewable energy

Renewable energy is vital if we are to meet our net zero target by 2045. Such developments need to be carefully planned so that all opportunities to enhance our natural capital assets are considered (at the same time as negative impacts are reduced). Access tracks can provide new routes through the landscape and link-up existing ones, if they are well planned, potentially creating off-road timber extraction routes.

There are emerging opportunities to integrate solar meadows alongside wind farms or to create them on land that can still be grazed, although there are landscape impacts from this, and grid connectivity is often a barrier.

Community involvement in new schemes is being encouraged whether through shared ownership or local benefit funds. This can be an important source of local investment and Community Wealth Building if it is well managed. An example of a community renewable energy project is given in Appendix 7).

Moorland Management and Sporting Interests

Large areas of South of Scotland are managed primarily for sporting activity, whether rough shooting driven shoots or fishing. Such land can be valuable for conservation (e.g. upland waders) but some practices such as poorly managed muirburn can have negative impacts and results in carbon emissions. There may also be an increased fire risk, which well managed moors can mitigate, but which require skilled labour to maintain and control.

There are opportunities to continue to improve sustainable management (e.g. through Wildlife Estates Scotland initiative), to reduce carbon emissions and to contribute to the regeneration of biodiversity,

protecting peatland and priority species to enhance natural capital (See Tarras Valley example in Appendix 7). Sustainable gamebird management in the lowlands could minimise impacts on biodiversity (e.g. reducing harm of introduced gamebirds on woodland habitats) and provide new habitats beneficial to wildlife (e.g. hedgerows and game crops).

Fisheries management will continue to provide habitat restoration benefiting Atlantic salmon and freshwater habitats and, in combination with catchment initiatives, can provide multiple benefits from adaptive measures such as riparian woodland to shade waters to reduce river temperatures, and habitat to protect from nutrient flushes and pollution e.g., resulting from intense rainfall after prolonged dry periods. Peatland restoration can also help maintain water flows and regenerative agriculture can improve water quality.

The RLUF vision realised

Combining information on the South of Scotland's existing natural capital, the changes that are necessary to respond to national policy, the priorities expressed by stakeholders, and wider drivers such as the climate and biodiversity crises allows us to anticipate how our vision could be realised. This helps provide a regional expression of the illustrative landscapes of Scotland's Land Use Strategy and Scottish Biodiversity Strategy to 2045. This will be built upon healthy, diverse, resilient ecosystems supported by resilient nature networks and regenerative agriculture providing benefits through nature-based solutions. Much will depend both on the evolution of public and private funding (e.g. proposals for making half of all farming funding conditional on the delivery of targeted outcomes for biodiversity and low emissions production³⁷) and on the actions and involvement of land managers, communities, agencies and other stakeholders.

In the **uplands**, which comprise a significant proportion of the South of Scotland, our peatlands are restored and managed to absorb and store carbon, reduce flood risk and support key habitats and species. Changes in the management of heather moorland, including for upland agriculture and grouse have created a diverse range of upland habitats and landscapes, with areas of regenerating native vegetation and a wider range of upland bird species. The hills and moors have seen a significant expansion of native woodland, with natural tree lines, woodland corridors along burns, and more wooded lower hillslopes, connecting with woodlands in the valleys and lowlands beyond. Deer are sustainably managed (in uplands and lowlands) so new woodland flourishes. Commercial forests remain an important land use in the uplands, though restructuring and integration with native planting has created woodlands that are more diverse, ecologically richer and that sit more easily in the landscape. Forest species and design are adapting to the changing climate. New and restructured woodlands and forests are designed to reduce downstream flooding, with targeted action in catchments with the highest risk. The uplands continue to accommodate larger scale renewables contributing to decarbonisation of the energy network, ensuring key environmental assets including designated landscapes and habitats and dark skies are protected from development. They also provide opportunities for a wide range of recreation activities, from active sports such as mountain biking, using the network of upland tracks, to more peaceful pursuits such as wildlife watching.

The **river valleys** have also seen an expansion of native woodland, creating networks linking fragments of longer established woodland, and connecting with woodlands on higher ground. There is also a focus on planting along rivers and burns, helping to improve water condition and maintain temperatures needed to sustain key habitats and species such as Atlantic salmon. Naturally meandering river courses have been restored where straightening and deepening took place in the past with greater connectivity to floodplains. There has been a shift to regenerative agriculture, with an emphasis on conserving soils, reduced inputs and restoring and integrating woodland and other habitats within the farming landscape. The valleys include a range of small-scale renewables, designed to serve local needs and build a more resilient energy system. In river valleys, lowlands and along the coast, local path networks and longer distance routes provide recreation opportunities and connections for local communities.

³⁷ Consultation on Scotland's Strategic Framework for Biodiversity - <https://tinyurl.com/yu8ctmnb>

The **lowlands** have also seen a marked expansion of native woodland, with a focus on integrating trees within the farmed landscape and agro-forestry being widespread. Woodland creation has been designed to link remnant woodlands, provide more wooded corridors along rivers and burns, and targeted to improve water condition (e.g., through riparian buffer zone planting) and help slow runoff particularly within catchments where flooding is an existing or future risk. Coastal habitats of saltmarsh, scrub, grassland and wetlands support low intensity grazing and biodiversity, storing carbon and providing natural coastal defences to flooding and sea-level rise. The lowlands have seen a shift to regenerative agriculture, with a focus on the management of soils, reductions in stocking density and greater diversity of farmland habitats. There is now a greater emphasis on producing high quality food to meet regional and local demands and a further focus on quality and animal welfare. Farm income has continued to diversify, with a wide range of tourism and recreation activities taking place across the region. The lowlands accommodate a variety of renewable energy sources, including medium sized solar farms, farm-scale hydrogen generation, small scale hydro and wind turbines. The area meets local energy needs as well as contributing to national supply.

Communities are central to this vision and are now more fully engaged in land use issues across the South of Scotland. The idea of Community Wealth Building is well established with a thriving rural economy directing benefits back into the local community. People are also more engaged in decisions about land use change more broadly, whether that relates to forest and woodland management or improvements in managed access. Alignment with local place plans and the Regional Spatial Strategy has supported place making across the South of Scotland. People are better connected with the countryside close to where they live, with improved and connected path networks, signposting and information. There has been an increase in community ownership of land right across the area, in many cases providing a catalyst for changes in land management and a focus on delivering a much wider range of economic, environmental and social benefits. Physical activity levels have increased, and mental health is improving. There are also growing opportunities for people to find employment, training and volunteering opportunities resulting from changes in the way land is managed. Action has been targeted on communities with the highest levels of multiple deprivation, helping to tackle inequality and contribute to the just transition.

Many of these changes have been facilitated by a stronger, positive and pragmatic partnership of land managers, communities, Non-Governmental Organisations (NGOs), agencies and the private sector. There have been new opportunities to share experiences and learn from a growing body of good practice. Partnership working has benefits from better data about the region's natural capital and the benefits we derive from it, allowing a more informed approach to decision making and practice on the ground. Monitoring has allowed progress to be tracked and approaches adapted as needed.

Our thriving regional economy is fair and inclusive, providing employment, skills and training opportunities, contributing to Scotland's zero carbon and nature positive economy. It is supported by a high-quality environment of healthy ecosystems and resilient nature networks. Our rich, cultural landscapes are maintained by regenerative agriculture and sustainable forestry, vibrant sustainable tourism. There is growing renewable energy production for local supply and export. Nature-based solutions are favoured and high quality, nutritious local food is provided to the communities of the region. Creative use of innovative digital technology helps guide our land use decisions. Our natural capital continues to be enhanced through a balance of public support and responsible investment and a just transition to Net Zero.

6. MAKING USE OF THE FRAMEWORK

This document represents the first version of the South of Scotland RLUF developed under the Scottish Government pilot. By its nature it will not be the definitive article, but the start of a direction of travel to help guide and inform land use decisions to enable the region to move towards a just transition to Net Zero 2045 and achieve climate change and biodiversity objectives.

This Framework is a non-statutory document but one that aims to support the work of a wide range of organisations and individuals across the region. It seeks to stimulate the conversation about sustainable land use and open it up to a wider audience by bringing together the latest and best available data on land use, the drivers of land use change and the multiple benefits land provides so that issues can be considered holistically.

The maps included in this Framework seek to develop an improved understanding of both existing land uses and habitats and the drivers of change, notably climate change, that mean the status quo of current land use and management is not an option. The opportunity maps also start to give a sense of how future Government support for certain types of land use could be spatially targeted to deliver the right land use change in the right places. The RLUP will seek to engage with Scottish Government on how this could be taken forward (see further details below).

The RLUF could also help set expectations and inform market conditions within which the rapidly developing green finance sector operates; and provide support to justify targeted investment. Associated monitoring and evaluation could help to give early warning of potential issues.

We trust that in the near future, through related programmes, higher resolution mapping and decision support tools will become available that can be used by land managers to inform decision making at the farm and field scale.

In the meantime, the information presented in this RLUF can be used to inform the Regional Economic Strategy, Regional Spatial Strategy, Local Development Plans and, Local Place Plans as shown in the diagram below.

Figure 12: Relationship between RLUF and other strategies and plans

Relationship between RLUF , Economic Strategy and statutory Planning?

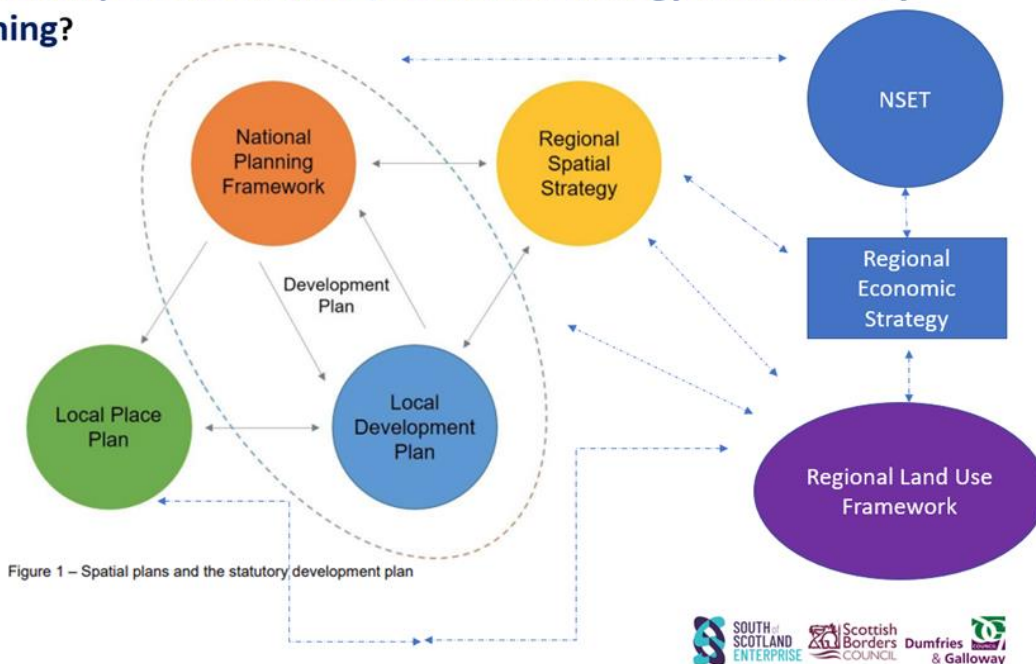


Figure 1 – Spatial plans and the statutory development plan

The principles for sustainable land use change, case studies and information on funding sources should also be useful resources for landowners and managers considering making changes to the use of their land.

7. NEXT STEPS / RECOMMENDATIONS

This Framework has two main functions.

Firstly,

- as an output of the pilot to test the practicalities of different ways to establish RLUPs and
- outlining in a Framework (RLUF) how to use a natural capital approach to identify and agree upon current and potential land use changes across the region.

Secondly,

- as a regional Framework that helps inform the South of Scotland Regional Economic Strategy, overseen by the Regional Economic Partnership, and
- to help inform the Local Development Plans, Regional Spatial Strategy and Local Place Plans linked to statutory planning.

The focus of the first function is to support the delivery of Scottish Government's climate change targets and other environmental objectives, including improving biodiversity and signposting public and private funding opportunities for landowners, land managers, and community groups to assist with delivery of the prioritised land use changes. In relation to this, the process of establishing the RLUP and the development of the RLUF suggests that this can provide a practical means to deliver national and regional objectives to address the climate change and biodiversity crises. At this initial stage, it cannot address all the issues, but can begin to give the strategic direction required to help co-ordinate land use change in the region. Whilst identifying how national objectives can be met, it also provides a powerful voice from the South of Scotland based upon a considerable amount of stakeholder input, gathered through our place-based engagement.

Below, we offer a set of recommendations for Scottish Government to consider which we believe helps inform the development of further RLUP pilots. We also set out a provisional set of actions following the guiding principles of the RLUF and provide the basis of a programme of action for implementing Phase 3 of the South of Scotland pilot. The action programme is closely linked to the Regional Economic Strategy and built around the key land use change priorities identified.

Recommendations:

A Governance structure has been established as an **interim Regional Land Use Partnership**. This Governance has helped embed the RLUP process into the Regional Economic Partnership (REP) with the REP providing oversight of the development of the Regional Land Use Framework. The REP is supported by an Advisory Group to provide technical support from a cross sectoral basis including statutory agencies, the land use sector and communities. The final approval stage of the RLUF lies with the two local authorities, Dumfries & Galloway Council and Scottish Borders Council. The process of approval mirrors that undertaken for the Regional Economic Strategy already established between the constituent authorities and SOSE.

Under the Bute House agreement³⁸ Scottish Government is committed to **planning for a second wave of RLUPs from 2023** and ensure that RLUPs take into consideration the delivery of statutory climate and nature targets on a regional basis including considering how RLUPs can influence public funding streams, if the pilots can demonstrate that they meet expectations relating to national outcomes on the environment and climate change, and show that they have taken a democratic, local approach. The first set of pilots has been to test practicalities and approaches. To this extent the establishment of the South of Scotland RLUP is still a work in progress from which we can learn, but it demonstrates the potential of RLUPs, involves tripartite representation (public bodies, land use sector and communities), is backed by a democratic approach and has enabled extensive stakeholder participation through the programme of 30 events with contributions and input from over 500 stakeholders in the region.

³⁸ <https://www.gov.scot/publications/scottish-government-scottish-green-party-shared-policy-programme/>

The RLUP will **continue to consider how the process and participation can be improved**. This has laid the groundwork for a phase of implementation. The next steps are subject to the Scottish Minister's decision, but we would hope for a continuation of this work in the region. Any move towards a more formal establishment of the RLUP would necessarily require adequate resources and a review of membership to reflect the functions and operations of a formal partnership. There are challenges to ensuring representation of views when covering such a large geographic area, but there are solid foundations to build upon and alignment with the REP has provided a strong basis from which to develop further.

Where possible Scottish Government should **use the findings of this pilot to inform developing policy on agricultural and forestry support and the emerging Just Transition Plans including the plan for land use and agriculture**. Priorities included in the RLUF, guided by stakeholders in our region, could help target support under the new agricultural scheme and improved data and mapping (building on the sources shared in this Framework) could support spatial targeting of that support.

Continued RLUP work could be supported by Scottish Government to **develop local catchment plans** that link to and inform the Place Planning agenda including the Local Development Plan, Local Place Plans and Community Planning Process. This would provide a robust platform to help guide land use change to build resilience to climate change and lead to nature recovery e.g. through nature networks, help facilitate better dialogue between stakeholders and, help inform communities of natural assets in their locality and involve them in discussions around land use.

Critical to the successful implementation of the RLUF is the **availability of up to date, publicly accessible data** to inform decision making at the regional, sub-regional (sub-catchment or local landscape) and local scale. Stakeholder input is essential through the careful interpretation of these data, with an understanding of the drivers of change and barriers to change. The national roll out of NatureScot's landscape-scale natural capital assessment tool³⁹ and the development of regional datasets and a decision support tool under the Borderlands Natural Capital programme will help address this gap, but resources will be required for maintaining and updating datasets. At a national level, there is a need for further investment in research to guide the just transition and to help support decision making and land-use planning, The use of innovative technology will be increasingly important including remote sensing and the use of in-field technology. Steps should be taken to support the development of a network of natural capital and carbon sensors to provide real-time data to land managers, land users and communities.

The second function, as outlined above, to guide the Regional Economic Strategy, focusses on regional actions that can guide the step-change in land use that we consider will be required to address the twin climate and biodiversity crises whilst facilitating sustainable, and productive land uses. This sets out our ambitions for delivery in an initial phase of implementation. However, to achieve our ambitions for net zero and nature recovery will require a step-change in delivery leading to a wide-spread uptake of good practice, through an evolving and growing programme. It will be necessary to review the RLUF and programme at a minimum of 5 year intervals.

Actions:

The delivery of the RLUF within the region is linked to the **Regional Economic Strategy (RES)** which targets a significant shift in the region's economic performance and the way by which wealth is created by and shared amongst people. With a renewed focus on the region's exceptional quality of life and natural capital, we can attract a new generation of people and investors to the South of Scotland. The RLUF nests within Theme 5 of the RES *A Green and Sustainable economy* with its priorities for

- Harnessing & Enhancing our Natural Capital
- Seizing the Economic opportunity of a Just Transition to Net Zero
- Supporting Community Wealth Building

³⁹ <https://www.nature.scot/professional-advice/social-and-economic-benefits-nature/natural-capital/farming-nature/developing-landscape-scale-natural-capital-tool-scotland>

- Growing Regional Supply Chains.

The RES Delivery Plan includes a set of key actions to make the South fairer, greener and flourishing. The RLUF links to the current Action 5 (c) of the RES Delivery Plan: *Develop proposals to increase opportunities and benefits arising from the region's natural capital assets including support for sustainable agriculture, woodlands and forests, restoring peatlands, water management and increasing biodiversity.*

The RLUF includes a **provisional set of Actions that could be undertaken under the RES Delivery Plan and its updated versions**. Further actions can be added through review. It is not intended to be an exhaustive list but to provide a realistic set of priority actions based on the needs of the South of Scotland. They are built around the land use change priorities identified by the pilot process through stakeholder input and fit with national and regional policy. These can effect real change in the region, building resilience to climate change in our environment through harnessing and enhancing our natural capital, on the journey to both the national 2030 milestones and 2045 targets for climate change and biodiversity.

They have been prioritised as short term (next three years) and medium term (ten years) to ensure maximum impact which will take the Framework to 2033/4 beyond the 2030 Climate Change and Biodiversity milestones. The actions are also linked to key regional programmes including local authority and statutory regional plans including Forestry & Woodland Strategies and Local Biodiversity Action Plans (LBAPs) and key regional land use plans such as the Tweed Catchment Management Plan and Galloway and Southern Ayrshire Biosphere Plans. This is in recognition that delivery will link strongly to existing and emerging programmes and that the RLUF does not seek to replace or supersede important regional strategies, plans and initiatives but aims to bring together how we meet national objectives in a way that meets the needs of the South,

Table 6: Actions for implementation of the RLUF

Priority Short-term (three years), Medium term (ten years)

Priority	Action	Detail (and Link to partnership and other Plans)	Short/Med Term priority
Biodiversity protection and enhancement	<ul style="list-style-type: none"> Explore how the RLUP can support or fulfil a Regional Network Group to co-ordinate regional and local approaches to delivery of a nature network for South of Scotland. Support the two local authorities in defining and developing the nature network for their regions in accordance with guidance and develop a strategic network for the South of Scotland. Explore opportunities to develop and integrate approaches for climate change resilience and biodiversity enhancement, building on River Basin Management Plans (RBMP). Produce a State of Nature Report for South of Scotland 	<p>Nature Networks led by local authorities under their Local Development Plans in alignment with NPF4 requirements. Link to emerging Nature Network Frameworks, Local Development plans including LBAPs. RBMPs are a comprehensive, long-established set of catchment plans focussed on water management issues, linked to wider land use, that could be further utilised to guide land use change in catchments.</p> <p>Quantify the status, trends, threats and opportunities for biodiversity in the region, following the model of the State of Nature in Scotland Report, making full use of regional and local data including LERC records. Report could be in two components: Dumfries & Galloway and Scottish Borders region to support biodiversity duty needs.</p>	<p>S</p> <p>M</p> <p>S</p> <p>S</p>
Climate change adaptation and mitigation	<ul style="list-style-type: none"> Develop sub-catchment plans for land use that link to local place-plans, to inform opportunities for land use change and emerging Just Transition Plans for land. 	<p>To identify the opportunities for land use change in local areas, develop a set of pilot plans at localities with willing stakeholders in the first instance</p>	<p>S</p>

	<ul style="list-style-type: none"> Support the development of flood protection schemes under Flood Risk Management Plans based on Natural Flood Management (NFM) where appropriate. Develop water scarcity plans in priority areas within the region. Develop a Peatland Action Plan to guide the peatland restoration in the region. Develop programmes to raise awareness of climate change mitigation 	<p>NFM studies may be developed in support of statutory flood protection schemes, but further work is required in catchments unlikely to be subject to a statutory flood protection scheme on a cost-benefit basis, where NFM is one of the viable measures. These proposals can also inform river restoration.</p> <p>Work with SEPA, Scottish Water, Scottish Government to develop action plans that guide activity at a local level. Vegetable production in the south may require large volumes of water for abstraction. Management of headwaters can benefit water users downstream.</p> <p>Build upon the Peatland Action Programme and Nature Recovery Fund (NRF) initiatives in the region including work led by Tweed Forum, Crichton Centre and other partners.</p> <p>Improve risk perceptions and build understanding of scale of land use change and urgency for action required.</p>	<p>M</p> <p>S</p> <p>S</p> <p>M</p>
Native woodland	<ul style="list-style-type: none"> Encourage native woodland creation through strategic and catchment-based initiatives as a priority land use change delivering multiple benefits. See also regional strategic approach below and Nature networks Support Lowland Deer Management Groups in the region to promote sustainable approaches to deer management. 	<p>Develop a programme for the Riverwoods initiative and maximise opportunities for emerging catchment-based approaches including through Tweed Catchment Management Plan, GSABiosphere plans, Borderlands, and Destination Tweed and targeting areas at temperature risk.</p> <p>Explore ways to increase collaboration and participation in sustainable management of deer in the region.</p>	<p>S</p> <p>M</p>
Commercial forestry	<ul style="list-style-type: none"> Develop a regional strategic approach to forest and woodland creation building upon the approaches developed in the earlier Regional Strategic Woodland Creation pilot in Scottish Borders. Develop a programme to test approaches with willing stakeholders for collaborative planning of forestry schemes to help facilitate community benefits. 	<p>To help facilitate woodland creation to achieve ambitious targets by streamlining the process, addressing cumulative impacts, enabling multiple benefits to be delivered and engaging with communities.</p> <p>To help realise the benefits that this important land use change may bring to the local economy and local communities.</p>	<p>S</p> <p>S</p>

<p>Agricultural viability and sustainability</p>	<ul style="list-style-type: none"> • Develop regional and local land use plans that can help contribute to reducing greenhouse gas emissions, build resilience to climate change and enhance biodiversity. • Develop a combination of farm scale demonstration projects and collaborative initiatives to inform the types of actions required at the farm-scale to be delivered at a landscape scale. • Develop opportunities and markets for local sustainable food production based on a local food strategy. • Develop a set of priority measures that could help inform Tier 2, 3 and 4 of new Agricultural scheme. • Increase uptake of the Wildlife Estates Scotland (WES) initiative. 	<p>Building upon the Net Zero Route Map for South of Scotland, Local Authority Climate Change Route Maps and opportunity layers from the Borderlands data pilot. To facilitate the development of short and circular supply chains.</p> <p>Explore opportunities to develop local markets for locally grown food e.g. through public procurement policy, and within settlements increasing provision of allotments, community market gardens and other schemes</p> <p>To address the twin emergencies and enable sustainable food production, land management prescriptions should be drawn up applicable to the land use priorities of South of Scotland.</p> <p>To promote best habitat and wildlife management practices for sustainable game management evolving to adapt to climate change and biodiversity priorities as appropriate.</p>	<p>M</p> <p>S</p> <p>M</p> <p>S</p> <p>M</p>
<p>Access, Recreation and Tourism</p>	<ul style="list-style-type: none"> • Develop proposals for responsible tourism aligned with the emerging SSDA responsible tourism economy strategy. • Develop opportunities from nature-based solutions for access and tourism. • Explore ways to support fisheries managers to future proof catchments for climate change. 	<p>Includes opportunities identified by sub-catchment plans, local place plans, renewable energy frameworks and woodland creation frameworks.</p> <p>Ensure landscape scale/ sub-catchment initiatives target measures for increased riparian woodland to mitigate temperatures and river restoration and peatland and wetland restoration to maintain flows.</p>	<p>M</p> <p>S</p> <p>M</p>

Renewable energy development	<ul style="list-style-type: none"> Explore opportunities to produce development Frameworks for renewable energy clusters in the region. 	<p>There is potential to identify opportunities to enhance and invest in the local environment, communities and place e.g. as guided by the Hagshaw Energy cluster development framework. https://www.thehagshawenergycluster.co.uk/</p>	S
	<ul style="list-style-type: none"> Guide hydrogen and other renewable developments in the region with sub-catchment plans to inform site location. 	<p>Availability of a sustainable water supply will be critical for local siting of these developments. Sub-catchment plans may help guide locations and opportunities to ensure sustainable supply of water.</p>	M
Development Planning	<ul style="list-style-type: none"> Explore how the RLUF links to and informs the Regional Spatial Strategy 	<p>Work with the two local authorities to ensure that the RLUF helps inform the development of the Regional Spatial Strategy to protect environmental assets and target development of nature-based solutions making sustainable use of the region's natural capital assets.</p>	S
	<ul style="list-style-type: none"> Develop sub-catchment plans linked to Local Place Plans 	<p>See above</p>	S
	<ul style="list-style-type: none"> Develop strategic programmes for delivery of positive effects for biodiversity 	<p>Develop in support of Local Authorities LDP policies under NPF4</p>	M
Natural Capital Investment	<ul style="list-style-type: none"> Develop the Borderlands Natural Capital Innovation Zone to facilitate responsible private investment in natural capital that is evidence –based and continue to develop the region as a living laboratory building on robust partnerships including with SRUC, GSA Biosphere, Tweed Forum, SUP and other organisations 	<p>Built initially around the programme of six pilot projects including:</p> <ul style="list-style-type: none"> Natural Capital investment plan Data pilot for a decision support tool Whole farm plans for natural capital Sustainable livestock and species rich grass Integrated land use and woodland creation Solway coastal and marine project <p>To be developed further with innovation, pilot and demonstration initiatives.</p>	S
	<ul style="list-style-type: none"> Develop innovative approaches for responsible natural capital investment in the region from private financial investment, infrastructure and development. including landscape scale restoration projects. 	<p>Develop programmes including the Wild Heart Expansion Project and other natural capital initiatives, guided by the South of Scotland Net Zero Investment Guide.</p>	M

Communities	<ul style="list-style-type: none"> Local Place planning Encourage the development of community led local land use plans Develop improved mechanisms for community involvement in decisions making 	<p>See sub-catchment plans and linkage to local place plans</p> <p>Enable local communities to develop local land use visions (e.g. Glenkens community) that can inform local place plans and sub-catchment plans</p> <p>Explore this to inform decision making at a landscape scale and resource capacity building within local communities to help facilitate their input.</p>	S S S
Sustaining RLUP/RLUF	<ul style="list-style-type: none"> Consider how support can be continued for the REP and RLUP Advisory Group to oversee implementation of the RLUF and strategic approaches to land use in the region. Ensure RLUP helps facilitate opportunities to discuss good practice through demonstration sites, events and promotes dialogue between interested stakeholders. 	<p>Explore with Scottish Government and regional partners how RLUP can be resourced to continue into an implementation phase.</p> <p>Hold events focussed on land use good practice sites and develop a set of further demonstration projects to show case priority land use change in accordance with RLUP principles.</p>	S S
Data & Research	<ul style="list-style-type: none"> Establish and maintain natural capital baseline data and develop natural capital assessment and valuation tools and decision support tools. Develop research to investigate the economic valuation and carbon assessment of different priority land uses in the region. 	<p>Make full use of the NatureScot Landscape scale natural capital assessment tool and data and support tool developed under the Borderlands data pilot. Develop a remote sensing network to provide real time natural capital data for monitoring and evaluation.</p> <p>Explore the economic return and carbon reduction of different land uses to inform decision making to maximise carbon reduction and minimise costs. Work with key stakeholders to develop research projects e.g. through SEFARI and Scottish Government Strategic Research Portfolio projects (Natural Resources)</p>	S M
Skills, employment and training	<ul style="list-style-type: none"> Continue to develop opportunities for green skills, training and employment that a just transition to Net Zero brings (aligned to RES Action 1(b) <i>Undertake a 'mapping and gapping' exercise to ensure the region has the skills to fully embrace significant future opportunities that growth of the digital and green economies will give rise to.</i> 		M

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8. MONITORING AND ASSESSMENT

Monitoring and evaluation are important tools for understanding whether a project is on track and achieving its objectives.

A clear and proportionate monitoring framework, drawing on readily available datasets, will be developed for monitoring the impacts of the South of Scotland RLUF pilot. This will be based on best-practice principles of monitoring and assessment. It will also be designed to provide accountability for those involved with implementation of the RLUF.

Indicators will be chosen to provide insight into the achievement of the RLUF objectives. To do so, monitoring indicators should be aligned with an understanding of the relationships between inputs, activities, outputs and outcomes. The guiding principles for RLUFs (Chapter 3) are likely to be a useful reference point. These are based around Scottish Government's National Performance Outcomes for Economy (Growth and Prosperity), Environment (Natural Capital approach and Policy alignment) and Communities (Stakeholder collaboration and Social focus) and can be used to test that RLUF activities are aligned with national outcomes. The land use change priorities identified in the RLUF and relevant national targets for land use change (e.g. in relation to peatland restoration and woodland creation) will also be important considerations.

Periodic reviews using the monitoring framework will test the delivery of and the contribution towards identified short- and long-term objectives/outcomes. It is suggested the RLUF should be reviewed at least every five years.

The approach will be informed by the monitoring and evaluation of the RLUP/RLUF pilots currently being developed by Scottish Government and monitoring and reporting arrangements for the South of Scotland Regional Economic Strategy.

The implementation of these monitoring arrangements will help to develop lessons from the RLUP/RLUF process to inform future iterations of the South of Scotland RLUF, as well as for other RLUFs across Scotland.

APPENDICES

Appendix A1: Glossary

Just transition - means greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.

Land use change - the conversion of a piece of land's use, by humans, from one purpose to another.

Natural capital - the renewable and non-renewable stocks of natural assets, including geology, soil, air, water and plants and animals that combine to yield a flow of benefits to people.

Nature based solutions - Actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human wellbeing and biodiversity benefits. (International Union for Conservation of Nature (IUCN))

Natural capital approach – considers land as an asset that needs to be managed to deliver a range of benefits to society.

Nature-positive outcomes - means reversing the current declines in biodiversity, so that species and ecosystems begin to recover.

Net zero - means the amount of greenhouse gas emissions we put into the atmosphere and the amount we're able to take out will add up to zero.

Protected area - A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. (IUCN)

Regenerative agriculture - a system of farming that aims to conserve and enhance the soil health, organic matter and biodiversity (Scotland's Farm Advisory Service).

Wellbeing economy - means building an economy that operates within safe environmental limits, and which serves the collective wellbeing of current and future generations first and foremost.

Appendix A2: Scottish Land Use Strategy Principles

The following text is from Scottish Government's Land Use Strategy:

Ten principles for sustainable land use which reflect Government policies on the priorities which should inform land use choices across Scotland:

- a) Opportunities for land use to deliver multiple benefits should be encouraged.
- b) Regulation should continue to protect essential public interests whilst placing as light a burden on businesses as is consistent with achieving its purpose. Incentives should be efficient and cost-effective.
- c) Where land is highly suitable for a primary use (for example, food production, flood management, water catchment management and carbon storage) this value should be recognised in decision-making.
- d) Land use decisions should be informed by an understanding of the functioning of the ecosystems which they affect in order to maintain the benefits of the ecosystem services which they provide.
- e) Landscape change should be managed positively and sympathetically, considering the implications of change at a scale appropriate to the landscape in question, given that all Scotland's landscapes are important to our sense of identity and to our individual and social wellbeing.
- f) Land-use decisions should be informed by an understanding of the opportunities and threats brought about by the changing climate. Greenhouse gas emissions associated with land use should be reduced and land should continue to contribute to delivering climate change adaptation and mitigation objectives.
- g) Where land has ceased to fulfil a useful function because it is derelict or vacant, this represents a significant loss of economic potential and amenity for the community concerned. It should be a priority to examine options for restoring all such land to economically, socially or environmentally productive uses.
- h) Outdoor recreation opportunities and public access to land should be encouraged, along with the provision of accessible green space close to where people live, given their importance for health and well-being.
- i) People should have opportunities to contribute to debates and decisions about land use and management decisions which affect their lives and their future.
- j) Opportunities to broaden our understanding of the links between land use and daily living should be encouraged.

Appendix A3: Summary of James Hutton Institute (JHI) work on land use change for net zero

James Hutton Institute (JHI) has developed a land use transformation analysis that utilised a low emission scenario⁴⁰ which focuses on land use change to deliver the following multiple benefits:

- Carbon storage through tree planting,
- Emission reduction through deintensification of grazing,
- Biodiversity enhancement through tree planting, and
- Pollination to support food production.

JHI focused on woodland expansion (including silvo-arable and silvo-pastoral) and decreased grazing intensity and constrained land use change options based on various bio-physical, policy and conservation restrictions. The model outputs estimate the minimum required to achieve net zero.

Figure A3.1 below shows the **modelled need for woodland creation** across South of Scotland. It indicates a widespread need for woodland creation across the region to achieve the low emission scenario. This is in line with Scottish Government's target to boost woodland expansion by 500,000 ha across Scotland (updated Climate Change Plan 2018-2032).

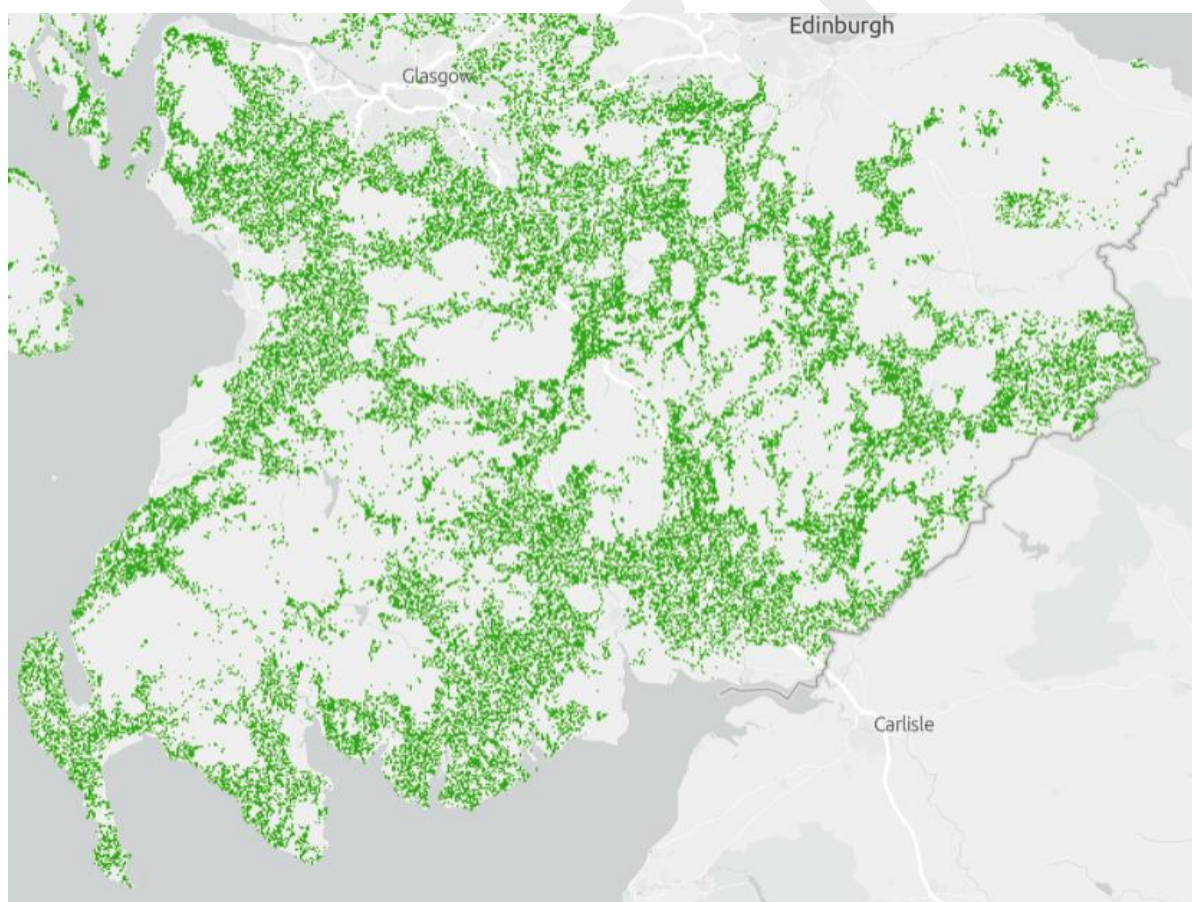


Figure A3.1: Modelled need for woodland creation across South of Scotland (Source: James Hutton Institute: <https://storymaps.arcgis.com/stories/c3d3feff85f14460b6c973127089d6f9>)

It should be noted that the tonnes of carbon sequestered per hectare is important, so the effectiveness of trees to capture carbon rather than overall area planted is a key consideration. The model considered woodland expansion on grasslands and heathers and excluded conservation areas, waders outside

⁴⁰ <https://storymaps.arcgis.com/stories/c3d3feff85f14460b6c973127089d6f9>

conservation areas and areas of high moorland connectivity; it also factored in soil type, peatland and protected areas.

JHI assumed all this to be broadleaved to support biodiversity and multi-functionality but in future work they plan to look at opportunities for some to be native pinewoods.

Figure A3.2 below shows a **substantial modelled need for a shift from grassland to silvo-pastoral systems** across the region. Silvo-pastoral systems are those in which trees are planted at wide spacing into grazed, permanent pastures. Silvo-pastoral agroforestry is also known as wood pasture, one of the Priority Habitats in the UK Biodiversity Action Plan and in the Dumfries & Galloway Local Biodiversity Action Plan.

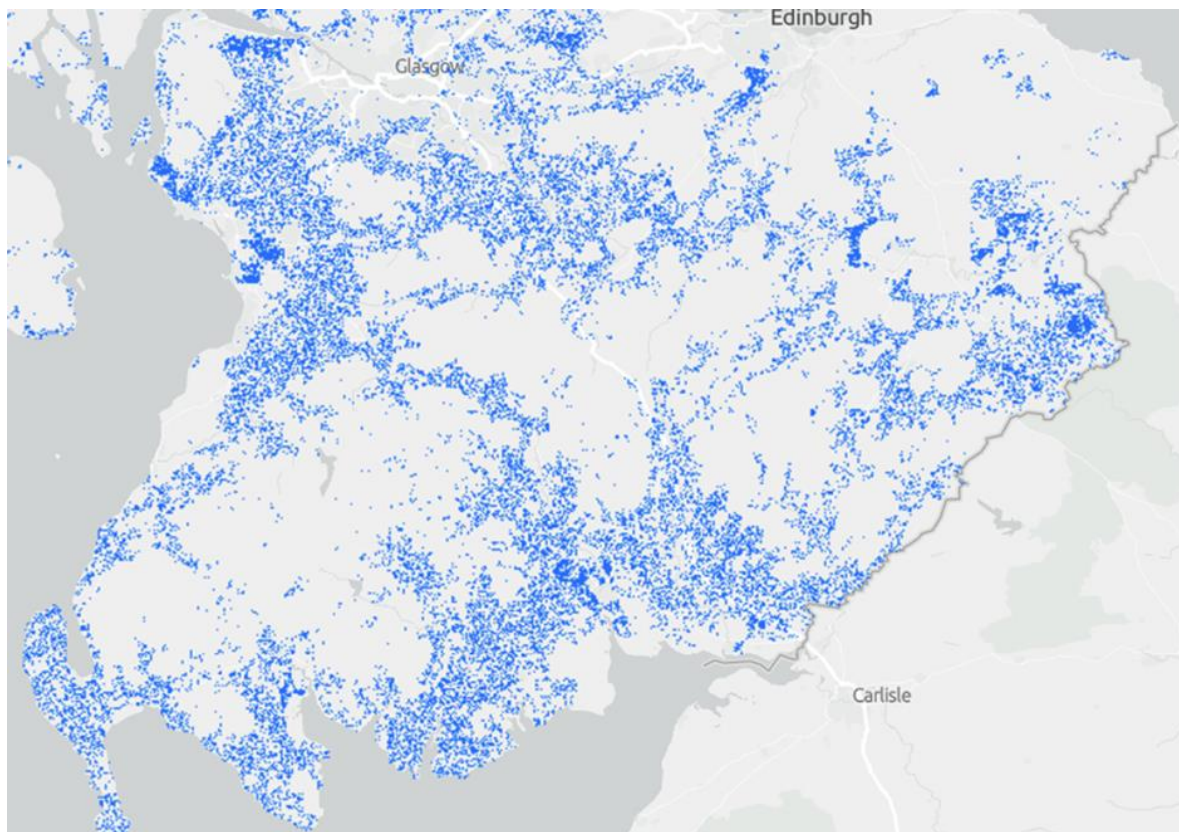


Figure A3.2: Modelled need for shift from grassland to silvo-pastoral across South of Scotland (Source: James Hutton Institute: <https://storymaps.arcgis.com/stories/c3d3feff85f14460b6c973127089d6f9>)

This shift was limited to all grasslands, excluding conservation areas. The context for this focus is the recommendation from the Committee on Climate Change (2020) that 10% of farm grasslands (improved and semi-natural) across Scotland should switch to silvo-pastoral. The new trees could be spread across the field or condensed at the edge of the field as windbreaks or as riparian woodland. Their exact configuration has not been considered at this stage, nor has the impact on sustainable stocking rate.

Figure A3.3 below shows the **modelled need for grazing de-intensification**. This map indicates a significant modelled need for a reduction in grazing pressure across the South of Scotland.

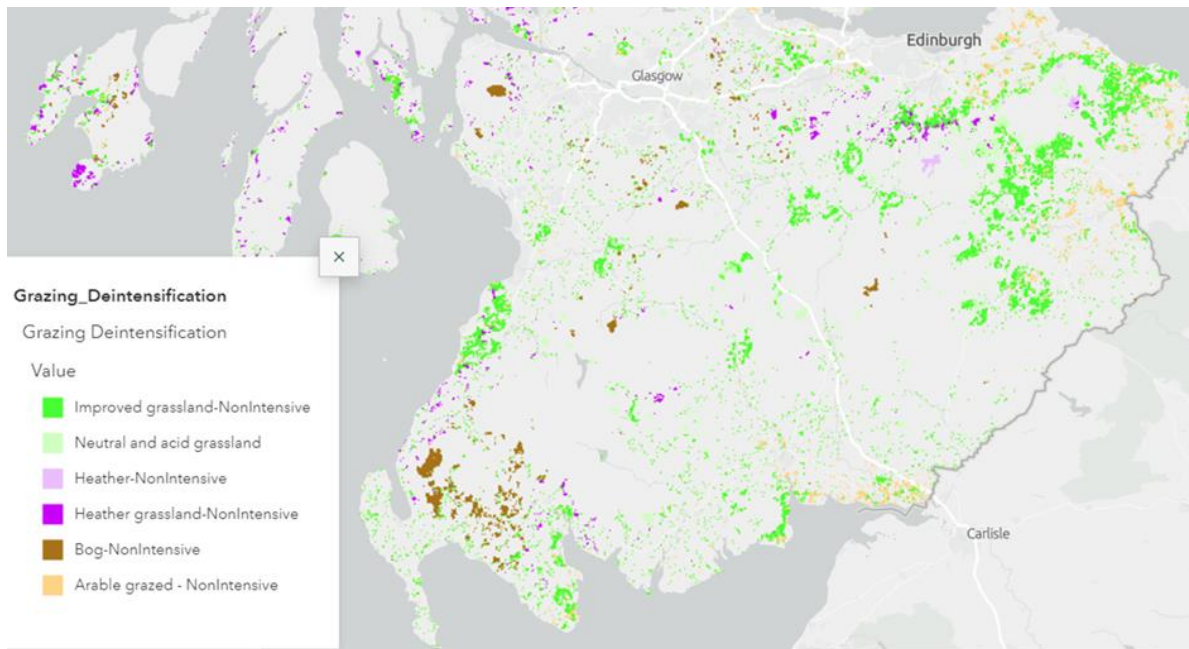


Figure A3.3: Modelled need for grazing de-intensification across South of Scotland (Source: James Hutton Institute: <https://storymaps.arcgis.com/stories/c3d3feff85f14460b6c973127089d6f9>)

This is based on baseline mapping indicating significant areas of grassland across the region grazed above their estimated conservation threshold i.e., 'intensive' grazing. Decreasing stocking rates to below the conservation threshold will reduce the herd size – and associated carbon emissions – while preserving enough local grazing pressure to be beneficial for many semi-natural grassland species. Impacts on dairy production and farm viability have not been considered at this stage.

Appendix A4: Policy context

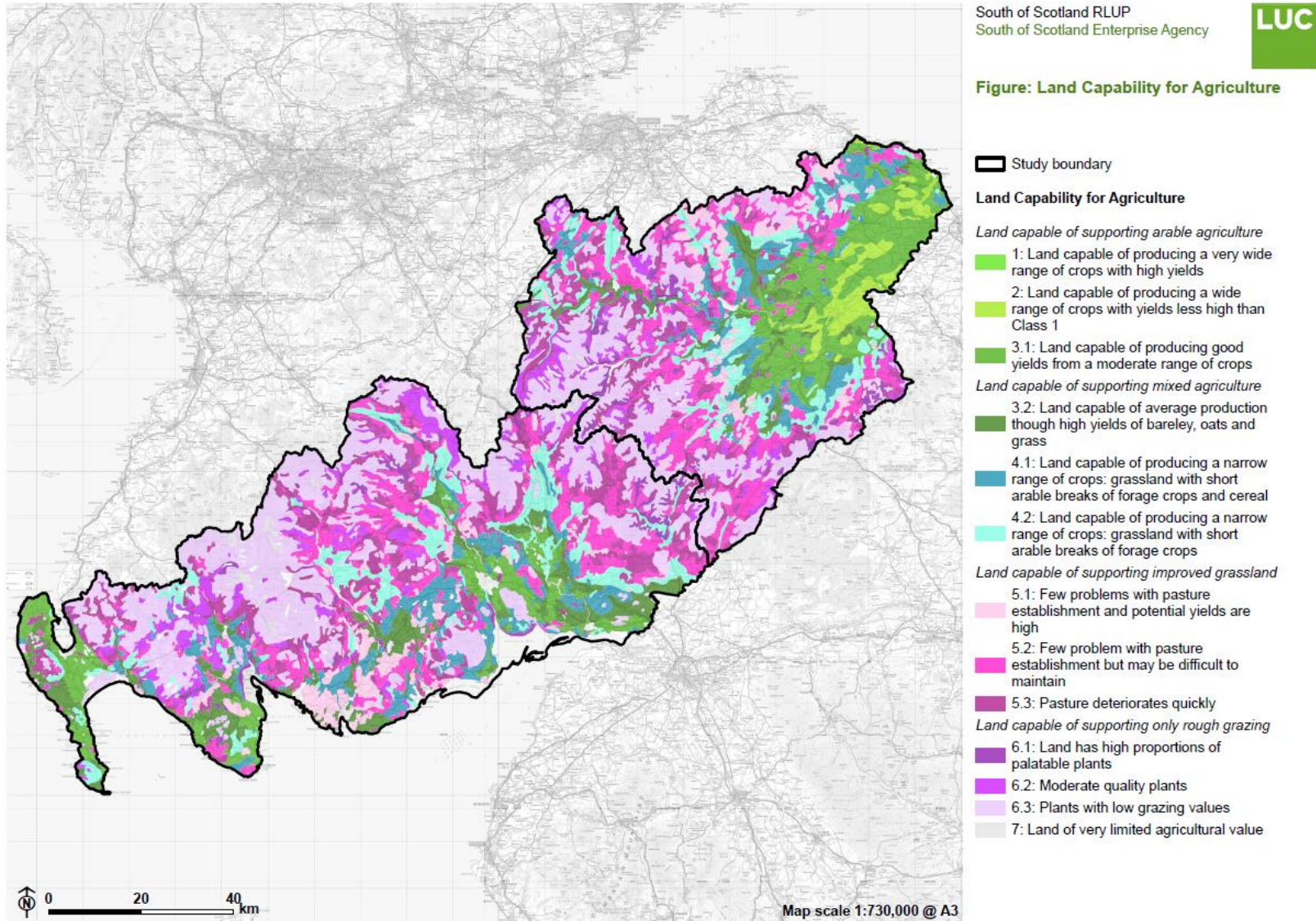
SG purpose	To focus government and public services on creating a more successful country, with opportunities for all to flourish, through increasing sustainable economic growth													
SG National Outcomes	<p>The Land Use Strategy contributes primarily to the following National Performance Framework outcomes that people:</p> <ul style="list-style-type: none"> ■ live in communities that are inclusive, empowered, resilient and safe ■ have a globally competitive, entrepreneurial, inclusive and sustainable economy ■ are well educated, skilled and able to contribute to society ■ value, enjoy, protect and enhance their environment ■ have thriving and innovative businesses, with quality jobs and fair work for everyone ■ are healthy and active ■ tackle poverty by sharing opportunities, wealth and power more equally 													
SG Plans, Policies and Strategies [square brackets denote current consultation stage or future publication]	Scotland's National Strategy for Economic Transformation 2022													
	Update to the climate change plan 2018-2032 [Draft of the next full climate change Plan by 2023, publication Spring 2025]	Scottish Climate Change Adaptation Programme 2019-2024 [Draft of next Scottish Climate Change Adaptation Programme by end 2023, publication 2024]	Low Carbon Scotland - meeting our emissions reduction targets 2013-2027: second report	Land Use – getting the best from our land; Strategy 2021-2026	National Planning Framework 4, 2023; and wider work on planning reform and implementation of the Planning (Scotland) Act 2019, including Local Place Plans	Achieving a sustainable future Regeneration Strategy, 2011	Scotland's National Marine Plan, 2015	The Environment Strategy for Scotland	Just Transition: A Fairer, Greener Scotland – Scottish Government's response to the report of the Just Transition Commission [Just transition plan for Land Use and Agriculture in preparation 2023/24]	Land Rights and Responsibilities Statement 2022 [Land reform in a net zero nation, consultation 2022]				
Sectoral Plans, Policies and Strategies	Scottish Government's Vision for Agriculture (March 2022) and Delivering Our vision for Scottish Agriculture – proposals for a new agriculture bill (August 2022) [Agriculture Bill]	Scotland Rural Development Programme and Community Led Local Development Projects	The River Basin Management Plan for Scotland 2021-2027	Biodiversity Strategy to 2045: tackling the nature emergency and species strategies e.g. Scottish Wild Salmon Strategy 2022; Scotland's Beaver Strategy 2022-2045 [Biodiversity Strategy and delivery Plan, consultation 2023]	[Natural Environment Bill being introduced to Parliament in 2024]	National Food and drink policy Becoming a Good Food Nation, 2014, Good Food Nation (Scotland) Act 2022	Flood Risk Management (Scotland) Act 2009 Flood risk management plans	The Historic Environment Policy for Scotland, 2019	Scottish Energy Strategy 2017 [Energy Strategy and Just Transition Plan (Consultation ended spring 2023)]	Onshore Wind Policy Statement 2022	Scottish Soil Framework, 2009	Scotland's National Peatland Plan, 2015	Scotland's Forestry Strategy 2019-2029	Pollinator Strategy for Scotland 2017-2027
Regional Strategies	South of Scotland Regional Economic Strategy		Dumfries and Galloway Local Development Plan		Scottish Borders Local Development Plan		Dumfries and Galloway Forestry and Woodland Strategy		Scottish Borders Woodland Strategy					
LUS Vision	2050 Vision: A Scotland where we fully recognise, understand and value the importance of our land resources, and where our plans and decisions about land use will deliver improved and enduring benefits, enhancing the wellbeing of our nation.													
LUS Objectives	<ul style="list-style-type: none"> ■ Land based businesses working with nature to contribute more to Scotland's prosperity ■ Responsible stewardship of Scotland's natural resources delivering more benefits to Scotland's people ■ Urban and rural communities better connected to the land, with more people enjoying the land and positively influencing land use 													

Appendix A5: Summary land cover statistics for South of Scotland, 2022

Land cover	Type	Ha	%
Grassland	Mesic Grasslands	320,822	28.1
	Dry Grasslands	144,058	12.6
	Wet Grasslands	128,096	11.2
	Alpine Grasslands	3,335	0.29
	Total Grassland	596,312	52.2
Woodland	Coniferous woodland	112,118	9.8
	Broadleaved deciduous woodland	81,222	7.1
	Lines of trees, small anthropogenic woodlands, recently felled woodland, early-stage woodland and coppice	45,043	4.0
	Mixed deciduous and coniferous woodland	9255	0.8
	Windthrow	6457	0.6
	Total Woodland	254,096	22.3
Arable	Arable land and market gardens	92,887	8.1
Heathland & Scrub	Temperate shrub heathland	50,107	4.4
	Woodland Fringes	25,243	2.2
	Temperate and Mediterranean Scrub	4,190	0.4
	Arctic/Alpine/Subalpine Scrub	78	0.01
	Riverine and Fen Scrubs	88	0.01
	Total Heathland & Scrub	79,705	7.0
Wetland	Raised and Blanket Bogs	33,996	3.0
	Surface standing and running waters	22,740	2.0
	Valley Mires, poor fens and transition mires	3156	0.3
	Total Wetland	59,892	5.3
Built-up or bare	Built up and bare	47,756	4.2
Rock & scree	Inland cliffs, rock pavements and outcrops	536	0.05
	Screes	394	0.03
	Total bare rock & scree	930	0.1
Coastal	Littoral sediment (predominantly saltmarsh)	2738	0.2
	Coastal dunes and sandy shores	5038	0.4
	Coastal shingle	662	0.06
	Rock cliffs, ledges and shores	1512	0.1
	Total coastal	9,949	0.9
	TOTAL	1,141,527	100

Appendix A6: Agriculture statistics and land capability for agriculture

Figure A6.1: Land capability for agriculture



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Table A6.1 Number of livestock by region and sub-region, June 2019

Scottish Borders	Dumfries & Galloway	South Scotland	Scotland	%	Livestock type
7,717	121,669	129,386	265,042	48.8%	Total Female Dairy Cattle
65,365	126,354	191,719	689,598	27.8%	Total Female Beef Cattle
18,937	48,936	67,873	253,406	26.8%	Total Male Cattle
44,967	127,916	172,883	519,681	33.3%	Total Calves
136,986	424,875	561,861	1,727,727	32.5%	Total Cattle
1,122,667	1,002,021	2,124,688	6,669,100	31.9%	Total sheep
43,586	13,729	57,315	319,265	18.0%	Total pigs
2,312,412	1,547,506	3,859,918	14,861,679	26.0%	Total poultry
288	762	1,050	6,150	17.1%	Goats and kids
1,153	1,307	2,460	13,218	18.6%	Deer
3,132	2,960	6,092	34,422	17.7%	Total horses
181	206	387	1,449	26.7%	Donkeys
157	265	422	2,040	20.7%	Camelids
262	201	463	4,748	9.8%	Beehives

Ref: <https://www.gov.scot/publications/economic-report-on-scottish-agriculture-tables-2020-edition/>

Table A6.2 Cereal production in South Scotland (2022 figs)

Crop	Geography	Area (000ha)	% Scotland	Tonnes (000)	% Scotland
Total Cereals	Scotland	414256		3138172	
	Southern Scotland	75681	18.27	599141	19.09
Total Barley	Scotland	279990		1967089	
	Southern Scotland	41360	14.77	296206	15.06
Spring Barley	Scotland	235816		1605235	
	Southern Scotland	29132	12.35	198214	12.35
Winter Barley	Scotland	44174		361853	
	Southern Scotland	12228	27.68	97992	27.08
Wheat	Scotland	107117		1000083	
	Southern Scotland	28181	26.31	261769	26.17
Oats	Scotland	27149		171000	
	Southern Scotland	6140	22.62	41166	24.07
Oilseed Rape	Scotland	35362		150876	
	Southern Scotland	7950	22.48	32513	21.55

Ref: <https://www.gov.scot/publications/cereal-oilseed-rape-harvest-2020-final-estimates/>

APPENDIX A7: CASE STUDIES OF INSPIRING LAND USE CHANGE PROJECTS ALREADY UNDERWAY

It is important to note that there is already much positive activity going on. South Scotland already has a strong tradition of collaborative working and innovation. From community-owned rewilding initiatives (such as Carrifran, Talla & Gameshope and Tarras Valley) to farm-based natural flood schemes (Tweed Forum), land use change to address carbon and wildlife issues has been happening for some time. Such schemes offer the chance to experiment with new approaches and to learn from others. Collaboration between interest groups or between enterprises may offer new opportunities, shared costs or reduced risks. Below we highlight some examples of projects which might be of interest and it is suggested that the future RLUP might want to actively encourage visits to some of these as a way of sharing best practice.

We anticipate that the range and scope of such projects will increase rapidly, and we are keen to hear of other examples. These are roughly grouped by land-use.

General sustainable land management

- **Galloway and Southern Ayrshire Biosphere.** Researchers from The University of Edinburgh and Forest Research facilitated a collaborative process with a diverse group of twenty-seven stakeholders in the Biosphere to understand common ground for a future land use vision and explore where change could help achieve the vision. The research identified a shared vision for sustainable regional land use in the Biosphere. The vision combines social, economic, and environmental aspirations for a varied, mixed and integrated living and working landscape that provides an excellent place to live and work with a strong identity and a respected and celebrated natural and cultural heritage. The vision narrative was used to develop spatial criteria to identify where changes in land use or land management should be considered to achieve the vision, such as diversifying agriculture and forestry, restoring peatlands and improving habitats and biodiversity. Despite broad agreement about the types of changes required, and the landscape functions and benefits land in the Biosphere should provide in the future, attempts to discuss specific land use changes at more local scales were difficult. The challenge is now to develop processes that bring together local stakeholders to understand different perspectives and find ways to identify benefits and negotiate trade-offs that are acceptable to a broad group of people.
<https://era.ed.ac.uk/handle/1842/38096>
- **Tweed Catchment Management Plan** / Tweed Forum has been delivering this catchment-wide plan for a number of years. It works with a wide range of partners to improve the quality of the catchment, including a private finance pilot re woodland creation
<https://www.rivertweed.org.uk/river-tweed-commission/reports-publications/tweed-catchment-management-plan/>
- **Talla Hartfell Wild Land Area (WLA)**
The communities around this WLA are working to explore how they can use the recognition of wildness as something of value to their well-being or livelihood. A range of environmental data for the area has been collated and maps will be used to promote debate about potential land use change.
<https://sup.org.uk/projects/talla-hartfell-wildland-project/>
- **The Glenkens communities** have published their own Vision for Land Use, setting out their aspirations for balanced land use across the area and the current challenges to achieving that. Core to their Vision is that '**everyone who takes value from our land returns value to it**'. The Vision aspires to a Glenkens that is an 'exemplar of sustainable land use practice in building resilience for climate, biodiversity & communities, where learning is valued and all voices are listened to and respected'. *It also recognises that the current rapid rate of change in land use in the Glenkens has left communities disempowered and frustrated, and suggests local, regional and national solutions to these issues.*

The Vision was produced under the Community Learning Programme project supported by Scottish Government for the RLUP pilots.

<https://glenkens.scot>

Nature recovery

- **Threave nature reserve**

Kelton Mains was a typical grass park dominated farm near Castle Douglas. The biodiversity value of the area whilst still modest was much diminished, indeed the owners, National Trust for Scotland declared in 2019 that it was an ecologically exhausted landscape. The Threave Nature Reserve is an ambitious 100-year restoration project with the aim of increasing the ecological health of the land so that it can more readily adapt to an uncertain climate future. The principle has been to remove as much of the anthropological furniture as possible, such as nonnative woodland, drainage, and flood banks. This has all been done with rigorous surveys and modelling. The outcome has been a measurable increase in biodiversity and a significant increase in the use by the public.

<https://gallowayglens.org/projects/threave-nature-reserve/>

- **Black Water of Dee**

The Black water of Dee is a river that is heavily influenced by human activity. The construction of the Clatteringshaws reservoir for the Galloway hydro scheme had a direct effect on the movement of fish and sediment in the river. A completely unforeseen impact was the effect that a disruption in the sediment transport of the river would have on salmon populations; this was poorly understood in the 1930s. Over the last 90 or so years river gravels have been discharged out of the River Dee without being replaced from upstream due to the dams, this meant there was nowhere for the salmon to spawn, and they became locally extinct. The Blackwater of Dee project, delivered by Galloway Fisheries Trust was the first attempt to address this with the introduction of gravel from elsewhere in the river system. This will supply the spawning requirements for salmon and other wildlife in the area. This is a significant project for Scotland and the techniques being used are being assessed for suitability on other rivers.

<https://www.gallowayfisheriestrust.org/black-water-of-dee-restoration-project.php>

- **Tarras Valley Nature Reserve** is another community-owned and managed site which is developing a nature reserve on what had previously been sheep and grouse moor.

<https://www.tarrasvalleynaturereserve.org>

- **Black Stank “Sanctuary”** This is a community-based project aimed at restoring a local burn and improving access for local people. Information can be found on the Creating Stranraer website: Black Stank Sanctuary | www.creatingstranraer.co.uk

Food production and regenerative agriculture

- **Greenknowe farm** near Duns, Berwickshire is a medium-sized, 230ha arable farm in the Berwickshire merse, an important area of prime agricultural land in Scotland. In 2015 farmer Neil White investigated options to reduce tillage for crop establishment to improve soil and plant health. A strip till system has been adopted on the whole farm with high quality crops grown without use of a plough or post-harrow combination drill. This has led to a significant improvement in soil health, the soil being more workable, with increased water carrying capacity and resilience, and organic matter has risen 10-15% increasing the carbon held by the soils, currently 40 tonnes of carbon/ha. This regenerative approach has saved time in establishing crops and uses only 1/3 of the fuel previously used.

Winter cover crops fix nitrogen and improve root structure over winter and companion crops are used, reducing inputs of fertilisers, pesticides and herbicides. Mechanical means are used to control weeds and slugs. Biodiversity is being enhanced through grass margins, beetle banks, water margins, species rich grassland and a pond, created under earlier agricultural schemes. The farmhouse and offices are also heated by a biomass boiler (using crop residues) and solar panels.

- **The Food Partnership in D&G** has secured funding to deliver a “Food for the Planet” campaign, with two overarching ambitions. First, to inspire and enable farmers to adopt climate-friendly farming practices, by facilitating a space where farmers and food producers could come together regularly for farm visits, group discussions, and peer-to-peer learning. And secondly, to encourage the production, procurement and consumption of local vegetables and sustainably produced meat.
<https://www.sustainweb.org/news/regenerative-farming-transition-dumfries-and-galloway/>
- **The Digital Dairy Chain** aims to deliver transformational research that will change the face of dairying by helping to establish new products and value chains, cut waste and reduce environmental impact.
<https://www.digitaldairychain.co.uk/>
- **Abundant Borders.** This is a community-based project which encourages local people to grow and appreciate food grown in community managed gardens.
<https://abundantborders.org.uk>
- **The Glenkens** group have also established an on-line food hub promoting and selling locally produced foods:
https://openfoodnetwork.org.uk/glenkens-food-hub/shop#/about_panel
- **MAC-CAN (Machars and Cree Valley Climate Action Network)** Originally a private residence turned into a community croft dedicated to knowledge sharing and food growing. Machars and Cree Valley Climate Action Network | Facebook / <https://mac-can.org>

Native Woodland Creation

- **Carrifran Wildwood** is a community-led habitat restoration project hosted by Borders Forest Trust. Much of it planted by volunteers, it has created a large area of native woodland on what was previously sheep-grazed hill. The project is closely-monitored and the biodiversity gains have been remarkable.
<https://bordersforesttrust.org/wild-heart/carrifran-wildwood>
- **NatureScot** and SOSE are partnering in a private finance investment pilot that could mobilise £2 billion in landscape scale restoration of native woodland, create new jobs and support rural communities across all parts of Scotland.
<https://www.dgwgo.com/rural-farming-news/2-billion-private-finance-pilot-potential-vital-step-restoring-scotlands-woodlands/>
- **The Riverwoods** initiative is a Scottish Wildlife Trust initiative. It has identified where riparian habitats could be enhanced resulting in multiple benefits and it has attracted funding to allow priority projects to proceed. A number of projects are being considered in south Scotland.
<https://www.riverwoods.org.uk/>

Peat restoration and flood mitigation

- **The Crichton Carbon Centre** is an independent, environmental not-for-profit organisation established in 2007. We specialise in peatland restoration, carbon management, sustainable land-use and environmental education.
<https://www.carboncentre.org/>
- **Eddleston Water project.** Supported by the Scottish Government, this project <https://www.gov.scot/policies/water/managing-flood-risk/> is investigating the effectiveness of natural flood management (NFM) techniques and habitat restoration measures at a catchment scale. NFM is one part of the wider sustainable flood risk management approach which, alongside structural measures, flood warning and behavioural responses provides a risk-based and plan-led approach to reducing flood risk, as well as a potential climate change adaptation response. The project looks to provide the evidence base to assess the value, costs and benefits of restoring a typical Scottish river system through changes to land management practices, delivered across the whole catchment.
<https://tweedforum.org/our-work/projects/the-eddleston-water-project/>

Wider community benefit

- Keir, Penpont, and Tynron (**KPT Development Trust**) – First community owned mini hydroelectric scheme with profits going to benefit community projects. Included are interpretation boards explaining the scheme and the importance of net zero. Info to be found here ([Penpont - SP Energy Networks](#))
[KPT Development Trust | Thornhill | Facebook](#)

APPENDIX A8: FUNDING OPPORTUNITIES TO SUPPORT SUSTAINABLE LAND USE

This is a pilot RLUF, tasked with exploring how a regional land use plan might operate. As such it has no direct influence over any funding, but nevertheless it could be used to inform future funding decisions. In the meantime, it should be noted that the aspirations behind the pilot (better outcomes for nature, climate and people) are shared by many funders and there are sources of funding that might be useful in helping to support land use change and to deliver projects. There are also emerging models of attracting private investment to support carbon sequestration and potentially enhanced biodiversity. It is also relevant that the pilot is being delivered by SOSE and guided by the Regional Economic Partnership (REP), which have some ability to help to identify local funds.

Current relevant funds including public and private sources are listed below. Please note it is not an exhaustive list and inevitably will be out of date quite quickly. We will explore the opportunity to share a periodically updated list of funding sources online.

Public Funds:

The Scottish Government's **Nature Restoration Fund** provides grants for projects that restore wildlife and habitats on land and sea and address the twin crises of biodiversity loss and climate change: <https://www.nature.scot/funding-and-projects/scottish-government-nature-restoration-fund-nrf>

Peatland restoration - Peatland Action Fund – contact Nature Scot:

<https://www.nature.scot/climate-change/nature-based-solutions/peatland-action-project/peatland-action-fund-how-apply>

Woodland creation and management – Scottish Forestry Woodland Grant Scheme:

<https://forestry.gov.scot/support-regulations/forestry-grants>

For smaller schemes you could try the South of Scotland Tree Planting Grant:

<https://bordersforesttrust.org/woodland-advice/tree-planting-grant#>

Support for sustainable agriculture – see:

www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2020/12/scottish-rural-development-programme

The Scottish Government is working to develop schemes which encourage farmers to move to address key issues including:

- Greenhouse gas emissions
- Biodiversity audits
- Soil testing
- Nutrient and forage plans, and
- Animal health and welfare plans

From 2026, the Agriculture Bill will have powers to introduce **enhanced payments under the National Test Programme**. This programme is already investing £51 million to help farmers (and crofters) undertake the essential first steps towards more sustainable farming.

<https://www.ruralpayments.org/topics/all-schemes/preparing-for-sustainable-farming--psf/>

Scottish Forestry has recently announced a change to their **grant scheme to promote agroforestry**.

See: <https://www.ruralpayments.org/topics/all-schemes/forestry-grant-scheme/agroforestry/>

Agricultural support is at a key transition point, with the new Agricultural Bill published. The future is sketched out in the 2023 document titled Agriculture Reform Route Map (see

<https://www.ruralpayments.org/topics/agricultural-reform-programme/arp-route-map/>)

Due to pressures on the Scottish budget, the **Food Processing Marketing and Cooperation Grant Scheme** will not be running in 2023/24, but may reopen in 2024/25.

<https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/food-processing--marketing-and-co-operation/>

SEPA have a **Water Environment Fund** (<https://www.sepa.org.uk/environment/water/water-environment-fund/>) for projects that improve water quality. Priorities for the Fund:

- Improving fish migration past redundant structures
- Improving river corridors
- Invasive non-native species (INNS)

Private Funds:

There is also a major push to encourage **private investment** into schemes that reduce carbon emissions, promote biodiversity and/or fund other ecosystem service benefits such as improved water quality or flood risk reduction. For example, **Nature Markets Framework**⁴¹ sets out the UK government's commitment to support the development and scaling up of high integrity 'nature markets' across the UK - including by defining core principles, rules and standards - to enable firms to have the clarity and confidence to mobilise this investment. These nature markets connect sellers of ecosystem services (goods and services provided by nature such as carbon sequestration and flood risk reduction) and biodiversity units/credits to public and private buyers. The Scottish Government has also published **Interim Principles for Responsible Investment in Natural Capital**⁴² and will publish proposals for a market framework to strengthen the interim principles, to help meet climate change and biodiversity goals, support communities and align with a just transition.⁴³

Key Codes and information sources on carbon offsetting include:

- **An interim guide to securing tradeable carbon credits for farmers** - explains the principles of carbon credit trading (under the Woodland carbon code and Peatland code) and the relevance to landlords and tenants of agricultural holdings in Scotland - : https://www.landcommission.gov.scot/downloads/6225dd8ba66c1_TFC%20Interim%20Guide%20to%20Securing%20Tradeable%20Carbon%20Credits%20in%20an%20Agricultural%20Holdings%20Situation.pdf
- **UK Woodland Carbon Code** - the quality assurance standard for woodland creation projects in the UK, the WCC generates high integrity, independently verified carbon units. Backed by the Government and the forest industry - <https://woodlandcarboncode.org.uk/>
- **Peatland code** - a voluntary certification standard for UK peatland projects wishing to market the climate benefits of peatland restoration and provides assurances to voluntary carbon market buyers that the climate benefits being sold are real, quantifiable, additional and permanent - <https://www.iucn-uk-peatlandprogramme.org/peatland-code/introduction-peatland-code>

NatureScot is partnering in a private finance investment pilot that could mobilise £2billion in landscape scale restoration of native woodland, reduce emissions, create new jobs and provide benefits to rural communities. The first pilot emerging under this scheme is in the South of Scotland and is supported by SOSE, and also involves the two local authorities, statutory agencies, Tweed Forum, Borders Forest Trust and Southern Uplands Partnership. This has potential for £200-£300M of private investment, to create up to 30,000ha of new native woodland sequestering around 6M tonnes of carbon.

⁴¹ <https://www.gov.uk/government/publications/nature-markets>

⁴² <https://www.gov.scot/publications/interim-principles-for-responsible-investment-in-natural-capital/>

⁴³ Programme for Government 2023 to 2024: <https://www.gov.scot/publications/programme-government-2023-24/pages/10/>

Information on the Scottish Government's Facility for Investment Ready Nature in Scotland (FIRNS) **grant scheme to support projects that shape and grow the use of private investment and market-based mechanisms** to finance the restoration of Scotland's nature can be found here: <https://www.nature.scot/funding-and-projects/firns-facility-investment-ready-nature-scotland>

There is not yet a clearly defined **Biodiversity Net Gain** (BNG) policy in Scotland so there is currently uncertainty about the future ability to sell biodiversity units/credits. However, this is anticipated to change in the near future.

Numerous **additional ecosystem service credit/unit types and standards** are known to be under development including:

- **further carbon offsetting standards** e.g. hedgerow carbon code (Game and Wildlife Conservation Trust), soil carbon code (Soil Association); UK salt marsh carbon code (UK Centre for Ecology & Hydrology); and the Wilder Carbon Standard (Kent Wildlife Trust).
- **marine net gain** (biodiversity)
- **water-related credit standards** e.g. Forestry Commission is working on a Woodland Water Code (a standard and new market for water-related benefits from woodland creation, including pollution mitigation, reducing flood risk and maintaining river flows);

With regard to wider institutional investment into natural capital, its noteworthy that the **UK Infrastructure Bank** is looking to deploy capital into high-integrity natural capital projects and recently loaned £12M to Highlands Rewilding to support a nature restoration project in the Scottish Highlands.

Wider funding sources:

Tourism support can be sought from SOSE see <https://www.southofscotlandenterprise.com/services>

See also the **Destination Net Zero programme** - <https://www.visitscotland.org/supporting-your-business/responsible-tourism/climate-change/net-zero>

There are a large number of **community benefit funds** associated with wind farms across the region. Many of these would consider proposals for enhanced land management projects. Information on these funds is not centrally coordinated – but Foundation Scotland manages many of them, see <https://www.foundationscotland.org.uk/apply-for-funding>