

**Scottish Government**

# Scotland's Third Land Use Strategy

## SEA Environmental Report

**Final report**

Prepared by LUC

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**Scottish Government**

**Scotland's Third Land Use Strategy  
SEA Environmental Report**

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# Chapter 1

## Introduction

### Purpose of this report

**1.1** The Scottish Government is preparing Scotland's Third Land Use Strategy 2021 - 2026. The Joint Screening and Scoping Report identified no likely significant effects arising from the draft Strategy and consequently concluded that a SEA is not required under the Environmental Assessment (Scotland) Act 2005 ("the 2005 Act). However, a voluntary SEA is has been undertaken to help identify any opportunities to deliver wider environmental benefits and to inform future policy development.

### Scotland's Third Land Use Strategy 2021 - 2026

#### Background

**1.2** The term "land use" covers all forms of land and water management. This includes farming, forestry, renewable energy, housing and recreation. The draft Strategy will cover all land use, ranging from urban to mountains.

**1.3** The Climate Change (Scotland) Act 2009 (the "2009 Act") sets targets for greenhouse gas (GHG) emissions reductions for 2020 and 2050 and requires the setting of annual targets and reporting of the progress of these actions towards the targets. The development of Scotland's first Land Use Strategy and further revised versions are a key commitment of Section 57 of the 2009 Act, placing a duty on Scottish Ministers to produce a land use strategy to 2050 which should be revised every 5 years. The 2009 Act set out a requirement for land use strategies to outline Scottish Ministers' objectives in relation to sustainable land use and their proposals and policies for meeting those objectives. It is also a requirement that strategies set out how they will contribute to the achievement of Ministers' duties and objectives for climate change mitigation and adaptation and sustainable development.

**1.4** The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (the "2019 Act") set more ambitious GHG emission reduction interim targets as well as a net zero target by 2045. The 2019 Act also includes additions relating to reporting on the land use strategy, as well as provisions for climate change plans to include information on the

establishment of any regional land use partnerships and how these will be supported and resourced to develop frameworks.

### Third Land Use Strategy: policies and proposals

**1.5** A two-phased approach is proposed, with the publication of a high-level themed Strategy in Spring 2021, followed by a delivery/action plan, which will outline more detailed steps on the relevant SG policies and actions. The Third Land Use Strategy will create an overall understanding of the role of existing policies, such as those related to peatland restoration, afforestation and sustainable agriculture alongside enhancing biodiversity, natural capital and ecosystems services and how these can help support the Scottish Government sustainable land use vision and objectives. In addition, the Strategy will support key wellbeing economy priorities of environmental, economic and social sustainability that Scotland's land is expected to deliver.

**1.6** However, the overarching focus would remain on the contributions Scotland's land can and will have on climate change mitigation and adaptation to reach our net-zero targets by 2045.

**1.7** The Convention on Biological Diversity states "the ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way".<sup>1</sup> It is expected that the draft Strategy will continue to integrate and promote an ecosystems approach to encourage good decision making similar to that adopted in the previous two strategies.

### Regional Land Use Partnerships

**1.8** Regional land use partnerships can be a tool to deliver improved outcomes to meet the challenges associated with climate change, environmental targets, economic recovery and renewal. They also aim to introduce a more joined up approach to planning for land use, delivering a change in the way land use decisions are made. The interim Land Commission report on regional land use partnerships identified a potential to empower more regional and local engagement, decision making and action through these as well as enable collaboration needed to meet Scotland's ambitions for natural capital, climate and inclusive growth. Regional land use partnerships can be a key mechanism to deliver the ambitions of the draft Strategy and Scotland's national net-zero target.

### Key objectives of the Strategy

- Responsible stewardship of Scotland's natural resources delivering more benefits to Scotland's people;
- Land based businesses working with nature to contribute more to Scotland's prosperity; and
- Urban and rural communities better connected to the land, with more people enjoying the land and positively influencing land use.

### Principles for Sustainable Land Use

**1.9** The Principles for Sustainable Land Use are a strong and useful component of policy and should continue to inform land use choices across Scotland. These Principles are:

- 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

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<sup>1</sup> Convention on Biological Diversity (2020) Ecosystem Approach [online]. Available at: <https://www.cbd.int/ecosystem>

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.

## Strategic Environmental Assessment

**1.10** The SEA Directive<sup>2</sup> is implemented by the Environmental Assessment (Scotland) Act 2005 ('the 2005 Act')<sup>3</sup>, and is a means to judge the likely impact of the plan, programme or strategy on the environment and to seek ways to minimise adverse effects, if likely to be significant.

**1.11** The SEA process comprises a number of stages:

- Pre-screening.
- Screening (preparation of a Screening Report).
- Scoping (preparation of a Scoping Report).
- Environmental Assessment (preparation of an Environmental Report).
- Main consultation on the Environmental Report.
- Preparation of a Post-adoption SEA Statement.
- Monitoring the significant environmental effects of implementing the Final Corporate Plan.

**1.12** A combined Screening/Scoping report was prepared and submitted to the SEA Gateway on 2<sup>nd</sup> October 2020.

## Structure of the Environmental Report

**1.13** This chapter has described the background to the Scotland's Third Land Use Strategy and the requirement to undertake SEA. The report is structured into the following chapters, and bold highlights illustrate where these meet the requirements of the 2005 Act.

- Chapter 1: Outlines the contents and main objectives of the Scotland's Third Land Use Strategy and its relationship with other qualifying plans and programmes.
- Chapter 2: Describes the approach to the assessment including the difficulties encountered.
- Chapter 3: Describes the, the environmental baseline including key trends and environmental problems.
- Chapter 4: Describes the significant environmental effects expected from the Scotland's Third Land Use Strategy and the reasonable alternatives.
- Chapter 5: Describes the mitigation and enhancement measures proposed.
- Chapter 6: Describes the approach to monitoring.
- Chapter 7: Sets out the next steps for the Scotland's Third Land Use Strategy and for the environmental assessment process.

**1.14** The main body of the report is supported by a number of appendices:

- Appendix A: Baseline maps.
- Appendix B: SEA assessment tables and summary tables of SEA scores.

<sup>2</sup> Directive 2001/42/EC

<sup>3</sup> The Environmental Assessment (Scotland) Act 2005

## Chapter 2

# Approach to Assessment

**2.1** This is a strategic level assessment of Scotland's third Land Use Strategy (LUS3). The approach to the assessment reflects the extent and level of detail included in the LUS3, which will be followed by a detailed delivery/action which will also be subject to SEA.

### SEA baseline

**2.2** The purpose of the environmental baseline is to provide a description of the environmental characteristics against which the changes arising from the Scotland's Third Land Use Strategy 2021 – 2026 are assessed. It is usual to consider how the environmental baseline would have continued to evolve in the absence of the plan that is being assessed. Environmental trends are therefore taken into account.

### Environmental baseline information

**2.3** The environmental baseline for the SEA is structured around the following SEA topics, all of which have been scoped in to the SEA:

- Biodiversity, flora and fauna;
- Population and human health;
- Soil;
- Water;
- Air;
- Climatic factors;
- Cultural heritage, including architectural and archaeological heritage;
- Landscape and geodiversity; and,
- Material assets.

### SEA framework

**2.4** Reflecting the high-level content of Scotland's Third Land Use Strategy, the assessment has focused on the identification of effects associated with each of the SEA topic areas, focusing on the broad assessment question of 'how will Scotland's Third Land Use Strategy affect...?'

## Approach to the assessment

**2.5** The approach to the assessment has been based on the following:

- Identifying the key themes for each landscape setting as set out in Scotland's Third Land Use Strategy;
- Identifying the environmental effects of each of the themes for that landscape setting, drawing on the findings of completed SEA related to that theme, where relevant.

### Cumulative, secondary and synergistic effects

**2.6** Cumulative, secondary and synergistic effects are identified at two levels:

- in relation to the key themes across each landscape setting;
- Across all landscape settings.

### Reasonable alternatives

**2.7** The 2005 Act requires that the likely significant environmental effects of reasonable alternatives of a plan, programme or strategy are assessed as part of the SEA process.

**2.8** Due to the staged approach to the preparation of the LUS3, this element of the Strategy sets out the interaction of existing policies. This will be followed by the delivery plan. Reflecting that the high-level component of LUS3 represents a compilation of existing / extant policies, there is no meaningful scope to reasonable alternatives.

**2.9** It is anticipated that the identification of alternatives will be reflected in the development of the delivery plan which will explore alternative mechanisms to address land use tensions or support positive synergies identified through the SEA for this first stage of the Strategy.

### Difficulties encountered

**2.10** Schedule 3 of the 2005 Act states that Responsible Authorities should identify any difficulties encountered during the assessment process.

**2.11** At the time of the assessment some of the themes included within Scotland's Third Land Use Strategy were still under development, such as the Blue Economy Action Plan. This led to the identification of uncertainty in some areas of the assessment.



# Chapter 3

## Environmental Context

### Introduction

**3.1** Schedule 3 of the Environmental Assessment (Scotland) Act 2005 (the 2005 Act) requires that the following be identified when undertaking a SEA:

- Relevant aspects of the current state of the environment and its likely evolution without implementation of the plan or programme.
- Environmental characteristics of areas likely to be affected.
- Relevant existing environmental problems.
- Relevant environmental protection objectives at the international, European or national level.

**3.2** Scotland's Third Land Use Strategy has been assessed against this baseline to provide an indication of the type and significance of any environmental effects that could arise.

**3.3** Baseline maps to illustrate the relationship of some of the key baseline information across Scotland are provided in Appendix 1 [*separate pdf file for this draft*].

## Climatic Factors

### Environmental Protection Objectives

**3.4** Scotland's ambition on tackling climate change is set out in the *Climate Change (Scotland) Act 2009* ("the 2009 Act")<sup>4</sup>. Through this legislation, Scotland contributes to international (EU and UN) efforts on climate change mitigation and adaptation. The 2009 Act creates the statutory framework for greenhouse gas (GHG) emissions reduction in Scotland and set targets for reduction in emissions of the seven Kyoto Protocol GHG by 80% by 2050, with an interim 2020 target of 42%, compared to the 1990/1995 baseline level.

**3.5** *The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019*<sup>5</sup>, amends the *Climate Change (Scotland) Act 2009*, sets targets to reduce Scotland's emissions of all

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<sup>4</sup> The Scottish Government (2009) Climate Change (Scotland) Act 2009 [online] Available at: <http://www.legislation.gov.uk/asp/2009/12/contents> (accessed 14/02/2020))

<sup>5</sup> Scottish Government (2019) The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 [online] Available at: <http://www.legislation.gov.uk/asp/2019/15/enacted> (accessed 27/03/2020)

greenhouse gases to net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040.

**3.6** The 2019 Act also requires that annual GHG emissions targets are set, by Order, for each year in the period 2021-2045. Following the initial phase of target-setting, the annual targets are set in nine-year batches.

**3.7** *The Climate Change Plan*<sup>6</sup> sets out a vision that by 2032 Scotland will have reduced its emissions by 66% relative to 1990 baseline. Specifically, the emissions from electricity production are expected to fall by 28% within that period, emissions from buildings by 33%, emissions from transport by 37%, emissions from industries by 21%, emissions from waste by 52%, and emissions from agriculture by 9%. In addition, land use, land use change and forestry should sequester 6.7 MtCO<sub>2</sub>e by 2032. The Climate Change Plan update was published in December 2020, after the preparation of this Environmental Report.

**3.8** The *Scottish Climate Change Adaptation Programme* (the Adaptation Programme)<sup>7</sup> addresses the impacts identified for Scotland in the *UK Climate Change Risk Assessment* (CCRA)<sup>8</sup>. The Adaptation Programme sets out Scottish Ministers' objectives in relation to adaptation to climate change, their proposals and policies for meeting these objectives, and the period within which these proposals and policies will be introduced. The Programme also sets out the arrangements for wider engagement in meeting these objectives.

**3.9** At the Paris Climate Conference (COP 21) in December 2015, 195 countries adopted the first ever universal, legally binding global climate deal. The *Paris Agreement* is a bridge between today's policies and climate-neutrality before the end of the century. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C<sup>9</sup>. The deal also states that countries should aim for the even more ambitious target of 1.5°C<sup>10</sup>. A number of other agreements were reached on key issues such as mitigation through reducing emissions, adaptation and loss and damage<sup>11</sup>. The Agreement entered into force on 4<sup>th</sup> November 2016<sup>12</sup>.

### Overview of Baseline

**3.10** In October 2018, the Intergovernmental Panel on Climate Change published a report which predicts that the impacts and costs of global warming 1.5°C above pre-industrial levels will be far greater than expected. It also highlights that the impacts will be much worse if global warming reaches 2°C or more. Urgency for action is required as the report predicts such level of global warming can be reached within the next 11 years, and most certainly within 20 years without major reductions in CO<sub>2</sub> emissions. The Scottish government has recognised a climate emergency and is acting accordingly.

**3.11** In 2018, Scotland's total emissions of the seven GHG were estimated to be 41.6 MtCO<sub>2</sub>e, an increase in source emissions of 1.5% from 2017<sup>13</sup>. The main contributors to this increase between 2017 and 2018 was a rise in Energy Supply emissions (0.8MtCO<sub>2</sub>e, 13.4%) and it was driven almost entirely by increased emissions from power stations. A 45.4% reduction in estimated GHG emissions between 1990 and 2018 was also reported<sup>14</sup>. Decreases in emissions were from energy supply, land use, land use change and forestry, waste management (i.e. landfill), and business emissions (such as manufacturing). The largest factor slowing the overall reduction is transport (excluding international), as this sector was the largest contributor in 2018 with 12.9MtCO<sub>2</sub>e, and it has only reduced emissions by 4.9% since 1990<sup>15</sup>.

**3.12** Land use, land use change and forestry play a crucial role in removing CO<sub>2</sub> from the atmosphere by serving as a carbon stock in a form of forestland, cropland, grassland, wetlands, settlements and harvested wood products and rewetting soils and gaining soils organic matter.

**3.13** In towns and cities, urban woodlands, forests and trees not only improve the general public realm but also deliver cooling, shade, better air quality and absorb CO<sub>2</sub> emissions.

### Evolution of the Baseline – Pressure, Trends and Key Points

**3.14** In Scotland, greenhouse gas (GHG) emissions are the key driver for climate change. Major contributors to the GHG emissions include transport sector (excluding international aviation and shipping) (12.9 million tonnes of carbon dioxide

<sup>6</sup> Scottish Government (2018) Climate Change Plan [online] Available at: <https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018-9781788516488/> (accessed 27/03/2020)

<sup>7</sup> Scottish Government (2019) Climate Ready Scotland Scottish Climate Change Adaptation Programme 2019-2024 [online] Available at: <https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/> (accessed 14/02/2020)

<sup>8</sup> UK Government (2017) UK Climate Change Risk Assessment [online] Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017> (accessed 10/02/2020)

<sup>9</sup> UNFCCC (2016) The Paris Agreement [online] Available at: [http://unfccc.int/paris\\_agreement/items/9485.php](http://unfccc.int/paris_agreement/items/9485.php) (accessed 14/02/2020)

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> Scottish Government (2020) Scottish Greenhouse Gas Emissions 2018. [pdf] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2018/> [Accessed on 08/09/2020]

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

equivalent (MtCO<sub>2</sub>e)), business (8.4MtCO<sub>2</sub>e), agriculture (7.5MtCO<sub>2</sub>e), energy supply (6.8MtCO<sub>2</sub>e) and the residential sector (6.2MtCO<sub>2</sub>e). Minor contributions were recorded for international aviation and shipping, public sector buildings, waste management and industrial processes. Land use, land use change and forestry were the only aggregate sector which contributed to reducing emissions by approximately 5.4MtCO<sub>2</sub>e in 2018<sup>16</sup>.

**3.15** Almost three-quarters (74.2%) of Scotland's GHG emissions in 2018 were in the form of carbon dioxide (CO<sub>2</sub>)<sup>17</sup>. During 2018, CO<sub>2</sub> was the main GHG emitted in most sectors, with the exception of agriculture sector. Methane (followed by CO<sub>2</sub> and nitrous oxide) was the main gas emitted by the agriculture sector and almost all emissions emitted by the waste management sector were in the form of methane.

**3.16** It is predicted that the greatest direct climate change-related threats for the UK are large increases in flood risk, exposure to high temperatures and heat waves; shortages in the public water supply and for agriculture, energy production and industry; substantial risks to UK wildlife and natural ecosystems risks to domestic and international food production and trade<sup>18</sup>. New and emerging pests and diseases, and invasive non-native species affecting people, plants and animals have also been noted as a research priority<sup>19</sup>.

**3.17** Scotland's soils and peatlands are the biggest terrestrial store of carbon with peatlands alone holding around 3,000 megatonnes tonnes of carbon<sup>20</sup>; 60 times more than carbon stored by trees and other vegetation<sup>21</sup>. Inshore and offshore waters also store a significant resource of blue carbon, with an estimated 18 million tonnes of organic carbon stored in the top 10 cm of sediments across Scotland's seas<sup>22</sup>. Stocks of carbon within the habitats and surface sediments of offshore Marine Protected Areas are estimated at 9.4 Mt organic carbon and 47.8 Mt inorganic carbon<sup>23</sup>.

**3.18** The extent of the effects of climate change will vary by location and projections indicate that climate change trends observed over the last century will continue and intensify over the coming decades. Key long-term climate change trends for Scotland are that weather may become more variable, typical summers will be hotter and drier, winter and autumn will be milder and wetter and sea levels will continue to rise<sup>24</sup> and this will have an impact on coastal landscapes. Increases in summer heat waves, extreme temperatures and drought, as well as an increase in the frequency and intensity of extreme precipitation events, are also expected<sup>25</sup>. Urban areas in particular will be exposed to extreme heat conditions.

**3.19** Climate change has been identified as a primary pressure on many of the SEA topic areas (i.e. soil, water, biodiversity, cultural heritage and the historic environment). These pressures and predicted impacts have been discussed further under the individual SEA topics. The complex interaction between air quality and climate change has also been considered under the SEA topic of "Air Quality".

**3.20** Climate change can also give rise to indirect impacts arising from mitigation and adaptation measures. For example, renewable energy is crucial to meeting Scotland's emissions reduction targets. However, individual technologies can have negative environmental impacts such as localised visual effects, changes in landscape and land use, and impacts on biodiversity, water, and air quality, amongst others.

**3.21** The Covid pandemic has posed new challenges and highlighted the scale of changes required for achieving Scotland's emissions reduction targets. Despite strict lockdown regulations imposed across the world and resulting temporary local improvements in air quality, evidence suggests that the direct effect of the pandemic-driven response will be negligible in the longer term. However, the same research highlights a window of opportunity to reduce emissions if the economic recovery is tilted towards green stimulus and reductions in fossil fuels investments<sup>26</sup>.

<sup>16</sup> Scottish Government (2020) Scottish Greenhouse Gas Emissions 2018. [pdf] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2018/> [Accessed on 08/09/2020]

<sup>17</sup> Scottish Government (2020) Scottish Greenhouse Gas Emissions 2018. [pdf] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2018/> [Accessed on 08/09/2020]

<sup>18</sup> Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017. Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 14/02/2020)

<sup>19</sup> *ibid*

<sup>20</sup> SNH [2019] Managing nature for carbon capture [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/managing-nature-carbon-capture> (accessed 14/02/2020)

<sup>21</sup> *ibid*

<sup>22</sup> SNH (2014) SNH Commissioned Report 761 – Assessment of carbon budgets and potential blue carbon stores in Scotland's coastal and marine environment. Available at: <https://www.nature.scot/snh-commissioned-report-761-assessment-carbon-budgets-and-potential-blue-carbon-stores-scotland>

[761-assessment-carbon-budgets-and-potential-blue-carbon-stores-scotland](https://www.nature.scot/snh-commissioned-report-957-assessment-blue-carbon-resources-scotland-inshore-marine-protected-area) (accessed 14/02/2020)

<sup>23</sup> SNH (2017) SNH Commissioned Report No. 957: Assessment of Blue Carbon Resources in Scotland's Inshore Marine Protected Area Network. Available at: <https://www.nature.scot/snh-commissioned-report-957-assessment-blue-carbon-resources-scotland-inshore-marine-protected-area> (accessed 14/02/2020)

<sup>24</sup> Adaptation Scotland (2018) Climate trends and projections [online] Available at: <https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections> (accessed 14/02/2020)

<sup>25</sup> *ibid*

<sup>26</sup> Forster, P. et al. (7 August 2020) Current and future global climate impacts resulting from COVID-19. Nature Climate change. [online] Available at: <https://www.nature.com/articles/s41558-020-0883-0> [accessed on 28/08/2020]

Importantly, the pandemic has demonstrated that radical change can be achieved if necessary.

**3.22** All Scottish landscapes play a role in reducing and removing excessive GHG emissions from the atmosphere through appropriate management of various land types and serving as valuable carbon sinks. In urban and peri-urban such actions will take form of green networks, open spaces, green and blue infrastructure and management of pollinators. For the fertile plains and marginal land, it will be important to increase biodiversity, tree cover, number of pollinators, design and manage forests and woodlands so that they have positive impacts on air, water, soils, biodiversity and landscapes and serve as natural flood management areas. Uplands and

mountains offer space for large carbon sequestration projects, peatland restoration and protection and enhancement of other carbon rich habitats. Further, rivers, water bodies and offshore areas enable further blue carbon sequestration. Island landscapes offer good conditions for taking advantage of wind and tidal energy.

**Related SEA topics:** Climate change has been identified as primary pressure on many of the SEA topic areas (i.e. soil, water, biodiversity, cultural heritage and the historic environment).

**Table 3.1: Climatic Factors issues related to Scotland's landscape settings**

Landscape type	Climatic factors related issues
Urban Peri-urban	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ GHG emissions from energy and heating sectors (domestic energy efficiency);</li> <li>■ GHG emissions from transport and importance of increasing active travel and low carbon transport;</li> <li>■ GHG emissions from travel;</li> <li>■ GHG emissions and transport are a particular issue for peri-urban due to commuting patterns</li> <li>■ GHG emissions from waste management (reduce waste production, improve recycling);</li> <li>■ GHG emissions reductions from renewable energy development located on buildings</li> <li>■ Role of urban woodlands, forests, and trees for the purposes of carbon sequestration;</li> <li>■ Land lost to development (loss of carbon storage);</li> <li>■ GHG emissions from waste management;</li> <li>■ Role of local food production and community growing;</li> </ul> <p><b>Climate change adaptation</b></p> <ul style="list-style-type: none"> <li>■ Cooling effect of green and blue infrastructure and role in flood management</li> <li>■ Land lost to development (loss of land to perform adaptation functions);</li> <li>■ Importance of flood plains for flood risk management;</li> </ul>
Fertile plain	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ GHG emissions from agricultural inputs and livestock production;</li> <li>■ GHG emissions from land use change (changes in land management practices);</li> <li>■ Importance of woodlands, forests and hedgerows amongst agricultural fields for carbon sequestration.</li> <li>■ GHG emissions from travel;</li> </ul>

Landscape type	Climatic factors related issues
	<p><b>Climate change adaptation</b></p> <ul style="list-style-type: none"> <li>■ Importance of natural flood management and shelter for livestock;</li> <li>■ Importance of woodlands, forests and hedgerows for habitat connectivity;</li> </ul>
Marginal land	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ Importance of large-scale woodland and forestry, green networks (carbon sequestration);</li> <li>■ Wetland carbon storage;</li> <li>■ Biomass production;</li> <li>■ Renewable energy generation;</li> <li>■ GHG emissions from travel;</li> </ul> <p><b>Climate change adaptation</b></p> <ul style="list-style-type: none"> <li>■ Importance of natural flood management;</li> <li>■ Woodland and hedgerows providing shelter for livestock;</li> <li>■ Importance of woodlands, forests and hedgerows for habitat connectivity;</li> </ul>
Upland Mountains	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ GHG emissions from travel;</li> <li>■ Peatland carbon storage;</li> <li>■ Wetland carbon storage;</li> <li>■ Woodlands and forests role in carbon storage;</li> <li>■ Renewable energy generation;</li> </ul> <p><b>Climate change adaptation</b></p> <ul style="list-style-type: none"> <li>■ Habitat change;</li> <li>■ Wildfire risk;</li> </ul>
Rivers and water bodies	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ GHG emissions from travel impacts;</li> <li>■ Renewable energy generation;</li> <li>■ Carbon sequestration and storage;</li> </ul> <p><b>Climate change adaptation</b></p> <ul style="list-style-type: none"> <li>■ Managing flood risk;</li> <li>■ water quality issues from changing climate;</li> </ul>
Coastal and Islands	<p><b>Climate change mitigation</b></p> <ul style="list-style-type: none"> <li>■ GHG emissions from travel and transport;</li> <li>■ Renewable energy generation;</li> <li>■ Carbon stored in intertidal habitats;</li> </ul>

Landscape type	Climatic factors related issues
	<b>Climate change adaptation</b> <ul style="list-style-type: none"> <li>■ Managing coastal erosion and sea level rise, including impacts on key infrastructure;</li> <li>■ Island communities;</li> <li>■ Managing habitats (managed realignment);</li> </ul>
Offshore	<b>Climate change mitigation</b> <ul style="list-style-type: none"> <li>■ Renewable energy developments;</li> <li>■ Carbon sequestration</li> </ul>

## Population and Human Health

### Environmental Protection Objectives

**3.23** Many existing environmental protection objectives are relevant to population and human health, either directly or indirectly. For example, the *Air Quality Standards (Scotland) Regulations 2010*<sup>27</sup>, the *Air Quality (Scotland) Regulations 2000*<sup>28</sup>, the *Air Quality (Scotland) Amendment Regulations 2002*<sup>29</sup> and the *Air Quality (Scotland) Amendment Regulations 2016*<sup>30</sup> help set out current objectives and requirements for air quality with clear relevance for human health. Protection is also afforded through existing legislation against noise and vibration nuisance at the both the European level through the *Environmental Noise Directive (2002/49/EC)*<sup>31</sup> and the national level through regulations such as the *Environmental Noise (Scotland) Regulations 2006*<sup>32</sup>.

**3.24** The *Pollution Prevention and Control (Scotland) Regulations 2012*<sup>33</sup> (PPC Regulations) also seek to provide protection for human health. The PPC Regulations introduce a consistent and integrated approach to environmental protection to ensure that industrial activities that may have a

significant impact on the environment are strictly regulated. The regulations were designed to eliminate or minimise emissions to air, water and land and extended pollution controls to previously unregulated sectors.

**3.25** *Cleaner Air for Scotland – The Road to a Healthier Future*<sup>34</sup> sets out a long-term vision for air quality in Scotland by detailing how Scottish Government and its partner organisations aim to reduce air pollution. As a result, this strategy will lead to improved human health, wellbeing, environment, placemaking and sustainable economic growth. Lastly, it will fulfil Scotland's legal responsibilities to reduce emissions. Currently, the strategy is under review and a new strategy is due to be published early 2021.

### Overview of Baseline

**3.26** The estimated population of Scotland in 2018 was 5.4 million, the highest to date, and has increased by 0.5% from 2017 and by 5% over the last decade<sup>35</sup>. Projections forecast that the population will continue to rise to around 5.6 million in 2026, continuing to increase to around 5.7 million in 2041<sup>36</sup>. Life expectancy has increased over the past three decades; however, this has slowed in recent years<sup>37</sup>.

<sup>27</sup> The Air Quality Standards (Scotland) Regulations 2010 [online] Available at: <http://www.legislation.gov.uk/ssi/2010/204/contents/made> (accessed 14/02/2020)

<sup>28</sup> Scottish Government (2000) The Air Quality (Scotland) Regulations 2000 [online] Available at: <http://www.legislation.gov.uk/ssi/2000/97/made> (accessed 27/03/2020)

<sup>29</sup> Scottish Government (2002) The Air Quality (Scotland) Amendment Regulations 2002 [online] Available at: <http://www.legislation.gov.uk/ssi/2002/297/introduction/made> (accessed 27/03/2020)

<sup>30</sup> The Air Quality (Scotland) Amendment Regulations 2016 [online] Available at: <http://www.legislation.gov.uk/sdsi/2016/9780111030837/contents> (accessed 14/02/2020)

<sup>31</sup> Environmental Noise Directive 2002/49/EC [online] Available at: [http://ec.europa.eu/environment/noise/directive\\_en.htm](http://ec.europa.eu/environment/noise/directive_en.htm) (accessed 14/02/2020)

<sup>32</sup> Environmental Noise (Scotland) Regulations 2006 [online] Available at: <http://www.legislation.gov.uk/ssi/2006/465/made> (accessed 14/02/2020)

<sup>33</sup> The Pollution and Prevention Control (Scotland) Regulations 2012 [online] Available at: <http://www.legislation.gov.uk/ssi/2012/360/contents/made> (accessed 14/02/2020)

<sup>34</sup> Scottish Government (2015) *Cleaner air for Scotland: the road to a healthier future* [online] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-road-healthier-future/> (accessed 27/03/2020)

<sup>35</sup> National Records for Scotland (2019) Scotland's population 2018 [online] Available at: <https://www.nrscotland.gov.uk/files//statistics/rqar/2018/rqar18.pdf> (Accessed on 08/09/2020)

<sup>36</sup> National Records of Scotland (2017) Projected Population of Scotland (2016-based) [online] Available at: <https://www.nrscotland.gov.uk/statistics-and-data/statistics/statistics-by-theme/population/population-projections/population-projections-scotland/2016-based> (accessed 08/09/2020)

<sup>37</sup> National Records for Scotland (2019) Scotland's population 2018 [online] Available at: <https://www.nrscotland.gov.uk/files//statistics/rqar/2018/rqar18.pdf> (Accessed on 08/09/2020)

**3.27** Approximately 71% of Scotland's people live in urban areas, which accounts for just 2% of Scotland's land surface<sup>38</sup>. Most of the population and industry is concentrated in highly urbanised areas in the Central Belt and on the East Coast, and primarily in four key city regions (Aberdeen, Dundee, Edinburgh, and Glasgow) and several smaller cities and towns (e.g. Ayr, Inverness, Perth and Stirling). Around 12.4% of the population live in small towns of less than 10,000 people; of these, around 70% are located within a 30-minute drive of large urban settlements, with the other 30% located more remotely<sup>39</sup>.

**3.28** The Scottish Index of Multiple Deprivation ranks small areas (data zones) in Scotland from the most deprived to the least deprived. It analyses data from several indicators across the domains of income, employment, health, education, skills and training, housing, geographic access and crime. Key findings from the 2020 Index show that 14 areas have been consistently among the 5% most deprived in Scotland since the 2004 Index. Of these, 9 were in Glasgow City with the remainder located in Inverclyde, Renfrewshire, Highland, North Lanarkshire and North Ayrshire. Six council areas now have a larger share of the 20% most deprived data zones in Scotland compared to 2016, with the largest increases observed in Aberdeen City, North Lanarkshire, Moray, East Lothian, Highland and North Ayrshire<sup>40</sup>.

### Evolution of the Baseline

**3.29** Air quality is important for both short and long-term human health. In general, healthy people may not suffer from any serious health effects from exposure to the levels of pollution commonly experienced in urban environments. However, continual exposure can cause harm over the long term, and those with pre-existing health conditions such as heart disease, lung conditions, and asthma can be adversely impacted by exposure to air pollutants<sup>41</sup>. Research has shown

that air pollution is one of the largest environmental risks to public health in the UK, reducing average life expectancy and often contributing to premature deaths<sup>42</sup>. Activities that generate air pollutants have been considered under the topic of Air Quality.

**3.30** Transport is a significant contributor to poor air quality in urban areas<sup>43</sup> and emissions from transport have only declined by 4.9% since 1990<sup>44</sup>. Approximately 66% of all journeys in Scotland are reported to be made by car, which is an increase of 7.7% over 5 years<sup>45</sup>. 40% of these journeys are less than two miles in length and could be potentially covered by bicycle or on foot<sup>46</sup>. In addition to helping to reduce GHG emissions, active travel such as cycling or walking, can provide access to the outdoors with additional benefits for physical and mental health and well-being, including reducing obesity and stress. Due to several common sources, most notably road traffic in urban areas, there is also a close relationship between air quality and environmental noise<sup>47</sup>. The agriculture sector has dominated the ammonia emissions inventory, producing around 90% of Scotland's ammonia emissions in 2016<sup>48</sup>.

**3.31** Heating and cooling homes and businesses accounts for approximately half of Scotland's GHG emissions. Challenging weather, poor energy efficiency and reduced heating options (especially in rural areas) can make fuel bills unaffordable, resulting in fuel poverty<sup>49</sup>. In 2018, the estimated rate of fuel poverty remained similar to the previous year at approximately 25.0% or around 619,000 fuel poor households, and 7.0% or 174,000 households were living in extreme fuel poverty<sup>50</sup>. This compares to the 26.5% or 649,000 fuel poor households in 2016, with 7.5% or 183,000 households living in extreme fuel poverty<sup>51</sup>.

<sup>38</sup> Scotland's Environment (2014) Scotland's State of the Environment Report 2014 – 7 People and the environment [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 08/09/2020)

<sup>39</sup> *ibid*

<sup>40</sup> Scottish Government (2020) Introducing - The Scottish Index of Multiple Deprivation 2020 [online] Available at: <https://www.gov.scot/publications/scottish-index-multiple-deprivation-2020/> (accessed 08/09/2020)

<sup>41</sup> Scotland's Environment (2016) Air quality and health [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality-and-health/> (accessed 09/09/2020)

<sup>42</sup> Scottish Government (2019) Cleaner Air for Scotland strategy: independent review [pdf] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-strategy-independent-review/pages/6/> (accessed 09/09/2020)

<sup>43</sup> Scotland's Environment (2016) Air quality [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality/> (accessed 09/09/2020)

<sup>44</sup> Scottish Government (2020) Scottish Greenhouse Gas Emissions 2018. [pdf] Available at: <https://www.gov.scot/publications/scottish-greenhouse-gas-emissions-2018/> [Accessed on 08/09/2020]

<sup>45</sup> Transport Scotland (2019) Scottish Transport Statistics [pdf] Available at: <https://www.transport.gov.scot/media/47196/scottish-transport-statistics-2019.pdf> (accessed 09/09/2020)

<sup>46</sup> Transport Scotland (undated) Walking and cycling [online] Available at: <https://www.transport.gov.scot/our-approach/active-travel/walking-and-cycling/#42959> (accessed 09/09/2020)

<sup>47</sup> Scottish Government (2019) Cleaner Air for Scotland strategy: independent review [pdf] Available at: <https://www.gov.scot/publications/cleaner-air-scotland-strategy-independent-review/pages/6/> (accessed 09/09/2020)

<sup>48</sup> National Atmospheric Emissions inventory (2018) Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2016 [online] Available at: [https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1810160958\\_DA\\_Air\\_Pollutant\\_Inventories\\_1990-2016\\_Issue1.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1810160958_DA_Air_Pollutant_Inventories_1990-2016_Issue1.pdf) (accessed 27/10/2020)

<sup>49</sup> Scottish Government (undated) Home energy and fuel poverty [online] Available at: <https://www.gov.scot/policies/home-energy-and-fuel-poverty/> (accessed 09/09/2020)

<sup>50</sup> Scottish Government (2018) A national statistic publication for Scotland [online] Available at: <https://www.gov.scot/news/no-real-change-in-fuel-poverty-in-2017/> (accessed 09/09/2020)

<sup>51</sup> *ibid*

**3.32** Flooding can have significant environmental impacts and can also affect people, communities and businesses<sup>52</sup>. When floods occur, they disrupt day-to-day lives and their impacts can be long lasting. Climate change is expected to increase the risk of flooding in coming years, and it also brings additional risks to human health posed by changes to air quality and rising temperatures<sup>53</sup>.

**3.33** The potential risks and benefits of climate change on population and health will not be evenly spread. For example, pockets of dense urban development will be more at risk of surface water flooding and summer heat stress. In addition, the effects to human health from climate change may have the greatest impact on vulnerable people. Negative health effects are likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover<sup>54</sup>.

**3.34** Urban and peri-urban landscapes which can provide high quality green spaces and have positive effects on human health and wellbeing<sup>55</sup>. The Covid-19 pandemic has

highlighted the inequality issues across the population and indicated that deprived areas are often the ones with least access to green spaces<sup>56</sup>.

**3.35** Fertile plains, uplands, mountains, river and water bodies and coastal areas in Scotland attract a significant amount of domestic and international tourism for its various landscapes, tranquillity and wilderness. Large amount of evidence suggests that access to nature positively impacts on human health, therefore preservation of such places is hugely important. Recent DEFRA's report<sup>57</sup> suggests that spending time by the coast delivers more benefits to health and wellbeing than any other green or open space.

**Related SEA topics:** Many of the issues that affect population and human health have direct or indirect impacts on other SEA topics such as air quality.

**Table 3.2: Population and human health issues related to Scotland's landscape settings**

Landscape type	Population and human health related issues
Urban	<ul style="list-style-type: none"> <li>■ Population growth and housing need</li> </ul>
Peri-urban	<ul style="list-style-type: none"> <li>■ Aging population</li> </ul>
Fertile plain	<ul style="list-style-type: none"> <li>■ Urban and rural deprivation, minorities and climate justice</li> </ul>
Marginal land	<ul style="list-style-type: none"> <li>■ Fuel poverty</li> </ul>
Upland	<ul style="list-style-type: none"> <li>■ Physical activity levels</li> </ul>
Mountains	<ul style="list-style-type: none"> <li>■ Health and wellbeing</li> <li>■ Access to green and blue spaces for physical and mental health;</li> <li>■ Flood risk vulnerability, coastal, pluvial and fluvial;</li> <li>■ Climate vulnerability (heat – particularly urban, extreme weather conditions – all landscapes);</li> </ul>
Rivers and water bodies	N/A
Offshore	N/A

<sup>52</sup> Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 09/09/2020)

<sup>53</sup> Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report [online] Available at: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/> (accessed 09/09/2020)

<sup>54</sup> The Scottish Parliament (2012) SPICe Briefing: Climate Change and Health in Scotland [online] Available at: [http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB\\_12-26rev.pdf](http://www.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_12-26rev.pdf) (accessed 09/09/2020)

<sup>55</sup> Dinnie L. (no date) Urban green space and wellbeing [online] Available at: <https://www.hutton.ac.uk/sites/default/files/files/projects/GreenHealth-InformationNote4-Urban-green-space-and-wellbeing.pdf> 9 (accessed 10/09/2020)

<sup>56</sup> Public Health England (2020) Improving access to greenspace: a review for 2020. [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/904439/Improving\\_access\\_to\\_greenspace\\_2020\\_review.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904439/Improving_access_to_greenspace_2020_review.pdf) (accessed 10/09/2020)

<sup>57</sup> DEFRA (2020) Marine and coastal areas linked with better health and wellbeing [website] Available at: <https://www.gov.uk/government/news/marine-and-coastal-areas-linked-with-better-health-and-well-being> (accessed 10/09/2020)



## Air

### Environmental Protection Objectives

**3.36** Scotland's air quality environmental protection objectives are largely derived from the *EC Air Quality Directive* (2008/50/EC)<sup>58</sup> and the *4<sup>th</sup> Air Quality Daughter Directive* (2004/107/EC)<sup>59</sup>, via the *Air Quality Standards (Scotland) Regulations 2010*<sup>60</sup> which transpose these Directives into the Scottish context. There are also domestic objectives as part of the Local Air Quality Management system set under the *Environment Act 1995*<sup>61</sup> and associated regulations<sup>62</sup>. These objectives are largely aimed at reducing air emissions that are potentially harmful to human health and the environment, and together they set out the requirement for monitoring with a particular focus on areas where air pollution is concentrated.

**3.37** Scotland's *PPC Regulations (2012)*<sup>63</sup> allow for the regulation and monitoring of certain industrial activities in Scotland that can generate airborne pollution. Together with the *Air Quality Standards (Scotland) Regulations 2010*<sup>64</sup>, the PPC Regulations enable regulators to monitor, manage and, ultimately, improve Scottish air quality. It also sets a requirement for monitoring of air quality with a particular focus on areas where air pollution is concentrated and seeks to identify the sources.

**3.38** Air Quality Strategy for England, Scotland, Wales and Northern Ireland<sup>65</sup> sets out long term air quality objectives and policy options to further improve air quality in the UK. The strategy focuses on tackling the key air pollutants to air in the UK which include Particulate Matter (PM-PM10 and PM2.5), oxides of nitrogen (NO<sub>x</sub>), Ozone, sulphur dioxide, polycyclic aromatic hydrocarbons (PAHs), benzene, 1,3 – butadiene, carbon monoxide, lead and ammonia. It sets out specific

national objectives that consider European Directive limits and target values for protecting human health.

### Overview of Baseline

**3.39** As discussed in 'Population and Human Health', air pollution can result in adverse impacts on human health and can significantly affect many aspects of quality of life. Air pollution can also cause adverse effects in the wider environment. For example, it can increase nutrient levels in water bodies and soil and contribute to acidification, both of which can impact on plant and animal life, as well as damage the fabric of buildings and monuments.

**3.40** The quality of the air around us is affected by the pollutants released into the atmosphere through human activities, such as transport, industry and agriculture as well as pollutants arising from natural sources. The main air pollutants are nitrogen oxides (NO<sub>x</sub>), particulate matter (PM<sub>x</sub>), sulphur dioxide (SO<sub>2</sub>), ammonia (NH<sub>3</sub>), volatile organic compounds (VOCs), and ozone (O<sub>3</sub>). Sulphur dioxide, oxides of nitrogen, particulates, and low-level ozone are generally considered to be of most importance in relation to human health and the environment<sup>66</sup>.

### Evolution of the Baseline – Pressure, Trends and Key Points

**3.41** Air quality in Scotland has improved considerably over the last few decades. Between 1990 and 2016 there were decreases of 84% for carbon monoxide (CO), 72% for nitrogen oxides (NO<sub>x</sub>), 65% for non-methane volatile organic compounds, 64% for fine particulate matter (PM<sub>10</sub>) and 94% for SO<sub>2</sub><sup>67</sup>. However, air pollution is still estimated to reduce the life expectancy of every person in the UK by an average of 7–

<sup>58</sup> The European Parliament and the Council of the European Union (2008) Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=en> (accessed 09/09/2020)

<sup>59</sup> The European Parliament and the Council of European Union (2004) Directive 2004/107/EC of the European Parliament and of the Council relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air [online] Available at: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:023:0003:0016:EN:PDF> (accessed 09/09/2020)

<sup>60</sup> The Air Quality Standards (Scotland) Regulations 2010 [online] Available at: [http://www.legislation.gov.uk/ssi/2010/204/pdfs/ssi\\_20100204\\_en.pdf](http://www.legislation.gov.uk/ssi/2010/204/pdfs/ssi_20100204_en.pdf) (accessed 09/09/2020)

<sup>61</sup> Environment Act 1995, c.25 [online] Available at: <http://www.legislation.gov.uk/ukpga/1995/25/introduction> (accessed 09/09/2020)

<sup>62</sup> Scottish Government (2016) Local Air Quality Management policy guidance [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/03/local-air-quality-management-policy-guidance->

[scotland/documents/00507617-pdf/00507617-pdf/govscot%3Adocument/00507617.pdf](http://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/03/local-air-quality-management-policy-guidance-) (accessed 09/09/2020)

<sup>63</sup> Scottish Parliament, The Pollution Prevention and Control (Scotland) Regulations 2012 [online] Available at: [http://www.legislation.gov.uk/sdsi/2012/9780111018408/pdfs/sdsi\\_9780111018408\\_en.pdf](http://www.legislation.gov.uk/sdsi/2012/9780111018408/pdfs/sdsi_9780111018408_en.pdf) (accessed 09/09/2020)

<sup>64</sup> The Air Quality Standards (Scotland) Regulations 2010 [online] Available at: <http://www.legislation.gov.uk/ssi/2010/204/made/data.pdf> (accessed 09/09/2020)

<sup>65</sup> DEFRA, Scottish Executive, Welsh Assembly Government and DENI (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf) (accessed 09/09/2020)

<sup>66</sup> Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/11170/state-of-environment-report-2014.pdf> (accessed 09/09/2020)

<sup>67</sup> Ibid

8 months<sup>68</sup> and there are some areas of towns and cities where air quality has been identified as a concern.

**3.42** Section 83(1) of the *Environmental Act 1995*<sup>69</sup> sets out a requirement that where air quality objectives are not being met or are unlikely to be met within the relevant period, Local Authorities must designate an Air Quality Management Area (AQMA). In Scotland, 38 AQMAs have currently been declared, with 15 of Scotland's 32 Local Authorities having declared at least one. The majority of these are in urban areas as a result of NO<sub>x</sub> alone or in combination with PM<sub>10</sub> levels, and primarily as a result of traffic emissions<sup>70</sup>.

**3.43** Air pollution often originates from the same activities that contribute to climate change; notably transport, agriculture and energy generation. Transport is the most significant source contributing to poor air quality in urban areas<sup>71</sup>. While measures such as using alternative fuels sources and encouraging active travel can help improve air quality in addition to reducing GHG emissions, some measures aimed at reducing the impacts of climate change can also have a negative impact on air quality. For example, while emissions from well operated and well-maintained modern biomass boilers are generally lower than the coal equivalent, the burning of biomass feedstock does emit air pollutants such as particulates<sup>72</sup>.

**3.44** Cleaner air provides multiple benefits and actions taken, such as a shift towards low or zero emissions transport and energy sources, should provide mutual benefits for both air quality and climate change<sup>73</sup>.

**3.45** Evidence suggests that due to the pandemic, air pollution of NO<sub>2</sub> and NO<sub>x</sub> across 7 sites in Scotland has on average decreased by -55% and -61% respectively<sup>74</sup>. However, such results have been gained by implementing very strict measures.

**3.46** Covid-19 pandemic has led to air quality improvements especially in urban areas mainly due to the reduction in private and public transport use. Private and public transport declined by approximately 90% between 14<sup>th</sup> to 19<sup>th</sup> of April 2020 in comparison to the same period last year. In the same time active travel such as cycling has increased by 50%<sup>75</sup>. With the easing of lockdown restrictions, private vehicles have returned on the roads, however bus and rail services still experience significant drops in demand (rail: -70%, bus: - 55% for the week of 17 – 23 of August). Interestingly, cycling rates have remained stable and are 30% higher than last year<sup>76</sup>.

**3.47** In terms of Scottish landscapes, areas such as fertile plains, marginal land, upland and mountains generally have better air quality, due to lower levels of polluting activities from transport and energy generation. However, these areas tend to have higher ammonia concentrations from agricultural activities. Further, urban and peri-urban areas with well-planned and high-quality green networks and green and blue infrastructure can have positive effects on the air quality within towns and cities<sup>77</sup>.

**Related SEA topics:** Air quality can directly or indirectly impact on other SEA topics, such as biodiversity and population and human health.

**Table 3.3: Air issues related to Scotland's landscape settings**

Landscape type	Air related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Urban air quality issues predominantly caused by transport, industrial production, and construction sector;</li> </ul>

<sup>68</sup> Scottish Government (2018) Air Quality - Air Pollutant Emissions - High Level Summary of Statistics Trend [online] Available at: <http://www.scotland.gov.uk/Topics/Statistics/Browse/Environment/trendairpollutants> (accessed 09/09/2020)

<sup>69</sup> Environment Act 1995, c.25 [online] Available at: <http://www.legislation.gov.uk/ukpga/1995/25/introduction> (accessed 09/09/2020)

<sup>70</sup> Air Quality in Scotland (2018) Air Quality Management Areas [online] Available at: <http://www.scottishairquality.co.uk/laqm/agma> (accessed 09/09/2020)

<sup>71</sup> Scotland's Environment (2016) Air quality [online] Available at: <https://www.environment.gov.scot/our-environment/air/air-quality/> (accessed 09/09/2020)

<sup>72</sup> *ibid*

<sup>73</sup> Scottish Government (2015) Cleaner air for Scotland: the road to a healthier future [online] Available at: <http://www.gov.scot/Publications/2015/11/5671> (accessed 09/09/2020)

<sup>74</sup> Ricardo Energy and Environment (2020) COVID-19 lockdown effects on air quality. [online] Available at: [http://www.scottishairquality.scot/assets/documents/COVID19\\_lockdown\\_effects\\_on\\_air\\_quality.html](http://www.scottishairquality.scot/assets/documents/COVID19_lockdown_effects_on_air_quality.html)

<sup>75</sup> Transport Scotland (2020) COVID-19 Transport Trend Data 14 – 19 April 2020 [online] Available at: <https://www.transport.gov.scot/publication/covid-19-transport-trend-data-14-19-april-2020/>

<sup>76</sup> Transport Scotland (2020) COVID-19 Transport Trend Data 17 – 23 August 2020 [online] Available at: <https://www.transport.gov.scot/publication/covid-19-transport-trend-data-17-23-august-2020/> [accessed on 28/08/2020]

<sup>77</sup> Mayor of London (2019) Using green infrastructure to protect people from air pollution [pdf] Available at: [https://www.london.gov.uk/sites/default/files/green\\_infrastructure\\_air\\_pollution\\_may\\_19.pdf](https://www.london.gov.uk/sites/default/files/green_infrastructure_air_pollution_may_19.pdf) (accessed 10/09/2020)

Landscape type	Air related issues
	<ul style="list-style-type: none"> <li>■ Importance of urban woodland and trees for improvements in air quality;</li> <li>■ Air quality improvements from active travel opportunities</li> </ul>
Fertile plain Marginal land	<ul style="list-style-type: none"> <li>■ Air quality issues from agriculture and livestock;</li> <li>■ Air quality issues from reliance on fossil fuels for domestic heating (coal, coil, wood) especially in areas located remotely from the gas grid;</li> </ul>
Upland Mountains	<ul style="list-style-type: none"> <li>■ Air quality issues from transport;</li> <li>■ Air quality issues from agriculture and livestock;</li> <li>■ Air quality issues from wildfire</li> </ul>
Rivers and water bodies	N/A
Coastal Islands	<ul style="list-style-type: none"> <li>■ Air quality issues from transport, including marine vessels;</li> </ul>
Offshore	N/A

## Soil and Geology

### Environmental Protection Objectives

**3.48** The importance of soil as a resource is recognised internationally through the *European Commission's Thematic Strategy for Soil Protection*<sup>78</sup>. Nationally, the protection of prime quality agricultural land and peatlands is set out in the *Scottish Soil Framework*<sup>79</sup>, *Scotland's National Peatland Plan*<sup>80</sup> and the *Scottish Government's Draft Peatland and Energy Policy Statement*<sup>81</sup>.

**3.49** Geological sites receive protection through the designation of geological Sites of Special Scientific Interest (SSSIs) at the national level and at the international recognition through establishment of a network of Geoparks<sup>82</sup>.

### Overview of Baseline

**3.50** Soil is a non-renewable resource and is fundamentally one of Scotland's most important assets<sup>83</sup>. It supports a wide range of natural processes and underpins much of our natural environment, helping to provide a wide range of environmental, economic and societal benefits. For example, soil provides the basis for food, controls and regulates environmental interactions such as regulating the flow and quality of water and providing a platform for buildings and roads<sup>84</sup>. There is an intrinsic relationship between soil health and other environmental topics; biodiversity, water and air quality in particular. For example, soil erosion is one of the main contributors to diffuse water pollution<sup>85</sup>.

**3.51** Soils can play two significant roles with regards to carbon. It is estimated that Scotland's soils contain over 3 billion tonnes of historic carbon, 60 times the amount of carbon held in trees and plants, making up over 53% of the

<sup>78</sup> European Commission (2015) Soil, The Soil Thematic Strategy [online] Available at: [http://ec.europa.eu/environment/soil/three\\_en.htm](http://ec.europa.eu/environment/soil/three_en.htm) (accessed 09/09/2020)

<sup>79</sup> The Scottish Government (2009) The Scottish Soil Framework [online] Available at: <https://www.gov.scot/publications/scottish-soil-framework/> (accessed 09/09/2020)

<sup>80</sup> SNH (2015) Scotland's National Peatland Plan, Working for our Future [online] Available at: <https://www.nature.scot/scotlands-national-peatland-plan-working-our-future> (accessed 09/09/2020)

<sup>81</sup> The Scottish Government (2017) Draft Peatland and Energy Policy Statement [online] Available at: <http://www.gov.scot/Resource/0050/00502389.pdf> (accessed 09/09/2020)

<sup>82</sup> SNH (undated) Geoparks [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/geopark> (accessed 09/09/2020)

<sup>83</sup> Scottish Government (2006) Scotland's Soil Resource - Current State and Threats [online] Available at: <https://www2.gov.scot/publications/2006/09/21115639/7> (accessed 09/09/2020)

<sup>84</sup> Scottish Government (2009) The Scottish Soil Framework [online] Available at: <http://www.scotland.gov.uk/Publications/2009/05/20145602/0> (accessed 09/09/2020)

<sup>85</sup> SEPA (undated) Soil [online] Available at: <http://www.sepa.org.uk/environment/land/soil/#effect> (accessed 14/01/2020)

UK's soil carbon<sup>86</sup>. It is estimated that the loss of just 1% of soil carbon as carbon dioxide would triple Scotland's annual GHG emissions<sup>87</sup>. However, soil has also capacity to continue removing atmospheric carbon dioxide through additional sequestration.

**3.52** Degraded soil can act as a net carbon emitter, soils in good condition protect the carbon store and depending on the vegetation cover can continue to sequester carbon until equilibrium is reached. Land use change and management practices can impact significantly on soil carbon stores and sequestration.

**3.53** Peatlands are of particular importance for mitigating climate change by acting as carbon 'sinks'. If peatlands are in good condition they have the ability to continually sequester and store new carbon in peat-forming vegetation. Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west in areas with gentle slopes and poor drainage<sup>88</sup>. Blanket bog is the most extensive semi-natural habitat in Scotland, covering around 23% of the land area<sup>89</sup>. Approximately 1.6 billion tonnes of the carbon stored in Scottish soils are within peat<sup>90</sup>. As with all soils, peats are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to be a significant contributor to Scotland's GHG emissions<sup>91</sup>. If Scotland lost all of the carbon stored in its peat soils as CO<sub>2</sub>, it would be the equivalent of more than 120 times Scotland's annual GHG emissions. It is estimated that over 80% of Scotland's peatlands are degraded<sup>92</sup>.

### Evolution of the Baseline – Pressures, Trends and Key Points

**3.54** While Scotland's soils are considered to generally be in good health, there are a range of pressures on them. Climate change and loss of organic matter pose significant threats to

Scottish soils, with both likely to affect soil function, including loss of soil carbon. The loss of valued soils in particular has the potential for national impacts which will be difficult to reverse. In the case of climate change, these impacts have the potential to be felt on a global scale<sup>93</sup>. As such, the management and use of these resources can affect the amount of CO<sub>2</sub> that is held or released. Peatlands in good condition remove CO<sub>2</sub> from the atmosphere and store carbon in the soil. Conversely, degraded peatlands may emit more CO<sub>2</sub>e than they remove and become a net source of greenhouse gases<sup>94</sup>.

**3.55** Changes in land use and land management practices are also a key pressure on soil. These include activities such as transport and development, including house building, road building and the expansion of agriculture and forestry<sup>95</sup>. At present, there is uncertainty and a lack of quantitative information regarding threats to soil functions and ecosystem services, particularly in relation to the extent of soil sealing, changes in soil biodiversity, and compaction of soils<sup>96</sup>. Estimates of soil sealing suggest figures of approximately 1000 hectares a year<sup>97</sup>. Soil contamination can also arise from many causes, including atmospheric deposition, agriculture and forestry operations, mining and historic land contamination, and can impact on soil function and biodiversity<sup>98</sup>.

**3.56** Proper management of soils across Scotland's different landscapes is crucial for improving the overall biodiversity, reducing impacts of climatic factors and improving water quality in rivers, water bodies and seas.

**Related SEA topics:** Loss of soil or poor-quality soils can have direct or indirect impacts on other SEA topics such as biodiversity, climatic factors and water quality.

<sup>86</sup> Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: <http://soils.environment.gov.scot/soils-in-scotland/state-of-scotland-soils/> (accessed 09/09/2020)

<sup>87</sup> *ibid*

<sup>88</sup> SNH (2014) Commissioned Report No. 701 - Scotland's peatland – definitions & information resources [online] Available at: <https://www.nls.uk/e-monographs/2014/701.pdf> (accessed 09/09/2020)

<sup>89</sup> *ibid*

<sup>90</sup> Climate X Change (2018) Soil Carbon and Land Use in Scotland Final Report [online] Available at: [climalexchange.org.uk/media/3046/soil-carbon-and-land-use-in-scotland.pdf](http://climalexchange.org.uk/media/3046/soil-carbon-and-land-use-in-scotland.pdf) (accessed 09/09/2020)

<sup>91</sup> Scotland's Soils – part of Scotland's Environment (undated) Welcome to Scotland's soils [online] Available at: <http://soils.environment.gov.scot/> (accessed 09/09/2020)

<sup>92</sup> Scotland's Environment (2019) Peatland Restoration [online] Available at: <https://soils.environment.gov.scot/resources/peatland-restoration/> (accessed 09/09/2020)

<sup>93</sup> *ibid*

<sup>94</sup> Scotland's Environment (2019) Peatland Restoration [online] Available at: <https://soils.environment.gov.scot/resources/peatland-restoration/> (accessed 09/09/2020)

<sup>95</sup> Scotland's Environment (2011) Soils [online] Available at: <https://www.environment.gov.scot/media/1213/land-soils.pdf> (accessed 09/09/2020)

<sup>96</sup> European Commission (2016) JRC Technical Reports - Soil threats in Europe - Status, methods, drivers and effects on ecosystem services [online] Available at: [http://esdac.jrc.ec.europa.eu/public\\_path/shared\\_folder/doc\\_pub/EUR27607.pdf](http://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR27607.pdf) (accessed 09/09/2020)

<sup>97</sup> SEPA (2011) The State of Scotland's Soil [online] Available at: <https://www.sepa.org.uk/media/138741/state-of-soil-report-final.pdf> (accessed 09/09/2020)

<sup>98</sup> SEPA (2019) Guidance on consideration of soil in Strategy Environmental Assessment [online] Available at: <https://www.sepa.org.uk/media/162986/lups-sea-qu2-consideration-of-soil-in-sea.pdf> (accessed 09/09/2020)

**Table 3.4: Soil issues related to Scotland's landscape settings**

Landscape type	Soil related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Soil sealing from development;</li> <li>■ Issues of contaminated, vacant and derelict land;</li> <li>■ Decreasing food and drink production within urban areas due to low quality of soil, pests and diseases;</li> <li>■ Green network benefits on soil quality;</li> <li>■ Waste management issues (fly tipping);</li> </ul>
Fertile plain Marginal land	<ul style="list-style-type: none"> <li>■ Soil erosion, compaction and fertility from food and drink production;</li> <li>■ Benefits of woodlands and hedgerows;</li> <li>■ Declining fertility and loss of soil biodiversity;</li> </ul>
Upland Mountains	<ul style="list-style-type: none"> <li>■ Impacts of renewable energy construction and infrastructure development on soil quality (and peatlands);</li> <li>■ Impact of forestry planting on soil quality;</li> <li>■ Impact of livestock industry on soils quality;</li> <li>■ Peatland restoration;</li> <li>■ Impacts of increasing rainfall on soil erosion and soil stability;</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Soil erosion and sedimentation</li> </ul>
Coastal Islands	<ul style="list-style-type: none"> <li>■ Soil erosion;</li> <li>■ Salinization of soil from storms/inundation by the sea</li> </ul>
Offshore	N/A

## Water

### Environmental Protection Objectives

**3.57** Objectives relating to the condition of all water bodies are set through the *Water Framework Directive*<sup>99</sup>, which governs objectives for rivers, lochs, transitional waters, coastal waters and groundwater resources. The Water Framework Directive sets out the requirement for an assessment of both chemical and ecological status, alongside the requirement to

consider the status of biodiversity as an indicator in determining water quality.

**3.58** These objectives are set in the Scottish context in a range of water, coastal and marine policies. Scotland's two River Basin Management Plans (RBMPs)<sup>100</sup> aim to improve the overall condition of water bodies. The protection of Scotland's water resources has also been translated through the establishment of legislation and regulations such as the *Water Environment and Water Services (Scotland) Act 2003*<sup>101</sup> and the *Water Environment (Controlled Activities) (Scotland) Regulations 2011*<sup>102</sup>. These complement the role of

<sup>99</sup> European Commission (2000) The Water Framework Directive [online] Available at: [http://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC\\_1&format=PDF](http://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF) (accessed 09/09/2020)

<sup>100</sup> SEPA (2016) River Basin Management Planning, The Current Plans [online] Available at: <https://www.sepa.org.uk/environment/water/river-basin-management-planning/> (accessed 09/09/2020)

<sup>101</sup> Water Environment and Water Services (Scotland) Act (2003) [online] Available at: <http://www.legislation.gov.uk/asp/2003/3/contents> (accessed 09/09/2020)

<sup>102</sup> Water Environment (Controlled Activities) (Scotland) Regulations (2011) [online] Available at: <http://www.legislation.gov.uk/ssi/2011/209/contents/made> (accessed 09/09/2020)

others such as the *Pollution Prevention and Control (Scotland) Regulations 2012*<sup>103</sup>, developed to specifically control pollution relating to industry discharges.

**3.59** The *Flood Risk Management (Scotland) Act 2009*<sup>104</sup> provides for the management of flood risk and translates the *EU Floods Directive*<sup>105</sup> into the national context. The Directive mandates the creation of Flood Risk Management Plans (FRMPs) for all inland and coastal areas at risk of flooding, integrating their development and employment with existing RBMPs.

**3.60** *Scotland's National Marine Plan*<sup>106</sup> covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). The plan provides direction to a wide range of marine decisions and consents made by public bodies and seeks to promote development that is compatible with the protection and enhancement of the marine environment.

## Overview of Baseline

**3.61** Scotland's water provides a wide range of benefits that support our health and prosperity, such as the provision of drinking water and as a resource for use in agriculture and industry<sup>107</sup>. These water resources also support a rich diversity of habitats and species, attract tourism, promote recreation and provide for the sustainable growth of the economy<sup>108</sup>.

**3.62** In recent decades, significant improvements to water quality in many rivers, canals, and estuaries have been observed alongside significant reductions in pollution<sup>109</sup>. Most of Scotland's seas, coasts, and estuaries are in good or excellent condition; however, some localised areas of concern remain. Nearly half of rivers are now in good condition or better and almost two thirds of lochs surveyed were found to be in good or high condition<sup>110</sup>.

**3.63** Scotland's groundwater is a valuable asset for many, particularly rural communities where it provides most of the private drinking water (75%)<sup>111</sup>. Around 80% of Scotland's groundwater is in good condition, although there are particular regions with widespread problems; for example, in the Central Belt<sup>112</sup>. Agriculture and the legacy of industrial activity are the main causes of regional-scale groundwater problems, whereas inadequate construction of private water supplies and inappropriate management of wastes can create localised problems<sup>113</sup>.

**3.64** Flooding can have significant and long-lasting impacts on people, communities, and businesses. Flood Risk Management Strategies<sup>114</sup> co-ordinate action to tackle flooding in Scotland, setting out the national direction for flood risk management and helping target investment and coordinate action across public bodies. Flood maps have also been produced which help to show where areas are likely to be at risk of flooding from rivers, seas and surface water<sup>115</sup>.

## Evolution of the Baseline – Pressures, Trends and Key Points

**3.65** Key pressures on the surface water environment include urbanisation, an increase in invasive non-native species, intensive agriculture/aquaculture and climate change. Rural and urban diffuse pollution remains a concern for water quality, particularly in relation to agriculture, forestry, and urban development<sup>116</sup>.

**3.66** Airborne pollution can impact upon water bodies. Heightened nitrogen concentrations can cause the acidification and eutrophication of water bodies. Eutrophication occurs when the concentrations of otherwise limiting nutrients increase, allowing aquatic plants and algae to grow unchecked and depleting oxygen levels.

**3.67** The predicted effects of climate change such as increased temperatures and changes to rainfall patterns could affect flows in rivers and impact on water resource

<sup>103</sup> The Pollution Prevention and Control (Scotland) Regulations (2012) [online] Available at: <http://www.legislation.gov.uk/ssi/2012/360/contents/made> (accessed 09/09/2020)

<sup>104</sup> The Flood Risk Management (Scotland) Act 2009 [online] Available at: <http://www.legislation.gov.uk/asp/2009/6/contents> (accessed 09/09/2020)

<sup>105</sup> European Commission, Directive 2007/60/EC of 23 October 2007 on the Assessment and Management of Flood Risks [online] Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007L0060&from=EN> (accessed 09/09/2020)

<sup>106</sup> Scottish Government (2015) Scotland's National Marine Plan [online] Available at: <https://www.gov.scot/publications/scotlands-national-marine-plan/> (accessed 09/09/2020)

<sup>107</sup> Scotland's Environment (undated) Scotland's Freshwater [online] Available at: <https://www.environment.gov.scot/our-environment/water/scotland-s-freshwater/> (accessed 09/09/2020)

<sup>108</sup> Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 09/09/2020)

<sup>109</sup> Scotland's Environment (2014) Rivers and Canals [online] Available at: <https://www.environment.gov.scot/media/1179/water-rivers-and-canals.pdf> (accessed 09/09/2020)

<sup>110</sup> *ibid*

<sup>111</sup> Scotland's Environment (2011) Groundwater [online] Available at: <https://www.environment.gov.scot/media/1230/water-groundwater.pdf> (accessed 09/09/2020)

<sup>112</sup> *ibid*

<sup>113</sup> *ibid*

<sup>114</sup> SEPA (undated) Flood Risk Management Strategies [online] Available at: <http://apps.sepa.org.uk/FRMStrategies/> (accessed 09/09/2020)

<sup>115</sup> SEPA (undated) Flood maps [online] Available at: <http://www.sepa.org.uk/environment/water/flooding/flood-maps/> (accessed 09/09/2020)

<sup>116</sup> SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 09/09/2020)

availability<sup>117</sup>. A changing climate is also expected to have ecological impacts, such as warmer sea temperatures and an increasing risk of non-native species spreading and becoming established in water environments<sup>118</sup>.

**3.68** The risk of flooding from rivers, surface waters and sea are predicted to increase. This can damage material assets, pose risks to population and human health through the spread of infectious diseases and also lead to a loss of habitats, resulting from erosion.

**3.69** The development and operation of new infrastructure has the potential to negatively impact on water quality, either during construction or via pollution run-off. New structures on land can also affect the capacity of flood plains or flood defences.

**3.70** Water management plays a key role in protecting water bodies, increasing biodiversity and minimising flood risk. Water protection, preservation and management will take different forms across different Scotland's landscapes. In addressing climate change effects in the Scottish context, flood management is inherent to managing land for climate resilience. Landscapes outside urban areas such as marginal land and uplands will serve crucial roles in tackling future flood risks. Appropriate management for these areas will enable flood risk resilience in areas located downstream from the rivers and water bodies.

**Related SEA topics:** Water quality and quantity can have a direct or indirect impact on other SEA topics such as biodiversity and population and human health.

**Table 3.5: Water issues related to Scotland's landscape settings**

Landscape type	Water related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Water quality issues including surface run off and pollutants from housing, residential developments, and brownfield sites;</li> <li>■ Water supply;</li> <li>■ Flood management including SuDS and green networks;</li> <li>■ Flood defence infrastructure.</li> </ul>
Fertile plain	<ul style="list-style-type: none"> <li>■ Water quality issues from agricultural production;</li> <li>■ Irrigation requirements for crop production;</li> <li>■ Increased run off from agricultural practices including agricultural buildings, polytunnels and cropping regimes;</li> <li>■ Flood management.</li> </ul>
Marginal land Upland Mountains	<ul style="list-style-type: none"> <li>■ Flood management;</li> <li>■ Water storage.</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Flood management including river restoration, floodplains and natural flood storage;</li> <li>■ Water quality and eutrophication and impacts on biodiversity;</li> <li>■ Water quantity and supply;</li> <li>■ Hydro development;</li> <li>■ Impact of fish farms on water quality;</li> </ul>

<sup>117</sup> Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 09/09/2020)

<sup>118</sup> SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: <https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf> (accessed 09/09/2020)

Landscape type	Water related issues
Coastal	<ul style="list-style-type: none"> <li>■ Sea level rise, coastal erosion and inundation</li> </ul>
Islands	<ul style="list-style-type: none"> <li>■ Marine litter</li> </ul>
Offshore	<ul style="list-style-type: none"> <li>■ Issues of marine water quality (urban and settlement sewage), run off, fish farms etc.</li> <li>■ Acidification of marine environment.</li> </ul>

## Biodiversity, Flora and Fauna

### Environmental Protection Objectives

**3.71** Environmental protection objectives for biodiversity, flora and fauna are largely aimed at protecting habitats and species from damage and disturbance; principally through the identification and conservation of areas of particular value. The policies define a hierarchy of protection and include a range of international conventions, including the development of the *Aichi Targets for 2020*<sup>119</sup> and the *Convention on Biological Diversity*<sup>120</sup>.

**3.72** At European level, the Natura 2000 network of sites affords protection to key natural assets under the European Commission (EC) *Habitats Directive*<sup>121</sup> and *Birds Directive*<sup>122</sup>; both of which have been transposed into UK and Scottish regulations. The Natura 2000 network is made up of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). The majority of SPAs and SACs are also underpinned by SSSI legislation<sup>123</sup>.

**3.73** The designation of European protected species and identification of species and habitats as being the most threatened and requiring conservation action in the UK also demonstrates the prioritisation of conservation ambitions at

European and national levels. *UK Biodiversity Action Plan*,<sup>124</sup> succeeded by the *UK Post 2010 Biodiversity Framework*<sup>125</sup> is a response to Article 6 of the Biodiversity Convention. It is a national strategy for the conservation of biological diversity, the sustainable use of biological resources and to contribute to the conservation of global biodiversity through all appropriate mechanisms.

**3.74** The *2020 Challenge for Scotland's Biodiversity*<sup>126</sup> is Scotland's response to the 20 Aichi Targets set by the United Nations Convention on Biological Diversity, and the *European Union's Biodiversity Strategy for 2020*<sup>127</sup>. The 2020 Challenge supplements the 2004 *Scottish Biodiversity Strategy*<sup>128</sup> and focuses on the importance of healthy ecosystems and an outcome that "*Scotland's ecosystems are restored to good ecological health so that they provide robust ecosystem services and build on our natural capital*".

**3.75** Beyond site and species designations there are also longer-term aspirations for enhancing biodiversity, improving landscape-scale ecological networks and addressing the impacts of climate change on the natural environment.

### Overview of Baseline

**3.76** Biodiversity is commonly used as a measure of the health of an ecosystem, and helps to provide the ecosystems services that are the basis of life including the regulation of air

<sup>119</sup> Convention on Biological Diversity (2011) Aichi Biodiversity Targets [online] Available at: <https://www.cbd.int/sp/targets/default.shtml> (accessed 09/09/2020)

<sup>120</sup> Convention on Biological Diversity (1993) Text of the CBD [online] Available at: <https://www.cbd.int/convention/text/> (accessed 09/09/2020)

<sup>121</sup> European Commission, The Habitats Directive [online] Available at: [http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm) (accessed 09/09/2020)

<sup>122</sup> European Commission, The Birds Directive [online] Available at: [http://ec.europa.eu/environment/nature/legislation/birdsdirective/index\\_en.htm](http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm) (accessed 09/09/2020)

<sup>123</sup> Scottish Government (undated) Natura 2000 [online] Available at: <https://www.gov.scot/policies/biodiversity/natura-2000/> (accessed 09/09/2020)

<sup>124</sup> UK Government (1994) Biodiversity: The UK Action Plan [online] Available at: <http://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf> (accessed 09/09/2020)

<sup>125</sup> JNCC and Defra on behalf of the Four Countries' Biodiversity Group (2012) UK Post-2010 Biodiversity Framework [online] Available at: <https://hub.jncc.gov.uk/assets/587024ff-864f-4d1d-a669-f38cb448abdc#UK-Post2010-Biodiversity-Framework-2012.pdf> (accessed 09/09/2020)

<sup>126</sup> Scottish Government (2013) 2020 Challenge for Scotland's Biodiversity – A Strategy for the conservation and enhancement of biodiversity in Scotland [online] Available at: <https://www.gov.scot/publications/2020-challenge-scotlands-biodiversity-strategy-conservation-enhancement-biodiversity-scotland/> (accessed 09/09/2020)

<sup>127</sup> European Commission (2011) Our life insurance, our natural capital: an EU biodiversity strategy to 2020 [online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN>

<sup>128</sup> Scottish Government (2004) Scottish Biodiversity Strategy – It's in your hands [online] Available at: <https://www.gov.scot/publications/scotlands-biodiversity---its-in-your-hands/> (accessed 09/09/2020)



and water, soil formation, nutrient cycling, flood regulation and pollination, amongst many others<sup>129</sup>. Biodiversity, flora, and fauna is also closely linked with other environmental topics, particularly soil and water, which help to support an incredible diversity of life across Scotland and in its surrounding waters.

**3.77** As of 2020, Scotland's protected areas included 251 SACs<sup>130</sup>, 153 SPAs<sup>131</sup>, 51 Ramsar sites<sup>132</sup> and 2 Biosphere reserves<sup>133</sup>, amongst other internationally designated sites. There are further national level designations such as 1,423 SSSIs<sup>134</sup>, 231 Marine Protected Areas<sup>135</sup> and 2 National Parks<sup>136</sup>. In addition to these, a recent consultation on proposed SPAs for Scottish Marine birds and site classifications set out additional sites to be designated<sup>137</sup>. In June 2019, a further consultation on proposals to designate four new MPAs in Scottish waters was launched<sup>138</sup>.

**3.78** The UK Biodiversity Action Plan<sup>139</sup> identified 39 priority habitats and 197 priority species either occurring, or known to have occurred until recently, in Scotland. By May 2019, the proportion of nationally protected nature sites reported as being in a "favourable" condition decreased by 0.8% from 79.7% in 2018 to 78.9%<sup>140</sup>. Despite this decrease, this represents a 2.9% percentage point increase since the current protocols were established in 2007<sup>141</sup>.

**3.79** Areas of biodiversity value are not only found within this network of designated sites and many undesignated areas of

Scotland also contain habitats and species that have important functions and roles. For example, urban greenspace such as public and private gardens, parks, woodlands, recreational grounds, green corridors, allotments and community growing spaces can provide habitats and ecosystems which are valuable to wildlife<sup>142</sup>.

### Evolution of the Baseline – Pressures, Trends and Key Points

**3.80** Biodiversity loss has been well documented over the last 50 years, and today there is a range of pressures with the potential to impact on Scotland's wildlife and biodiversity. Key issues such as land use intensification and modification, and pollution have been noted<sup>143</sup>.

**3.81** Climate change in particular has the potential to greatly impact on biodiversity on a global scale<sup>144</sup>. The predicted effects of climate change and the potential for associated impacts on biodiversity, flora and fauna are well documented, with evidence already showing the wide-ranging effects that a changing climate can have on flora and fauna species and their habitats<sup>145</sup>. Indirect impacts may also arise through climate change adaptation and the action taken in sectors such as agriculture, forestry, planning, water and coastal management in the face of a changing climate<sup>146</sup>.

<sup>129</sup> SNH (undated) Ecosystem approach [online] Available at: <https://www.nature.scot/scotlands-biodiversity/value-ecosystem-approach/ecosystem-approach> (accessed 09/09/2020)

<sup>130</sup> SNH (undated) Special Areas of Conservation [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/natura-sites/special-areas-conservation-sacs> (accessed 09/09/2020)

<sup>131</sup> SNH (undated) Special Protection Areas [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/natura-sites/special-protection-areas-spas> (accessed 09/09/2020)

<sup>132</sup> SNH (undated) Ramsar Sites [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/ramsar-sites> (accessed 09/09/2020)

<sup>133</sup> SNH (undated) Biosphere Reserves [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/biosphere-reserve> (accessed 09/09/2020)

<sup>134</sup> SNH (undated) Sites of Special Scientific Interest [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/sites-special-scientific-interest> (accessed 09/09/2020)

<sup>135</sup> Scottish Government (2018) Scottish MPA network – Parliamentary Report [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/progress-report/2018/12/marine-protected-area-network-2018-report-scottish-parliament/documents/00544750-pdf/00544750-pdf/govscot%3Adocument/00544750.pdf> (accessed 09/09/2020)

<sup>136</sup> Scottish Government (undated) Landscapes and outdoor access [online] Available at: <https://www.gov.scot/policies/landscape-and-outdoor-access/national-parks/> (accessed 09/09/2020)

<sup>137</sup> Scottish Government (2019) Proposed Special Protected Areas for Scottish marine birds: Strategic Environmental Assessment. Available at: <https://www.gov.scot/publications/proposed-special-protection-areas-scottish-marine-birds-supplementary-consultation-sea-site-classification/> (accessed 09/09/2020)

<sup>138</sup> Scottish Government (2019) A consultation on proposals to designate four Marine Protected Areas in Scottish waters. Available at: <https://www.gov.scot/publications/marine-protected-areas-mobile-marine-species-consultation-proposals-designate-four-new-marine-protected-areas-scottish-waters/> (accessed 09/09/2020)

<sup>139</sup> UK Government (1994) Biodiversity: The UK Action Plan [online] Available at: <http://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf> (accessed 09/09/2020)

<sup>140</sup> SNH (2019) The Proportion of Scotland's Protected Sites in Favourable Condition 2019: An Official Statistics Publication for Scotland [online] Available at: <https://www.nature.scot/information-hub/official-statistics/official-statistics-protected-sites> (accessed 09/09/2020)

<sup>141</sup> SNH (2019) Statistical News Release: the proportion of Scotland's Protected Sites in Favourable Condition 2019 [online] Available at: <https://www.snhpresscentre.com/news/statistical-news-release-the-proportion-of-scotlands-protected-sites-in-favourable-condition-2019> (accessed 09/09/2020)

<sup>142</sup> SNH (undated) Urban habitats [online] Available at: <https://www.nature.scot/habitats-and-ecosystems/habitat-types/urban-habitats> (accessed 09/09/2020)

<sup>143</sup> SNH (undated) Key pressures on biodiversity [online] Available at: <https://www.nature.scot/scotlands-biodiversity/key-pressures-biodiversity> (accessed 09/09/2020)

<sup>144</sup> Convention on Biological Diversity (undated) Climate Change and Biodiversity – Introduction [online] Available at: <http://www.cbd.int/climate/intro.shtml> (accessed 09/09/2020)

<sup>145</sup> SNH (undated) Climate change impacts in Scotland [online] Available at: <https://www.nature.scot/climate-change/climate-change-impacts-scotland> (accessed 14/02/2020)

<sup>146</sup> JNCC (2010) Biodiversity and Climate Change – a summary of impacts in the UK [online] Available at: <http://archive.jncc.gov.uk/page-5145> (accessed 09/09/2020)

**3.82** Habitat change, due mainly to increased and more intensive land management, urban development, pollution, nutrient enrichment, and over exploitation of natural resources are other known pressures.

**3.83** The importance of green spaces has become more significant than ever during the pandemic. For many people, urban greenspaces such as parks and local woodlands have served as important space to rest and reconnect with nature in these difficult times. Moreover, greenspaces offer space to exercise or meet family, friends or local community. Research

shows that green spaces promote physical and mental health which in the times such as the pandemic are critical<sup>147</sup>.

**3.84** All landscapes have important roles in enhancing Scotland's biodiversity, therefore appropriate management of all areas can deliver positive benefits not only in terms of biodiversity but also air, water and soil quality.

**Related SEA topics:** Biodiversity, flora, and fauna impacts have direct or indirect effects on other SEA topics such as air, water and soil quality.

**Table 3.6: Biodiversity issues related to Scotland's landscape settings**

Landscape type	Biodiversity related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ The positive contribution of green and blue networks;</li> <li>■ Need to enhance habitat connectivity;</li> <li>■ Habitat loss and fragmentation from development;</li> <li>■ Active travel routes contribution to habitat network;</li> <li>■ Importance of urban woodlands and forests;</li> <li>■ Importance of urban pollinators;</li> <li>■ Biodiversity value of vacant and derelict land.</li> </ul>
Fertile plain	<ul style="list-style-type: none"> <li>■ Historic decline of farmland biodiversity</li> <li>■ Actions to enhance and expand habitats on farmland and increase habitat connectivity;</li> <li>■ Importance of protecting pollinators.</li> </ul>
Marginal land	<ul style="list-style-type: none"> <li>■ Habitat networks;</li> <li>■ Rare habitats</li> </ul>
Upland	<ul style="list-style-type: none"> <li>■ Habitat networks;</li> <li>■ Habitat value of protection and large landscape scale restoration actions;</li> <li>■ Importance of large-scale woodlands and forests;</li> <li>■ Loss of unique habitats.</li> </ul>
Mountains	<ul style="list-style-type: none"> <li>■ Habitat networks;</li> <li>■ Importance of large-scale woodlands and forests;</li> <li>■ Habitat value of protection and large landscape scale restoration actions.</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Habitat networks;</li> </ul>

<sup>147</sup> Dinnie L. (no date) Urban green space and wellbeing [online] Available at: <https://www.hutton.ac.uk/sites/default/files/files/projects/GreenHealth-InformationNote4-Urban-green-space-and-wellbeing.pdf>

Landscape type	Biodiversity related issues
	<ul style="list-style-type: none"> <li>Water quality benefits for biodiversity.</li> </ul>
Coastal Islands	<ul style="list-style-type: none"> <li>Water quality benefits for biodiversity;</li> <li>Importance of natural habitats as coastal protection from erosion, flooding and storm events;</li> <li>High nature value of key coastal habitats e.g. machair;</li> <li>Impact of fish farms on biodiversity.</li> </ul>
Offshore	<ul style="list-style-type: none"> <li>Water quality benefits for biodiversity;</li> </ul>

## Cultural Heritage and Historic Environment

### Environmental Protection Objectives

**3.85** Existing cultural heritage objectives are set out in legislation including the *Historic Environment (Amendment) Scotland Act 2011*<sup>148</sup>, *Ancient Monuments and Archaeological Areas Act 1979 (as amended)*<sup>149</sup> and *Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997*<sup>150</sup>. These objectives are focused primarily on the protection of valued sites and features, including townscapes (i.e. places, buildings and open spaces), buildings, archaeological sites, battlefields, wrecks and landscapes that have been recognised at the international, national and local levels through a hierarchy of designations.

**3.86** Policies such as *National Planning Framework (NPF3)*<sup>151</sup> and *Scottish Planning Policy (SPP)*<sup>152</sup> aim to improve the quality of our settlements and built environment with a national level focus. These are complemented by the *Historic Environment Strategy for Scotland (2014)*<sup>153</sup> and the *Historic Environment Scotland Policy Statement*<sup>154</sup> which provide an overarching framework for historic environment policy in Scotland. Together, they emphasise the importance of

preserving recognised sites, avoiding negative impacts on them and their wider setting, and contributing to their enhancement where appropriate. These key objectives also extend to taking into accounting of, and avoiding damage to or loss of, currently unknown archaeology.

### Overview of Baseline

**3.87** Scotland's many and varied historical sites are unique and irreplaceable. These sites and features are regarded as making a valuable contribution to our quality of life, cultural identity, education and economy. While these assets are distributed widely throughout Scotland, there are clusters of sites in and around our settlements and around our coastlines.

**3.88** Some parts of Scotland's historic environment are protected through a process of designation. The process aims to identify parts of the historic environment for their significance and enhance their protection. As of 2016, it is estimated that around 5-10% of the historic environment is designated<sup>155</sup>. Designated assets currently include World Heritage Sites, Listed Buildings, Scheduled Monuments, Conservation Areas, Designed Gardens and Landscapes, Historic Marine Protected Areas, Scheduled Wrecks and Nationally Important Battlefields<sup>156</sup>. However, whilst most of the historic environment is undesignated (90-95%), these known but undesignated assets provide important contextual

<sup>148</sup> The Historic Environment (Amendment) Scotland Act 2011 [online] Available at: <http://www.legislation.gov.uk/asp/2011/3/contents/enacted> (accessed 09/09/2020)

<sup>149</sup> Ancient Monuments and Archaeological Areas Act 1979 (as amended) [online] Available at: [http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga\\_19790046\\_en.pdf](http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf) (accessed 09/09/2020)

<sup>150</sup> Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 [online] Available at: <http://www.legislation.gov.uk/ukpga/1997/9/contents> (accessed 09/09/2020)

<sup>151</sup> The Scottish Government (2014) National Planning Framework 3 [online] Available at: <http://www.gov.scot/Publications/2014/06/3539/0> (accessed 09/09/2020)

<sup>152</sup> The Scottish Government (2014) Scottish Planning Policy [online] Available at: <http://www.gov.scot/Publications/2014/06/5823> (accessed 09/09/2020)

<sup>153</sup> Historic Environment Scotland (2014) Our Place in Time: The Historic Environment Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0044/00445046.pdf> (accessed 09/09/2020)

<sup>154</sup> Historic Environment Scotland (2019) Historic Environment Scotland Policy Statement [online] Available at: <https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/historic-environment-scotland-policy-statement/> (accessed 09/09/2020)

<sup>155</sup> Historic Environment Scotland (2016) Scotland's Historic Environment Audit: Summary Report 2016 [online] Available at: <https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=315b3f0d-631b-4a24-b12b-a6db00ba1696> (accessed 09/09/2020)

<sup>156</sup> Scotland's Environment (undated) Historic Environment [online] Available at: <https://www.environment.gov.scot/our-environment/people-and-the-environment/historic-environment/> (accessed 09/09/2020)

information which helps us better understand designated sites<sup>157</sup>.

### Evolution of the Baseline – Pressures, Trends and Key Points

**3.89** Development is a key pressure on the historic environment and cultural heritage, both directly in terms of damage to known and unknown features, and the potential for impacts on setting. Other known pressures include changing land use and land management, tourism/visitors, pollution and climate change.

**3.90** It is projected that Scotland will become warmer and wetter as a result of climate change, resulting in the increased weathering of stone, rotting timbers and corrosion of metals. Rising sea levels and increased storm events may increase coastal erosion, endangering our historic landscapes, structures, buildings and archaeology in the coastal zone.

Some of Scotland's unique and special sites, such as Skara Brae in Orkney, are at most risk<sup>158</sup>.

**3.91** Increased rainfall will mean that historic buildings and assets will be wetter for longer periods of time, and as such may result in the penetration of water, dampness, condensation and fungus growth, ground instability and structural collapse<sup>159</sup>. This can potentially have damaging effects on the fabric of buildings and the health of those using it. This threat will grow in the future, given the future predictions of the likely effects of global warming and climate change for the remainder of this century.

**Related SEA topics:** The SEA topics of cultural heritage and landscape are closely linked. Climate change can have direct or indirect impacts on cultural heritage and the historic environment.

**Table 3.7: Cultural heritage and historic environment issues related to Scotland's landscape settings**

Landscape type	Cultural heritage and historic environment related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Impacts on setting and physical integrity from development;</li> <li>■ Impacts on structures from climate change;</li> <li>■ Visitor pressure on sensitive sites and historic townscapes.</li> </ul>
Fertile plain Marginal land	<ul style="list-style-type: none"> <li>■ Impacts on setting and physical integrity from agricultural practices and development;</li> <li>■ Impacts on structures from climate change;</li> <li>■ Visitor pressure on sensitive sites, historic gardens and designed landscapes.</li> </ul>
Upland Mountains	<ul style="list-style-type: none"> <li>■ Impacts on setting and physical integrity from renewable energy development and afforestation;</li> <li>■ Impacts on structures from climate change;</li> <li>■ Visitor pressure on sensitive sites.</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Impacts on structures from climate change e.g. historic bridges;</li> <li>■ Visitor pressure on sensitive sites.</li> </ul>
Coastal Islands	<ul style="list-style-type: none"> <li>■ Impacts on structures from climate change including sea level rise and coastal erosion.</li> <li>■ Visitor pressure on sensitive sites.</li> </ul>

<sup>157</sup> ibid

<sup>158</sup> Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 09/09/2020)

<sup>159</sup> Historic Environment Scotland (undated) Effect on the historic environment [online] Available at: <https://www.historicenvironment.scot/about-us/what-we-do/climate-change/effect-on-the-historic-environment/> (accessed on 09/09/2020)

Landscape type	Cultural heritage and historic environment related issues
Offshore	<ul style="list-style-type: none"> <li>Impacts of offshore development on sub-sea archaeology.</li> </ul>

## Landscape

### Environmental Protection Objectives

**3.92** Environmental protection objectives reflect the importance of all landscapes and also the need to help to improve those that have become degraded. The *European Landscape Convention*<sup>160</sup> lays the foundation for these objectives.

**3.93** The establishment of key national programmes including the National Scenic Areas Programme<sup>161</sup> demonstrate a continuing commitment to protect the special qualities of nationally important landscapes and seascapes. The protection and enhancement of Scotland's landscapes are set out at the national level in SPP and are also referenced in relation to several national developments and under a natural, resilient place in NPF3.

**3.94** NatureScot Natural Heritage Futures<sup>162</sup> sets out guidelines for sustainable management and use of Scotland's nature and landscaped until 2025. It aims to ensure utilisation of an integrated approach to work with Scotland's nature and land. It also provides basis for stakeholders' engagement. It consists of 21 documents that cover the whole of Scotland, as each of the areas has its own identity and distinct issues.

**3.95** NatureScot Landscape Policy Framework<sup>163</sup> sets out to safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes to ensure that in the future they will contribute to the quality of life. Its main priorities include promotion of the debate on Scotland's future landscapes, description of Scotland's landscape resources, monitoring of change in Scotland's

landscape, landscape planning and management and action for Scotland's special landscapes.

**3.96** NatureScot has undertaken research on areas which are viewed as wildland<sup>164</sup>. This is based on four attributes: perceived naturalness of land cover; ruggedness of the terrain; remoteness from public roads or ferries; and lack of buildings, roads, pylons and modern artefacts. Areas with stronger wildland characteristics are more commonly found in the north and west, particularly areas of higher ground, although additional areas of wildland are present in other areas of Scotland<sup>165</sup>.

### Overview of Baseline

**3.97** Rich in diversity, Scotland's landscapes are internationally renowned. Scotland's distinctive landscapes are a significant part of the country's natural and cultural heritage and make a significant contribution to both the country's economic performance and the well-being of its people. Scotland's landscapes play a key role in attracting tourism, affording opportunities for business and providing the setting for outdoor recreation.

**3.98** There are currently two National Parks (Loch Lomond and The Trossachs, and the Cairngorms) and 40 National Scenic Areas in Scotland. Over 13% of Scotland's land area has been classified as a National Scenic Area<sup>166</sup>. Designations such as Local Landscape Areas, Special Landscape Areas, Regional Scenic Areas and Areas of Great Landscape Value have also been established at a regional and local level by many local authorities<sup>167</sup>. These areas of important nature or landscape value have been designated

<sup>160</sup> Council of Europe (2015) European Landscape Convention, ETS No. 176 [online] Available at: <http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/176> (accessed 09/09/2020)

<sup>161</sup> SNH (undated) National Scenic Areas [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/national-scenic-areas> (accessed 09/09/2020)

<sup>162</sup> Scottish Natural Heritage (2002) Natural Heritage Futures: An Overview [online] Available at: <https://www.nature.scot/sites/default/files/2017-05/A337645%20-%20Natural%20Heritage%20Futures%20-%20An%20Overview.pdf> (accessed 09/09/2020)

<sup>163</sup> Scottish Natural Heritage (2010) SNH's Landscape Policy Framework [online] Available at: <https://www.nature.scot/sites/default/files/2019->

<10/Landscape%20Policy%20Framework%20-%20Policy%20Statement%20No.05-01.pdf> (accessed 09/09/2020)

<sup>164</sup> SNH (undated) Landscape Policy: Mountains [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-policy-wild-land> (accessed 09/09/2020)

<sup>165</sup> Ibid

<sup>166</sup> Scottish Natural Heritage (undated) National Scenic Areas [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/national-scenic-areas> (accessed 09/09/2020)

<sup>167</sup> SNH (undated) Local Designations [online] Available at: <https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/local-designations> (accessed 09/09/2020)

locally for conservation purposes and are afforded protection from inappropriate development<sup>168</sup>.

### Evolution of the Baseline – Pressures, Trends and Key Points

**3.99** Scotland's landscapes are constantly changing and evolving in response to both natural processes and the changing demands of society. Changes in landscape tend to occur over long periods of time, and gradual change, as a result of development such as housing, and changes in farming and forestry practice, can be difficult to determine<sup>169</sup>.

**3.100** Climate change is expected to lead to extensive landscape change across Scotland and is viewed as an increasing pressure on landscape, not only as a result of direct effects but also as a result of indirect impacts<sup>170</sup>. Direct impacts are likely as a result of changing temperatures and patterns of precipitation, weather events and sea level change<sup>171</sup>. Other commitments to adapting to the predicted effects of climate change, for example, the development of

renewable energy (such as wind farms and hydro schemes) is seen by many as a pressure on both visual amenity and the character of many rural landscapes. The construction of new transport infrastructure and working towards a national target for increasing forest cover in Scotland also has the potential to affect our landscapes and seascapes.

**3.101** The greatest changes are likely to be seen in areas of highest population, such as lowland and coastal areas. Mitigation and adaptation measures are expected to have a greater influence on both Scotland's landscapes and the quality of life than that of the direct effects of climate change<sup>172</sup>. The coast and foreshore are under many pressures particularly from climate change, rising sea level and coastal erosion.

**Related SEA topics:** Climate change can have direct or indirect impacts on landscape, cultural heritage, and the historic environment.

**Table 3.8: Landscape issues related to Scotland's landscape settings**

Landscape type	Landscape related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Landscape change from development;</li> <li>■ Landscape change from land management change, including increased woodland planting.</li> <li>■ Recreational use</li> </ul>
Fertile plain Marginal land	<ul style="list-style-type: none"> <li>■ Landscape change from development including agricultural buildings and polytunnels</li> <li>■ Landscape change from land management change including changing agricultural practices including crop choice, field size, loss of field boundary hedgerows and trees etc.</li> </ul>
Upland Mountains	<ul style="list-style-type: none"> <li>■ Landscape change from development, including renewable energy development and electricity infrastructure;</li> <li>■ Landscape change from afforestation</li> <li>■ Landscape change from management of climate related risks e.g. landslides, wildfire</li> <li>■ Landscape change from large scale nature restoration</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Landscape change associated with flood defence and flood management</li> </ul>

<sup>168</sup> Ibid

<sup>169</sup> Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 09/09/2020)

<sup>170</sup> Scottish Natural Heritage (2019) Landscape: Climate change [online] Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-climate-change> (accessed 09/09/2020)

<sup>171</sup> Scotland's Environment (2014) Landscape [online] Available at: <https://www.environment.gov.scot/media/1196/land-landscape.pdf> (accessed 09/09/2020)

<sup>172</sup> SNH (undated) Landscape: climate change. Available at: <https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-climate-change> (accessed 09/09/2020)

Landscape type	Landscape related issues
Coastal Islands	<ul style="list-style-type: none"> <li>■ Landscape change from development;</li> <li>■ Landscape change from land management change</li> <li>■ Landscape change from coastal defence and managed realignment.</li> </ul>
Offshore	N/A

## Material Assets

### Environmental Protection Objectives

**3.102** While existing policies relating to energy, waste, transportation and land use are wide-ranging, they largely share the aims of contributing to core planning objectives and supporting sustainable development, reducing GHG emissions, and making the best use of Scotland's resources and existing infrastructure.

**3.103** There is a wealth of existing protection objectives and policy at the national and international levels relating to these broad topic areas. These include existing and forthcoming energy policy and climate change commitments in addition to current objectives and commitments set out in relevant policies.

**3.104** *National Planning Framework 3 (NPF3)*<sup>173</sup> is a long-term strategy for Scotland that identifies national developments and other strategically important development opportunities in Scotland. It sets out a vision for Scotland to be a successful and sustainable, low carbon, natural and resilient and a connected place. *Scottish Planning Policy (SPP)*<sup>174</sup> sets out national planning policies. It promotes the consistency in application of policies across Scotland and it relates to the preparation of development plans, the design of development, and the determination of planning applications and appeals.

**3.105** *Scotland's National Transport Strategy 2*<sup>175</sup> considers the whole transport system including walking, wheeling, cycling, travelling by bus, train, ferry, car, lorry and aeroplanes/ It sets out the strategic framework within which future decisions on investment will be made.

**3.106** *Infrastructure Investment Plan 2015*<sup>176</sup> sets out priorities for investment and a long-term strategy for the development of public infrastructure in Scotland. It sets out why the Scottish Government invests, how it invests and what it plans to invest in.

**3.107** *Getting the Best from Our Land: A Land Use Strategy for Scotland 2016-2021*<sup>177</sup> builds on the framework set out in 2011 in Scotland's first Land Use Strategy from 2011. The overall aim of this strategy is to continue use Scotland's land with long term objectives in mind and in a well-integrated and sustainable manner. In addition, this strategy focuses on the five-year period (2016 – 2021) and represents a programme of action supported by a suite of policies and proposals.

**3.108** *Energy Efficient Scotland: Route Map*<sup>178</sup> focuses on improving the energy efficiency of Scotland's existing buildings and supporting the deployment of low carbon heat options to achieve the targets of the Climate Change Plan 2018.

**3.109** *The Scottish Energy Strategy: The future of energy in Scotland*<sup>179</sup> guides energy related decisions of the Scottish Government. It directly builds on the Heat Policy Statement of 2015, and it continues to focus on energy and electricity.

<sup>173</sup> Scottish Government (2014) National Planning Framework 3 [online] Available at: <http://www.gov.scot/Publications/2014/06/3539/0> (accessed 09/09/2020)

<sup>174</sup> Scottish Government (2016) Scottish Planning Policy [online] Available at: <http://www.gov.scot/Publications/2014/06/5823> (accessed 09/09/2020)

<sup>175</sup> Scottish Government (2020) National Transport Strategy 2, Protecting our Climate and Improving Lives [online] Available at: <https://www.transport.gov.scot/media/47052/national-transport-strategy.pdf> (accessed 09/09/2020)

<sup>176</sup> Scottish Government (2015) Infrastructure Investment Plan [online] Available at: <https://www.gov.scot/publications/infrastructure-investment-plan-2015/> (accessed 09/09/2020)

<sup>177</sup> Scottish Government (2016) Getting The Best From Our Land: A Land Use Strategy For Scotland 2016 – 2021 [online] Available at: <https://www.gov.scot/publications/getting-best-land-land-use-strategy-scotland-2016-2021/> (accessed 09/09/2020)

<sup>178</sup> Scottish Government (2018) Energy Efficient Scotland: route map [online] Available at: <https://www.gov.scot/publications/energy-efficient-scotland-route-map/> (accessed 09/09/2020)

<sup>179</sup> Scottish Government (2017) Scottish Energy Strategy: The future of energy in Scotland [online] Available at: <https://www.gov.scot/publications/scottish-energy-strategy-future-energy-scotland-9781788515276/> (accessed 09/09/2020)

However, this strategy takes a whole-system view and also includes heat and transport sectors.

**3.110 Heat Decarbonisations Strategy<sup>180</sup>** - A key objective of the Policy Statement will be to support heat decarbonisation of homes and buildings in Scotland, including the scaling up and acceleration of existing work with the aim to reduce emissions from heating our homes and buildings to levels compatible with net zero by 2045, in line with advice from the Committee on Climate Change and the targets in the 2019 Act.

**3.111 Scotland's Forestry Strategy 2019-2029<sup>181</sup>** - The Scottish Forestry Strategy 2019-2029 aims to achieve sustainable development of forests and woodlands, through good management and better integration with other land uses. Priorities include ensuring forests and woodlands are managed sustainably, increasing the adaptability and resilience of forests and woodlands and expanding the area of forests and woodlands, recognising wider land-use objectives. The Strategy sets out a vision of "*In 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses. These will provide a more resilient, adaptable resource, with greater natural capital value, that supports a strong economy, a thriving environment, and healthy flourishing communities*".

**3.112 Making Things Last: A Circular Economy Strategy for Scotland<sup>182</sup>** sets out priorities for moving towards a more circular economy with a long-term ambition. It articulates Scotland's aspirations and proposes a number of actions to take over the short to medium term and creates conditions for long term change. This strategy builds on the Zero Waste Plan (2010)<sup>183</sup> and the Safeguarding Scotland's Resources (2013)<sup>184</sup>.

**3.113 Realising Scotland's full potential in a digital world: A Digital Strategy for Scotland<sup>185</sup>** sets out a vision for Scotland as a vibrant, inclusive, open and outward looking digital nation. It sets out plans to ensure that all aspects of life in Scotland will also have its digitalised form, as well as recognition of challenges which such transition brings.

## Overview of Baseline

**3.114** Scotland's natural resources are also material assets. Mineral resources and aggregates are used for purposes such as fuel (e.g. coal), and construction (e.g. sand, gravel and rock). However, the quantity of these resources is finite and once they are used up, they cannot be replaced.

**3.115** Waste management, transportation and efficiency in energy generation and land use form key aspects of the draft update and have the potential for environmental impacts. Environmental baseline information relevant to each of these sectors is presented in the following sections.

## Energy

**3.116** Heating makes up approximately half of Scotland's energy consumption (52%) with transport (24.4%) and electricity (23.5%) making up approximately a quarter each<sup>186</sup>. A breakdown by sector of non-transport energy consumption shows that 58.1% is accounted for by industrial and commercial sectors, with 41.9% consumed domestically<sup>187</sup>. Domestic consumption of electricity and heat dropped by 20.1% in 2016, with energy consumption in transport decreasing by 2.7%. It is estimated that industrial energy consumption has dropped by 31.8% but commercial consumption rose by 17.7% compared to the 2005-2007 baseline<sup>188</sup>.

**3.117** It is estimated that 20% of Scotland's total energy consumption in 2017 came from renewable sources; the highest level to date and an increase from 16% in 2016. This is attributed to an increase in installed capacity for renewable electricity and heat in 2016. In 2018, provisional figures indicate that the equivalent of 74.6% of gross electricity consumption was from renewable sources, rising from 70.3% in 2017. Much of this increase is due to increase in wind capacity<sup>189</sup>.

**3.118** There have been significant changes to the electricity generation mix in recent years with the vast majority of the electricity that Scotland generated from low carbon sources,

<sup>180</sup> Scottish Government (2015) Heat Policy Statement [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/speech-statement/2015/06/heat-policy-statement-towards-decarbonising-heat-maximising-opportunities-scotland/documents/00478997-pdf/00478997-pdf/govscot%3Adocument/00478997.pdf> (accessed 09/09/2020)

<sup>181</sup> Scottish Government (2019) Scotland's Forestry Strategy 2019 – 2029 [online] Available at: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/> (accessed 09/09/2020)

<sup>182</sup> Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 09/09/2020)

<sup>183</sup> Scottish Government (2010) Zero Waste Plan [online] Available at: <https://www2.gov.scot/Publications/2010/06/08092645/11> (accessed 09/09/2020)

<sup>184</sup> Scottish Government (2013) Safeguarding Scotland's Resources: blueprint for a more resource efficient and circular economy [online] Available at:

<https://www.gov.scot/publications/safeguarding-scotlands-resources-blueprint-more-resource-efficient-circular-economy/> (accessed 09/09/2020)

<sup>185</sup> Scottish Government (2017) Realising Scotland's full potential in a digital world: a digital strategy for Scotland [online] Available at: <https://www.gov.scot/publications/realising-scotlands-full-potential-digital-world-digital-strategy-scotland/> (accessed 09/09/2020)

<sup>186</sup> Scottish Government (2019) Annual Compendium of Scottish Energy Statistics May 2019 Update [online] Available online: <https://www2.gov.scot/Resource/0054/00547632.pdf> (accessed 09/09/2020)

<sup>187</sup> Scottish Government (2019) Annual Compendium of Scottish Energy Statistics May 2019 Update [online] Available online: <https://www2.gov.scot/Resource/0054/00547632.pdf> (accessed 09/09/2020)

<sup>188</sup> *ibid*

<sup>189</sup> *ibid*



88.3% in 2017, compared to 50.1% in 2010<sup>190</sup>. In turn, fossil fuel generation is at its lowest level, with just 10.5% of all electricity generated from oil and gas, compared to 48.4% in 2010<sup>191</sup>.

**3.119**In 2018, 71.8% of all renewable electricity generated in Scotland was from wind. Hydro is Scotland's second highest source of renewable generation, while solar capacity has increased rapidly in the first half of this decade. Bioenergy and energy from waste accounts for 8.3% and whilst the current capacity of wave and tidal is considered to be relatively small, technology is developing<sup>192</sup>.

**3.120**In 2017, the equivalent of 5.9% of non-renewable heat demand was met by renewable sources, an increase from 4.7% in 2016. A rise in the generation of renewable heat by biomass is attributed to this increase. Thermal energy from waste and heat pumps each make up less than 10% of renewable heat output<sup>193</sup>.

**3.121**As Scotland's energy mix changes over the next few years, the electricity transmission network (grid) that supports the balance between energy generation and demand will change significantly. For example, as a result of the increased electrification of the transport and heat network. Infrastructure will play a key role in ensuring security of supply and decarbonising our energy systems in the most cost effective, affordable way<sup>194</sup>.

**3.122**Since 2000, Scottish renewables have displaced an estimated 124 million tonnes of CO<sub>2</sub><sup>195</sup>, assuming that the same amount of electricity generation would be generated by fossil fuels.<sup>196</sup> In 2007 alone, Scottish renewable electricity has displaced an estimated 11.6 million tonnes of CO<sub>2</sub><sup>197</sup>.

## Waste

**3.123**Nearly 12 million tonnes of waste were generated in Scotland in 2017; an increase of 5.5% (0.62 million tonnes) from 2016. Most of this increase is due to wastes from

construction and demolition which increased by 10.8% (0.6 million tonnes) from 2016<sup>198</sup>. However, the generation of waste from construction and demolition is sensitive to large regional projects which can account for large year on year variations.

**3.124**The largest proportions of waste produced in 2017 consisted of soils (37.6%), household and similar wastes (17.4%) and mineral waste from construction and demolition (12.3%)<sup>199</sup>. Of this, around 6.93 million tonnes were recycled, reused or composted, an increase of 2.1% than in 2016<sup>200</sup>. The remaining waste comprised 4.0 million tonnes disposed via incineration or landfill, and 0.76 million tonnes recovered through incineration/co-incineration processes<sup>201</sup>.

**3.125**There has been a progressive reduction in landfilled waste volumes since 2005 (around 50%)<sup>202</sup>. However, following significant reductions seen between 2005 and 2010, coinciding with the publication and implementation of Scotland's Zero Waste Plan, there has been increased variation in recycled volumes in recent years. In 2017, around two thirds of recycled wastes were classed as soils and mineral wastes from construction and demolition, with the remainder consisting of vegetal, paper and cardboard, wood, metallic, sludge and other wastes<sup>203</sup>. There has been a steady increase in waste recovered through energy generation at co-incineration or incineration facilities.

**3.126**A key driver to waste management has been achieving the aim of 'moving up' the waste hierarchy, and promoting the long-term benefits of waste prevention, use minimisation and reuse in preference to disposal options. Much of Scotland's policy approach to waste management was set out in Scotland's Zero Waste Plan<sup>204</sup>, Safeguarding Scotland's Resources: Blueprint for a More Resource Efficient and Circular Economy<sup>205</sup> and Making Things Last: A Circular Economy Strategy for Scotland<sup>206</sup>.

<sup>190</sup> ibid

<sup>191</sup> ibid

<sup>192</sup> ibid

<sup>193</sup> ibid

<sup>194</sup> DECC (2015) Towards a Smart Energy System [online] Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/486362/Towards\\_a\\_smart\\_energy\\_system.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/486362/Towards_a_smart_energy_system.pdf) (accessed 09/09/2020)

<sup>195</sup> Across the GB system

<sup>196</sup> Scottish Government (2019) Annual Compendium of Scottish Energy Statistics May 2019) Update [online] Available online: <https://www2.gov.scot/Resource/0054/00547632.pdf> (accessed 09/09/2020)

<sup>197</sup> ibid

<sup>198</sup> SEPA (2017) Waste from all sources – summary data 2017 [online] Available at:

[https://www.sepa.org.uk/media/413267/wfas\\_2017\\_commentary\\_final.pdf](https://www.sepa.org.uk/media/413267/wfas_2017_commentary_final.pdf) (accessed 09/09/2020)

<sup>199</sup> ibid

<sup>200</sup> ibid

<sup>201</sup> ibid

<sup>202</sup> ibid

<sup>203</sup> ibid

<sup>204</sup> Scottish Government (2010) Scotland's Zero Waste Plan. Available at: <http://www.gov.scot/Publications/2010/06/08092645/0> (accessed 09/09/2020)

<sup>205</sup> Scottish Government (2013) Zero Waste - Safeguarding Scotland's Resources: Blueprint for a More Resource Efficient and Circular Economy [online] Available at: <https://www2.gov.scot/Resource/0043/00435308.pdf> (accessed 09/09/2020)

<sup>206</sup> Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 09/09/2020)

## Transport<sup>207</sup>

**3.127** Over the last five years there has been an increase in car, air, rail, and ferry passenger numbers, as well as in distance cycled. At the same time, there has been a fall in bus passengers. In 2017, 48.0 billion vehicle kilometres were travelled on Scotland's roads, the highest recorded level. Cars account for over three quarters (75%) of the total volume of traffic on the roads while the remaining traffic is shared between light goods vehicles (17%) and heavy goods vehicles (5%). More than 99% of road vehicles in Scotland ran on petrol (51%) or diesel (48%) in 2017. As of 2018, there were 56,364 kilometres of public road in Scotland. Overall, there was an increase of 24% in the amount of trunk road that was newly constructed, reconstructed, strengthened, or surface dressed in 2017-18 compared to the previous year. Newly registered cars are becoming more efficient, with average CO<sub>2</sub> emissions for new car registrations falling by 26% over the last 10 years, despite a slight 0.1% increase compared to 2016<sup>208</sup>. While there has been a nine-fold increase in the uptake of ultra-low carbon vehicles between 2014 and 2018, and a 31% increase in new registrations in 2018 compared to 2017, this currently represents a very small proportion of new car registrations<sup>209</sup>.

**3.128** Passenger journeys on Scotrail services increased by 4% in 2017-18, with 97.8 million passenger journeys undertaken and in general, rail patronage has been steadily rising since 1994-95. The total route length of the railway network in Scotland is 2,819km in Scotland which is serviced by 359 stations. Of this total, 709km are electrified. Bus use is generally higher in urban areas compared to rural, however, bus passenger journeys have generally been falling in the long-term.

**3.129A** reported 28.8 million air terminal passengers travelled through Scottish airports in 2017, an increase of 7.3% or 2 million people from 2016. Edinburgh had the highest number of terminal passengers, though Glasgow's share has increased in the last year. A number of smaller airports are also run by Local Authorities in Scotland, such as Oban Airport, and some of these provide connections to more

remote areas

**3.130** Scotland's marine areas and coastal waters are utilised by a wide range of vessels and service a variety of industries. Ports and harbours are located all around the Scottish coastline. In addition to being an important means of distributing goods, the shipping sector also helps deliver lifeline ferry services which are vital to island communities. In 2017, 67 million tonnes of freight was handled by ports, accounting for one quarter of Scotland's total freight tonnage<sup>210</sup>. A total of 8.5 million passengers travelled on ferry routes within Scotland in 2017. Larger ports such as Cairnryan support ferry services between Scotland and Northern Ireland, with a further 1.8 million passengers travelling to Northern Ireland in 2017. The Forth (28 million tonnes), Clyde (9 million tonnes) and Glensanda (6 million tonnes) ports accounted for the highest freight traffic in 2017<sup>211</sup>.

**3.131** Transport emissions, including Scotland's share of international aviation and shipping, accounted for 37% (14.9 MtCO<sub>2</sub>e) of Scotland's total emissions in 2017, an increase of 3% on the previous year<sup>212</sup>. Road transport is by far the largest source of these emissions, accounting for 65% of all transport emissions. In 2017, cars alone accounted for nearly half of Scotland's transport sector emissions (40%) alongside HGVs (13%) and vans (13%). International aviation and shipping emissions contributed around 30% of total transport emissions<sup>213</sup>.

## Forestry

**3.132** In 2019, Scotland's woodland and forest cover is estimated at 1.46 million hectares (19% of the land area), with just one quarter of this being native woodland; the remainder is dominated by introduced species<sup>214</sup>. Of this, around one third of which is owned by Scottish Ministers, on behalf of the nation, as part of the National Forest Estate<sup>215</sup>. The remainder of Scotland's woodland area is privately or community<sup>216</sup> owned.

**3.133** Around 13,000 hectares of new woodland were created in the UK in 2018-2019, mostly with conifer species which accounted for 60% of the new planting area<sup>217</sup>. Scotland's

<sup>207</sup> All statistics in this section of text have been drawn from the following reference document, unless individually referenced: Transport Scotland (2018) Scottish Transport Statistics No 37: 2018 Edition [online] Available at: <https://www.transport.gov.scot/publication/scottish-transport-statistics-no-37-2018-edition/> (accessed 09/09/2020)

<sup>208</sup> Transport Scotland (2018) Scottish Transport Statistics No. 37 2018 Edition [online] Available at: <https://www.transport.gov.scot/media/44025/scottish-transport-statistics-no-37-2018-edition.pdf> (accessed 09/09/2020)

<sup>209</sup> *ibid*

<sup>210</sup> *ibid*

<sup>211</sup> *ibid*

<sup>212</sup> Committee on Climate Change (2019) Reducing Emissions in Scotland 2019 Progress Report [online] Available at: <https://www.theccc.org.uk/wp->

<content/uploads/2019/12/Reducing-emissions-in-Scotland-2019-Progress-Report-to-Parliament-CCC.pdf> (accessed 09/09/2020)

<sup>213</sup> *ibid*

<sup>214</sup> Forest Research (2019) Forestry Statistics 2019 [online] Available at: <https://www.forestryresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/forestry-statistics-2019/> (accessed 09/09/2020)

<sup>215</sup> Scottish Government (2019) Scotland's Forestry Strategy [online] Available at: <https://www.gov.scot/publications/scotlands-forestry-strategy-20192029/> (accessed 09/09/2020)

<sup>216</sup> *ibid*

<sup>217</sup> Forest Research (2019) Forestry Statistics 2019 [online] Available at: <https://www.forestryresearch.gov.uk/tools-and-resources/statistics/forestry-statistics/forestry-statistics-2019/> (accessed 09/09/2020)

Forestry Strategy sets out plans to increase woodland cover to 21% by 2032<sup>218</sup>. While Scotland's forests and woodlands occupy just 19% of our land surface, they support a disproportionately high share of our biodiversity<sup>219</sup>. Scotland's mature native woodlands support a rich variety of species, and some native woodlands and the plants and animals that live there are unique to Scotland and are at the limits of their worldwide distribution. Some areas of native woodland are legally protected as SSSIs or SACs, and as of February 2020, around 79% of designated woodland features were in favourable or recovering condition<sup>220</sup>. This represented an increase from 68% in 2015.

**3.134** Most Scottish woodlands are dominated by non-native species, with native woodland covering just 4% of the total land area<sup>221</sup>. Some 8.4 million cubic metres of overbark standing timber was harvested from Scottish forests in 2016, representing a 1% decrease from the previous year<sup>222</sup>. Wood fuel for biomass heating is a growing use of forestry resources<sup>223</sup>. With the exception of a drop in harvesting in 2008/2009 and since 2014, the quantity of timber harvested has increased relatively steadily over the past 35 years and is around seven times the level of the late 1970s<sup>224</sup>.

**3.135** Woodlands and forests contain substantial carbon in the soil and vegetation, and are hugely important for carbon, water and energy cycles. In the UK, the amount of carbon held in woodlands and forests is estimated at around 880 million tonnes of carbon<sup>225</sup>. In addition, harvesting trees for wood fuel or power generation instead of fossil fuels can result in a net emissions reduction, provided the rate of growth of replacement trees is sufficient to absorb the CO<sub>2</sub> released during fuel production and consumption<sup>226</sup>.

**3.136** Scotland is a net sink of carbon dioxide equivalence from land use, land use change and forestry activities. The size of this sink increased fifteen-fold between 1990 and 2017, from -347 kt CO<sub>2</sub>eq to -5,438 kt CO<sub>2</sub>eq attributed largely to an increase in forest carbon stocks and a reduction in the conversion of grassland and forests to cropland and settlements<sup>227</sup>.

### Agriculture

**3.137** Agriculture is the dominant land use in Scotland, with 75% of Scotland's land mass under agricultural production<sup>228</sup>. A diverse range of farming takes place across the country including arable farming, crofting, hill farming and lowland livestock and dairy farming<sup>229</sup>. Over half of Scotland's agricultural land is used for upland sheep farming and mixed sheep and beef cattle farming<sup>230</sup>.

**3.138** Agricultural land use has a strong influence on the landscape and environment, sustaining important habitats for biodiversity including unimproved grassland, cultivated fields, walls and hedges, watercourses, wetlands, moorland and upland grassland. Changes in land use can have an impact on wildlife habitats and water pollution (e.g. via diffuse pollution). Agriculture also accounts for around 10% of the total GHG emissions in the UK, contributing predominantly Nitrous oxide (N<sub>2</sub>O) and methane gases, with smaller amounts of CO<sub>2</sub><sup>231</sup>.

**3.139** Intensive land management is one of the main challenges to farmland wildlife and shift toward intensification has resulted in a change in biodiversity which could have major implications for food production<sup>232</sup>. Increased field sizes and use of agricultural chemicals has led to a potentially serious decline in pollinators such as bees, which in turn, can

<sup>218</sup> Scottish Government (2019) Scotland's Forestry Strategy [online] Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2019/02/scotlands-forestry-strategy-20192029/documents/scotlands-forestry-strategy-2019-2029/scotlands-forestry-strategy-2019-2029/govscot%3Adocument/scotlands-forestry-strategy-2019-2029.pdf> (accessed 09/09/2020)

<sup>219</sup> Scottish Forestry (undated) Biodiversity [online] Available at: <https://forestry.gov.scot/forests-environment/biodiversity> (accessed 09/09/2020)

<sup>220</sup> Scotland's Environment (2020) Protected Nature Sites [online] Available at: <https://www.environment.gov.scot/data/data-analysis/protected-nature-sites/> (accessed 09/09/2020)

<sup>221</sup> SNH (undated) History of Scotland's Woodlands [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/forests-and-woodlands/history-scotlands-woodlands> (accessed 09/09/2020)

<sup>222</sup> Scottish Government (2017) Forestry – Timber Harvested [online] Available at: <https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/TrendTimberHarvested> (accessed 09/09/2020)

<sup>223</sup> Energy Saving Trust (2017) Woodfuel Demand & Usage. Available at: <https://forestry.gov.scot/publications/91-woodfuel-demand-and-usage-in-scotland> (accessed 09/09/2020)

<sup>224</sup> Scottish Government (2017) Forestry – Timber Harvested [online] Available at: <https://www2.gov.scot/Topics/Statistics/Browse/Agriculture-Fisheries/TrendTimberHarvested> (accessed 09/09/2020)

<sup>225</sup> Forest Research (undated) Forestry and climate change mitigation [online] Available at: <https://www.forestresearch.gov.uk/research/forestry-and-climate-change-mitigation/> (accessed 09/09/2020)

<sup>226</sup> *ibid*

<sup>227</sup> Jones et al. (2019) Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2017 [online] Available at: [https://naei.beis.gov.uk/reports/reports?report\\_id=991](https://naei.beis.gov.uk/reports/reports?report_id=991) (accessed 09/09/2020)

<sup>228</sup> Scottish Natural Heritage, (2018). Farming and crofting. Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/farming-and-crofting> (accessed 09/09/2020)

<sup>229</sup> *ibid*

<sup>230</sup> Scottish Natural Heritage, (2018). Hill farming. Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/farming-and-crofting/types-farming/hill-farming> (accessed 09/09/2020)

<sup>231</sup> Jones et al. (2019) Greenhouse Gas Inventories for England, Scotland, Wales and Northern Ireland: 1990 – 2017 [online] Available at: [https://naei.beis.gov.uk/reports/reports?report\\_id=991](https://naei.beis.gov.uk/reports/reports?report_id=991) (accessed 09/09/2020)

<sup>232</sup> Scotland's Environment (2014) State of the Environment Report [online] Available at: <https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf> (accessed 09/09/2020)

negatively affect crop volumes<sup>233</sup>. Poor land management can also lead to increased soil erosion, which can lead to loss of topsoil and reduce soil function<sup>234</sup>.

**3.140** Climate change is expected to raise further challenges for the agriculture sector. Further changes in temperature and rainfall are expected to change the patterns of Scotland's agricultural land-uses and could lead to increased pressure on the land<sup>235</sup>. Farming has an important role to play in increasing the resilience of biodiversity and assisting adaptation through the management of existing habitats and enhancing connectivity between areas through habitat networks<sup>236</sup>. Conversely, increased connectivity may also result in quicker spread of diseases and pests, including invasive non-native species.

### Evolution of the Baseline – Pressures, Trends and Key Points

**3.141** Energy storage is likely to be an increasingly important part of the transition to delivering clean, affordable and secure supplies of energy<sup>237</sup>. For example, the continued development of battery storage technologies and hydrogen fuel cells for vehicle use in the transport sector.

**3.142** Increasing the use of biological wastes in processes such as anaerobic digestion can increase the production of biogas, a source of renewable fuel and heat<sup>238</sup>. This can help divert waste materials away from landfill, reducing the amount of waste going to landfill and in turn, lead to a reduction of sequestered gases that would otherwise be released into the atmosphere.

**3.143** Forestry and farming will need to adapt to cope with the

impacts of climate change, such as flooding, drought, unseasonable weather and increased risk of pests and diseases. Further, changes in temperature and rainfall are expected to change the patterns of Scotland's agricultural land-use placing increased pressure on the land<sup>239</sup>.

**3.144** The demand for the services that the natural environment provides, such as food, water, fuel and materials for development, is likely to grow in line with population growth.

**3.145** Some material assets including road and rail transport are generally more vulnerable to a changing climate than air and water transport and flooding is anticipated to be the most significant impact on these networks, as well as those arising from extreme weather conditions and landslides<sup>240</sup>.

**3.146** The network support services underlying energy, transport, water, and information and communications technology are vital to health and wellbeing and economic prosperity. The effect of climate change on these infrastructure systems will be varied but is likely to include an increase in disruptive events such as flooding, landslides, drought, and heatwaves. Further, this infrastructure is closely inter-linked and failure in any area can lead to wider disruption across these networks<sup>241</sup>.

**Related SEA topics:** Changes made to material assets can directly or indirectly impact on other topic areas, such as air quality and population and human health.

<sup>233</sup> ibid

<sup>234</sup> Scotland's Soils (undated) Extent of soil erosion and landslides [online] Available at: <http://www.soils-scotland.gov.uk/context/erosion> (accessed 09/09/2020)

<sup>235</sup> SNH (undated) Farming and Climate Change [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/farming-and-crofting/farming-and-climate-change> (accessed 09/09/2020)

<sup>236</sup> SNH (2009) Natural Heritage Futures Update, Farming [online] Available at: <http://www.snh.gov.uk/docs/A306272.pdf> (accessed 09/09/2020)

<sup>237</sup> ClimateXChange (2016) Energy Storage in Scotland - Summary of reports on thermal and electrical energy storage [online] Available at: [https://www.climateexchange.org.uk/media/1391/summary\\_energy\\_storage.pdf](https://www.climateexchange.org.uk/media/1391/summary_energy_storage.pdf) (accessed 09/09/2020)

<sup>238</sup> Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: <http://www.gov.scot/Resource/0049/00494471.pdf> (accessed 09/09/2020)

<sup>239</sup> SNH (2019) Farming and Climate Change [online] Available at: <https://www.nature.scot/professional-advice/land-and-sea-management/managing-land/farming-and-crofting/farming-and-climate-change> (accessed 09/09/2020)

<sup>240</sup> Committee on Climate Change (2017) UK Climate Change Risk Assessment 2017 Evidence Report Summary for Scotland [online] Available at: <https://www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Scotland-National-Summary.pdf> (accessed 09/09/2020)

<sup>241</sup> Adaptation Scotland (undated) 15 Key Consequences of Climate Change for Scotland [online] Available at: <http://adaptationscotland.org.uk/climate-ready-places/impacts/> (accessed 09/09/2020)

**Table 3.9: Material assets issues related to Scotland's landscape settings**

Landscape type	Material assets related issues
Urban Peri-urban	<ul style="list-style-type: none"> <li>■ Vacant and derelict land;</li> <li>■ Active travel routes and open spaces;</li> <li>■ Tourism infrastructure;</li> <li>■ Energy and heat supply infrastructure;</li> <li>■ Sewage system infrastructure;</li> <li>■ Transport infrastructure;</li> <li>■ Waste management infrastructure;</li> <li>■ Renewable energy and electricity transmission infrastructure.</li> </ul>
Fertile plain	<ul style="list-style-type: none"> <li>■ Food production;</li> <li>■ Energy forests;</li> <li>■ Renewable energy and electricity transmission infrastructure;</li> <li>■ Mineral extraction.</li> </ul>
Marginal land	<ul style="list-style-type: none"> <li>■ Renewable energy and electricity transmission infrastructure.</li> <li>■ Forestry</li> </ul>
Upland Mountains	<ul style="list-style-type: none"> <li>■ Renewable energy and electricity transmission infrastructure;</li> <li>■ Recreation and tourism, including field sports;</li> <li>■ Mineral extraction</li> <li>■ Water supply and distribution infrastructure</li> <li>■ Forestry</li> </ul>
Rivers and water bodies	<ul style="list-style-type: none"> <li>■ Water supply and distribution infrastructure</li> </ul>
Coastal Islands	<ul style="list-style-type: none"> <li>■ Renewable energy and electricity transmission infrastructure;</li> <li>■ Tourism infrastructure;</li> <li>■ Transport infrastructure including port and harbour infrastructure.</li> </ul>
Offshore	<ul style="list-style-type: none"> <li>■ Renewable energy infrastructure and electricity transmission infrastructure;</li> <li>■ Marine aggregates</li> </ul>

# Chapter 4

## Strategic Environmental Assessment Findings

### Introduction

**4.1** This chapter of the Environmental Report sets out the assessment findings and the significant environmental effects of Scotland's Third Land Use Strategy. The following paragraphs summarise the environmental effects identified in relation to each of the landscape settings.

**4.2** The full assessment matrices, and a summary of scores is presenting in Appendix B.

### Urban

**4.3** The key themes in Scotland's Third Land Use Strategy for urban areas include:

- Urban planning;
- Urban woodlands (expanding green networks);
- Community woodland ownership;
- Vacant and derelict land;
- Blue and green infrastructure and water resilient places.

**4.4** **No significant adverse** effects are identified in relation to **climate change mitigation**. **No significant positive** effects are identified, although minor positive effects are identified with respect to climate change mitigation through the role of urban planning, the role of urban woodland, the role of vacant and derelict land, and the role of blue green infrastructure. Minor positive effects are identified at a Scotland-wide scale and relate to the development of low carbon projects. Although these may be locally significant where they substantially contribute to the overall carbon emissions reductions of urban areas.

**4.5** **No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified with respect to climate change adaptation through the role of increasing urban woodlands, the role of community woodland ownership, and the role of blue and green infrastructure. Minor positive effects are identified from potential effects of urban planning and vacant and derelict land.

**4.6** **No significant adverse** effects are identified in relation to **population and human health**. **Significant positive** effects are identified in relation to population and human

health through the role of urban planning, the role of increasing urban woodlands, and the role of community woodland ownership and the role of blue and green infrastructure. Minor positive effects relate to potential effects arising from vacant and derelict land. These may be locally significant where they contribute substantially to improvements in areas with greater levels of vacant and derelict land.

**4.7 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of urban woodlands, and the role of community woodland ownership and the role of blue and green infrastructure. Minor positive effects are identified related to urban planning. Mixed effects are also identified, and they relate to potential effects arising from vacant and derelict land.

**4.8 No significant adverse** effects are identified in relation to **water**. **Significant positive** effects are identified in relation to water through blue and green infrastructure. Minor positive effects are identified from urban planning, urban woodlands, and community woodland ownership. These may be locally significant where they contribute substantially to improvements in areas with lower levels of blue and green infrastructure.

**4.9 No significant adverse** effects are identified in relation to **air**. **No significant positive** effects are identified, although minor positive effects are identified, from urban planning, urban woodlands, community woodland ownership and blue and green infrastructure. These may be locally significant where levels of air pollutants are highest.

**4.10 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of urban planning, the role of urban woodlands, the role of community woodland ownership, the role of vacant and derelict land and the role of blue and green infrastructure.

**4.11 No significant adverse** effects are identified in relation to **landscape and geodiversity**. **Significant positive** effects are identified in relation to landscape and geodiversity through the role of urban woodlands and the role of community woodland ownership. Minor positive effects are identified from urban planning, and vacant and derelict land. Mixed effects are also identified from blue and green infrastructure. These may be locally significant where they contribute substantially to improvements to areas with lower levels of green and blue infrastructure or greater flood risk.

**4.12 No significant adverse** effects are identified in relation to **cultural heritage and the historic environment**. **No significant positive** effects are identified, although minor positive effects are identified in relation to cultural heritage and

historic environment through the role of blue and green infrastructure which may impact on these assets or their setting. Mixed effects are also identified for urban planning.

**4.13 No significant adverse** effects are identified in relation to **material assets**. **Significant positive** effects are identified in relation to material assets through the role of blue and green infrastructure. Minor positive effects are identified, and they relate to potential effects arising from urban planning and from vacant and derelict land. These may be locally significant where they contribute significantly to improvements in areas with lower levels of green infrastructure.

## Peri-urban

**4.14** The key themes in the Scotland's Third Land Use Strategy for peri-urban areas include:

- Evolving planning;
- Local engagement;
- Cleaner air;
- More trees and increasing training for outdoor learning and play;
- Creation of Climate Action Towns Network;
- Green infrastructure and improving access and availability of greenspace.

**4.15 No significant adverse** effects are identified in relation to **climate change mitigation**. **Significant positive** effects are identified in relation to climate change mitigation through the role of the creation of Climate Action Towns Network. Minor positive effects are identified from potential indirect effects arising from evolving planning, cleaner air, more trees and increasing training for outdoor learning and play and green infrastructure.

**4.16 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of evolving planning, the role of more trees and increasing training for outdoor learning and play, the role of creation of Climate Action Towns and the role of green infrastructure. Minor positive effects are identified from cleaner air. These may be locally significant where levels of air pollutants exacerbated by climate change are greatest.

**4.17 No significant adverse** effects are identified in relation to **population and human health**. **Significant positive** effects are identified in relation to population and human health through the role of local engagement, the role of cleaner air, the role of more trees and increasing training for outdoor learning and play, the role of green infrastructure and improving access and availability of greenspace and by creating of Climate Action Towns Network. Minor positive

effects are also identified from evolving planning. These may be locally significant in locations where there are highest levels of air pollution and lowest levels of urban forests and green infrastructure provisions.

**4.18 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of evolving planning, the role of more trees and increasing training for outdoor learning and play. These may be locally significant in areas where biodiversity levels are the lowest.

**4.19 No significant adverse** effects are identified in relation to **water**. **No significant positive** effects are identified, although minor positive effects are identified in relation to water, and they relate to evolving planning, more trees and increasing training for outdoor learning and play. These may be locally significant where there are lower levels of green infrastructure and greater flood risk.

**4.20 No significant adverse** effects are identified in relation to **air**. **Significant positive effects** are identified in relation to air through the role of cleaner air. Minor positive effects are identified from evolving planning and more trees and increasing training for outdoor learning and play. These may be locally significant where levels of air pollutants are highest.

**4.21 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of evolving planning and more trees and increasing training for outdoor learning and play.

**4.22 No significant adverse** effects are identified in relation to **landscape and geodiversity**. **Significant positive** effects are identified in relation to landscape and geodiversity through the role of evolving planning and the role of more trees and increasing training for outdoor learning and play. These may be locally significant where levels of green infrastructure and landscape quality are lowest.

**4.23 No significant adverse** effects are identified in relation to **cultural heritage and historic environment**. **No significant positive** effects are identified, although minor positive effects are identified in relation to cultural heritage and historic environment through the role of evolving planning.

**4.24 No significant adverse** effects are identified in relation to **material assets**. **No significant positive** effects are identified, although minor positive effects are identified in relation to material assets through the role of green infrastructure and improving access and availability of greenspaces and by creating Climate Action Towns Network. These may contribute substantially locally to the overall carbon emissions reductions of peri-urban areas.

## Fertile land

**4.25** The key themes in Scotland's Third Land Use Strategy for fertile land include:

- Impacts from food production (commercial crop farming) agricultural inputs such as fertilisers, pesticides, and cultivation practices including agricultural buildings and polytunnels and management of silage and slurry;
- Promoting sustainable practices (encourage good practice, world-class producer of high-quality food, low carbon farming methods);
- On-farm woodlands and agroforestry;
- Valuing Our Soils (Soil Regenerative Agriculture Group);
- Wild and managed pollinators (pollinator friendly pest control measures).

**4.26 No significant adverse** effects are identified, although minor negative effects are identified in relation to **climate change mitigation** through the role of impacts from food production. **No significant positive** effects are identified, although minor positive effects are identified in relation to climate change mitigation through the role of promoting sustainable practices, the role of on-farm woodland and agroforestry, and the role of Valuing Our Soils.

**4.27 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of promoting sustainable practices, the role of on-farm woodlands and agroforestry, and the role of Valuing Our Soils. Minor positive effects are identified related to potential effects arising from wild and managed pollinators. Mixed effects are also identified related to the role of impacts from food production.

**4.28 No significant adverse** effects are identified in relation to **population and human health**. **No significant positive** effects are identified, although minor positive effects are identified in relation to population and human health through the role of promoting sustainable practices, the role of Valuing Our Soils and the role of wild and managed pollinators. Mixed effects are identified from the impacts from food production.

**4.29 No significant adverse** effects are identified, although minor negative effects are identified in relation to **biodiversity, fauna and flora** through the role of impacts from food production. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of promoting sustainable practices, the role of on-farm woodland and agroforestry and the role of wild and managed pollinators.

**4.30 No significant adverse** effects are identified, although minor negative effects are identified in relation to **water** through the role of agricultural activity. **No significant**



**positive** effects are identified in relation to water. Minor negative effects may be locally significant where they contribute areas with poor water quality.

**4.31 No significant adverse** effects are identified, although minor negative effects are identified in relation to **air** through the role of impacts from food production. **Significant positive** effects are identified in relation to air through the role of promoting sustainable practices. Minor positive effects are identified from on-farm woodlands and agroforestry and from Valuing Our Soils.

**4.32 No significant adverse** effects are identified, although minor negative effects are identified in relation to **soil** through the role of impacts from food production. **Significant positive** effects are identified in relation to soil through the role of promoting sustainable practices and the role of Valuing Our soils. Minor positive effects are identified related to potential effects arising from on-farm woodlands and agroforestry. These may be locally significant in areas with higher levels of soil erosion.

**4.33 No significant adverse** effects are identified, although minor negative effects are identified in relation to **landscape and geodiversity** through the role of impacts from food production. **No significant positive** effects are identified, although, minor positive effects are identified in relation to landscape and geodiversity arising from promoting sustainable practices, on-farm woodlands and agroforestry and from Valuing Our soils. These may be locally significant in areas with lower levels of landscape quality.

**4.34 No significant negative effects** are identified, although minor negative effects are identified in relation to **cultural heritage and historic environment** through the role of impacts from food production. **No significant positive effects** are identified in relation to cultural heritage and historic environment.

**4.35 No significant adverse** effects are identified in relation to **material assets**. **No significant positive** effects are identified, although minor positive effects are identified in relation to material assets arising from promoting sustainable practices and from Valuing Our Soils. Mixed effects are identified from impacts from food production and on-farm woodland and agroforestry. These may be locally significant in areas of lower woodland cover.

## Marginal land

**4.36** The key themes in the Scotland's Third Land Use Strategy for marginal land include:

- Peatland restoration;
- Farming and Crofting (Beef Efficiency Scheme);
- Increasing woodland; Woodland Carbon Code;

- Biodiversity Challenge Fund; and
- A new tourism strategy.

**4.37 No significant adverse** effects are identified, although minor negative effects are identified in relation to **climate change mitigation** through the role of a new tourism strategy. **Significant positive effects** are identified in relation to climate change mitigation through the role of peatland restoration and increasing woodland. Minor positive effects are identified from farming and crofting, the Woodland Carbon Code and the Biodiversity Challenge Fund.

**4.38 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of peatland restoration, the role of farming and crofting and the role of Woodland Carbon Code. Minor positive effects are also identified and they relate to potential effects arising from increasing woodland and the Biodiversity Challenge Fund.

**4.39 No significant adverse** effects are identified in relation to **population and human health**. **Significant positive effects** are identified in relation to population and human health through the role of increasing woodland and the role of a new tourism strategy.

**4.40 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of peatland restoration and the role of increasing woodland. Minor positive effects are identified related to potential effects arising from the Woodland Carbon Code, and the Biodiversity Challenge Fund. Mixed effects are also identified, and they relate to effects arising from the tourism strategy.

**4.41 No significant effects** are identified in relation to **water**. **No significant positive** effects are identified, although minor positive effects are identified in relation to water through the role of peatland restoration and the role of large-scale woodland and forestry creation. These may be locally significant in areas where water quality is lowest and there is greatest flood risk.

**4.42 No significant adverse** effects are identified in relation to **air**. **No significant positive** effects are identified, although minor positive effects are identified in relation to air through the role of peatland restoration and the role of increasing woodland.

**4.43 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of peatland restoration and the role of increasing

woodland and the Woodland Carbon Code. These may be locally significant where soil is prone to erosion.

**4.44 No significant adverse** effects are identified in relation to **landscape and geodiversity**. **No significant positive** effects are identified, although minor positive effects are identified in relation to landscape and geodiversity through the role of peatland restoration. Mixed effects are also identified from increasing woodland. These may be locally significant where landscape quality is degraded.

**4.45 No significant adverse** effects are identified in relation to **cultural heritage and historic environment**. **No significant positive** effects are identified, although minor positive effects are identified in relation to cultural heritage and historic environment through the role of tourism strategy. These may be locally significant where they contribute substantially to the protection and enhancement of these resources.

**4.46 No significant adverse** effects are identified in relation to **material assets**. **No significant positive** effects are identified, although minor positive effects are identified in relation to material assets through farming and crofting, the role of Woodland Carbon Code and the role of tourism strategy. Mixed effects are also identified related to potential impacts arising from increasing woodland.

## Uplands

**4.47** The key themes in the Scotland's Third Land Use Strategy for uplands include:

- High nature value;
- Growing our woodland economy;
- The right tree, or bog, in the right place;
- Onshore Wind Policy Statement;
- Biodiversity Strategy;
- Local food strategy; and
- Community initiatives.

**4.48 No significant adverse** effects are expected in relation to **climate change mitigation**. **Significant positive** effects are identified in relation to climate change mitigation through the role of growing our woodland economy, and the role of the right tree, or bog, in the right place. Minor positive effects are also identified, and they relate to potential effects arising from high value nature, Onshore Wind Policy Statement, Biodiversity Strategy, local food strategy and community initiatives.

**4.49 No significant adverse** effects are expected in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through

the role of growing our woodland economy, the role of the right tree, or bog, in the right place, the role of the Onshore wind Policy Statement and the role of local food strategy. Minor positive effects are also identified, and they relate to potential effects arising from high value nature, Biodiversity Strategy, and community initiatives.

**4.50 No significant adverse** effects are identified in relation to **population and human health**. **Significant positive effects** are identified in relation to population and human health through the role of community initiatives. **Minor positive** effects are identified in relation to population and human health in relation to potential effects arising from growing our woodland economy, Onshore Wind Policy Statement and local food strategy.

**4.51 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of growing our woodland economy, and the role of the right tree, or bog, in the right place. Minor positive effects are identified, and they relate to the potential effects arising from high value nature, and the Biodiversity Strategy. Mixed effects are also identified, and they relate to the potential effects arising from the Onshore Wind Policy Statement.

**4.52 No significant adverse** effects are identified in relation to **water**. **No significant positive** effects are identified, although minor positive effects are identified in relation to water through the role of growing our woodland economy and the role of the right tree, or bog, in the right place. These may be locally significant where flood risks are greater.

**4.53 No significant adverse** effects are identified in relation to **air**. **No significant positive** effects are identified, although minor positive effects are identified in relation to air through the role of growing our woodland economy, and the Onshore Wind Policy Statement.

**4.54 No significant adverse** effects are identified, although minor negative effect are identified in relation to **soil** through the role of the Onshore Wind Policy Statement. **No significant positive** effects are identified, although minor positive effects are identified, and they relate to potential effects arising from growing our woodland economy and the role of the right tree, or bog, in the right place. These may be locally significant where soil erosion or slope stability issues are greater.

**4.55 No significant adverse** effects are identified, although minor negative effects are identified in relation to **landscape and geodiversity** through the role of the Onshore Wind Policy Statement. **No significant positive** effects are identified, although minor positive effects are identified in relation to landscape and geodiversity through the role of the right tree,

or bog, in the right place. Mixed effects are identified related to potential effects arising from growing our woodland economy.

**4.56 No effects** are identified in relation to **cultural heritage and historic environment**.

**4.57 No significant adverse** effects are identified in relation to **material assets**. **Significant positive** effects are identified in relation to material assets through the role of growing our woodland economy. Minor positive effects are identified related to potential effects arising from the right tree, or bog, in the right place, local food strategy and community incentives. Mixed effects are also identified, and they relate to potential risks arising from the Onshore Wind Policy Statement. These may be locally significant where peatlands are degraded.

### Semi-natural land

**4.58** The key themes in the Scotland's Third Land Use Strategy for mountains areas include:

- Protecting our semi-natural land;
- Living landscapes;
- Restoring native ecology;
- Responsible tourism; and
- Restoration of peatland.

**4.59 No significant adverse** effects are identified, however minor negative effects are identified in relation to **climate change mitigation** by responsible tourism. **Significant positive** effects are identified in relation to climate change mitigation through the role of restoring native ecology and the role of peatland restoration. Minor positive effects are identified from protecting our semi-natural land and from living landscapes.

**4.60 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of restoring native ecology and the role of peatland restoration. Minor positive effects are also identified and relate to potential effects arising from protecting our semi-natural land and from living landscapes. These may be locally significant where they contribute substantially to increasing habitat networks and flood mitigation.

**4.61 No significant adverse** effects are identified in relation to **population and human health**. **No significant positive** effects are identified, although minor positive effects are identified in relation to population and human health, and they relate to potential effects arising from protecting our semi-natural land and living landscapes. These may be locally significant where they support local employment.

**4.62 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of protecting our semi-natural land, the role of restoring native ecology and the role of peatland restoration. Minor positive effects are identified from responsible tourism.

**4.63 No significant adverse** effects are identified in relation to **water**. **No significant positive** effects are identified, although minor positive effects are identified in relation to water through the role of protecting our semi-natural land, the role of restoring native ecology and the role of peatland restoration.

**4.64 No effects** are identified in relation to **air**.

**4.65 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of protecting our semi-natural land, the role of restoring native ecology and the role of peatland restoration. These may be locally significant where peatland is degraded.

**4.66 No significant adverse** effects are identified in relation to **landscape and geodiversity**. **Significant positive** effects are identified in relation to landscape and geodiversity through the role of protecting our semi-natural land. Minor positive effects are identified, and they relate to potential effects arising from restoring native ecology and restoring peatlands.

**4.67 No significant adverse** effects are identified in relation to **cultural heritage and historic environment**. **Significant positive effects** are identified in relation to cultural heritage and historic environment through the role of protecting our semi-natural land. Minor positive effects are identified related to potential effects arising from responsible tourism.

**4.68 No significant adverse** effects are identified in relation to **material assets**. **No significant positive** effects are identified, although minor positive effects are identified in relation to material assets through the role of protecting our semi-natural land, the role of living landscapes, the role of restoring native ecology, the role of responsible tourism and the role of peatland restoration.

### Rivers and water bodies

**4.69** The key themes in the Scotland's Third Land Use Strategy for rivers and water bodies include:

- Healthy water, healthy land;
- Flood Risk Management;
- Land impacts;
- Water Environment Fund; and
- Ecosystem Approach.

**4.70 No significant adverse** effects are identified in relation to **climate change mitigation**. **Significant positive** effects are identified in relation to climate change mitigation through the role of healthy water, healthy land. Minor positive effects are also identified, and they relate to potential effects arising from land impacts, Water Environment fund and an ecosystems approach.

**4.71 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of healthy water, healthy land, the role of Flood Risk Management, the role of Water Environment fund, and the role of an ecosystems approach. Minor positive effects are identified from land impacts. These may be locally significant where there is a need for an increased regulation of water flow.

**4.72 No significant adverse** effects are identified in relation to **population and human health**. **Significant positive** effects are identified in relation to population and human health through the role of healthy water, healthy land, the role of Flood Risk Management, and the role of the Water Environment fund. These may be locally significant where water is of lower quality.

**4.73 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of healthy water, healthy land. Minor positive effects are identified from land impacts, the Water Environment Fund and an ecosystems approach. Mixed effects are identified for Flood Risk Management.

**4.74 No significant adverse** effects are identified in relation to **water**. **Significant positive** effects are identified in relation to water for healthy water, healthy land, Flood Risk Management, land impacts, and the Water Environment Fund. Minor positive effects are also identified related to potential effects arising from an ecosystems approach.

**4.75 No significant negative effects** are identified in relation to **air**. **No significant positive effects** are identified, although minor positive effects are identified in relation to air, and they relate to potential effects arising from an ecosystem approach.

**4.76 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to **soil**, and they relate to potential effects arising from healthy water, healthy land, Flood Risk Management, land impacts, the Water Environment Fund and ecosystems approach. These may be locally significant where there is a greater flood risk.

**4.77 No significant adverse** effects are identified for **landscape and geodiversity**. **No significant positive** effects are identified, although minor positive effects are identified in

relation to landscape and geodiversity, and they relate to potential effects arising from the Water Environment Fund and ecosystems approach. Mixed effects are identified from Flood Risk Management.

**4.78 No significant adverse** effects are identified for **cultural heritage and historic environment**. **No significant positive** effects are identified in relation to cultural heritage and historic environment. However, mixed effects are identified for Flood Risk Management.

**4.79 No significant adverse** effects are identified in relation to **material assets**. **Significant positive** effects are identified in relation to material assets through the role of Flood Risk Management. Minor positive effects are identified related to potential effects arising from healthy water, healthy land, land impacts, the Water Environment Fund and an ecosystems approach.

## Coastal

**4.80** The key themes in Scotland's Third Land Use Strategy for coastal areas include:

- Where the land meets the sea (coastal planning, further alignment of marine and terrestrial planning policy);
- Strengthening natural defences (natural shoreline habitats and Dynamic Coast project);
- Coastal and marine industries (Blue Economy Action Plan);
- Aquaculture (improved regulatory processes, more benefit to communities where aquaculture is based); and
- Investing in coastal communities (Crown Estate Scotland's sustainable communities fund).

**4.81 No significant adverse** effects are identified in relation to **climate change mitigation**. **Minor positive** effects are identified in relation to climate change mitigation through the role of coastal planning, the role of coastal and marine industries, and the role of aquaculture.

**4.82 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive effects** are identified in relation to climate change adaptation through the role of strengthening natural defences. **Minor positive** effects are identified in relation to climate change adaptation through the role of coastal planning, the role of coastal and marine industries, and the role of aquaculture.

**4.83 No significant adverse** effects are identified in relation to **population and human health**. **Significant positive** effects are identified in relation to population and human health through the role of coastal and marine industries and the role of aquaculture. Minor positive effects are also identified from strengthening natural defences and from

investing in coastal communities. These may be locally significant in areas where erosion risk is greatest.

**4.84 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity through the role of coastal planning. Minor positive effects are identified related to potential effects arising from strengthening natural coastal defences. Mixed effects are also identified related to potential effects arising from aquaculture and uncertain effects relate to potential impacts arising from the coastal and marine industries.

**4.85 No significant adverse** effects are identified in relation to **water**. **Significant positive** effects are identified in relation to water through where the land meets the sea. Minor positive effects are identified related to potential effects arising from strengthening natural defences. Mixed effects are identified from aquaculture and uncertain effects are identified and relate to potential effects arising from coastal and marine industries.

**4.86 No effects** are identified in relation to **air**.

**4.87 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of strengthening natural defences. These may be locally significant where they contribute

**4.88 No significant adverse** effects are identified in relation to **landscape and geodiversity**. **No significant positive** effects are identified, although minor positive effects are identified in relation to landscape and geodiversity through the role of where the land meets the sea and the role of strengthening natural defences. Uncertain effects are also identified from the coastal and marine industries. These may be locally significant where they contribute areas at risk of coastal erosion and flooding.

**4.89 No significant adverse** effects are identified in relation to **cultural heritage and historic environment**. **No significant positive** effects are identified, although minor positive effects are identified in relation to cultural heritage and historic environment through the role of where the land meets the sea, the role of strengthening natural defences and the role of aquaculture. Mixed effects are identified from the coastal and marine industries depending on the nature of actions brought forward.

**4.90 No significant adverse** effects are identified in relation to **material assets**. **No significant positive** effects are identified, however minor positive effects are identified in relation to material assets from where the land meets the sea, by strengthening natural defences, by coastal and marine industries by aquaculture and by investing in coastal communities.

## Islands

**4.91** The key themes in Scotland's Third Land Use Strategy for Islands relate to:

- National Islands Plan;
- Collaboration with non-native species action group;
- Nature based solutions to climate change;
- Prosperous island economies (Rural and Islands Economic Recovery Plan);
- Community engagement;
- Low carbon projects; and
- Natural and Cultural Heritage Fund.

**4.92 No significant adverse** effects are identified, although minor negative effects relate to potential effects arising from prosperous island economies in relation to **climate change mitigation** which may increase emissions. **No significant positive** effects are identified, although minor positive effects are identified in relation to climate change mitigation through the role of National Island Plan, the role of nature based solutions to climate change, the role of collaboration with non-native species action group, the role of community engagement to influence the development of local renewable energy projects, and the role of low carbon energy projects. Minor positive effects are identified at a Scotland-wide scale in relation to the development of low carbon projects, although these may be locally significant where they contribute substantially to the overall carbon emissions reduction of the island communities.

**4.93 No significant adverse** effects are identified in relation to **climate change adaptation**. **Significant positive** effects are identified in relation to climate change adaptation through the role of the National Islands Plan. Minor positive effects are identified related to potential effects arising from collaboration with non-native species action group, nature based solutions to climate change, community engagement and low carbon projects. These may also be locally significant where benefits are achieved for communities which are at greater risk from climate change, reflecting the potential impacts of sea level rise and increased storminess.

**4.94 No significant adverse** effects are identified in relation to **population and human health**. **No significant positive** effects are identified, although minor positive effects are identified in relation to population and human health through the role of National Islands Plan, the role of prosperous island economies, the role of community engagement, the role of low carbon projects and the role of Natural and cultural Heritage Fund. These may be locally significant where they support local employment.

**4.95 No significant adverse** effects are identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of nature-based solutions to climate change, the role of collaboration with non-native species action group and the role of Natural and Cultural Heritage Fund. These may be locally significant where they protect locally rare habitats such as machair.

**4.96 No adverse effects** are identified in relation to **water**. **No significant positive** effects are identified, although minor positive effects are identified in relation to water through the role of nature-based solutions to climate change.

**4.97 No effects** are identified in relation to **air**.

**4.98 No significant adverse** effects are identified in relation to **soil**. **No significant positive** effects are identified, although minor positive effects are identified in relation to soil through the role of nature-based solutions to climate change. These may be locally significant where they protect soil resources which are vulnerable to erosion.

**4.99 No effects** are identified in relation to **landscape and geodiversity**.

**4.100 No significant adverse effects** are identified in relation to **cultural heritage and historic environment**. Significant positive effects are identified in relation to cultural heritage and historic environment through the role of Natural and Cultural Heritage Fund. Minor positive effects are identified related to potential effects arising from the National Islands Plan.

**4.101 No significant adverse** effects are identified in relation to **material assets**. **No significant positive effects** are identified, although minor positive effects are identified in relation to material assets through the role of nature based solutions to climate change, the role of prosperous island economies, the role of low carbon projects and the role of Natural and Cultural Heritage Fund. Mixed effects are identified for the National Islands Plan.

## Offshore

**4.102** The key themes in Scotland's Third Land Use Strategy for offshore areas relate to:

- Alignment of marine and terrestrial planning policy;
- Protecting and enhancing the marine environment whilst promoting existing and emerging industries;
- Offshore Wind Policy Statement and the Sectoral Marine Plan for the Offshore Wind;
- Marine based economic growth.

**4.103 No significant adverse** effects are identified, although minor negative effects are identified, and they relate

to potential effects arising from marine based economic growth in relation to **climate change mitigation**. **No significant positive** effects are identified, although minor positive effects are identified in relation to climate change mitigation through the role of alignment of marine and terrestrial planning policy, the role of protecting and enhancing the marine environment whilst promoting existing and emerging industries. Mixed effects are also identified and relate to potential effects arising from Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind.

**4.104 No significant adverse** effects are identified in relation to **climate change adaptation**. **No significant positive** effects are identified, although minor positive effects are identified in relation to climate change adaptation through the role of further alignment of marine and terrestrial planning policy and the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind. Mixed effects are identified and relate to potential effects arising from protecting and enhancing the marine environment whilst promoting existing and emerging industries.

**4.105 No significant adverse** effects identified in relation to **population and human health**. **No significant positive** effects are identified, although minor positive effects are identified in relation to population and human health through the role of protecting and enhancing the marine environment whilst promoting existing and emerging industries, the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind, and the role of marine based economic growth.

**4.106 No significant adverse** effects identified in relation to **biodiversity, fauna and flora**. **Significant positive** effects are identified in relation to biodiversity, fauna and flora through the role of aligning marine and terrestrial planning policy. Mixed effects are identified from enhancing the marine environment whilst promoting existing and emerging industries and the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind.

**4.107 No significant adverse** effects identified in relation to **water**. **Significant positive** effects are identified in relation to water through the role of aligning marine and terrestrial planning policy. Mixed effects are identified and relate to effects arising from protecting and enhancing the marine environment whilst promoting existing and emerging industries and the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind.

**4.108 No significant adverse** effects are identified in relation to **air**. **No significant positive** effects are identified, although minor positive effects are identified in relation to air through the role of protecting and enhancing the marine environment whilst promoting existing and emerging industries.

**4.109** No effects are identified in relation to **soil**.

**4.110** No significant adverse effects are identified, although minor negative effects are identified in relation to **landscape and geodiversity** through the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind. No significant positive effects are identified, although minor positive effects are identified in relation to landscape and geodiversity through the role of alignment of marine and terrestrial planning policy. Mixed effects are identified and relate to potential effects arising from protecting and enhancing marine environment whilst promoting existing and emerging industries.

**4.111** No significant adverse effects are identified, although minor negative effects are identified in relation to **cultural heritage and historic environment** through the role of protecting and enhancing the marine environment whilst promoting existing and emerging industries and the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind. No significant positive effects are identified, although minor positive effects are identified, and they relate to potential effects arising from alignment of marine and terrestrial planning policy.

**4.112** No significant adverse effects are identified in relation to **material assets**. No significant positive effects are identified, although minor positive effects are identified in relation to material assets through the role of protecting and enhancing the marine environment whilst promoting existing and emerging industries, the role of alignment of marine and terrestrial planning policy, the role of Offshore Policy Statement and the Sectoral Marine Plan for Offshore Wind, and the role of marine based economic growth.

### Cumulative, secondary and synergistic effects

**4.113** This section of the Environmental Report sets out the potential cumulative, secondary and synergistic effects which may arise from the actions in Scotland's Third Land Use Strategy. It explores potential effects in relation to each of the SEA topics and identifies key issues arising for each topic.

#### Climate change mitigation

**4.114** A number of themes across all landscape settings contribute positively to climate change mitigation. Significant positive effects are identified for climate change mitigation for marginal land and the uplands, reflecting the scale of mitigation measures in these settings. Minor positive cumulative effects are identified across urban, peri-urban, rivers and water bodies, coastal and offshore. Mixed effects are identified for fertile land, mountains and islands reflecting

emissions associated with agricultural land, tourism and economic development in remote locations.

**4.115** Across all landscape settings there is an overall **positive** cumulative effect for climate change mitigation through actions to increase carbon sequestration and support renewable energy. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting, there is a positive synergy between themes that include urban planning, urban woodlands, actions to support blue and green infrastructure, and actions to address vacant and derelict land.
- In the peri-urban landscape setting there is a positive synergy between actions to plan at a regional scale, improve air quality, increase number of trees, actions to support green infrastructure and the creation of a Climate Action Town network.
- In the fertile landscape setting, there are potential tensions between the effects of emissions from food production and the climate change mitigation benefits from farm woodlands and soils regeneration.
- In the marginal landscape setting, there is a cumulative positive effect between actions to restore peatland and woodland and forestry expansion. However, there are potential tensions between biodiversity and a new tourism strategy. Similarly, in the uplands there is a cumulative positive effect, assuming appropriate management to ensure that tensions are resolved between peatland restoration and woodland expansion.
- In the semi-natural landscape setting there is a positive synergy between protecting the semi-natural land and restoring native ecology and peatlands, however there are some tensions between actions which sequester carbon in peatland and green infrastructure and those which increase tourism in the area.
- For the rivers and water bodies landscape setting there is a positive synergy between actions to enhance healthy water, healthy land and ecosystem approach through improved land management to reduce emissions.
- For the coastal landscape setting, there is a positive synergy between coastal planning, coastal and marine industries and aquaculture supporting renewable energy development.
- For the islands landscape setting there is a mixed effect from actions which support low carbon activities and potential emissions from increased levels of economic activity.

- For the offshore landscape setting there is an overall mixed cumulative effect for climate change mitigation from actions which support low carbon and potential emissions from increased levels of economic activity.

### Climate change adaptation

**4.116** All of the landscape settings are cumulatively positive for climate change adaptation. Significant positive effects are identified for the landscape settings with higher levels of population, but also within the marginal lands and uplands which can play a greater role in adaptation particularly in relation to the water environment. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting there is a strong positive synergy for climate change adaptation in urban landscapes between increasing urban woodland cover, improving the green infrastructure network and bringing vacant and derelict land into use.
- In the peri-urban landscape setting there is a strong positive synergy for climate change adaptation in peri-urban landscapes between evolving planning, increasing tree cover, promoting green infrastructure and creating a network of Climate Actions Towns.
- In fertile lands there is a positive synergy between promoting sustainable practices, on-farm woodland and agroforestry, soil regeneration and supporting pollinators in supporting climate change adaptation for biodiversity and agricultural production.
- For the marginal and upland landscape settings there is a cumulative positive effect between peatland restoration and woodland and forestry creation to support flood management as part of climate change adaptation.
- For the semi-natural landscape setting there is a positive cumulative effect for climate change adaptation between enhancing biodiversity and restoring native ecology and peatlands by increasing the extent of habitats and improving habitat connectivity.
- For the rivers and water bodies landscape setting there is a significant cumulative positive effect on climate change adaptation from improved management of the water environment and flood risk.
- For the coastal landscape setting there is a positive synergy for climate change adaptation between protection of natural coastal defences, coastal and marine industries and aquaculture.
- For the islands landscape setting there is an overall cumulative positive effect for climate change adaptation due to the use of nature-based solutions, removal of biodiversity pressure from non-native species and security of energy supply from low carbon projects.

- For the offshore landscape setting overall, there is a minor cumulative positive effect on climate adaptation. There is a positive synergy between further alignment of marine and terrestrial planning policy and offshore renewables.

### Population and human health

**4.117** The majority the landscape settings are cumulatively positive for population and human health. Significant positive effects are identified for the landscape settings with higher levels of population including urban and peri-urban areas, or more fragile populations in remote areas including coasts. Significant positive effects are also identified for rivers and water bodies, reflecting the impacts of flood risk and water quality on this topic. Mixed effects are identified for fertile land. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting, there is a strong positive synergy for population and human health between urban planning, increasing urban woodland cover and improving the greenspace network. This includes health benefits of climate change resilience, improvement in environmental quality and increased opportunities for recreation and active travel.
- In the peri urban landscape setting a positive synergy is created between all actions as they all contribute to the improvement of health and wellbeing through environmental improvements and awareness and understanding.
- In fertile lands, mixed cumulative effects are expected as there is potential for tensions between food production and actions to increase environmental quality, as some actions may impact on the livelihoods of rural workers.
- For the marginal landscape setting there is a cumulative positive effect between woodland and forestry creation and tourism as new woodland areas can create opportunities for recreation and physical activity, supporting population and human health.
- For upland landscape setting there is a positive synergy between the indirect benefits from increased natural capital, renewable energy, and direct benefits from the local food strategy and community initiatives.
- For the semi-natural landscape setting positive cumulative effects are identified between the themes which protect environmental quality of the semi-natural landscapes, and sustainable tourism.



- For the rivers and water bodies landscape setting there is a significant cumulative positive effect on population and human health from improved management of the water environment and flood risk, and the risks these pose.
- For the coastal, island and offshore landscape settings there is a significant positive cumulative effect for population and human health through enhanced economic and employment opportunities, helping to support remote coastal and island communities.

### Biodiversity, fauna and flora

**4.118** The majority of themes across all landscape settings contribute positively to biodiversity, flora and fauna reflecting the enhanced habitat connectivity arising from enhanced green infrastructure and woodland expansion. However mixed effects were identified for coastal and offshore areas. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting, while actions such as green infrastructure and increased urban woodland, contribute positively to the area of urban habitat and improve habitat networks, changes to some existing habitats may have a mixed effect on biodiversity, fauna and flora.
- In the peri-urban landscape setting there is a positive synergy between evolving planning and more trees and increasing training for outdoor learning and play.
- In fertile lands there are some tensions between actions to support pollinators, increase habitat networks through farm woodlands and improving soils quality and food production, however overall a cumulative positive effect is expected.
- In the marginal settings there are potential minor positive cumulative effects between different actions to increase habitats and improve connectivity. However tensions may arise between management of land to restore native ecology, peatlands, and increase woodland cover and actions to increase tourism.
- For the upland landscape setting there is a positive cumulative effect for biodiversity from restoring habitats and increasing woodland cover. However, there may be some tensions between action to restore habitats and actions delivering renewable energy projects.
- For the semi-natural landscape setting there is a positive cumulative effect for biodiversity from restoring peatlands by increasing the extent of habitats and improving habitat connectivity.

- For the rivers and water landscape setting there is a significant cumulative positive effect for biodiversity which benefits from improved water and soil quality and habitat benefits from natural flood risk management. There may be tensions where hard engineering flood risk management solutions are implemented.
- For the coastal landscape setting there are mixed cumulative effects for biodiversity, flora and fauna which may arise from development of the coastal and marine industries and aquaculture.
- For the islands landscape setting there is a positive cumulative effect for biodiversity, flora and fauna from nature-based solutions to climate change and collaboration with non-native species action group.
- For the offshore landscape setting there is an overall mixed effect, as the themes bring both potential benefits through improved protection, and risks from increased levels of development and their impacts on biodiversity.

### Water

**4.119** For the majority of landscape settings, the effects for water are positive with more benefits for rivers and water bodies. Although mixed effects were identified for fertile land, coastal and offshore areas. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- For the urban landscape setting there is a positive synergy between urban planning, actions to increase urban woodlands, and green and blue infrastructure. Similarly in the peri-urban landscape setting there is a positive synergy between evolving planning and increasing forest and woodland creation.
- As for biodiversity there are some tensions for fertile lands between water pollution and use and actions which support water quality through farm woodlands and encourage sustainable practices.
- For marginal and islands landscape settings there are no significant cumulative effects on water.
- For the upland landscape setting, there are overall positive effects for water through actions which will support flood management in upper river catchments.
- The semi-natural landscape setting has cumulative positive effects on water both in terms of water quality and flood management.
- For river and water bodies landscape setting, there is an overall significant positive cumulative effect, with a positive synergy between actions that support

restoration of land and water habitats, Flood Risk Management, and actions to minimise land impacts.

- For the coastal and offshore landscape settings there are mixed cumulative effects for water which may arise from actions to support environmental protection and development of coastal and marine industries and offshore wind developments.

### Air

**4.120** Overall cumulative effects for air are expected to be negligible, however positive effects were identified for urban areas and peri urban. Mixed effects were identified for fertile land. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting, many of the actions such as increased urban forestry and green infrastructure create a positive synergy by putting actions in place which would reduce air pollution in urban spaces through the role of vegetation in filtering air pollutants. Further positive effects may be achieved by increased use of these areas for active travel, reducing pollutants emitted.
- In the peri-urban landscape setting there is a positive synergy between actions to implement an air quality strategy, and increase forestry and woodland for the reasons outlined above.
- For fertile land there is a tension between air quality issues from agricultural production and air quality benefits of farm woodlands and agroforestry.
- No significant cumulative or synergistic effects are identified for air for the marginal, upland, semi-natural landscapes, river and water, coast, island and offshore landscape setting.

### Soil

**4.121** A number of themes across all landscape settings contribute positively to soil quality, although mixed effects are identified for fertile land and uplands. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting, there is a positive synergistic effect as a result of actions which seek to protect soil resources through the increase of urban green spaces and woodlands, flood management measures and the reclamation of vacant and derelict land.
- In the peri-urban landscape setting there is a positive synergy for soil resources through the increase of urban

green spaces, flood management measures and the reclamation of vacant and derelict land.

- For fertile land there is a tension between soil quality issues from agricultural production and soil quality benefits of farm woodlands and agroforestry.
- For the marginal and upland landscape settings, there is a positive cumulative effect between peatland restoration and increasing woodland habitats, which individually enhance soil quality, based on the assumption that woodland planting avoids high carbon soils.
- For the semi-natural landscape setting cumulative positive effects are identified for soil from peatland restoration and natural heritage enhancement.
- For the rivers and water landscape setting, cumulative effects for soil arise from improved flood management reducing erosion.
- No significant cumulative or synergistic effects are identified for soil for the coast, islands or offshore landscape setting.

### Landscape and geodiversity

**4.122** For a number of landscape settings, the effects for landscape are positive. Mixed effects are expected for fertile land, marginal land, uplands, rivers and water bodies, coastal and offshore. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- In the urban landscape setting positive synergistic effects are identified between actions such as increased urban woodland, green infrastructure, and bringing vacant and derelict land back into use. Similarly for peri-urban landscapes increased woodland and green infrastructure have a positive synergy in contributing to landscape.
- For fertile land there is a tension between landscape impacts from agricultural production and landscape quality benefits of farm woodlands and agroforestry.
- For the marginal and upland landscape settings there is a tension between the positive landscape impacts of increasing woodland and forestry and peatland restoration and renewable energy projects.
- For the semi-natural landscape setting there is a positive cumulative effect between actions to restore the semi-natural land and restoration of peatland and native ecology which bring landscape benefits.
- For rivers and water landscape setting there may be mixed effects for landscape due to tensions between the

landscape impacts of different approaches to flood management.

- For the coastal landscape setting there are mixed effects for landscape which may arise from development of the blue economy and aquaculture and actions to support environmental protection.
- No significant cumulative or synergistic effects are identified for landscape and geodiversity for the islands landscape setting.
- Mixed effects are identified for the offshore landscape setting for landscape due to increased levels of development in the marine environment such as offshore renewables, alongside potential improved protection.

### Cultural heritage and historic environment

**4.123** Overall cumulative effects for cultural heritage and historic environment are negligible with positive effects were identified for semi-natural and coastal landscapes. Mixed effects are identified for river and water bodies and minor negative effects for offshore landscape settings. A summary of the overall cumulative, secondary and synergistic effects for each landscape setting is provided below.

- No significant cumulative or synergistic effects are identified for cultural heritage and the historic environment for the urban areas, peri-urban, fertile, marginal, upland, or islands landscape settings.
- For the semi-natural landscape setting, there is a positive synergy between actions to protect semi-natural land and responsible tourism.
- For the rivers and water landscape setting there may be mixed effects for the historic environment due to tensions between the impacts of different approaches to flood management on assets and their setting.
- For the coastal landscape setting, there is a positive synergy between coastal planning and actions to strengthen natural defences. There may be some tensions however between the actions mentioned and coastal and marine industries.
- Overall, there is a minor cumulative negative effect on cultural heritage and historic environment for the offshore landscape setting due to increased levels of development in the marine environment.

### Material assets

**4.124** Across the majority of landscape settings, the effects for material assets are positive. Negligible effects are identified for peri-urban landscapes and mixed effects for fertile land landscape settings.

- In the urban landscape setting positive synergistic effects are identified in terms of protection and enhancement of material assets between actions such as increased urban woodland, green infrastructure, bringing vacant and derelict land back into use and natural flood management.
- No significant effects are identified for peri-urban landscapes.
- For fertile land potential tensions exist between agricultural production and woodland expansion.
- For the marginal and upland landscape setting there are cumulative positive effects for material assets through enhancement of the peatland resource and increasing the woodland resource, and renewable energy development in the uplands. There are further secondary positive effects on material assets from the role of these in flood management, protecting other material assets.
- For the semi-natural landscape setting there are cumulative positive effects for material assets through management and enhancement of the natural heritage supporting natural capital.
- For rivers and water there are significant cumulative positive effects for material assets from the management of water quality and flood risk, and the secondary impacts of these on resources such as transport and energy infrastructure, food production and property.
- For the coastal and island landscape settings, positive cumulative effects are identified from development of built infrastructure and coastal protection.
- For the offshore landscape setting there is an overall positive cumulative effect arising from increased energy and other infrastructure, and the facilitation of this development from further alignment of marine and terrestrial planning policy.

Table 4.1: Summary of cumulative effects for each landscape setting

Land- scape type	CC mitigation	CC adap- tation	Populat- ion and human health	Biodiver- sity, fauna and flora	Water	Air	Soil	Land- scape and geodiver- sity	Cultural heritage and historical environ- ment	Material assets
Urban areas	+	++	++	++	+	+	+	+	0	+
Peri- urban	+	++	++	++	+	+	0	+	0	0
Fertile land	+/-	++	+/-	+	+/-	+/-	+/-	+/-	0	+/-
Marginal land	+	++	+	+	0	0	+	+/-	0	+
Uplands	++	++	+	+	0	0	+/-	+/-	0	+
Semi- natural land	+	++	+	++	+	0	+	+	+	+
Rivers & water bodies	+	++	++	+	++	0	+	+/-	+/-	+
Coastal	+	+	++	+/-	+/-	0	0	+/-	+/-	+
Islands	+/-	+	+	++	0	0	0	0	0	+
Offshore	+/-	+	+	+/-	+/-	0	0	+/-	+/-	+

# Chapter 5

## Mitigation and Enhancement

### Introduction

**5.1** The 2005 Act states requires that 'the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme' are outlined within the Environmental Report. These measures are often referred to as mitigation measures. No significant adverse effects are identified from the assessment. This section therefore focuses on ways in which minor adverse effects could be reduced or avoided, or where there is potential to enhance benefits for the landscape settings.

### Mitigation and enhancement

#### All landscape settings:

- Adopting a natural capital and ecosystems approach will help ensure that priority actions are integrated and deliver the widest range of benefits whilst ensuring that existing interests, including land management, biodiversity and cultural heritage are recognised, safeguarded and enhanced as appropriate.
- All land use changes should be taken forward to be resilient to the impacts of climate change, including changes in rainfall patterns, increased storminess and the increasing risk of pests and diseases.

### Urban areas

- Opportunity to ensure that the biodiversity potential of urban woodland, forest and trees to play a key role in creating wildlife corridors and stepping stones through urban areas, increasing biodiversity and helping mobile species adapt to the changing climate is recognised. This is particularly important in Central Scotland where urban and peri-urban areas create a barrier to south-north movement.

### Peri-urban

- Opportunity to emphasise the importance of enhanced peri-urban landscapes, recreation opportunities and biodiversity for residents of nearby urban areas as well as those of settlements in the peri-urban area.

- Opportunity to create local recreation provision, facilitating greater engagement with the environment and reducing the need to travel.
- Opportunity to ensure synergy between local air quality, Climate Action Towns Network, green infrastructure and forest and woodland planting.

### Fertile land

- Opportunity to prioritise nature recovery alongside agricultural production with restoration and management of field boundaries, trees, small woodlands, wetlands and natural river corridors to support farmland birds, mammals and invertebrates (alongside pollinators).
- Opportunity to encourage a transition to more sustainable farming practices that conserve soils and a biodiverse countryside.

### Marginal land

- Involvement of local communities and stakeholders in areas where significant change in land use is envisaged, for example the creation of new woodlands.
- Opportunity to ensure that actions to improve habitat and create new woodland with recreational opportunities support sustainable travel and tourism in marginal lands.

### Uplands

- Ensuring land management changes incorporate climate resilience for communities and land use.

### Semi-natural land

- Commitment to ensuring that tourism is as sustainable as possible as well as being placed on a responsible footing.
- Identify opportunities for actions to address rural depopulation to achieve wider environmental benefits through supporting links to land management and environmental stewardship.

### Rivers and waterbodies

- Opportunity to highlight the role of rivers in contributing to nature restoration, creating wildlife corridors through more intensively managed or developed landscapes.
- Opportunity to highlight the need to explore the impacts of flood risk management measures in terms of achieving wider environmental benefits such as creation of wet woodland for carbon sequestration.

- Opportunity to recognise the cultural and recreational importance of rivers.

### Coastal

- Opportunity to reflect the importance of the coast for sustainable tourism and recreation, potentially as part of the Blue Economy Action Plan.
- Ensuring that development of the blue economy positively addresses climate risk and future proofs activities against sea level rise.
- Opportunity to support coastal defences based around managed realignment and which help conserve or restore natural processes and habitats.

### Islands

- Opportunity to emphasise the importance of sustainable tourism and recreation.
- Importance of recognising and managing climate risks affecting the islands.
- Support for high nature value land management / crofting / farming systems.

### Offshore

- Emphasise the need to ensure protection of the marine environment from the impacts of climate change.
- Supporting technological development and research to support climate change adaptation in marine industries to reduce environmental impacts from the impacts of adverse weather on offshore infrastructure which may pollute the marine environment as a result of these events.

## Chapter 6

### Monitoring

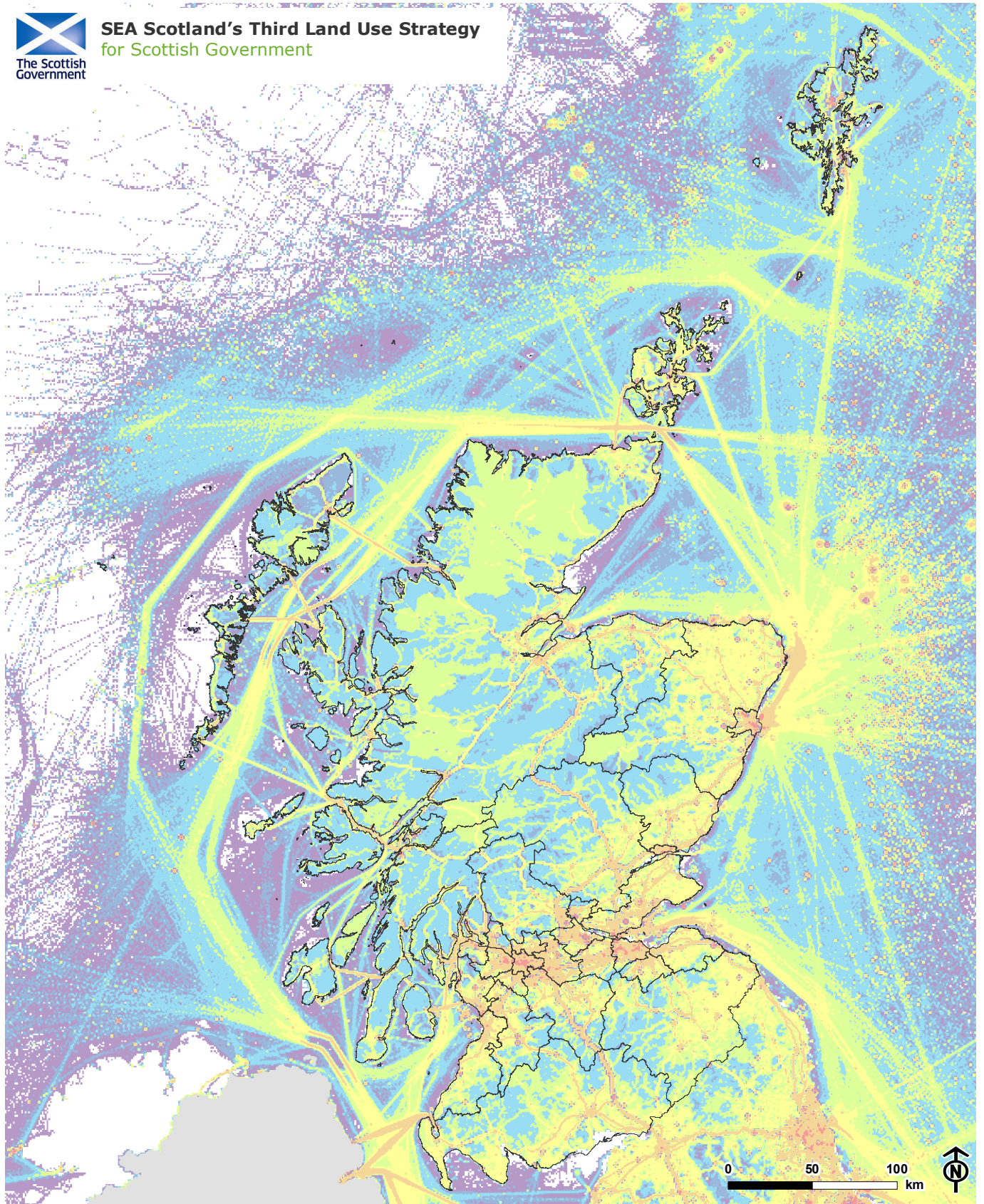
**6.1** Monitoring significant environmental effects is a statutory requirement within the 2005 Act. Monitoring seeks to ensure that plans avoid generating unforeseen adverse environmental effects and enables the responsible authority to undertake appropriate remedial action.

**6.2** Proposals for monitoring will be addressed and further outlined within the post-adoption statement at the end of the SEA process/Environmental Report for the delivery / action plan.

# Appendix A

## Baseline maps

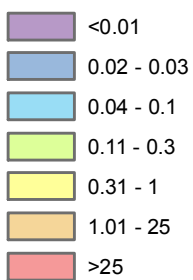


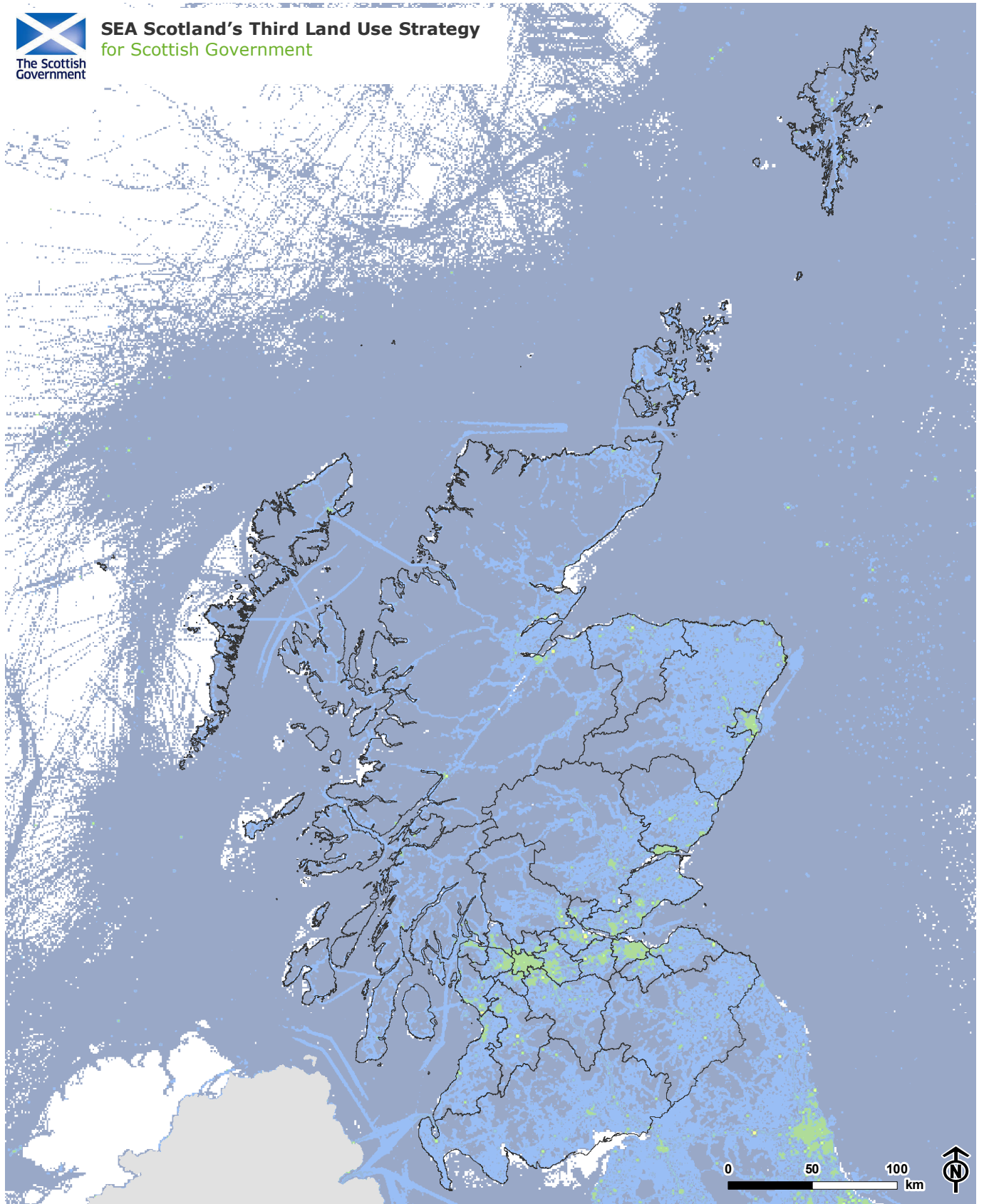


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**Figure 1: Emissions of Nitrogen Oxides (NOx) as NO<sub>2</sub> in tonnes in Scotland 2018**

**Emissions of Nitrogen Oxides (NOx) 2018 as NO<sub>2</sub> in tonnes**

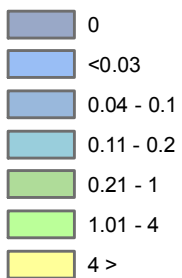


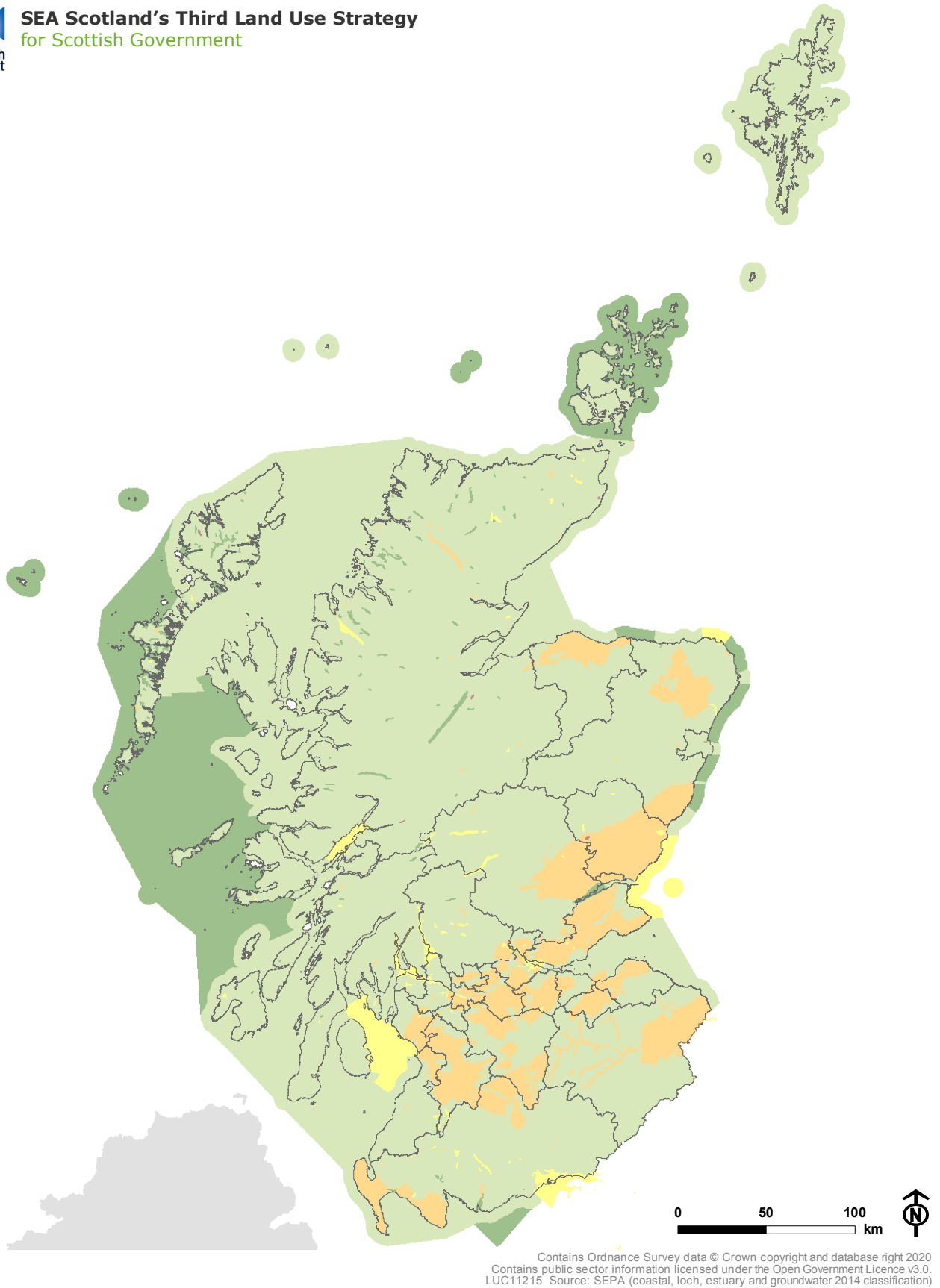


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**Figure 2: Emissions of PM10 (Particulate Matter < 10µm) in tonnes in Scotland in 2018**

Emissions of PM10 (Particulate Matter < 10µm) in tonnes in Scotland in 2018

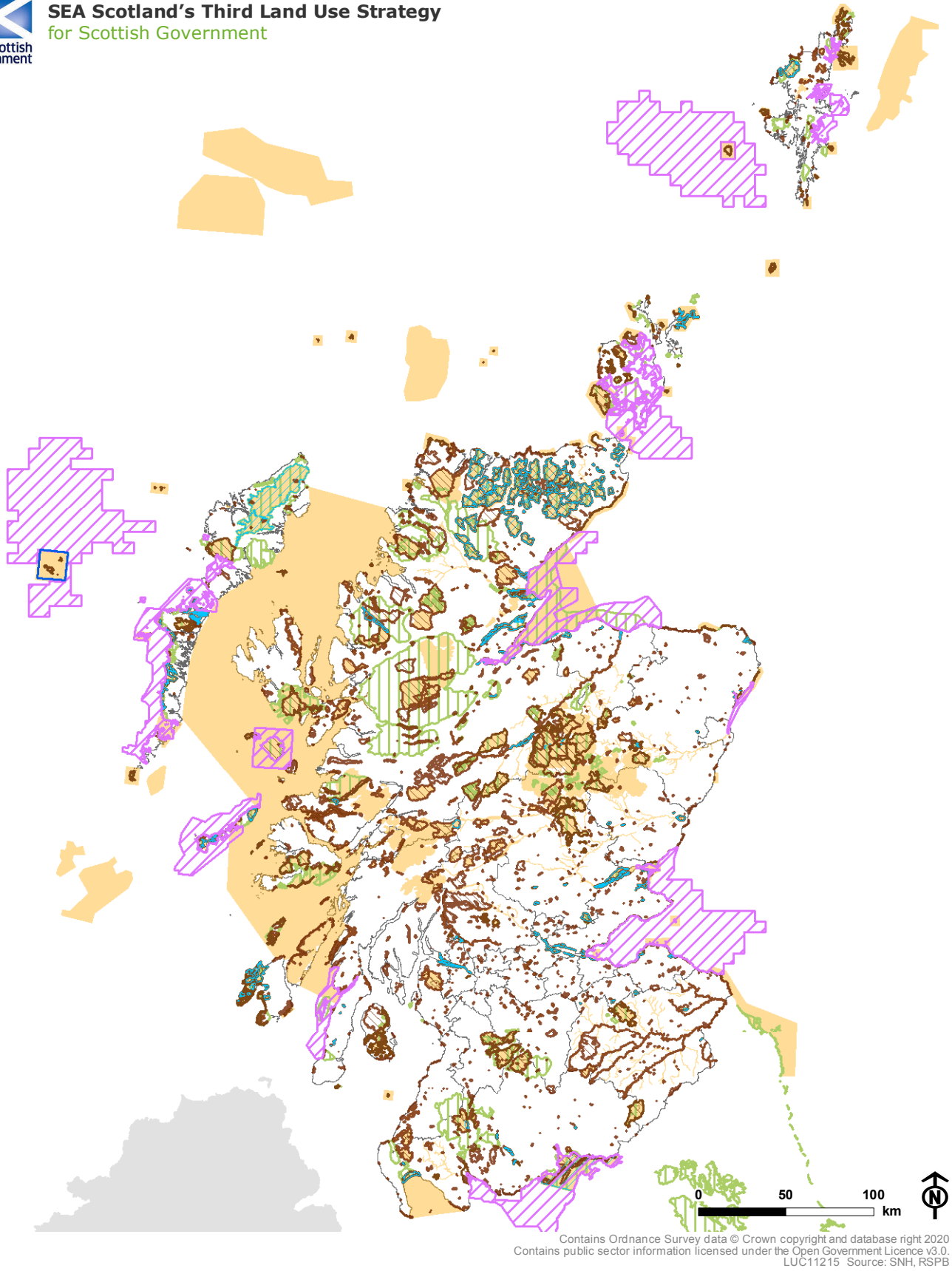




**Figure 3: Water Condition in Scotland**







**Water condition classification**

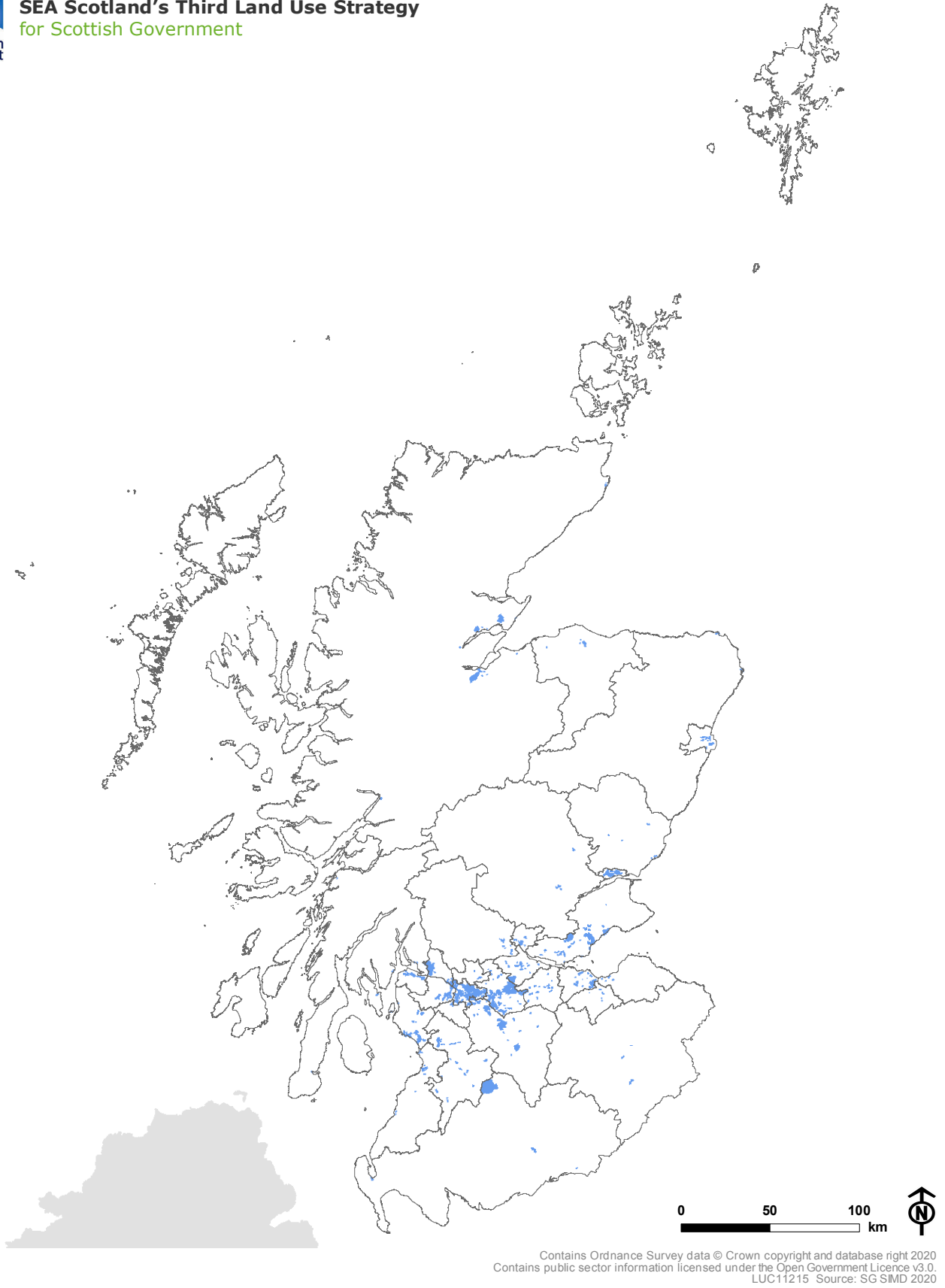
- High
- Good
- Moderate
- Poor
- Bad




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LUC11215 Source: SNH, RSPB

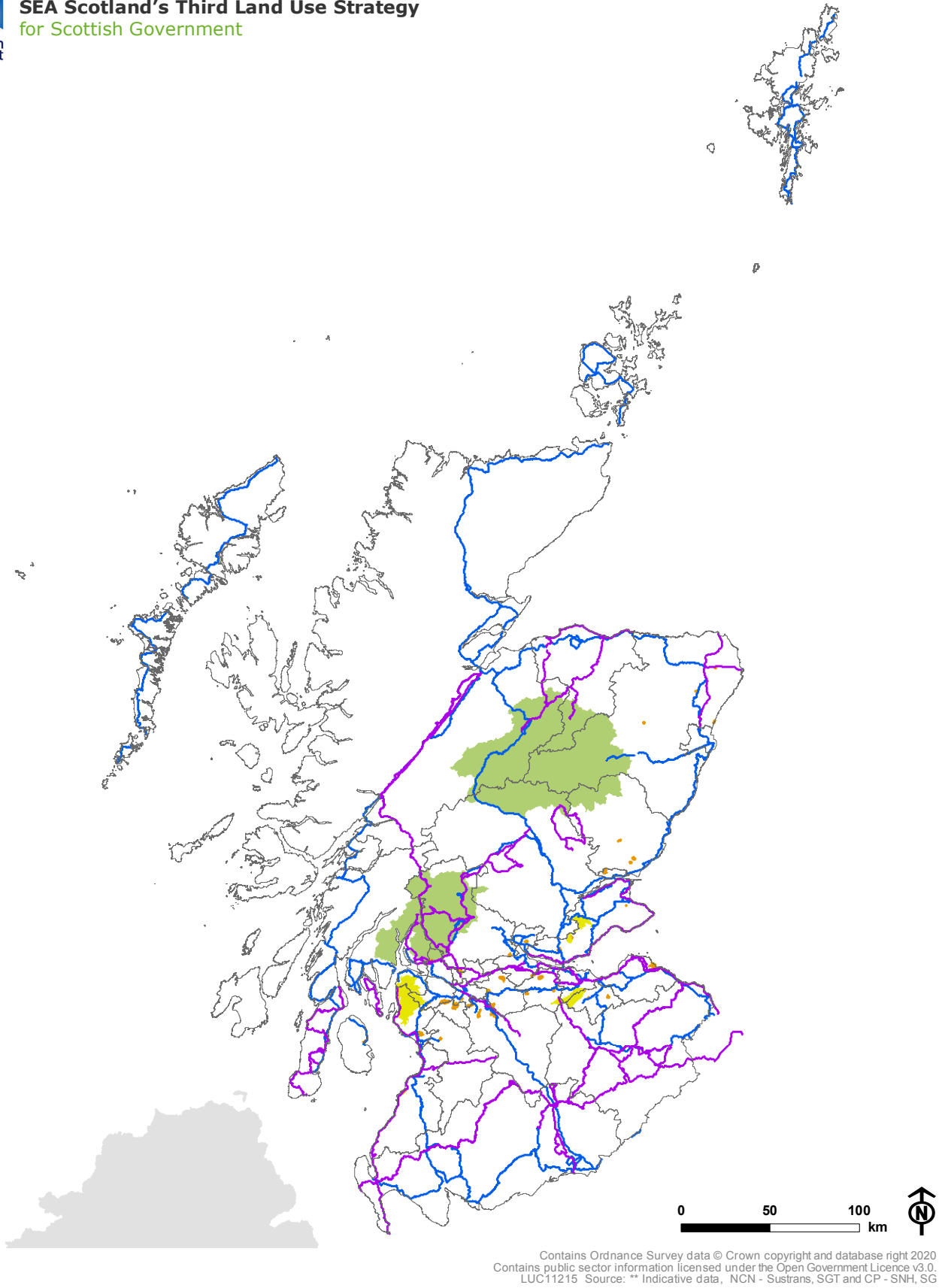
**Figure 4: Natural Heritage in Scotland**

- |  |   |
|--|---|
|  World Heritage Site (St Kilda)   |  Important Bird Area   |
|  Ramsar site  |  National designations including National Nature Reserves and Sites of Special Scientific Interest |
|  Natura 2000 sites (Special Area of Conservation and Special Protection Area) |   |
|  Proposed Special Protection Area   |   |








**Figure 5: Overall Deprivation in Scotland**

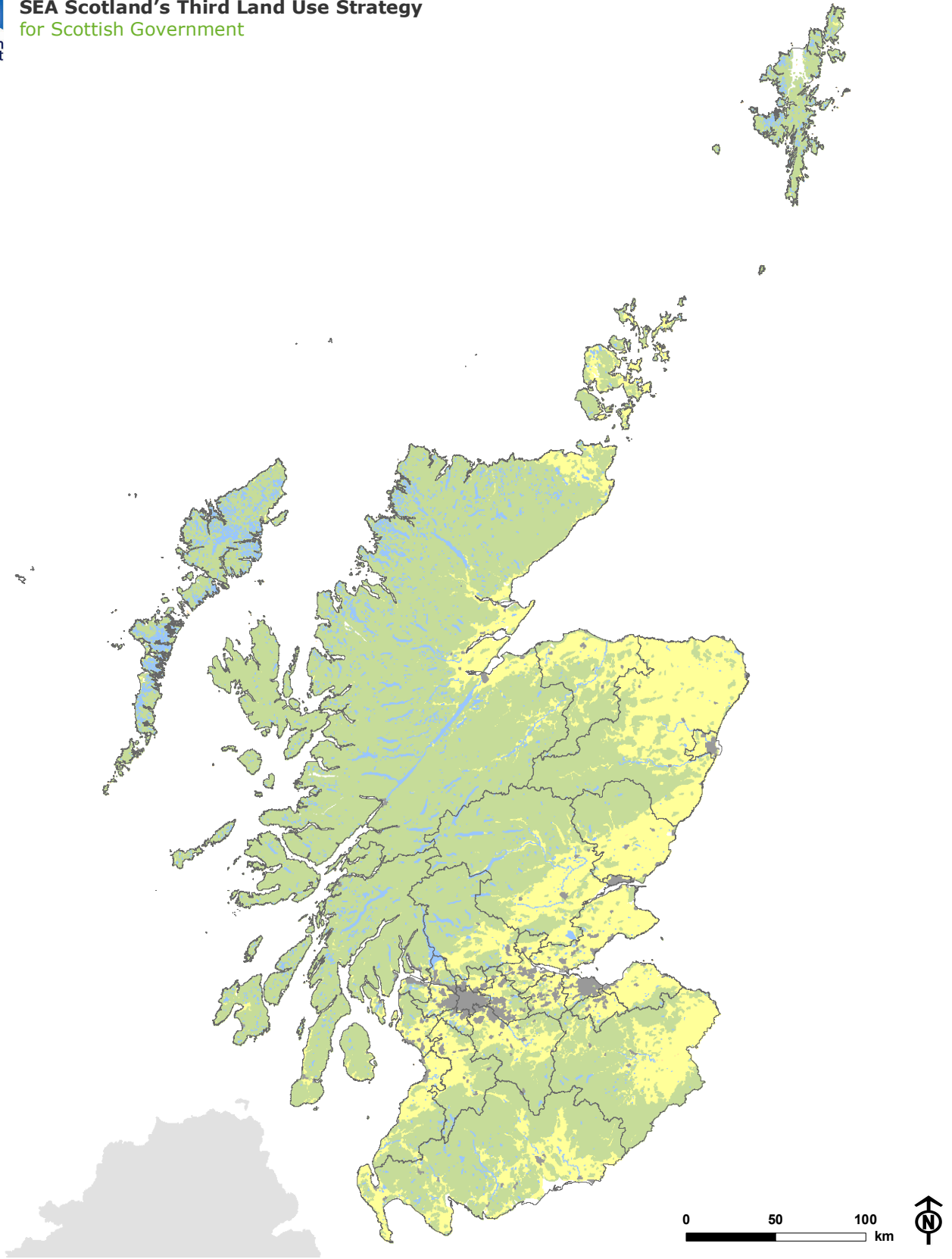
 Index of multiple deprivation  
(20% most deprived areas)



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LUC11215 Source: \*\* Indicative data, NCN - Sustrans, SGT and CP - SNH, SG

**Figure 6: Recreational Routes and Areas in Scotland**

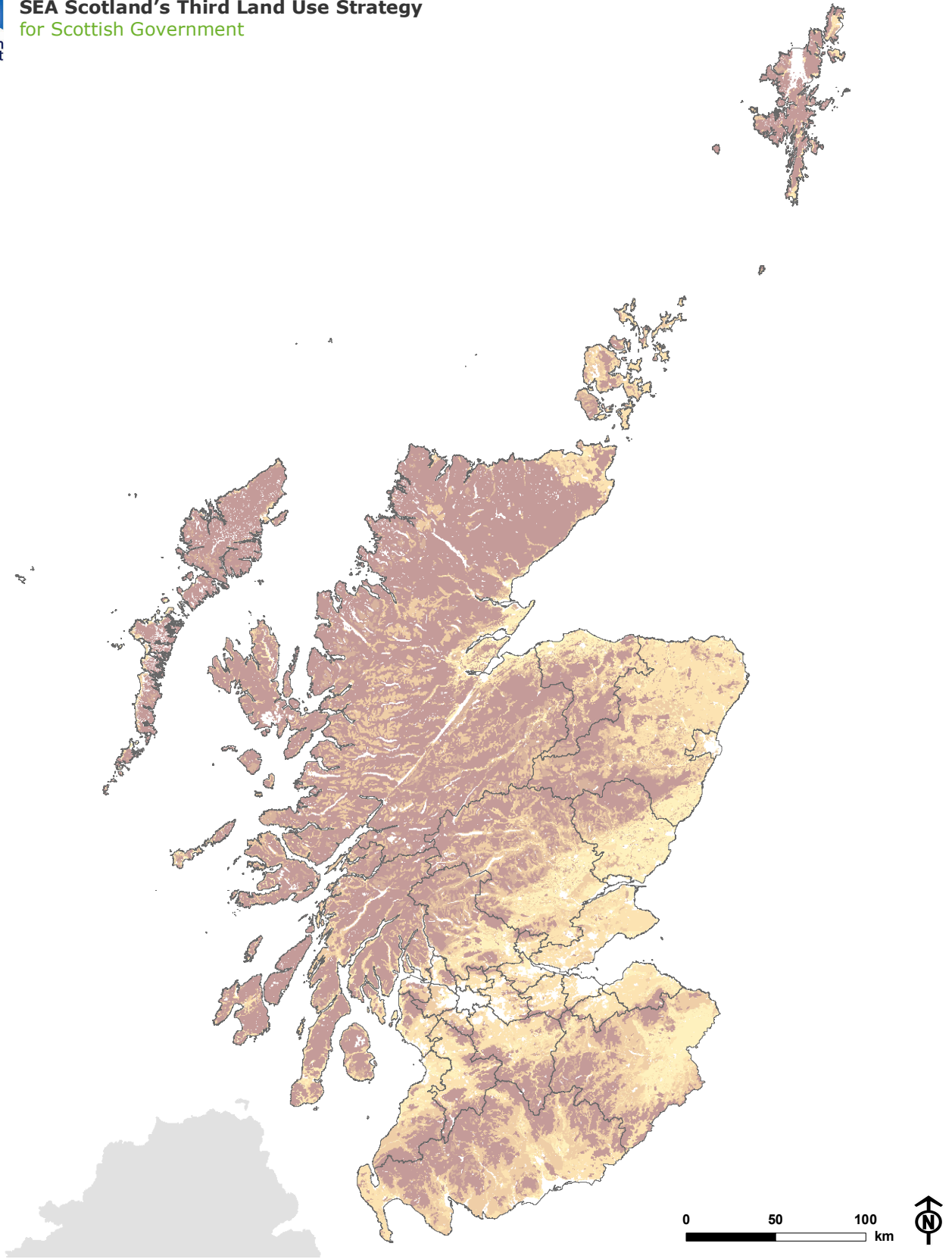
-  National Park
-  Regional Park
-  Country Park
-  National Cycle Network
-  Scottish Great Trails\*\*



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LUC11215 Source: Land Capability for Agriculture 250K - Copyright James Hutton Institute.







**Figure 7: Land Capability for Agriculture in Scotland**

- Land suited to arable cropping (categories 1-4)
- Land suited only to improved grassland and rough grazing (categories 5-7)
- Built up area
- Inland water
- Undefined

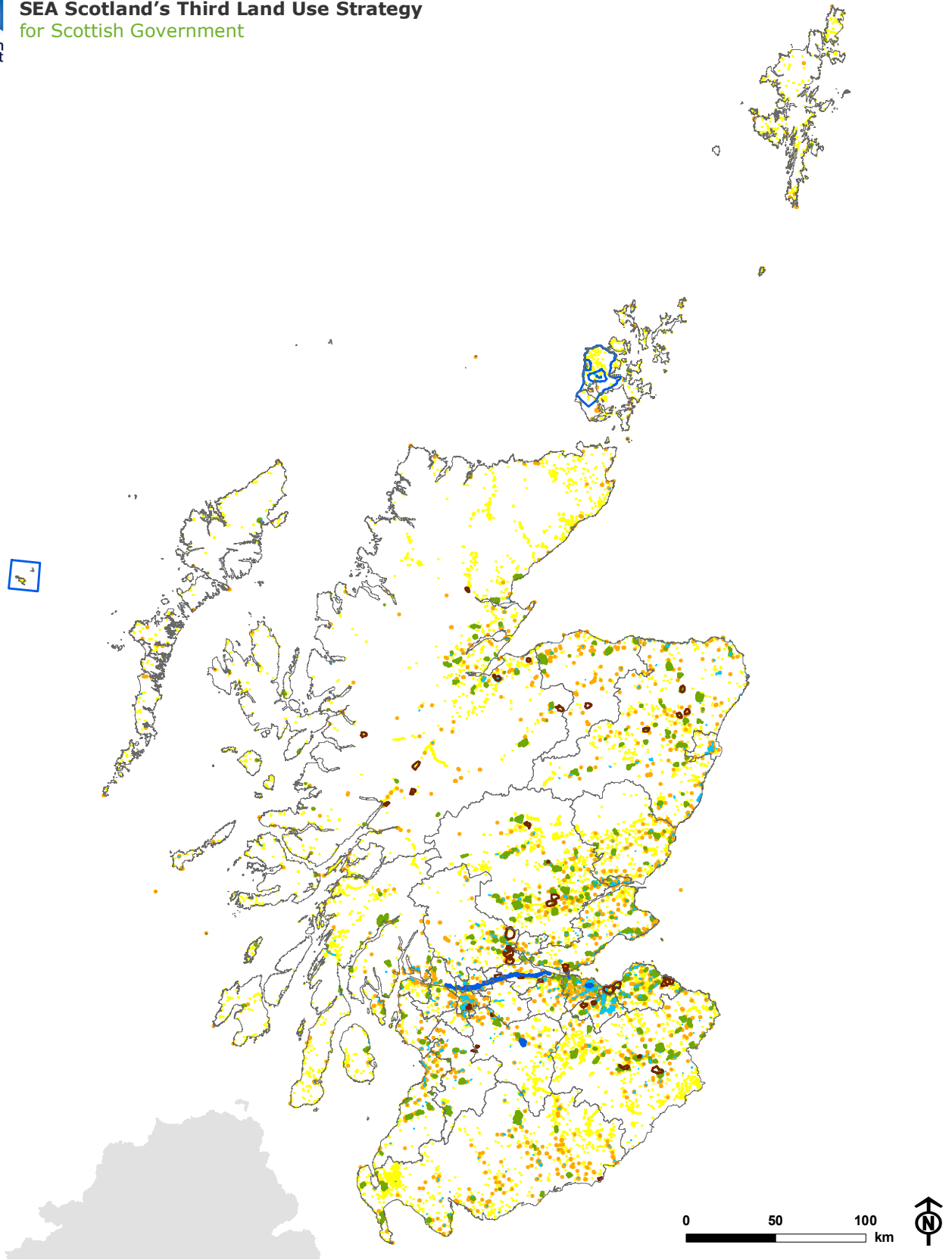


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LUC11215 Source: Topsoil organic carbon concentration 250K - Copyright James Hutton Institute.

**Figure 8: Top Soil Organic Carbon Concentration in Scotland**







<b>Top soil organic carbon concentration</b>	 Humose (more than 5 to 12%)
 Low (less than 1.5%)	 Organo-mineral (more than 12 to 35%)
 Moderate (between 1.5 and 3%)	 Organic (greater than 35%)
 High (more than 3 to 5%)	

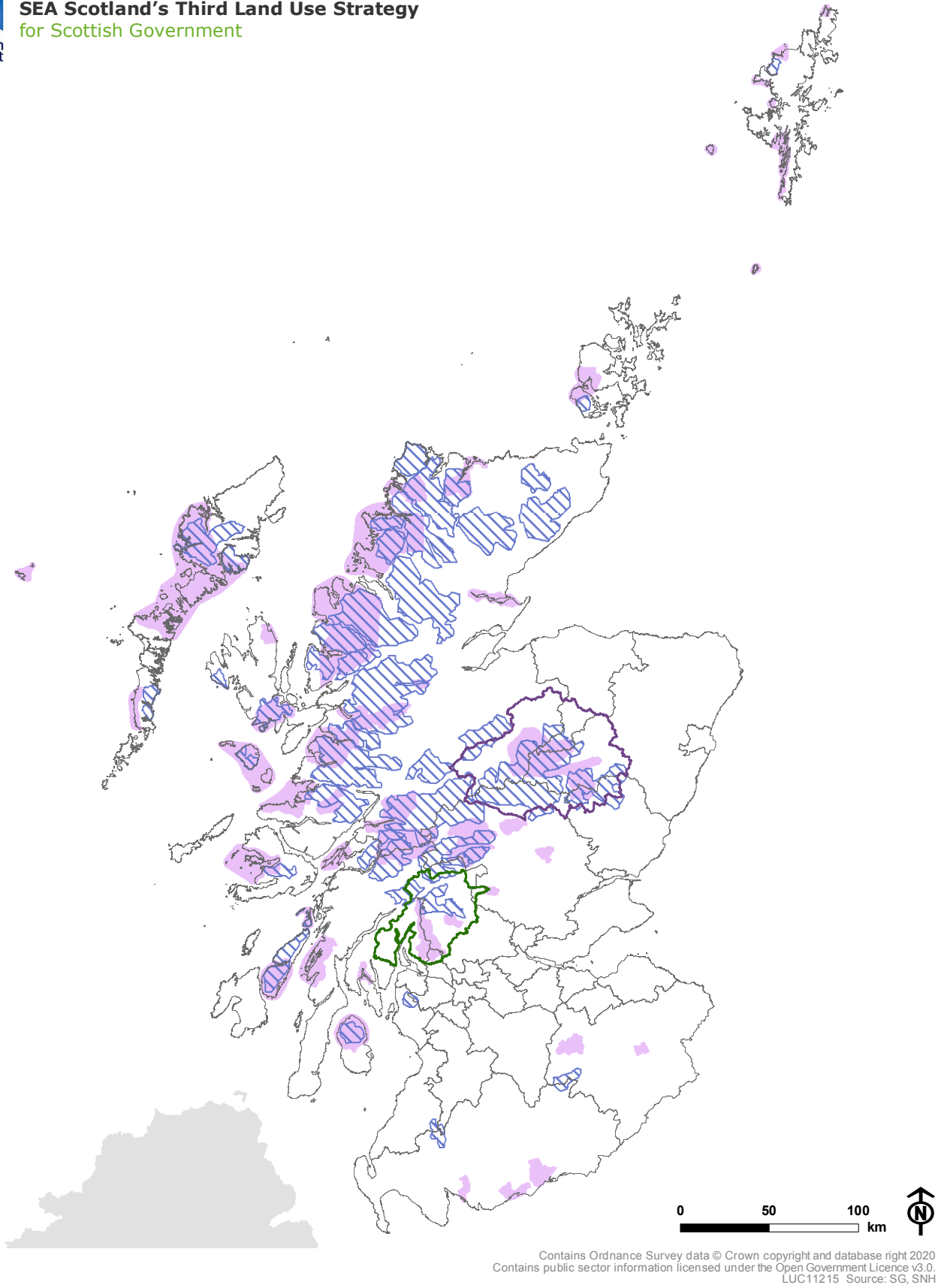




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LUC11215 Source: Historic Scotland





**Figure 9: Cultural Heritage in Scotland**

-  World Heritage Site
-  Scheduled Monument
-  Historic Battlefield
-  Conservation Area
-  Gardens and Designed Landscapes
-  Listed Buildings (Grade A)





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LUC11215 Source: SG, SNH

**Figure 10: Designated Landscapes in Scotland**

-  National Scenic Area
-  Cairngorms National Park
-  Loch Lomond and the Trossachs National Park
-  Wild Land Area



**Figure 11: Forestry and Woodland Cover in Scotland**

-  Ancient Woodland Inventory (AWI)
-  Native Woodland Survey of Scotland (NWSS) and National Forest Inventory (NFI 2018)

## Appendix B

### Assessment matrices

**B.1** Assessment matrices for each landscape setting.

Urban

	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Issues											
Urban planning	+	+	++	+	+	+	+	+	+/-	+	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from increased vegetation within urban spaces, and increased opportunity for active travel and recreation.</p> <p>While the effects of climate change are increasingly apparent in urban areas (e.g. urban heat island effect, increased flooding episodes), urban planning may reduce some of these effects, and minor positive effects are identified for <b>climate change adaptation</b>.</p> <p>Urban planning is likely to provide significant benefits for <b>population and human health</b> through the creation of attractive and accessible spaces as increased amenity spaces can result in positive impacts on mental health and improve opportunities for physical activity.</p> <p>Minor positive effects are also identified for <b>biodiversity, flora and fauna</b> as green infrastructure is likely to support and enhance ecological connectivity and natural environments within urban areas.</p> <p>Urban planning can include measures such as green infrastructure and deliver rainwater harvesting and SuDs which provide efficient management of <b>water resources</b>. Urban planning can also improve <b>air quality</b> as urban vegetation can mitigate emissions arising from sources such as road traffic.</p> <p>Urban planning will have minor positive effect on <b>soil</b> through more diverse and connected green spaces that will enable greater carbon sequestration and as a result improve soil quality.</p> <p>Urban planning will have minor positive effects on <b>landscape</b> by green spaces in the urban environment contributing to improved landscape quality.</p> <p>Urban planning may enhance the landscape setting of cultural heritage assets and the historic environment, however mixed effects are identified, as some urban developments may have negative effects on cultural heritage and historic environment.</p> <p>Minor positive effects are identified for <b>material assets</b> through the inclusion of assets such as small-scale renewable energy generation and urban farming as elements of green infrastructure.</p>
Urban woodland (expanding green networks)	+	++	++	++	+	+	+	++	0	0	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from increased vegetation within urban spaces.</p> <p>A significant positive effect is identified for <b>climate change adaptation</b> as urban green spaces will provide adaptation measures such as cooling effects and flood mitigation.</p> <p>A significant positive effect is identified for <b>population and human health</b>, reflecting the role of urban woodland in improving environmental quality, supporting mental health, physical activity and wellbeing and climate change adaptation with direct benefits for human health.</p> <p>Habitat creation will likely result in major positive effects for <b>biodiversity, fauna and flora</b> significantly increasing habitat networks within biodiversity poor urban areas.</p>

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	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
											<p>A minor positive effect is anticipated for <b>water</b> in relation to urban woodlands, forest and trees through their contribution to flood management and erosion control.</p> <p>A minor positive effect is anticipated in relation to <b>air quality</b> as increased tree cover will reduce air pollution in the environment.</p> <p>An increase in vegetation through urban woodland, forest and tree provisions may protect <b>soil resources</b> from erosion and runoff with minor positive environmental effects.</p> <p>A major positive effect is anticipated in relation to <b>landscape and geodiversity</b> as urban woodlands, forest and trees are likely to enhance spaces within urban centres.</p> <p>It is not identified that urban woodlands, forests and trees will have a significant effect on <b>cultural heritage</b> and <b>material assets</b>.</p>
Community woodland ownership	0	0	++	++	+	+	+	++	0	0	<p>Negligible effects are identified in relation to <b>climate change mitigation</b> through community woodland ownership, as this action regards the way existing woodlands are managed rather than encourages creation of additional woodlands.</p> <p>Similarly, no effects are identified for <b>climate change adaptation</b> as more urban woodlands that are owned and managed by local communities will only ensure the way woodlands are managed.</p> <p>Increased community woodland ownership can deliver major positive effects for <b>population and human health</b>. Having more and easily accessible urban woodlands can deliver a range of mental and physical health benefits. Community ownership can also establish stronger relationships between people and their local woodlands.</p> <p>Significant positive effects are identified for <b>biodiversity, flora and fauna</b> as habitat creation will significantly increase and connect habitat networks especially within biodiversity poor urban areas.</p> <p>A minor positive effect is anticipated for <b>water, air</b> and <b>soil</b> as they will contribute to flood management, reducing air pollution and protecting soil from erosion.</p> <p>Significant positive effects are identified for <b>landscape and geodiversity</b> as community woodland ownership will provide more opportunities for urban communities to influence decisions affecting their local forests and woodlands, and potentially increase their protection and enhancement.</p> <p>No effects are identified for <b>cultural heritage and historic environment</b> and <b>material assets</b>.</p>
Vacant and Derelict land	+	+	+	+/-	0	0	+	+	0	+	<p>The development of vacant and derelict land for delivering sustainable inclusive growth will have a minor positive effect upon <b>climate change mitigation</b> by helping to deliver development in more accessible locations and minimising the need to travel. As an opportunity for investing in local green and blue infrastructure vacant and derelict land also has a positive role to play in <b>climate change adaptation</b>.</p> <p>Addressing vacant and derelict land and bringing it into positive use will have positive effects on <b>population and human health</b> as issues such as pests and increased risk of crime may be associated with vacant and derelict land.</p> <p>Vacant and derelict land can provide habitats for valuable species of <b>flora and fauna</b> and may have a mixed effect from loss of rare species but gains from creation of other habitats.</p>

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											<p>It not identified that bringing vacant and derelict land into positive use will have an impact upon <b>water</b> and <b>air</b>. Similarly, no effect is identified for <b>cultural heritage and the historic environment</b>.</p> <p>Historic activities related to <b>vacant and derelict land</b> may have resulted in <b>soil</b> contamination and bringing these sites into positive use may result in remediation with a minor positive effect on soil quality.</p> <p>The surrounding <b>landscape</b> may be negatively impacted upon by vacant and derelict land and bringing this land into positive use through built development or green and blue infrastructure is likely to have positive effects.</p> <p>Minor positive effects are identified for <b>material assets</b> as these areas present an opportunity for the investment of infrastructure especially in urban areas where there is high demand for continued development such as housing, office space and other amenities.</p>
Blue and green infrastructure and water resilient places (Green Infrastructure Fund and Green Infrastructure Community Fund)	+	++	++	++	++	+	+	+/-	+	++	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from increased vegetation within urban spaces.</p> <p>Blue infrastructure and water resilient places will help mitigate for flood risks within urban areas, from climate change with a significant positive effect on <b>climate change adaptation</b> from measures put in place to tackle flooding events arising as a result of climate change.</p> <p>This could also have a positive impact upon <b>population and human health</b> as flooding events particularly in urban areas pose a serious health risk. Additionally, blue and green infrastructure offers urban recreation spaces that can positively impact physical and mental health.</p> <p>Significant positive effects are also expected for <b>biodiversity, fauna and flora</b>, from increased blue and green infrastructure and flood management as they will increase the area and extent of urban habitats.</p> <p>Blue and green infrastructure and water resilient places may have significant positive impacts for <b>water</b>. This includes positive effects on water quality by mitigating the amount of water which may carry harmful contaminants picked up over land. There are also significant positive effects for flood management.</p> <p>Minor positive effects are identified for <b>air</b>, as blue and green infrastructure will enhance urban carbon sequestration and will the overall improve air quality.</p> <p>Minor positive effects are identified for <b>soil resources</b> as blue and green infrastructure may prevent excess erosion, runoff and waterlogging.</p> <p>Blue and green infrastructure can reduce air pollutants, and therefore positively impact the <b>air</b> quality.</p> <p>Creation of water resilient places can include putting flood management measures in place that can be present in the <b>landscape</b> in many different forms ranging from hard engineering solutions to flood management with landscape benefits such as SuDs and increased vegetation with mixed effects. However, blue and green infrastructure can enhance landscape quality where it is well designed and maintained.</p>

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											<p>Blue and green infrastructure and water resilient places are likely to have a minor positive effect on <b>cultural heritage and the historic environment</b> by potentially safeguarding existing and unknown assets in urban areas from flooding events.</p> <p>Blue and green infrastructure and water resilient places are likely to have significant positive effects on <b>material assets</b> by potentially safeguarding assets which are likely to be affected by flooding events.</p>

Peri-urban

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Evolving planning (Regional Spatial Strategies)	+	++	+	++	+	+	+	++	+	0	<p>More long-term and strategic approach to regions can deliver minor positive effects for <b>climate change mitigation</b>, as Regional Spatial Strategies will enable planning on a landscape scale to better align with priorities and opportunities specific to a region.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b> through evolving planning as it will enable more strategic planning that will recognise regional differences when adapting to climate change.</p> <p>Evolving planning is identified to have a minor positive effect on <b>population and human health</b>, because it will enable land use planning decisions that respect regional circumstances and specific needs.</p> <p>Significant positive effects are identified for <b>biodiversity, fauna and flora</b> because regional planning will enable habitat creation on a landscape scale, connect fragmented habitats and tailor approaches depending on the regional circumstances.</p> <p>Minor positive effects are expected for <b>water, air and soil</b> as the strategic landscape and long-term planning has the potential to improve water quality, reduce air pollution and prevent from soil erosion.</p> <p>Significant positive effects are identified for <b>landscape and geodiversity</b>, as strategic planning at a regional scale will ensure landscape protection to enhance regional character.</p> <p>Minor positive effects are identified for cultural heritage and historic environment, because regional strategic planning will better enable the protection of special character of the regions/</p> <p>No effects are expected for <b>material assets</b>.</p>
Local engagement	0	0	++	0	0	0	0	0	0	0	<p>Increased opportunities and levels of community engagement bring potential but uncertain minor positive effects across all of the SEA topics, as communities can influence decisions in their area to achieve local benefits. However significant positive effects are identified in relation to <b>population and human health</b> through increased levels of community empowerment.</p>
Cleaner air	+	+	++	0	0	++	0	0	0	0	<p>The improvement of air quality within peri-urban landscapes can also contribute to the reduction of GHG emissions where sources contribute to both, which will be beneficial for <b>climate change mitigation</b>.</p>



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											<p>Additionally, an air quality strategy is likely to have a minor positive impact upon <b>climate change adaptation</b> as excessive heat or stalled weather patterns associated with climate change can affect the concentration and dispersion of pollutants. By implementing an early <b>air</b> quality improvement strategy, this will support adaptation in peri-urban spaces.</p> <p>An air quality improvement strategy is likely to improve health within the population, due to the significant health impacts associated with poor air quality, with significant positive effects for <b>population and human health</b>.</p> <p>This action is likely to have a significant positive impact on air quality, as it directly addresses it.</p> <p>It is unlikely that the implementation of an air quality improvement strategy will have a significant effect on <b>biodiversity, water, soil, landscape, cultural heritage and material assets</b>, although improvements to air quality are beneficial for all of these topic areas.</p>
More trees and increasing training for outdoor learning and play	+	++	++	++	+	+	+	++	0	0	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from more trees.</p> <p>A significant positive effect is identified for <b>climate change adaptation</b> as increased tree cover will provide adaptation measures such as cooling effects and flood mitigation.</p> <p>Through the provision of outdoor learning and play, <b>population and human health</b> is likely to experience a significant positive impact through greater engagement with the natural environment and outdoor spaces, boosting mental and physical health as well as providing additional skills to the wider population.</p> <p>More trees will likely result in significant positive effects for <b>biodiversity, fauna and flora</b> by significantly increasing habitat networks within biodiversity poor areas. Increasing training for outdoor learning and play will also bring indirect positive effects as increased training in outdoor learning and play can improve biodiversity conservation efforts and stewardship of the natural environment.</p> <p>A minor positive effect is anticipated for <b>water</b> in relation to more trees through their contribution to flood management and erosion control.</p> <p>A minor positive effect is anticipated in relation to <b>air quality</b> as increased tree cover will contribute to reducing air pollution in the environment.</p> <p>An increase in vegetation through planting more trees may protect <b>soil resources</b> from erosion and runoff with minor positive environmental effects.</p> <p>A significant positive effect is anticipated in relation to <b>landscape and geodiversity</b> as more trees are likely to enhance surrounding landscapes within peri-urban areas.</p> <p>It is not identified that peri-urban woodlands, forests and trees will have a significant effect on <b>cultural heritage and the historic environment</b>, although new woodland planting may impact directly or indirectly on historic assets and their setting.</p> <p>No significant effects are identified for <b>material assets</b>.</p>
Creation of Climate Action Towns Network (promoting)	++	++	++	0	0	0	0	0	0	+	<p>The creation of Climate Action Towns will provide support for towns to move towards becoming carbon neutral by cutting GHG emissions and take steps to <b>mitigate climate change</b> and significant positive effects are identified.</p>

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recycling, sustainable use of resources and cutting GHG emissions)											<p>By targeting small towns which have previously not fully engaged with climate change actions, this will provide support in these areas taking steps to <b>adapt to climate change</b>.</p> <p>Climate Action Towns are likely to be significantly beneficial to <b>population and human health</b>. By creating climate resilient towns and the steps taken to achieve this, it is likely that Climate Actions will create more attractive spaces and a better quality of life.</p> <p>Impacts on water, <b>air, soil, landscape, cultural heritage and the historic environment</b> are likely as a result of actions to support urban climate change mitigation, however these may be mixed and vary in scale depending on the implementation and no significant effects are identified in this assessment.</p> <p>The Climate Action Towns Network provide support for small towns to use resources sustainably and promote actions such as increased recycling rates, having a minor positive impact upon <b>material assets</b>.</p>
Green infrastructure and improving access and availability of greenspace	+	++	++	++	+	+	0	+	+	+	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from increased vegetation within urban spaces, and increased opportunities for local recreation reducing the need to travel.</p> <p>While the effects of climate change are increasingly apparent in urban areas (e.g. urban heat island effect, increased flooding episodes), green infrastructure may reduce some of these effects, and significant positive effects are identified for <b>climate change adaptation</b>.</p> <p>Green infrastructure is likely to provide significant benefits for <b>population and human health</b> through the creation of attractive and accessible spaces as increased amenity spaces can result in positive impacts on mental health and improve opportunities for physical activity.</p> <p>Significant positive effects are also identified for <b>biodiversity, flora and fauna</b> as green infrastructure is likely to support and enhance ecological connectivity and natural environments within urban areas.</p> <p>Green infrastructure can include measures such as rainwater harvesting and SuDs which provide efficient management of <b>water resources</b>. Green infrastructure can also improve <b>air quality</b> as urban vegetation can mitigate emissions arising from sources such as road traffic.</p> <p>Green infrastructure will have minor positive effects on <b>landscape</b> by green spaces in the urban environment contributing to improved landscape quality.</p> <p>Green infrastructure may enhance the landscape setting of cultural heritage assets and the historic environment, and minor positive effects are identified.</p> <p>Minor positive effects are identified for <b>material assets</b> through the inclusion of assets such as small-scale renewable energy generation and urban farming as elements of green infrastructure.</p>

Fertile land

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscap e and geodiversi ty	Cultural heritage and historic environment	Material assets	Justification
Impacts from food production (commercial crop farming) agricultural inputs such as fertilisers, pesticides, and cultivation practices including agricultural buildings and polytunnels and management of silage and slurry	--	+/-	+/-	-	-	-	-	-	-	+/-	<p>Food production has minor negative effects on <b>climate change mitigation</b> as production operations lead to GHG emissions from farm machinery, fertiliser inputs and production processes.</p> <p>Agricultural production provides food security, however food production practices need to adapt to the challenges posed by climate change in terms of flooding, soil erosion and drought and the ability to adapt to these changes. Actions are being taken to change practices in line with <b>climate change adaptation</b> and mixed effects are identified as the rate of required change and time lag of implementing some actions may not be rapid enough.</p> <p>Agricultural production has a mixed effect on <b>population and human health</b> as it provides food security, but also has a negative impact the natural environment which impacts on human health.</p> <p>Fertilizers and pesticide use have minor adverse effects on <b>biodiversity, fauna and flora</b>, and declines in farmland biodiversity result from removal of field margins, hedgerows and trees.</p> <p>Further, application of fertilisers to improve crop yields leads to minor negative effects on <b>water</b> and <b>soil</b> quality through run off affecting water bodies and soils.</p> <p>Minor negative effects are identified for air quality as a result of emissions from farming machines, silage and slurry facilities and transportation and food processing.</p> <p>Agriculture significantly shapes the <b>landscapes</b> of the Scottish countryside. Increases in field size and removal of trees and hedgerows, along with large scale farm buildings may have minor negative effects on landscape and geodiversity.</p> <p>Agricultural production can impact on <b>cultural heritage and the historic environment</b> as a result of direct loss or damage to resources or impacts on setting and minor negative effects are identified.</p> <p>Agricultural land is a <b>material asset</b> and positive stewardship of this resource will have a mixed effect on material assets, however some levels of current activity result in unsustainable loss or damage to this resource.</p>
Promoting sustainable practices (encourage good practice, world-class producer of high quality food, low carbon farming methods)	+	++	+	++	++	++	++	+	0	+	<p>Promoting sustainable farming practices has minor positive effects on <b>climate change mitigation</b> as there is a potential for reductions of GHG emissions from farm machinery, fertiliser inputs and productions processes.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b> as sustainable farming practices can ensure food security in the light of the challenges posed by climate change and enable agriculture sector to adapt to these changes.</p> <p>Minor positive effects are identified for <b>population and human health</b>, particularly because of the potential of reducing ammonia emissions from farming.</p> <p>Significant positive effects are identified for <b>biodiversity, fauna and flora</b> as sustainable farming practices could ensure greater biodiversity in fertile land.</p> <p>Similarly, significant positive effects are identified for <b>water, air, and soil</b> as there is the potential for sustainable practices to improve water quality, reduce air pollution and prevent soil erosion.</p> <p>Minor positive effects are anticipated for <b>landscape and geodiversity</b>, as a more sustainable approach to farming will preserve the landscape from deterioration through processes such as landslides and soil erosion. Moreover, sustainable farming practices will introduce landscape features such as hedgerows that will increase the diversity of the landscape.</p> <p>No effects are expected for <b>cultural heritage and historic environment</b>.</p> <p>Agricultural land is a <b>material asset</b> and positive stewardship of this resource will have a minor positive effect on material assets.</p>

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On-farm woodland and agroforestry	+	++	0	++	0	+	+	+	0	+/-	<p>Minor positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from increased woodland and forestry.</p> <p>A significant positive effect is identified for <b>climate change adaptation</b> as increased woodland will provide adaptation measures such as shelter, soil stabilisation, cooling effects and flood mitigation.</p> <p>No significant effects are identified for <b>population and human health</b>.</p> <p>Woodland habitat creation in farmland will likely result in significant positive effects for <b>biodiversity, fauna and flora</b> by significantly increasing habitat networks within biodiversity poor areas.</p> <p>No effects are identified for <b>water quality</b>.</p> <p>An increase in vegetation through forest and woodland creation may improve <b>air</b> quality and protect <b>soil resources</b> from erosion and runoff with minor positive environmental effects.</p> <p>Farm woodlands and agroforestry will have positive effects on <b>landscape and geodiversity</b> through improvements to the landscape quality, and in providing screening for agricultural buildings.</p> <p>No significant effects are identified for <b>cultural heritage and historic environment</b>.</p> <p>Mixed effects are identified for <b>material assets</b>, as having increased tree cover on agricultural land may decrease the space available for commercial crops farming, but also improves the stability of the soil and provides wider benefits to the productivity of the land.</p>
Valuing our soils (Soil Regenerative Agriculture Group)	+	++	+	+	+	+	++	+	0	+	<p>Valuing our soils has minor positive effects on <b>climate change mitigation</b> as there is a potential for reductions of GHG emissions from activities on fertile land.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b> as soils in a good condition can ensure food security in the light of the challenges posed by climate change and enable agriculture sector to adapt to these changes. Therefore, minor positive effects are also expected for <b>population and human health</b>.</p> <p>Minor positive effects are identified for <b>biodiversity, fauna and flora</b> as enhanced soil quality could support greater biodiversity on fertile land.</p> <p>Similarly, minor positive effects are identified for <b>water</b> and <b>air</b> as by ensuring soil quality there is the potential for secondary benefits such as improved water quality, and reduced air pollution.</p> <p>Significant positive effects are expected for soil through valuing our soils, as better awareness of different practices across agriculture sector can lead to significant improvements in <b>soil</b> quality. Specifically, Soil Regenerative Agriculture Group can deliver positive benefits by collaborating with the Government to advice on potential improvements that will enable better carbon sequestration on farms.</p> <p>Minor positive effects are anticipated for <b>landscape and geodiversity</b>, as Valuing our soils will ensure more diverse and sustainable landscapes.</p> <p>No effects are identified for <b>cultural heritage and historic environment</b>.</p> <p>Agricultural land is a <b>material asset</b> and positive stewardship of this resource will have a positive effect on material assets.</p>
Wild and managed pollinators (pollinator friendly pest control measures)	0	+	+	++	0	0	0	0	0	0	<p>Addressing the issues of the decline in native pollinator populations will have positive effects on <b>climate adaptation</b>, as it will secure the stability of biodiversity. Such policies will also positively impact <b>population and human health</b> in terms of improving ecosystem function and food security. Significant positive effects are identified for <b>biodiversity</b>, as the online tool provided by the Scottish Government will enable farmers and crofters to develop an integrated pest management plan</p> <p>No impacts are identified for <b>climate change mitigation, water, air and soil, landscape and geodiversity, cultural heritage and the historic environment or material assets</b>.</p>

Marginal Land

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Peatland restoration (National Peatland Action Plan)	++	++	0	++	+	0	+	+	0	0	<p>The restoration of peatlands will protect and enhance important carbon sinks and aid in the sequestration of GHG emissions, with significant positive effects for <b>climate change mitigation</b>. Peatlands, only in a good environmental condition can absorb carbon and water, and therefore protection of them will be crucial in enabling climate change adaptation. It is expected that peatland restoration will have significant positive effects on <b>climate change adaptation</b>.</p> <p>No significant effects are identified for <b>population and human health</b> by peatland restoration, although there will be indirect benefits from improved <b>water</b> quality and regulation.</p> <p>Peatlands provide important habitats for certain species of <b>flora and fauna</b>, and restoration of these habitats will have significant positive effects on <b>biodiversity</b>.</p> <p>Peatland is important for water quality and flow regulation, and restoration will bring minor positive effects for the <b>water</b> environment.</p> <p>No significant impacts are identified for <b>air</b>.</p> <p>Peatland is an important <b>soil resource</b> and restoration will result in minor positive effects.</p> <p>Restoration of peatland can also bring associated benefits for <b>landscape</b> quality and geodiversity, and minor positive effects are identified.</p> <p>No significant effects associated with peatland restoration are identified in relation to <b>cultural heritage and the historic environment material assets</b>.</p>
Farming and crofting (Beef Efficiency Scheme)	+	++	0	0	0	0	0	0	0	+	<p>Farming and crofting include supporting ways to reduce greenhouse gas emissions from food production which is a significant contributor to emissions and minor positive effects are identified for <b>climate change mitigation</b>. Sustainable food production will also seek to support resilience to climate change. More sustainable beef production will be crucial for <b>climate change adaptation</b>, therefore significant positive effects are expected.</p> <p>Farming and crofting are likely to bring indirect positive effects in terms <b>population and human health</b> as this will likely increase food security while reducing environmental impact, however no direct impacts are identified.</p> <p>Some aspects of farming and crofting may have indirect beneficial effects on <b>biodiversity, flora and fauna, water, air, soil, landscape and geodiversity</b> through actions to reduce the use of fertilisers and pesticides and reducing the environmental impacts of farming, however no direct impacts are identified.</p> <p>It is not identified that farming and crofting will have an impact upon <b>cultural heritage and the historic environment</b>.</p> <p>Minor positive effects are identified for <b>material assets</b> through the benefits of sustainable food production in protecting and enhancing productive land.</p>
Increasing woodland	++	+	++	++	+	+	+	+-	0	+/-	<p>Significant positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from significantly increased vegetation.</p> <p>A minor positive effect is identified for <b>climate change adaptation</b> as increased woodland will provide adaptation measures such as shelter, soil stabilisation, cooling effects and flood mitigation within marginal land areas.</p> <p>Increasing woodlands will have a significant positive impact upon <b>population and human health</b> through the creation of extensive green spaces which may provide recreation opportunities in marginal land. There may also be minor indirect negative effects on population and human health as a result of displacement of other land uses which support rural communities.</p> <p>Habitat creation will likely result in a significant positive effect for <b>biodiversity, fauna and flora</b> significantly increasing habitat connectivity, although this must be balanced against the protection of other important habitats.</p> <p>A minor positive effect is anticipated for <b>water</b> in relation to forest and woodland creation through their contribution to flood management and erosion control.</p>

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Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
											<p>A minor positive effect is anticipated in relation to <b>air quality</b> as increased tree cover will reduce air pollution in the environment.</p> <p>An increase in vegetation through forest and woodland provisions may protect <b>soil resources</b> from erosion and runoff with minor positive environmental effects.</p> <p>A mixed effect is anticipated in relation to <b>landscape and geodiversity</b> as increasing woodlands are likely to enhance surrounding landscapes within some marginal land areas, but large scale landscape change may also have adverse landscape impacts.</p> <p>Increasing woodland may impact directly or indirectly on the setting of <b>cultural heritage and the historic environment</b>, however significant effects are not identified.</p> <p>Increasing woodland would also increase the forestry resource, having a positive effect on <b>material assets</b>, however it will also displace other land uses and mixed effects are identified.</p>
Woodland carbon code	+	++	0	+	0	+	+	0	0	+	<p>Minor positive effect is identified for <b>climate change mitigation</b> as the voluntary code can encourage a consistent approach to woodland carbon projects and lead to overall reductions of GHG in the atmosphere through carbon sequestration.</p> <p>Significant positive effects are anticipated for <b>climate change adaptation</b>, as more consistent approach will enable more strategic climate adaptation utilising the capacity of woodlands to sequester carbon.</p> <p>No effects are identified in relation to <b>population and human health</b> and <b>water</b>.</p> <p>Minor positive effects are expected for <b>biodiversity, air and soil</b>, as the Woodland Carbon Code may encourage more landowners to plant forests and woodlands and deliver secondary benefits in a form of enhanced biodiversity, reduced air pollution and soil erosion.</p> <p>No effects are identified in relation to <b>landscape and geodiversity</b> and <b>cultural heritage and historic environment</b>.</p> <p>Forests and woodlands are <b>material assets</b> and positive stewardship of these resources will have positive effects on material assets.</p>
Biodiversity Challenge Fund	+	+	0	+	0	0	0	0	0	0	<p>The Biodiversity Challenge Fund supports projects which will make a clear impact to improving biodiversity, helping it to respond to the added challenges for biodiversity brought about by climate change. It also supports projects which help to tackle the climate emergency. Therefore, minor positive effects are identified for <b>climate change mitigation</b>.</p> <p>Investment in conservation and in priority habitats projects which increase resilience in habitats and species most at risk, which will bring minor positive effects for <b>climate change adaptation</b>.</p> <p>The Biodiversity Challenge Fund will actively support actions relating to the conservation of priority <b>biodiversity, fauna and flora</b>, through the projects which receive funding. A minor positive effect is identified reflecting the project-based scale of benefits.</p> <p>The projects supported by the Biodiversity Challenge Fund are also likely to lead to indirect positive effects on <b>population and human health, water, soil, and landscape and geodiversity</b> through actions to improve habitats and increased awareness and understanding, however no direct effects are identified for these topics.</p> <p>No impacts are identified for <b>cultural heritage and the historic environment or material assets</b>.</p>
A new tourism strategy (The rural Tourism Infrastructure Fund)	-	0	++	+/-	0	0	0	0	+	+	<p>A Tourism Strategy may result in minor negative effects on <b>climate change mitigation</b> through increased levels of travel, particularly by private car.</p> <p>No impacts are identified for <b>climate change adaptation</b>.</p> <p>The creation of a Tourism Strategy focusing on marketing opportunities for Scotland's marginal landscapes is likely to have a significant positive effect on <b>population and human health</b> through increasing recreation and visitor opportunities in marginal land areas, which are accessible to a large proportion of the population.</p> <p>Nature based tourism can result in positive effects for <b>biodiversity, flora and fauna</b>. However increased visitor numbers can also result in increased levels of disturbance. Therefore, mixed effects are identified for biodiversity.</p>

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
											<p>No significant effects are identified for <b>water, air, soil, landscape and geodiversity</b></p> <p>The implementation of a tourism strategy could benefit <b>cultural heritage and the historic environment</b> by promoting these assets and associated conservation efforts in order to attract visitors to the area.</p> <p>This strategy will also result in increased investment in infrastructure and <b>material assets</b> to allow communities to support increased visitor numbers such as improved parking places and visitor facilities.</p>

## Uplands

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
High nature value (Biodiversity Challenge Fund)	+	+	0	+	0	0	0	0	0	0	<p>The Biodiversity Challenge Fund supports projects which will make a clear impact to improving biodiversity, helping it to respond to the added challenges for biodiversity brought about by climate change. It also supports projects which help to tackle the climate emergency. Therefore, minor positive effects are identified for <b>climate change mitigation</b>.</p> <p>Investment in conservation and in priority habitats projects which increase resilience in habitats and species most at risk, which will bring minor positive effects for <b>climate change adaptation</b>.</p> <p>The Biodiversity Challenge Fund will actively support actions relating to the conservation of priority <b>biodiversity, fauna and flora</b>, through the projects which receive funding. A minor positive effect is identified reflecting the project-based scale of benefits.</p> <p>The projects supported by the Biodiversity Challenge Fund are also likely to lead to indirect positive effects on <b>population and human health, water, soil, and landscape and geodiversity</b> through actions to improve habitats and increased awareness and understanding, however no direct effects are identified for these topics.</p> <p>No impacts are identified for <b>cultural heritage and the historic environment or material assets</b>.</p>
Growing our woodland economy	++	++	+	++	+	+	+	+/-	0	++	<p>Significant positive effects are identified for <b>climate change mitigation</b> through carbon sequestration from significantly increased vegetation and increased use of timber in construction.</p> <p>Significant positive effects are identified for <b>climate change adaptation</b> as increased woodland cover will provide adaptation measures such as flood mitigation within upland areas.</p> <p>The creation of large-scale woodland and forestry will have an indirect positive effect on <b>population and human health</b> through the creation of extensive large areas of woodland and the wider benefits which it brings in relation to flood management and for recreation. Direct benefits are also identified from the role of woodland related employment and the benefits this will bring to rural communities in terms of job creation and supporting the viability of services within these areas. There could also be minor indirect negative effects on population and human health as a result of displacement of other land uses which support rural communities, however overall minor positive overall effects are identified.</p> <p>Major positive effects for <b>biodiversity, fauna and flora</b> are identified as a result of habitat creation significantly increasing habitat extent and connectivity although this must be balanced against the loss of other habitats.</p> <p>A minor positive effect is anticipated for <b>water</b> in relation to forest and woodland creation through their contribution to flood management and erosion control.</p>

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											<p>A minor positive effect is anticipated in relation to <b>air quality</b> as increased tree cover will reduce air pollution in the environment.</p> <p>An increase in vegetation through forest and woodland provision may protect <b>soil resources</b> from erosion and runoff, and slope stabilisation with minor positive environmental effects.</p> <p>A mixed effect is anticipated in relation to <b>landscape and geodiversity</b> as large-scale forest and woodlands are likely to enhance surrounding landscapes within some marginal land areas, but large-scale landscape change may also have adverse landscape impacts.</p> <p>Large scale woodland and forestry creation may impact directly or indirectly on the setting of <b>cultural heritage</b> resources, however significant effects are not identified.</p> <p>Large scale woodland and forest creation will have a significant positive impact upon <b>materials assets</b>. As part of large-scale woodland creation, this will create an increased timber supply, employment opportunities and economic growth in rural, upland areas. There are also opportunities for diversification such as tourism. Indirect negative effects may arise from the displacement of other land uses.</p>
The right tree, or bog, in the right place (Peatland Carbon Code)	++	++	0	++	+	0	+	+	0	+	<p>The restoration of peatlands will protect and enhance important carbon sinks and aid in the sequestration of GHG emissions, with significant positive effects for <b>climate change mitigation</b>. Peatlands are also important for water storage which brings significant positive effects for <b>climate change adaptation</b>, through increased regulation of water flow.</p> <p>No significant effects are identified for <b>population and human health</b> by peatland restoration, although there will be indirect benefits from improved water quality and regulation.</p> <p>Peatlands provide important habitats for certain species of <b>flora and fauna</b>, and restoration of these habitats will have significant positive effects.</p> <p>Peatland is important for water quality and flow regulation, and restoration will bring minor positive effects for the <b>water</b> environment.</p> <p>No significant impacts are identified for <b>air</b>.</p> <p>Peatland is an important <b>soil resource</b> and restoration will result in minor positive effects.</p> <p>Restoration of peatland can also bring associated benefits for <b>landscape</b> quality and geodiversity, and minor positive effects are identified.</p> <p>No significant effects associated with peatland restoration are identified in relation to <b>cultural heritage and the historic environment</b>.</p> <p>The restoration of peatland will support the protection of this natural resource, with minor positive effects for <b>material assets</b>.</p>
Onshore Wind Policy Statement	+	++	+	+/-	0	+	-	-	0	+/-	<p>The Onshore Wind Policy Statement is expected to have minor positive effects for <b>climate change mitigation</b>, as transition to renewable energy sources will enable GHG emissions reductions. There are some carbon emissions associated with the production and construction of wind turbines, however should deliver net reductions.</p> <p>It is expected that onshore wind will have significant positive effects on climate change adaptation, as transition to renewables is crucial in <b>climate change adaptation</b>.</p> <p>Minor positive effects are identified for <b>air</b> and <b>population and human health</b>. Onshore wind turbines will improve the overall air quality, and therefore, they will also have positive effects on population and human health.</p> <p>Mixed effects are identified for biodiversity, flora and fauna because the biodiversity of the location of wind farm will impact the local biodiversity. Planning and required assessment in the pre-construction phase can help avoiding disturbing protected species and habitat, nevertheless, there are negative impacts which are unavoidable in short term scales.</p> <p>No significant effects are identified for water.</p> <p>Minor negative effects are identified for <b>soil</b> and <b>landscape and geodiversity</b>. Onshore wind changes landscapes and impacts on soils. Planning and required pre-construction assessments ensure avoiding the most negative impacts, and the policy supports the draft Peatland Policy Statement and Carbon Calculator, nevertheless construction of a windfarm will disturb soils and change landscapes.</p>



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											<p>No significant effects have been identified for cultural heritage and the historic environment.</p> <p>Mixed effects are expected for material assets, because construction of wind farms will require resources, however it will enable saving finite resources in the long run.</p>
Biodiversity Strategy (Biodiversity Challenge Fund, Scottish Forestry Grant Scheme)	+	+	0	+	0	0	0	0	0	0	<p>The Biodiversity Strategy and the Biodiversity Challenge Fund encourage and support projects which will make a clear impact to improving biodiversity, helping it to respond to the added challenges for biodiversity brought about by climate change. It also supports projects which help to tackle the climate emergency. Therefore, minor positive effects are identified for <b>climate change mitigation</b>.</p> <p>Investment in conservation and in priority habitats projects which increase resilience in habitats and species most at risk, which will bring minor positive effects for <b>climate change adaptation</b>.</p> <p>The Biodiversity Challenge Fund and the Scottish Forestry Grant Scheme will actively support actions relating to the conservation of priority <b>biodiversity, fauna and flora</b>, through the projects which receive funding. A minor positive effect is identified reflecting the project-based scale of benefits.</p> <p>The Biodiversity Strategy likely to lead to indirect positive effects on <b>population and human health, water, soil, and landscape and geodiversity</b> through actions to improve habitats and increased awareness and understanding, however no direct effects are identified for these topics.</p> <p>No impacts are identified for cultural heritage and the <b>historic environment</b> or <b>material assets</b>.</p>
Local food strategy	+	++	+	0	0	0	0	0	0	+	<p>Local food strategy can support ways to reduce GHG emissions from food production, especially from transportation, which is a significant contributor to emissions and minor positive effects are identified for <b>climate change mitigation</b>. Local food strategy will also seek to support resilience to climate change, and significant positive effects are identified for <b>climate change adaptation</b>.</p> <p>Local food strategy is likely to bring indirect positive effects in terms <b>population and human health</b> as this will likely increase food security while reducing environmental impact, therefore minor positive impacts are identified.</p> <p>Local food strategy may have indirect beneficial effects on <b>biodiversity, flora and fauna, water, air, soil, landscape and geodiversity</b> through actions to reduce the use of fertilisers and pesticides and reducing the environmental impacts of farming, and reducing the distance the food needs to travel, however no direct impacts are identified.</p> <p>It is not identified that local food strategy will have an impact upon <b>cultural heritage and the historic environment</b>. Minor positive effects are identified for material assets through the benefits of local food strategy in protecting and enhancing productive land of the uplands.</p>
Community initiatives (Scottish Land Matching Service, Scottish Land Fund, community Action Plans)	+	+	++	0	0	0	0	0	0	+	<p>Minor positive effects are identified for <b>climate change mitigation</b> and <b>climate change adaptation</b> through community initiatives.</p> <p>Significant positive effects are expected in relation to <b>population and human health</b>, as community initiatives have the potential to enable people to uptake vacant land and provide opportunities for jobs, housing and economic growth. It will also enable communities to purchase land and perform desired agricultural activities that can deliver for example food security.</p> <p>No direct effects have been identified in relation to <b>biodiversity, flora and fauna, water, air, soil, landscape and geodiversity and cultural heritage and historic environment</b>.</p> <p>Farming land is a material assets and positive stewardship of this resource will have a positive effect on <b>material assets</b>.</p>

Semi-natural land

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Protecting our semi-natural land	+	+	+	++	+	0	+	++	++	+	<p>Protecting our semi-natural land is likely to have minor positive effects on <b>climate change mitigation</b>, as nature protection can lead to reductions in GHG emissions through increased carbon sequestration. Similarly, minor positive effects are identified from nature enhancement as it contributes to <b>climate change adaptation</b>, through increasing habitat networks to support biodiversity resilience and flood mitigation.</p> <p>Protecting our semi-natural land can lead to an increase in tourism and enhanced vitality for local services and facilities with minor positive effects on local <b>population and human health</b>.</p> <p>Protecting our semi-natural land will have a significant positive effect on <b>biodiversity, fauna and flora</b>, because it will help enhancing Scotland's wildlife.</p> <p>It is also expected that there will be minor positive effects on <b>water</b> and <b>soil</b>, as improving the overall biodiversity will positively impact on water and soil quality. Having more biodiversity will enable water filtration and avoid soil erosion.</p> <p>No effects from protecting our semi-natural land are identified for <b>air</b>.</p> <p>Protecting our semi-natural land has the potential to have a significant positive impact <b>landscape</b> and <b>cultural heritage and historic environment</b>, as it will enhance local characteristics.</p> <p>Minor positive effects are expected for <b>material assets</b>, because it will enhance biodiversity and tree growth across semi-natural landscapes and increase the number of natural resources available.</p>
Living landscapes	+	+	+	0	0	0	0	0	0	+	<p>Living landscapes include areas with lower levels of human interference. Protection of these areas can bring a range of benefits, including that they may also represent areas of significant natural resources which can contribute to <b>climate change mitigation</b>, for example as woodland for carbon sequestration or water resources for hydro power. Living landscapes will also seek to support resilience to climate change through protecting natural habitats and supporting species movement, and minor positive effects are identified for <b>climate change adaptation</b>.</p> <p>Living landscapes is likely to bring minor positive effects in terms <b>population and human health</b> as this will likely enable local communities to thrive and offer opportunities to young people and future generations, alongside the benefits to visitors.</p> <p>Some aspects of the Living landscapes may have indirect beneficial effects on <b>biodiversity, flora and fauna, water, air, soil, landscape and geodiversity</b> through actions to reduce the enhance the semi-natural areas, however no direct impacts are identified.</p> <p>It is not identified that the Living landscapes will have an impact upon <b>cultural heritage and the historic environment</b>. Minor positive effects are identified for <b>material assets</b> through the benefits of the Living landscapes in protecting and enhancing semi-natural land.</p>
Restoring native ecology	++	++	0	++	+	0	+	+	0	+	<p>The restoration of native ecology will protect and enhance important carbon sinks and aid in the sequestration of GHG emissions, with significant positive effects for <b>climate change mitigation</b>. Native ecology is also important for water storage through increased vegetation contributing to regulation of water flow and biodiversity through restoring habitats which bring significant positive effects for <b>climate change adaptation</b>.</p> <p>No significant effects are identified for <b>population and human health</b> by native ecology restoration, although there will be indirect benefits from improved water quality and regulation, soil quality and biodiversity.</p> <p>Native ecology provides important habitats for certain species of <b>flora and fauna</b>, and restoration of these habitats will have significant positive effects.</p> <p>Native ecology, such as for example peatland, is important for water quality and flow regulation, and restoration will bring minor positive effects for the <b>water</b> environment.</p> <p>No significant impacts are identified for <b>air</b>.</p> <p>Restoring native ecology can also play a role in protecting the <b>soil resource</b> and restoration will result in minor positive effects.</p>

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											<p>Restoration of native ecology can also bring associated benefits for <b>landscape</b> quality and geodiversity, and minor positive effects are identified.</p> <p>No significant effects associated with native ecology restoration are identified in relation to <b>cultural heritage and the historic environment</b>.</p> <p>The restoration of native ecology will support the protection of this natural resource, with minor positive effects for <b>material assets</b>.</p>
Responsible tourism	-	0	+	+	0	0	0	0	+	+	<p>Increased levels of tourism may result in minor negative effects on <b>climate change mitigation</b> through increased levels of travel, particularly by private car.</p> <p>No impacts are identified for <b>climate change adaptation</b>.</p> <p>Actions related with supporting responsible tourism are likely to have a minor positive effect on population and human health, through increasing tourism opportunities and managing the impacts of tourism on communities.</p> <p>More responsible tourism practices have the potential to have a minor positive effect on <b>biodiversity, fauna and flora</b> through managing impacts on habitats and species.</p> <p>No significant effects are identified for <b>water, air, soil, landscape and geodiversity</b>.</p> <p>Minor positive effects are identified for <b>cultural heritage and the historic environment</b> by promoting these assets and associated conservation efforts in order to attract visitors to the area.</p> <p>Supporting tourism recovery is likely to have a minor positive effect on <b>material assets</b> by supporting investment in local infrastructure to support tourism.</p>
Restoration of peatland	++	++	0	++	+	0	+	+	0	+	<p>The restoration of peatlands will protect and enhance important carbon sinks and aid in the sequestration of GHG emissions, with significant positive effects for <b>climate change mitigation</b>. Peatlands are also important for water storage which brings significant positive effects for <b>climate change adaptation</b>, through increased regulation of water flow.</p> <p>No significant effects are identified for <b>population and human health</b> by peatland restoration, although there will be indirect benefits from improved water quality and regulation.</p> <p>Peatlands provide important habitats for certain species of <b>flora and fauna</b>, and restoration of these habitats will have significant positive effects.</p> <p>Peatland is important for water quality and flow regulation, and restoration will bring minor positive effects for the <b>water</b> environment.</p> <p>No significant impacts are identified for <b>air</b>.</p> <p>Peatland is an important <b>soil resource</b> and restoration will result in minor positive effects.</p> <p>Restoration of peatland can also bring associated benefits for <b>landscape</b> quality and geodiversity, and minor positive effects are identified.</p> <p>No significant effects associated with peatland restoration are identified in relation to <b>cultural heritage and the historic environment</b>.</p> <p>The restoration of peatland will support the protection of this natural resource, with minor positive effects for <b>material assets</b>.</p>

## Rivers and Water Bodies

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Healthy water, healthy land (Framework for Water, River Basin Management )	++	++	++	++	++	0	+	0	0	+	<p>Healthy water, healthy land protects and improves Scotland's water environment for the benefit of people, wildlife and the economy. Land management practices can have a significant impact on soil which is an important carbon sink and aid in the sequestration of GHG emissions, improved land management practices to support the water environment will also support soil, with significant positive effects for <b>climate change mitigation</b>.</p> <p>The River Basin Management Plans (RBMP) put strategies in place which address <b>climate change adaptation</b> issues for the water environment. This includes managing water quality and changes in flows associated with climate change. Vegetation and soils, including peatlands are also important for water storage. Therefore, significant positive effects are identified for <b>climate change adaptation</b>.</p> <p>Significant positive effects are identified for <b>population and human health</b> which are likely to benefit from actions which prioritise the improvement of water resources. This would extend to drinking water and recreational water quality.</p> <p><b>Biodiversity, fauna and flora</b> are likely to significantly benefit from RBMP as these strategies aim to protect native species while tackling threats associated with invasive species. Improved understanding of the impact of land management on the water environment will additional positive effects on <b>biodiversity, flora and fauna</b> through supporting improved water quality and addressing flood risk.</p> <p>Much of the water environment in Scotland is in good condition. However, there are still significant problems affecting water quality, physical condition, water flows and levels, and the migration of wild fish. Invasive non-native species are also damaging aquatic plant and animal communities. Healthy water, healthy land will result in significant positive impacts upon rivers and water bodies by addressing issues such as <b>water quality</b> with the aim to bring about further enhancement.</p> <p>No effects are identified for air quality.</p> <p>Healthy water, healthy land can also put measures in place to tackle issues such as riverbank erosion and sedimentation of soils resulting in positive impacts for <b>soil</b> resources.</p> <p>No significant impacts are identified for <b>landscape, or cultural heritage and the historic environment</b>.</p> <p>Water is a key natural resource for many activities such as energy generation, food production and industry and managing the quality and quantity of this will have <b>minor positive effects</b> on material assets.</p>
Flood Risk Management	0	++	++	+/-	++	0	+	+/-	+/-	++	<p>Flood management will not contribute to <b>climate change mitigation</b>, although managing flood risk may indirectly protect carbon stores in soil.</p> <p>Flood management is likely to have a significant positive impact on <b>climate change adaptation</b> with measures put in place to tackle flooding events arising as a result of climate change.</p> <p>This could also have a significant positive impact upon <b>population and human health</b> as flooding events can pose a serious health risk to human health.</p> <p>Flood risk management and protection can bring benefits for <b>biodiversity, flora and fauna</b> where actions protect biodiversity resources, or create new habitats. However, some flood risk management actions may impact negatively, and mixed effects are identified.</p> <p>Flood management will have significant positive impacts for <b>water</b> and water quality by managing flow.</p> <p>This is also similar for <b>soil resources</b> as flood management may prevent excess erosion, runoff and waterlogging and reduce contamination. No impacts are identified for <b>air</b> quality.</p> <p>Flood management measures could be present in the <b>landscape</b> in many different forms ranging from hard engineering solutions to less intrusive forms of flood management such as SuDs, increased vegetation. As a result, the impact on the landscape is likely to be mixed.</p>

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Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
											<p>Flood management measures may have a mixed effect on <b>cultural heritage and the historic environment</b> by potentially safeguarding existing and unknown assets from flooding events considering that these assets are more likely to be vulnerable considering their age and physical state. Conversely, flood management may result in loss or damage to historic environment resources.</p> <p>Flood risk management and protection is likely to have a significant positive effect on <b>material assets</b> by safeguarding important assets including infrastructure and productive land which are likely to be affected by flooding events.</p>
Land impacts	+	+	0	+	++	0	+	0	0	+	<p>Minor positive effects are identified for <b>climate change mitigation</b> as managing impacts from different land uses can enhance a healthy water environment and enhance carbon sequestration.</p> <p>Minor positive effects are expected for <b>climate change adaptation</b> as managing impacts from land uses such as agriculture, forestry, peatland restoration, and blue-green infrastructure can enhance the water environment and support a resilient water environment that will protect land from flooding.</p> <p>No significant effects are identified for <b>population and human health</b>, although indirect benefits will occur from a healthy water environment.</p> <p>Managing impacts from different land uses is identified to have minor positive effects on <b>biodiversity, fauna and flora</b>. When land use is sustainably managed it can enhance biodiversity.</p> <p>Significant positive effects are identified for <b>water</b>, as well managed land can significantly enhance the water environment and its quality.</p> <p>No significant effects are expected for <b>air</b> quality.</p> <p>Minor positive effects are expected for soil, and sustainable land management can prevent <b>soil</b> from erosion.</p> <p>No significant effects are identified for <b>landscape and geodiversity</b> and <b>cultural heritage and historic environment</b>.</p> <p>Land is a material asset, and positive stewardship of this resource will have positive effect on material assets.</p>
Water Environment fund	+	++	++	+	++	0	+	+	0	+	<p>Minor positive effects are identified for <b>climate change mitigation</b>, as Water Environment Fund can deliver benefits to rivers and local communities and mitigate for future climate risks such as flooding.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b>, as the Fund has the potential to enhance rivers and help local communities to adapt to the changing climate.</p> <p>Significant positive effects are also expected for <b>population and human health</b>, as the Fund has the potential to reduce risks from flooding to local communities.</p> <p>There are minor positive effects identified for <b>biodiversity, fauna and flora</b> through the Water Environment Fund that can enable creating new water habitats and connect the fragmented habitats.</p> <p>Significant positive effects are identified for <b>water</b>. Water environment Fund has the potential to significantly enhance the water quality.</p> <p>No effects are identified for <b>air</b> and <b>cultural heritage and historic environment</b>.</p> <p><b>Landscape and geodiversity</b> are expected to be positively impacted by the Water Environment Fund. Similarly, minor positive effects are expected for material assets because water is a <b>material asset</b> and positive stewardship should deliver positive effects for material assets.</p>
Ecosystems Approach	+	++	0	+	+	+	+	+	0	+	<p>Minor positive effects are identified for <b>climate change mitigation</b>, as ecosystem approach can enable greater carbon sequestration across land uses.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b>, considering that ecosystem approach will help adapting to future climate changes by enabling a range of ecosystem services.</p> <p>No significant effects are identified for <b>population and human health</b>.</p> <p>Minor positive effects are identified for <b>biodiversity, water, air, soil, landscape and geodiversity</b>, because through ecosystem approach there is a scope to enhance biodiversity, improve air, water and soil quality and improve landscapes.</p>

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											No effects are expected for <b>cultural heritage and historic environment</b> . Minor positive effects are expected for <b>material assets</b> .

Coastal

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Where the land meets the sea (coastal planning, further alignment of marine and terrestrial planning policy)	+	+	0	++	++	0	0	+	+	+	<p>Further aligning marine and terrestrial planning policy can deliver minor positive effects on <b>climate change mitigation</b>. This will support the delivery of offshore renewable energy projects which can make significant contributions to electricity generation.</p> <p>Better and more coherent management of landscapes and seascapes can help minimising climate change impacts</p> <p>Coastal planning can deliver more coherent and more complementary <b>climate change adaptation</b> actions, particularly in relation to managing sea level rise. Therefore, minor positive effects are identified for <b>climate change adaptation</b>.</p> <p>No effects are expected for <b>population and human health</b>.</p> <p>Significant positive effects are expected for <b>biodiversity, fauna and flora</b> and <b>water</b>. As more coherent and complementing policy can help avoid environmental issues such as contamination of water courses, location of agricultural activities and designating land for biodiversity.</p> <p>No effects are expected for <b>air</b> and <b>soil</b>.</p> <p>Minor positive effect is expected for <b>landscape and geodiversity</b>, as coastal planning can better designate areas for development and protection and balance environmental, social and economic needs. Similarly, minor positive effects are identified for <b>cultural heritage and historic environment</b>.</p> <p>Further alignment of marine and terrestrial policies has the potential to deliver minor positive effect on <b>material assets</b>, as it supports more efficient and co-ordinated distribution of resources.</p>
Strengthening natural defences (Natural shoreline habitats and Dynamic Coast project)	0	++	+	+	+	0	+	+	+	+	<p>According to climate predictions, sea level will continue to rise, and it will pose particular risks to coastal landscapes and on key coastal infrastructure. An increased investment in protection of natural coastal defences from erosion is not likely to have impacts on <b>climate change mitigation</b>, however it is expected to have significant positive effects on <b>climate change adaptation</b>, because natural shoreline habitats play a significant role in combating the effects of climate change.</p> <p>Strengthening natural defences will positively impact local communities and increase their resilience to future climate impacts such as for example coastal flooding. Therefore, minor positive effects are expected for <b>population and human health</b>. However, certain areas (i.e. agricultural land) may be lost to natural coastal defences.</p> <p>It is also expected that by Strengthening natural defences there will be minor positive effects on <b>biodiversity, flora and fauna</b> as they have a potential to create habitats.</p> <p>Water quality is at risk of marine litter, sewage water run-off, fish farms and acidification of marine environment; therefore, Strengthening natural defences can improve the <b>water</b> quality and have positive effects on this SEA objective.</p> <p>No effects are expected on <b>air</b> quality.</p> <p>Strengthening natural defences can have positive effects on <b>soil</b>, as it will reduce risks of soil erosion and salinization of soil in coastal areas.</p> <p><b>Landscape</b> can positively benefit from additional investments in protecting natural defences by increasing its resilience to coastal erosion and flooding.</p> <p>Increasing the resilience of the existing natural flood defences will also positively impact on <b>cultural heritage and historic environment</b>, especially for coastal sites. However, there are likely to be gains and losses if coastal areas are converted into intertidal habitats, and this may result in loss or damage to cultural heritage resources.</p> <p>There are savings to be made in terms of resource use if more investment is directed towards natural flood defences. Hence, <b>material assets</b> are expected to be positively impacted. Moreover, natural flood defences can protect coastal resources such as farmland, tourist destinations, energy transmission infrastructure and transport infrastructure etc., although it involves land take.</p>

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Coastal and marine industries (Blue Economy Action Plan)	+	+	++	?	?	0	0	?	+/-	+	<p>Some of the key issues for the Blue Economy are the GHG emissions from fuel consumption of marine vessels. The Blue Economy Action Plan is assumed to navigate decarbonisation of marine vessels used in marine tourism, fishing, used for installation and maintenance of renewables and positively impact <b>climate change mitigation</b>. In order to achieve Scotland's ambitious net zero targets, blue economy will have to play an important part in enabling <b>climate change adaptation</b> of the industries but also of the local communities that live in coastal areas.</p> <p>Significant positive effects are also expected for <b>population and human health</b>. Blue Economy Action Plan has the potential to reduce GHG emissions from marine industries, encourage sustainable sea food production, and eco-tourism what will have positive effects on local communities and their health.</p> <p>Uncertain effects are expected for <b>biodiversity, fauna and flora</b> as managed sea fisheries tend to negatively impact marine ecosystems. Offshore renewables can negatively impact marine ecosystem, especially during the construction stage of the project. However, in longer-term scales they may allow the biodiversity to re-establish, due to exclusion zones near wind turbines.</p> <p>Similarly, there are uncertain effects expected for <b>water</b> as increased activity of blue economy industries may lead to more frequent oil or chemical spills, particularly in the case of fisheries and oil and gas industries.</p> <p>No effects are expected for <b>air</b> and <b>soil</b>.</p> <p>The Blue Economy Action Plan has the potential to have uncertain effects on <b>landscape and geodiversity</b> and mixed effects upon <b>cultural heritage and historic environment</b>. Positive effects are linked with coastal eco-tourism. However, renewable energy and aquaculture may impact negatively on seascape and setting of coastal cultural heritage assets.</p> <p>It is expected that there will be minor positive effects on <b>material assets</b>, as further focus on marine industries will lead to new infrastructure and developments.</p>
Aquaculture (improved regulatory processes, more benefit to communities where aquaculture is based)	+	+	++	+/-	+/-	0	0	0	+	+	<p>Aquaculture as one of the key industries in Scotland has significant impacts on the marine environment, and a more sustainable approach to aquaculture can reduce these effects.</p> <p>Sustainable growth of aquaculture can deliver reduction of GHG emissions from the industry and positively impact <b>climate change mitigation</b> by addressing issues such as emissions from feed, medicine, other chemicals and nutrients, and from transportation and manufacturing.</p> <p>By changing current practices, the support for sustainable growth of aquaculture has the potential to increase the resilience of the aquaculture industry and positively impact <b>climate change adaptation</b>.</p> <p>Sustainable growth of aquaculture will provide jobs in the most remote locations and island communities and it has the potential to have significant positive effects upon <b>population and human health</b>.</p> <p>Fish farming poses risks to biodiversity, especially to species such as wild salmon, sea trout and sea lice because of fish escapes. Sustainable management of aquaculture can minimise these risks, however, sustainable growth of aquaculture inevitably leads to a growing number of fisheries which may negatively impact the marine environment. Therefore, mixed effects are identified for <b>biodiversity, fauna and flora</b>.</p> <p>Sustainable growth of aquaculture can have mixed effects on <b>water</b>. Careful management of the growth and choice of suitable locations can minimise risk of water contamination and freshwater abstraction. However, expanding areas of aquaculture will increase the overall area exposed to pollution.</p> <p>No effects are identified for <b>air, soil</b> and <b>landscape</b>.</p> <p>Sustainable growth of aquaculture will result in an increase in infrastructure; however, locations of new fish farms will be managed to minimise impacts.</p> <p>Fishing is a part of Scotland's <b>cultural heritage</b>; sustainable management of aquaculture can deliver minor positive benefits and preserve this traditional sector by making it more environmentally neutral.</p>



Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
											Minor positive effects are also expected for <b>material assets</b> as sustainable growth of aquaculture is expected to utilise more efficient technologies and renewable energy.
Investing in coastal communities (Crown Estate Scotland's sustainable communities fund)	0	0	+	0	0	0	0	0	0	+	<p>No effects are identified in for <b>climate change mitigation</b> and <b>climate change adaptation</b> in relation to investing in coastal communities.</p> <p>Minor positive effects are identified for <b>population and human health</b> in relation to investments in coastal communities by for example Crown Estate Scotland's sustainable communities fund. Such investments can support local regeneration and sustainable development initiatives that deliver economic, social and environmental benefits.</p> <p>No significant effects are expected for <b>biodiversity, water, air, soil and landscape and geodiversity</b>.</p> <p>Minor positive effects are identified in relation to <b>material assets</b>, as there is an opportunity for increasing the amount of material assets available by enabling coastal communities such as locally produced renewable energy.</p>

## Islands

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
National Islands Plan	+	++	+	0	0	0	0	0	+	+/-	<p>The National Islands Plan seeks to increase population levels, improve and promote sustainable economic development environmental wellbeing, health and wellbeing, and community empowerment, improving transport services and digital connectivity; reducing fuel poverty; and enhancing biosecurity. It is expected that the National Island Plan will have minor positive effects on <b>climate change mitigation</b> as it can lead to overall reductions of GHG.</p> <p>Significant positive effects are expected for <b>climate change adaptation</b>, as encouraging more sustainable approach to economic development can help island communities to become more resilient to climate change.</p> <p>Minor positive effects are expected for <b>population and human health</b>, as the Plan focuses on improving health and wellbeing.</p> <p>No direct effects are expected for <b>biodiversity, water, air, soil, landscape and geodiversity</b>.</p> <p>Minor positive effects are identified for <b>cultural heritage and historic environment</b> as the Plan will enable continuation of island lifestyles and continuation of cultural heritage of island communities.</p> <p>Mixed effects are identified for <b>material assets</b>, as reducing of fuel poverty may increase the energy consumption.</p>
Collaboration with Non – native species action group	0	+	0	++	0	0	0	0	0	0	<p>Non-native species management does not impact on <b>climate change mitigation</b>, but brings minor positive benefits for <b>climate change adaptation</b> through reducing the pressures on native species which are being challenged by climate change, Related to this, significant positive effects are identified for <b>biodiversity, flora and fauna</b> through improving the conditions for native species, and reflecting the level of threat posed to protected species in island locations.</p> <p>Indirect positive effects on <b>population and human health</b> will result from improved quality of the natural environment and functional ecosystems.</p> <p>No direct impacts on <b>water, air, soil, landscape and geodiversity, cultural heritage and material assets</b> are identified,</p>

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Nature based solutions to climate change	+	+	0	++	+	0	+	0	0	+	<p>Nature based solutions to climate change and increased woodland will have a beneficial impact upon <b>climate change mitigation</b> by providing measures to protect resources such as peatlands and increase carbon sequestration and brings benefits for <b>climate change adaptation</b> through safeguarding these resources from future climatic changes.</p> <p>Nature based solutions to climate change such as restoration of habitats will bring significant positive effects for native <b>biodiversity, fauna and flora</b>, reflecting the extent of natural heritage designations across the islands.</p> <p>Working with island communities to explore opportunities on how to expand forests and woodland which will have beneficial effects in relation to <b>water and soil</b>. Continued collaboration could be beneficial for <b>material assets</b> as this would promote economic investment and increased protection of infrastructure within island communities.</p> <p>It is not identified that this will impact on <b>population and human health, air, landscape and geodiversity</b> or <b>cultural heritage</b>.</p>
Prosperous island economies (Rural and Islands Economic Recovery Plan)	-	0	+	0	0	0	0	0	0	+	<p>Creation of a thriving business environment with a focus on sustainable opportunities for the islands is likely to result in minor negative effects on <b>climate change mitigation</b> due to increased travel and transport of goods.</p> <p><b>Climate adaptation</b> is likely to be unaffected by the creation of thriving business environments, however increased business use of the islands may increase the justification and support for adaptation, particularly in relation to key transport infrastructure, such as coastal roads and ports.</p> <p>A minor positive effect is identified for <b>population and human health</b> in relation to the creation of a thriving business environment, however in the context of islands, these will have a significant positive impact upon as this will likely boost population numbers within these areas and promote sustainable communities which can support local services.</p> <p>It is not identified that <b>biodiversity, water, air, soil, landscape and cultural heritage</b> would be affected by creation of a thriving business environment, however increased levels of business use and visitors may impact on all of these resources, depending on the business activities which take place.</p> <p>No significant effects are identified for <b>water, air, soil, landscape and cultural heritage</b>.</p> <p>The creation of business environments on Scottish islands will generate economic opportunities and may lead to an increase in investment in infrastructure to enable it to meet the demand created by new business environments. Ultimately this will have a minor positive effect upon <b>material assets</b>, which may be locally significant.</p>
Community engagement (community empowerment)	+	+	+	0	0	0	0	0	0	0	<p>Minor positive effects are identified for community engagement and <b>climate change mitigation</b>, allowing communities to influence local power generation, which in some island locations can be reliant on non-renewable resources.</p> <p>Community engagement and empowerment also has the potential to deliver minor positive effects for <b>climate change adaptation</b> by allowing communities to influence projects which address the most significant local needs, in more remote communities, where resources to respond to severe events may be more limited. Closely linked to this, minor positive effects are identified for <b>population and human health</b> through the positive effects of community empowerment. All of these positive effects may be locally significant for the local communities.</p> <p>No effects are identified for <b>biodiversity, water, air, soil, landscape, cultural and historic environment and material assets</b>.</p>
Low carbon Local Energy Challenge Fund)	+	+	+	0	0	0	0	0	0	+	<p>Low carbon projects are likely to have a minor positive impact upon <b>climate change mitigation</b>, which may be locally significant. Low carbon projects may also indirectly contribute to <b>climate change adaptation</b>, for example through securing security of energy supply by reducing reliance on imported fuel.</p> <p>These low carbon projects will also bring minor positive benefits to <b>population and human health</b>, due to their contribution to net zero and less polluting means of delivering utilities. Depending on the nature of the low carbon projects developed, there may be local positive or negative impacts on <b>biodiversity, water, air, soil, landscape and geodiversity</b> and <b>cultural heritage</b> from construction and operation of these projects, however it is assumed that adverse impacts will be addressed through the planning and assessment of these projects.</p>

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											However, low carbon projects will have a minor positive but locally significant impact upon <b>material assets</b> with low carbon projects delivering more efficient infrastructure and creating jobs in rural island communities.
Natural and Cultural Heritage Fund	0	0	+	++	0	0	0	0	++	+	<p>The Natural and Cultural Heritage Fund is not expected to have any direct effects on <b>climate change mitigation</b> and <b>climate change adaptation</b>.</p> <p>It is expected that the NatureScot's Natural and Cultural Heritage Fund will deliver minor positive effects for <b>population and human health</b> as it will enable enhancement of nature of the local surroundings and as a result deliver recreational places that will benefit human health.</p> <p>Significant positive effects are expected for <b>biodiversity, fauna and flora</b> as this fund will help boost nature restoration.</p> <p>No effects are identified for <b>water, air, soil or landscape and geodiversity</b>.</p> <p>Significant positive effects are identified for <b>cultural heritage and historic environment</b>, as Nature Scot's Natural and Cultural Heritage Fund will enable protection of cultural heritage.</p> <p>Minor positive effects are identified for <b>material assets</b>, as the fund offers opportunities to support inclusive and sustainable economic growth and enable rural populations to sustain themselves within their local setting.</p>

Offshore

Issue	CC mitigation	CC adaptation	Population and human health	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Justification
Alignment of marine and terrestrial planning policy	+	+	0	++	++	0	0	+	+	+	<p>Further aligning marine and terrestrial planning policy can deliver minor positive effects on <b>climate change mitigation</b>. This will support the delivery of offshore renewable energy projects which can make significant contributions to electricity generation.</p> <p>Better and more coherent management of landscapes and seascapes can help minimising climate change impacts</p> <p>Marine and terrestrial planning when considered together can also deliver more coherent and more complementary <b>climate change adaptation</b> actions, particularly in relation to managing sea level rise. Therefore, minor positive effects are identified for <b>climate change adaptation</b>.</p> <p>No effects are expected for <b>population and human health</b>.</p> <p>Significant positive effects are expected for <b>biodiversity, fauna and flora</b> and <b>water</b>. As more coherent and complementing policy can help avoid environmental issues such as contamination of water courses, location of agricultural activities and designating land for biodiversity.</p> <p>No effects are expected for <b>air</b> and <b>soil</b>.</p> <p>Minor positive effect is expected for <b>landscape and geodiversity</b>, as better alignment of planning policy can better designate areas for development and protection and balance environmental, social and economic needs. Similarly, minor positive effects are identified for <b>cultural heritage and historic environment</b>.</p> <p>Further alignment of marine and terrestrial policies has the potential to deliver minor positive effect on <b>material assets</b>, as it supports more efficient and co-ordinated distribution of resources.</p>
Protect and enhance the marine environment whilst promoting existing and emerging industries	+	+/-	+	+/-	+/-	+	0	+/-	-	+	<p>The marine environment will play a key role in mitigating climate change. The Scottish National Marine Plan has the potential to deliver significant reductions in GHG emissions from fishing, transport and renewable energy industries. Therefore, it is expected the Plan will have minor positive effects on <b>climate change mitigation</b>.</p> <p>Climate change adaptation offers a long-term approach to helping coastal and island communities and marine industries adapt to climatic changes. It is expected that the Scottish National Marine Plan will have mixed effects on <b>climate change adaptation</b>, as it focuses on protecting the marine environment and simultaneously sustainably growing marine-based industries, which may themselves be vulnerable to climate changes.</p> <p>The Plan is expected to have minor positive effects on <b>population and human health</b> as it focuses on increasing employment opportunities, supporting cohesion of local and island communities, and safeguarding of lifeline ferry routes.</p> <p>Biodiversity is essential to healthy marine ecosystems. The Plan aims to enhance biodiversity, however in the same time it strives to grow the aquaculture industry which poses serious risks to wild fish, may lead to dead zones and pollute water bodies. Therefore, mixed effects are expected for <b>biodiversity, fauna and flora</b>.</p> <p>Encouraging more aquaculture and other marine-based industries increases the likelihood of accidental spill of oil and chemicals for sea fisheries and oil and gas industries. Despite more sustainable practices in place, smaller in scale but more frequent events may have damaging results. As a result, mixed effects are expected for <b>water</b>.</p> <p>The Plan aims to control sulphur oxides, nitrogen oxides and particles emissions from vessels, and positive effects are expected for <b>air</b>.</p> <p>No effects are identified for <b>soil</b>.</p> <p>Mixed negative effects are expected for <b>seascape/landscape</b> caused by the visual impacts of renewable energy arrays or fish farms.</p> <p>Minor negative effects are also expected for <b>cultural heritage and the historic environment</b> as a result of direct effects on marine archaeology from activities such as scallop dredging, and impacts on setting</p> <p>An increased number of offshore renewable energy will have minor positive effects on <b>material assets</b> by increasing electricity generation potential and distribution networks.</p>

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Offshore Wind Policy Statement and the Sectoral Marine Plan for Offshore Wind	+/-	+	+	+/-	+/-	0	0	-	-	+	<p>Offshore Wind Policy Statement and the Sectoral marine plan for offshore wind energy play an important part in helping Scotland achieve its net-zero carbon emissions targets. By transforming the energy industry, there are significant reductions in GHG emissions to be made. In the short term, however, there are mixed effects expected for <b>climate change mitigation</b>. As wind turbines do deliver renewable energy, however they also have some embedded carbon from the production and construction process.</p> <p>Offshore renewables contribute to the energy mix in Scotland, which indirectly contributes <b>climate change adaptation</b> by ensuring diversity in the energy mix.</p> <p>The transition to renewable energy, especially offshore wind, offers reskilling opportunities for traditional energy sector workers, and minor positive effects are expected for <b>population and human health</b>.</p> <p>Construction of offshore renewables can adversely impact biodiversity, fauna and flora and water, mainly because of the disruption to the marine ecosystem and potential oil spills during the construction process. However, in longer-term, there is the potential for biodiversity and water quality to recover, especially as that fishing and other marine movements are prohibited near the wind turbines. Therefore, mixed effects are expected for <b>biodiversity, fauna and flora and water</b>.</p> <p>No effects are expected for air and soil.</p> <p>Offshore renewables have the potential to have minor negative effects on <b>landscape and geodiversity and cultural heritage and historic environment</b> as arrays of wind turbines may be visually intrusive, affecting seascapes and the setting of historic environment assets.</p> <p>It is expected that there will be positive effects on <b>material assets</b>, as further focus on offshore renewables will lead to new infrastructure and developments.</p>
Marine based economic growth	-	0	+	0	0	0	0	0	0	+	<p>Marine based economic growth with a focus on sustainable opportunities for the islands is likely to result in minor negative effects on <b>climate change mitigation</b> due to increased travel and transport of goods.</p> <p><b>Climate adaptation</b> is likely to be unaffected by the marine based economic growth, however increased business use of the islands may increase the justification and support for adaptation, particularly in relation to key transport infrastructure, such as coastal roads and ports.</p> <p>A minor positive effect is identified for <b>population and human health</b> in relation to the marine based economic growth, however in the context of islands, these will have a significant positive impact upon as this will likely boost population numbers within these areas and promote sustainable communities which can support local services.</p> <p>It is not identified that <b>biodiversity, water, air, soil, landscape and cultural heritage</b> would be affected by creation of a thriving business environment, however increased levels of business use and visitors may impact on all off these resources, depending on the business activities which take place.</p> <p>No significant effects are identified for <b>water, air, soil, landscape and cultural heritage</b>.</p> <p>The marine based economic growth, especially on Scottish islands, will generate economic opportunities and may to lead to an increase in investment in infrastructure to enable it to meet the demand created by new business environments. Ultimately this will have a minor positive effect upon <b>material assets</b>, which may be locally significant.</p>