Scottish National Adaptation Plan 2024-2029 Strategic Environmental Assessment

Environmental Report - Appendices

Scottish Government

Final report

Prepared by LUC

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Appendix A

Relationship with other relevant plans and programmes

General

Table A.1: General

Source	Key objectives	Implications/ Comments
International		
Aarhus Convention (1998) **[See reference** 1**]**	To develop a number of rights of the public with regard to the environment. Local authorities should provide for: ■ The right of everyone to receive environmental information ■ The right to participate from an early stage in environmental decision making ■ The right to challenge in a court of law public decisions that have been made without respecting the two rights above or environmental law in general	Ensure that the public are involved and consulted at all relevant stages of SEA production.
Johannesburg Declaration on Sustainable Development (2002) **[See reference** 2**]**	Commitment to building a humane, equitable and caring global society aware of the need for human dignity for all. Areas of focus include:	The SEA should reflect objectives to support reduction in emissions of greenhouse gases, promote renewable energy and energy efficiency.

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/ Comments
	■ Sustainable consumption and production patterns. ■ Accelerate shift towards sustainable consumption and production – 10-year framework of programmed of action. ■ Reverse trend in loss of natural resources. ■ Renewable energy and energy efficiency. ■ Urgently and substantially increase Global share of renewable energy. ■ Significantly reduce the rate of biodiversity loss by 2010.	
National (Legislation)		
Town and Country Planning (Scotland) Act 1997 (as amended) **[See reference 3]**	The Town and Country Planning (Scotland) Act governs the use and development of land within Scotland. The 1997 Act forms the basis of the Scottish planning system. It sets out the roles of Scottish Ministers and designates local authorities as 'planning authorities' with a responsibility for producing local development plans and handling most aspects of development management and enforcement.	The SEA should be mindful of the requirements set out in the 1997 Act.

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/ Comments
	All planning applications in Scotland are required to be determined against the Town and Country Planning (Scotland) Ac 1997.	
Planning etc. (Scotland) Act 2006 **[See reference 4]**	The Planning etc. (Scotland) Act 2006 formed a central part of the reform of the Scottish planning system. One of its key effects was the creation of Strategic Development Planning Authorities, which comprise several local planning authorities and are charged with producing long-term development plans.	The SEA should be mindful of the requirements set out in the Planning etc. (Scotland) Act 2006
Planning (Scotland) Act 2019 **[See reference 5]**	The Planning (Scotland) Act 2019 system sets the future of Scotland's planning system and includes a broad range of changes to be made, such as arrangements for the preparation of development plans and proactive masterplanning.	The SEA should be mindful of the requirements set out in the Planning (Scotland) Act 2019
Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 **[See reference 6]**	Sets out provisions for granting planning permission in accordance with the Town and Country Planning (Scotland) Act 1997.	The SEA should be mindful of the requirements of the Town and Country Planning (Development Management Procedure) Scotland Regulations
Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 **[See reference 7]**	Sets out criteria for determining whether an Environmental Impact Assessment would be required for developments.	The SEA should reflect the objectives to minimise the potential environmental impacts of development
Planning (Scotland) Bill **[See reference 8]**	An Act of the Scottish Parliament to make provision about how land is developed and used.	The SEA should be mindful of the requirements proposed by the Planning (Scotland) Bill.

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/ Comments
	The Bill is part of a wider planning system reform responding to an independent review of planning, which includes changes to secondary legislation made under existing powers as well as non-legislative changes. Some of the key aspects of the Bill are its provisions in relation to the system of development plans; the opportunities for community engagement in planning; the effective performance of planning authorities' functions; and a new way to fund infrastructure development.	
The Environment Act 2021 **[See reference** 10**]**	Sets statutory targets for the recovery of the natural world in four priority areas: air quality, biodiversity, water, and resource efficiency and waste reduction. It also establishes the Office for Environmental Protection which will act as an impartial and objective body for the protection and improvement of the environment. The Act sets out legislation which covers local air quality management frameworks and the recall of motor vehicles.	The SEA should be mindful of the targets set out by the Act. The Environment Act 2021 has limited authority in Scotland.
National (Policies, Plans, Programmes and Strategies)		
National Planning Framework 4 (the Scottish Government) **[See reference** 11**]**	The Fourth National Planning Framework, published February 2023, sets out our spatial principles, regional priorities, national developments and national planning policy. It	The SEA should be mindful of the policy framework of National Planning Framework 4.

Source	Key objectives	Implications/ Comments
	should be read as a whole and replaces NPF3 and Scottish Planning Policy. NPF4 comprises: ■ Part 1 – A National Spatial Strategy for Scotland 2045 ■ Part 2 - National Planning Policy; covering sustainable places, liveable places, and productive places	
The 25 Year Environment Plan **[See reference** 12**]**	Sets out goals for improving the environment over the next 25 years. It details how the Government will work with communities and businesses to leave the environment in a better state than it is presently. The document identifies six key areas upon which action will be focused. ■ Using and managing land sustainably ■ Recovering nature and enhancing the beauty of landscapes ■ Connecting people with the environment to improve health and wellbeing. ■ Increasing resource efficiency and reducing pollution and waste ■ Securing clean, healthy, productive and biologically diverse seas and oceans	The SEA should be mindful of the key actions of the 25 Year Environment Plan. The 25 Year Environment Plan has limited authority in Scotland.

Source	Key objectives	Implications/ Comments
	■ Protecting and improving our global environment	

Climatic Factors

Table A.2: Climatic factors

Source	Key objectives	Implications/comments
International		**International**
IPCC's Sixth Assessment Report on Climate Change (2022) **[See reference** 13**]**	To limit and/or reduce all greenhouse gas emissions which contribute to climate change	IPCC's Sixth Assessment Report on Climate Change (2022)
The Cancun Agreement- UNFCC (2011) **[See reference** 14**]**	Shared vision to keep global temperature rise to below two degrees Celsius, with objectives to be reviewed as to whether it needs to be strengthened in future on the basis of the best scientific knowledge available.	The Cancun Agreement- UNFCC (2011)
Paris Agreement (United Nations 2015) **[See reference** 15**]**	The main aim of the Paris Agreement centres on keeping global temperature rise this century below 2°C above preindustrial levels.	Paris Agreement (United Nations 2015)

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/comments
	Frameworks are to be put in place to help achieve these goals.	
The Kyoto Protocol to the UNFCCC (1997) **[See reference** 16**]**	The Kyoto Protocol to the UNFCCC established the first policy that actively aims to reduce greenhouse gas emissions by industrialised countries.	The Kyoto Protocol to the UNFCCC (1997)
National (Legislation)		**National (Legislation)**
The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 **[See reference** 17**]**	The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019 ("The Fuel Poverty Act") was introduced in 2019. Alongside the increased funding, work to decarbonise our homes and buildings will be led and co-ordinated by a new-dedicated National Public Energy Agency, to be established by 2025. A virtual agency will be in place and will act first to coordinate and then accelerate existing- and new-delivery programmes as part of the transition process.	The Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019
Climate Change (Scotland) Act 2009 **[See reference** 18**]** Including amendments made by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 **[See reference** 19**]**	The 2009 Act sets statutory targets for the reduction of greenhouse gas emissions and makes further provision about energy efficiency and about the reduction and recycling of waste. The Act set an interim 42 percent reduction target by 2020 and an 80 percent reduction target for 2050. In 2019, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amended these	Climate Change (Scotland) Act 2009 Including amendments made by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019

Source	Key objectives	Implications/comments
	reduction targets to a 56% reduction by 2020, 75% reduction by 2030, 90% reduction by 2040 and achieving net-zero emissions by 2045. Secondary legislation has been made under the Climate Change (Scotland) Act 2009, including: ■ The Climate Change (Annual Targets) (Scotland) Order 2010: sets emission reduction targets for 2010-2022 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2010: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2010-2012 ■ The Carbon Accounting Scheme (Scotland) Regulations 2010: establish a scheme for monitoring compliance with annual reduction targets for 2010-22 (as amended in 2015 and 2016) ■ The Climate Change (International Aviation and Shipping) (Scotland) Order 2010: establish a method by which emissions of greenhouse gases from international aviation and international shipping that are attributable to Scotland are calculated.	

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/comments
	■ The Climate Change (Annual Targets) (Scotland) Order 2011: sets emission reduction targets for 2023-2027 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2011: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2023-2027 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2010: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2013-2017 ■ The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015: requires bodies to prepare reports on compliance with climate change duties ■ The Climate Change (Additional Greenhouse Gas) (Scotland) Order 2015: adds nitrogen trifluoride as an additional greenhouse gas listed in the Climate Change (Scotland) Act 2009 ■ The Climate Change (Annual Targets) (Scotland) Order 2016: sets annual reduction targets for 2028-2032	

Source	Key objectives	Implications/comments
	■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2016: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2018-2022 ■ Part 5 of the Climate Change (Scotland) Act 2009 also includes secondary legislation in relation to the energy performance of buildings and the functions of forestry commissioners.	
Heat Networks (Scotland) Act 2021 **[See reference** 20**]**	The Heat Networks (Scotland) Act 2021 (the Act) received Royal Assent in February 2021. The Act aims to accelerate the deployment of heat networks in Scotland through the introduction of a regulatory system aimed at boosting consumer confidence in the sector and providing greater certainty for investors. The Act sets statutory targets for heat network deployment in 2027 and 2030, which are equivalent to an estimated 120,000 and 650,000 additional homes being connected to heat networks. This helps it to contribute to the achievement of the targets and ambition set out in Scotland's 2018 to 2032 climate change plan.	Heat Networks (Scotland) Act 2021
National (policies, Plans, Programmes and Strategies)		

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/comments
Climate Change Plan 2018 -32 Including the Update to the Climate Change Plan 2020 **[See reference** 21**]**	The Climate Change (Scotland) Act 2009 requires that Ministers publish a report setting out policies and proposals to meet annual targets. With the publication of the Climate Change Plan (2018), the Scottish Government aims to meet its emission reduction targets over the period 2018-2032. The Climate Change Plan sits alongside the Scottish Government's Energy Strategy and provides the strategic framework for our transition to a low carbon Scotland. Building on previous reports on policies and proposals, the Plan sets out the path to a low carbon economy while helping to deliver sustainable economic growth and secure the wider benefits to a greener, fairer and healthier Scotland in 2032. The third Climate Change Plan provides policies and proposals to reduce GHG emissions from seven key sectors, including: electricity; buildings; transport; industry; waste and the circular economy; land use, land use change and forestry; and agriculture. The update to the Climate Change Plan, published in 2020, committed to lay out a coordinated vision for the whole energy system within Scotland's refreshed energy strategy as well as ensuring the targets within the 2017 Energy Strategy remain on track. This update also provided a detailed, clear	The SEA should reflect objectives to adapt and mitigate climate change and support the reduction of greenhouse gas emissions.

Source	Key objectives	Implications/comments
	and credible pathway to meeting emissions targets over the period to 2032. Following the amendments to emissions reduction targets by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, the Scottish Government committed to updating the climate change plan (2020). The new plan continues to drive progress towards the current emissions reduction target of net-zero b 2045. The plan includes an additional sector, negative emissions technologies.	
Reducing emissions in Scotland Progress Report to Parliament 2023 **[See reference** 22**]**	This report documents Scotland's progress towards reducing greenhouse gas emissions. The report sets out strategic policies, objectives and milestones for the coming years, including: ■ Delivering an update to the Climate Change Plan which takes into account recent progress, seeks to deliver meaningful reductions outside of the power sector, and considers the implications of COVID-19. ■ Delivering a strategy for low-carbon heat and energy efficiency in Scotland's buildings. ■ Decarbonising transport by encouraging behavioural change, uptake of active and	

Source	Key objectives	Implications/comments
	sustainable means of travel, and promoting ’20 minute’ neighbourhoods. ■ Accelerating investments in low-carbon technologies (e.g. carbon capture and storage, renewables and hydrogen) and climate adaptation infrastructure ■ Maximise carbon sequestration by increasing tree planting to 18,000 ha per year, and peatland restoration to 20,000 ha per year. ■ Strengthen policies in local plans relating to climate change and adaptation.	
Progress in reducing emissions in Scotland – 2022 Report to Parliament **[See reference** 23**]**	This report reviews Scotland’s targets for estimating emissions since previous target advice. The report assesses Scotland’s progress in emission reduction in the last year and provides adaptation recommendations surrounding: ■ A target of 65-67% reduction in Scotland’s emissions by 2030. ■ Drives action based on its vision for a well-adapted Scotland. ■ Urgently improve monitoring and evaluation. ■ Raises the level of adaptation response	The SEA should reflect objectives to adapt and mitigate climate change and support the reduction of greenhouse gas emissions.

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/comments
Climate Ready Scotland: Scottish Climate Change Adaptation Programme 2019-2024 **[See reference** 24**]**	Addresses the impacts identified for Scotland in the UK Climate Change Risk Assessment (CCRA) published under section 56 of the UK Climate Change Act 2008. It aims to increase the resilience of Scotland's people, environment and economy to the impacts of a changing climate.	. The SEA should reflect on the implications of the previous actions set out within the programme.
Hydrogen Action Plan 2022 **[See reference** 26**]**	Scottish Government's Hydrogen Action Plan articulates the actions that will be taken over the next five years to support the development of a hydrogen economy to further our efforts to reduce greenhouse gas emissions from Scotland's energy system while ensuring a just transition.	The SEA should reflect the objectives to support the development of a hydrogen economy.
Hydrogen Policy Statement 2020 **[See reference** 27**]**	The Statement sets out a vision for Scotland to become a leading hydrogen nation in the production of reliable, competitive, and sustainable hydrogen. It recognises the importance of hydrogen in the transition to renewable energy. The policy statement outlines the commitments of the Scottish Government to help achieve hydrogen production.	The SEA should reflect objectives to support the reduction of greenhouse gas emissions.

Source	Key objectives	Implications/comments
Energy Strategy Position Statement 2021 **[See reference** 28**]**	The Scottish Government's Energy Strategy position statement, published in March 2021, provided an overview of the Scottish Government's key short-to-medium-term priorities, set out a comprehensive programme of work across the energy sector as well as an overview of the Scottish Government's commitment to ensuring a green economic recovery in respect to energy. It also summarised policy publications and consultations. The UK Government published their energy security strategy in April 2022, which will need to be taken into consideration for Scotland's Energy Strategy	The SEA should reflect objectives to support the transition to net zero through changes to the energy sector.
Scotland's electricity and gas networks: vision to 2030 (2019) **[See reference** 29**]**	In 2019, the Scottish Government published Scotland's electricity and gas networks: vision to 2030, supporting an inclusive transition to a decarbonised energy system; a whole system approach across heat, transport and electricity; and smarter local energy models. It recognises that new transmission infrastructure will be required, including links to meet the needs of the islands, within Scotland and with the rest of the UK	The SEA should reflect objectives to support the transition to a decarbonised energy system.
Heat in Buildings Strategy 2021 **[See reference** 30**]**	The Heat in Buildings Strategy, published October 2021, sets out our vision for the future of heat in buildings, and the actions we	The SEA should reflect objectives to support the transition to zero emissions buildings.

Source	Key objectives	Implications/comments
	are taking in the buildings sector to deliver our climate change commitments, maximise economic opportunities, and ensure a just transition, including helping address fuel poverty. This Strategy outlines the steps we will take to reduce greenhouse gas emissions from Scotland's homes, workplaces and community buildings and to ensure that we remove poor energy performance as a driver of fuel poverty. The focus of this Strategy is on energy demand for space and water heating in homes, workplaces and community buildings. This Strategy sets out a pathway to zero emissions buildings by 2045 and details a series of near-term actions to put us on a clear path towards this, as well as a range of further, longer-term commitments to accelerate the transformation of the nation's building stock. It sets out the principles we will apply to ensure our zero emissions heat delivery programmes support the fuel poverty objectives.	
A Low Carbon Economic Strategy for Scotland – Scotland A Low Carbon Society 2010 **[See reference** 31**]**	The main purpose of the Low Carbon Economic Strategy is to achieve the targets as set out in the Climate Change (Scotland) Act 2009, as amended. The document provides a comprehensive framework for developing a low carbon economy across Scotland. The strategy sets	The SEA should reflect objectives to support the reduction of greenhouse gas emissions

Source	Key objectives	Implications/comments
	out measures that could be undertaken by Parties to cut their greenhouse gas emissions. This vision relates to the energy sector, the built environment, Scotland's resources and businesses.	
Delivering for Today, Investing for Tomorrow: The Government's Programme for Scotland 2023-24 **[See reference** 32**]**	One of the key national missions is to build a fair, green and growing economy through the clean energy transition and growth of green jobs.	The SEA should reflect objectives to support the green economy.
	■	
Scottish Emissions Targets 2028-2032 – The high ambition pathway towards a low-carbon economy 2016 **[See reference** 34**]**	Sets out recommendations by the Committee on Climate Change which involves the following; ■ Significant rollout of low-carbon heat pumps and heat networks ■ Promoting sales of electric cars ■ Stimulating afforestation in Scotland Expanding renewable power and shutdown of coal-fired power	The SEA should reflect objectives to reduce greenhouse gas emissions.
Energy Efficient Scotland: route map **[See reference** 35**]**	This route map for the Energy Efficient Scotland programme sets out the journey our homes, businesses and public buildings will take to become more energy efficient.	The SEA should reflect objectives to ensure homes and buildings are more energy efficient

Source	Key objectives	Implications/comments
Offshore Wind Policy Statement 2020 **[See reference** 36**]**	The Offshore Wind Policy Statement was published October 2020. Scottish offshore wind generation will play a vital part in helping us meet this challenge, while taking into account wider environmental factors and the interests of other users of the sea. This needs to happen within timeframes that keep us on course for Scotland's 2045 and interim emissions reduction targets and securing our 2030 target of meeting at least 50% of Scotland's total energy needs from renewable sources.	The SEA should reflect objectives to support continued use of offshore wind.
Onshore Wind Policy Statement 2022 **[See reference** 37**]**	The Onshore Wind Policy Statement was published in December 2022. The transition to net zero means that our demand for green electricity will increase substantially over the course of the next decade. This means that a consistently higher rate of onshore wind and other renewables capacity will be required year on year. The onshore wind policy statement confirms the Scottish Government ambition to deploy 20 GW of installed onshore wind capacity by 2030. This will be enabled in part by a strong, supportive policy environment from the Scottish Government, particularly one that mitigates preventable barriers. The Climate Change Plan Update noted the need to develop 11-16GW of renewable capacity through to 2032.	The SEA should reflect objectives to support continued use of onshore wind.

Appendix A Relationship with other relevant plans and programmes

Source	Key objectives	Implications/comments
Sectoral Marine Plan for Offshore Wind Energy 2020 **[See reference** 38**]**	Sets out the spatial framework for the development of commercial-scale offshore wind energy in Scotland.	The SEA should reflect objectives to reduce greenhouse gas emissions, minimise negative impacts to population and human health; biodiversity; soils; water quality; landscape and coastal environment; and historic environment.
Delivering Scotland's circular economy: A Route Map to 2025 and beyond' 2022 **[See reference** 39**]**	Through this consultation we set out our proposals for a Route Map to 2025, our strategic plan to deliver Scotland's zero waste and circular economy ambitions. This consultation invites views on the proposed priorities and actions to reach our waste, recycling and emissions reduction targets.	The SEA should reflect objectives to support the circular economy.
Big Climate Conversation **[See reference** 40**]**	The Big Climate Conversation engaged over 2,500 people in Scotland over a six-month period up to November 2019, in a discussion about Scotland's response to tackling the global climate emergency. Cross cutting issues which emerged included: ■ A holistic and system-wide approach requiring an integrated plan. ■ Government leadership ensuring that low carbon behaviours become the most convenient or only option. ■ A just transition to ensure that action to address climate change should not	The SEA should reflect objectives to reduce greenhouse gas emissions.

Source	Key objectives	Implications/comments
	exacerbate inequalities and where possible, should reduce them.	
Bute House Agreement 2021 **[See reference 41]**	The Scottish Government and the Scottish Green Party Parliamentary Group have agreed to work together over the next five years to build a green economic recovery from COVID, respond to the climate emergency and create a fairer country. A shared draft policy programme has been agreed. It details collaboration on the climate emergency, economic recovery, child poverty, the natural environment, energy and the constitution. It includes commitments to: ■ hold a referendum on Scottish independence after the COVID pandemic has passed, within the current parliamentary session ■ increase investment in active travel and public transport ■ a strengthened framework of support for the marine renewables and offshore wind ■ take forward a ten-year £500 million Just Transition Fund for the North East and Moray	The SEA should reflect the agreement to build a green economic recovery.

Source	Key objectives	Implications/comments
	■ significantly increase the level of the Scottish Payment, in order to maximise the impact of child poverty ■ designate at least one new National Park by the end of this parliamentary session ■ enhance marine environmental protection ■ implement an effective national system of rent controls, enhance tenants' rights and deliver 110,000 affordable homes by 2032 ■ invest at least £1.8 billion over this parliamentary session in energy efficiency and renewable heating establish two new Scottish Government overseas offices in Warsaw and Copenhagen	
Zero Emission Energy for Transport Report 2022 **[See reference** 42**]**	The Zero Emission Energy for Transport Report was published on 26 May 2022. Transport Scotland is committed to removing greenhouse gas emissions from the transport system. The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 requires Scotland to reduce greenhouse gas emissions to net-zero by 2045, with an interim reduction target of 75% against 1990 levels by 2030. Transport is one of the biggest 'demand	The SEA should reflect objectives to reduce greenhouse gas emissions from transport.

Source	Key objectives	Implications/comments
	sectors' of energy, and neither the energy nor transport sectors can decarbonise without the other in sync.	
Scotland's National Strategy for Economic Transformation 2022 **[See reference** 43**]**	Sets out the priorities for Scotland's economy as well as the actions needed to maximise the opportunities of the next decade to achieve our vision of a wellbeing economy.	The SEA should reflect objectives for a thriving economy across the economic, social and environmental dimensions. This includes delivering a fairer and more equal society.
Programme for Government 2023-2024 **[See reference** 44**]**	The programme sets out Scottish Governments plans to make Scotland a more successful country, with opportunities and increased well-being for all. Within the context of the global climate emergency it sets out that the Scottish Government is committed to achieving net zero by 2045. The importance of adaption to prepare and manage the impacts of climate change is also set out. The programme sets out the next Infrastructure Investment Plan which will reflect Scotland's commitment to achieving net zero.	The SEA should reflect objectives to reduce greenhouse gas emissions.
Energy Consumer Action Plan: Putting Consumers at the heart of Scotland's Energy Transition 2019 **[See reference** 45**]**	Energy Consumer Action Plan sets out our commitment to ensure consumers are at the heart of Scotland's energy transition.	The SEA should reflect objectives to support the energy transition.
Heat networks delivery plan 2022 **[See reference** 46**]**	The delivery plan sets out how provisions of the Heat Networks Scotland Act 2021 and wider policy will contribute to increasing heat networks in Scotland.	The SEA should reflect objectives to support heat networks.

Source	Key objectives	Implications/comments
Potential heat network zones: first national assessment 2022 **[See reference** 47**]**	Analysis to identify and characterise potential zones for heat networks in Scotland. It provides further detail on the analysis criteria, assessment methodology, limitations, definitions and the interpretation of the outputs.	The SEA should reflect objectives to support heat networks.
Heat Network Fund: application guidance 2023 **[See reference** 48**]**	Information on Scotland's Heat Network Fund, including eligibility and how to apply.	The SEA should reflect objectives to support heat networks.
Bioenergy: update - March 2021 **[See reference** 49**]**	The update considers the potential role for bioenergy to support our net zero greenhouse emissions targets and outlines how we intend to move forward over the next 18 to 24 months to understand the most appropriate and sustainable use of bioenergy resources in Scotland.	The SEA should reflect objectives to support bioenergy.
The Net Zero Strategy: Build Back Greener (2021) **[See reference** 50**]**	■ The strategy sets out policies and proposals for decarbonising all sectors of the UK economy to meet net zero targets by 2050. It sets out strategies to keep the UK on track with carbon budgets, outlines the National Determined Contribution (NDC) and sets out the vision for a decarbonised economy in 2050. Its focus includes: ■ Policies and proposals for reducing emissions across the economy in key sectors (power, fuel supply and	The SEA should reflect objectives to support net zero.

Source	Key objectives	Implications/comments
	hydrogen, industry, heat and buildings, transport, natural gas and waste); and ■ Policies and proposals for supporting transition across the economy through innovation, green investment, green jobs, embedding net-zero in government, local climate action, empowering people and businesses	
The UK Low Carbon Transition Plan: National Strategy for Climate and Energy **[See reference** 51**]**	■ Sets out a five-point plan to tackle climate change. The points are as follows: protecting the public from immediate risk, preparing for the future, limiting the severity of future climate change through a new international climate agreement, building a low carbon UK and supporting individuals, communities and businesses to play their part.	The SEA should reflect objectives to support the low carbon transition.
The Carbon Budget Delivery Plan **[See reference** 52**]**	■ The Plan explains how the government intends to meet its legally binding climate goals, setting out a package of quantified and unquantified proposals and policies, and associated timescales and delivery risks this also includes: ■ wider matters in connection with carbon budgets	

Source	Key objectives	Implications/comments
	■ the contribution of these proposals and policies to sustainable development ■ the impact the package has on sectors of the economy	

Biodiversity, Flora and Fauna

Table A.3: Biodiversity, Flora and Fauna

Source	Key objectives	Implications/ Comments
International		
Bern Convention (1979) **[See reference** 53**]**	To ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to regulate the exploitation of those species) listed in Appendix III. To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species.	The SEA should consider the preservation and protection of the environment.

Source	Key objectives	Implications/ Comments
Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979) **[See reference** 54**]**	To ensure that contracting parties work together to conserve terrestrial, marine and avian migratory species and their habitats (on a global scale) by providing strict protection for endangered migratory species. The overarching objectives set for the Parties are: ■ Promote, co-operate in and support research relating to migratory species ■ Endeavour to provide immediate protection for migratory species included in Appendix I ■ Endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II	The SEA should reflect the objectives protecting biodiversity and the natural environment.
Ramsar Convention (1971) **[See reference** 55**]**	To promote the wise use of wetlands and their resources. The Convention's mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".	The SEA should take into account the conservation of wetlands and their resources.

Source	Key objectives	Implications/ Comments
The Convention on Biological Diversity (2010) **[See reference** 56**]**	The Convention on Biological Diversity (CBD) is a multilateral treaty which served three main goals, including: ■ Conservation of biological diversity ■ Sustainable use of its components ■ Fair and equitable sharing of benefits arising from genetic	The SEA should reflect objectives protecting biodiversity and sustainable use of its components.
National (Legislation)		
Wildlife and Countryside Act 1981 (as amended) **[See reference** 57**]**	The Act implements the principles of the Bern Convention and the EU Birds Directive in the UK. Since it came into force, the Act has been amended several times. The act applies to the terrestrial environment and inland waters. According to the Act, Scottish Natural Heritage (SNH) is a regulator of the Wild and Countryside Act and is legally responsible for Sites of Special Scientific Interest (SSSIs) and to enforce law when necessary. It is important to note that specific amendments, which only apply in Scotland due to devolution, have been made to the Act.	The SEA should reflect objectives to value, protect and enhance biodiversity.
The Conservation (Natural Habitats, &c.) Regulations 1994 **[See reference** 58**]**	The Act amends the Wildlife and Countryside Act 1981 for Scotland. The Act, together with the Nature Conservation (Scotland) Act 2004,	The SEA should reflect objectives to value, protect and enhance biodiversity.

Source	Key objectives	Implications/ Comments
	implements the EU Birds and Habitats Directives.	
Nature Conservation (Scotland) Act 2004 **[See reference** 59**]**	The Act amends the Wildlife and Countryside Act 1981 for Scotland and makes provision for the further conservation of biodiversity. The Act requires the Scottish Government to report on progress in relation to the Scottish Biodiversity Strategy	The SEA should reflect objectives to protect biodiversity and the natural environment.
Wildlife and Natural Environment (Scotland) Act 2011 (as amended) **[See reference** 60**]**	The Act amends the Wildlife and Countryside Act 1981 for Scotland. The Act mainly changed the way land and the environment is managed in Scotland e.g., it made operational changes to how SSSIs are managed.	The SEA should reflect objectives to protect and enhance designated biodiversity areas.
The Conservation of Offshore Marine Habitats and Species Regulations 2017 **[See reference** 61**]**	The Regulations form the legal basis for the implementation of the Habitats Directive and the Bird Directive in terrestrial areas and territorial waters.	The SEA should reflect objectives to value, protect and enhance marine habitats and species.
National (policies, Plans, Programmes and Strategies)		
UK Post-2010 Biodiversity Framework (JNCC, 2012) **[See reference** 62**]**	The Framework shows how the work of the four UK countries joins up with work at a UK level to achieve the 'Aichi Biodiversity Targets' and the aims of the EU biodiversity strategy. The Framework identifies the following strategic goals:	The SEA should reflect objectives to value, protect and enhance biodiversity.

Source	Key objectives	Implications/ Comments
	■ Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society. ■ Reduce the direct pressures on biodiversity and promote sustainable use. ■ Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity. ■ Enhance the benefits to all from biodiversity and ecosystems. ■ Enhance implementation through participatory planning, knowledge management and capacity building.	
Scotland's Biodiversity: It's in Your Hands (Scottish Executive, 2004) **[See reference** 63**]**	Scotland's Biodiversity: It's in Your Hands presents a 25-year strategy (until 2030) for the conservation and enhancement of Scotland's biodiversity. It sets out a number of outcomes in relation to; ■ Species and habitats ■ People ■ Landscapes and Ecosystems ■ Integration and Co-ordination	The SEA should reflect objectives to value, protect and enhance biodiversity.

Source	Key objectives	Implications/ Comments
	■ Knowledge	
2020 Challenge for Scotland's Biodiversity – A Strategy for the conservation and enhancement of biodiversity in Scotland (The Scottish Government, 2013) **[See reference** 64**]**	The aims of the 2020 Challenge are in line with the targets set by the aforementioned United Nations Convention on Biological Diversity (2010) and the European Union's Biodiversity Strategy for 2030, and include: ■ Protect and restore biodiversity on land and in Scotland's SAs ■ Involve and engage people in decisions about the environment. ■ Promote sustainable economic growth. ■ The 2020 Challenge and the 'Scotland's Biodiversity: It's in Your Hands' together make up the Scottish Biodiversity Strategy.	The SEA should reflect objectives to value, protect and enhance biodiversity.
Biodiversity strategy to 2045: tackling the nature emergency – draft **[See reference** 65**]**	Biodiversity strategy to 2045: tackling the nature emergency – draft, sets out the ambition for Scotland to be Nature Positive by 2030, and to have restored and regenerated biodiversity across the country by 2045	The SEA should reflect objectives to value, protect and enhance biodiversity.

Population and Human Health

Table A.4: Population and Human Health

Source	Key objectives	Implications/ Comments
International		
International Health Regulations, 2005 **[See reference** 66**]**	The International Health Regulations provide a legal instrument for upholding global public health security by preventing and responding to acute public health risks. The Regulations require countries to report certain disease outbreaks and public health risks to the World Health Organisation.	The SEA should reflect the objective that acknowledges the potential health hazards that could be caused by the different development types.
National (Legislation)		
Public Health etc. (Scotland) Act 2008 **[See reference** 67**]**	The Act updates the law on public health, enabling Scottish Ministers to protect public health. It also makes provision for law on statutory nuisances.	The SEA should reflect objectives to protect public health.
National (policies, Plans, Programmes and Strategies)		
National Performance Framework **[See reference** 68**]**	The main purpose of the National Performance Framework is to promote sustainable economic growth by setting out a measurement set that can be used to	The SEA should reflect objective to promote the principles of sustainable economic growth.

Source	Key objectives	Implications/ Comments
	determine the extent to which key targets are being fulfilled. It sets seven broad targets in relation to: ■ Growth – stimulating economic growth ■ Productivity – improving productivity ■ Participation – improving economic participation ■ Population – increase population growth ■ Solidarity – reduce income equality ■ Cohesion – reduce inequalities in economic participation ■ Sustainability – reduce greenhouse gas emissions	
Scotland's Third Land Use Strategy 2021-2026 **[See reference** 69**]**	Scotland's Third Land Use Strategy 2021-2026 sets out our vision, objectives and policies to achieve sustainable land use. The strategy covers the next five years and aims to provide a more holistic understanding of our land the demands we place upon it and the benefits we get from our land.	The SEA should reflect objective to support sustainable land use.
Scotland's Public Health Priorities (Scottish Government, 2018) **[See reference** 70**]**	Sets out the six public health priorities for Scotland and how they are to be developed. The 6 priorities are:	The SEA should reflect objectives which support Scotland's public health priorities.

Source	Key objectives	Implications/ Comments
	■ A Scotland where we live in vibrant, healthy and safe places and communities ■ A Scotland where we flourish in our early years ■ A Scotland where we have good mental wellbeing ■ A Scotland where we reduce the use of and harm from alcohol, tobacco and other drugs ■ A Scotland where we have a sustainable, inclusive economy with equality of outcomes for all ■ A Scotland where we eat well, have a healthy weight and are physically active	
Tackling Fuel Poverty in Scotland: A Strategic Approach 2021 **[See reference** 71**]**	The fuel poverty strategy sets out policies and proposals for national government, local authorities and third sector partners to help meet the targets set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019.	The SEA should reflect objectives which support tackling fuel poverty.
A National Mission with Local Impact: Infrastructure Investment Plan for Scotland 2021-22 to 2025-26 (2021) **[See reference** 72**]**	The Infrastructure Investment Plan outlines a coherent, and strategic approach to delivering our National Infrastructure Mission. The Plan demonstrates the vital role infrastructure has	The SEA should reflect objectives which supports delivering the National Infrastructure Mission.

Source	Key objectives	Implications/ Comments
	to play in helping businesses and communities to adapt and recover from the COVID-19 pandemic.	
Social Housing Net Zero Heat Fund - development funding invitation 2022 **[See reference** 73**]**	Information and guidance notes for the Social Housing Net Zero - Development Funding Invitation.	The SEA should reflect objectives which supports net zero housing.
Climate Emergency Skills Action Plan (CESAP) (2020) **[See reference** 74**]**	Published in December 2020, the Climate Emergency Skills Action Plan sets out the government's plan to maximise the transition to net-zero for Scotland ensuring that Scotland's workforce has the skills required to make the transition to net-zero a just transition, fair and inclusive to all. It will act as a driver towards Scotland's ambition to be a world leader in decarbonisation, aiming to reduce reach zero greenhouse gases by 2045, with an interim reduction of 45 per cent by 2030. It sets out a clear direction for the changes needed in the skills system, and signals the role that industry, communities and individuals across Scotland will play in achieving this.	The SEA should reflect objectives to support the transition to net zero.

Soil

Table A.5: Soil

Source	Key Objectives	Implications/ Comments
National (Legislation)		
Environmental Protection Act 1990 (as amended) **[See reference** 75**]**	Sets out legislation for the management and remediation of contaminated land that in its current states, is causing or has the potential to cause significant pollution of the environment.	The SEA should reflect objectives to protect soil quality.
Contaminated Land (Scotland) Regulations 2000 **[See reference** 76**]**	Provides a detailed framework for the definition, identification and remediation of contaminated land.	The SEA should reflect objectives to protect soil quality.
National (policies, Plans, Programmes and Strategies)		
The Scottish Soil Framework (The Scottish Government, 2009) **[See reference** 77**]**	The Soil Framework sets out a vision for the enhancement and protection of soil consistent with the economic, social and environmental needs of Scotland. The Framework identifies 13 key outcomes, as follows:	The SEA should reflect objectives to protect soils and minimise soil pollution.

Source	Key Objectives	Implications/ Comments
	■ Protecting and enhancing soil organic matter ■ Reducing soil erosion ■ Maintaining soil structure ■ Reduce greenhouse gas emissions from soils ■ Protecting soil biodiversity ■ Ensuring that soils contribute to sustainable flood management ■ Enhancing water quality through sustainable soil management ■ Enhancing soil's productive capacity ■ Reducing soil contamination ■ Reducing pressure on greenfield land and redirect development to brownfield sites where appropriate ■ Protecting soils with significant historical and cultural features ■ Enhancing knowledge base ■ Promoting effective coordination between stakeholders	

Source	Key Objectives	Implications/ Comments
Scotland's National Peatland Plan *Working for our future (Scottish Natural Heritage, 2015)* **[See reference** 78**]**	This plan sets out proposals for the sustainable use, protection, management and restoration of Scotland's peatlands. It identifies the following outcomes: ■ Protect those areas of peatland currently in good condition and supporting their potential range of ecosystem functions; ■ Enhance ecosystem resilience to climate change through appropriate management; ■ Restore peatland ecosystem functions and biodiversity, evaluating and understanding the benefits to help inform future decisions; ■ Secure greater peatland restoration capabilities and understanding of these amongst land managers, developers, advisers and the public; ■ Ensure peatland values are reflected in the support given to those who manage and restore them; and ■ Demonstrate and communicate the wider public benefits of healthy peatland landscapes and peatland restoration.	The SEA should reflect objectives to protect and promote sustainable use and management of peatlands.

Water

Table A.6: Water

Source	Key objectives	Implications/ Comments
International		
Convention on the Law of the Sea (1982) **[See reference** 79**]**	Defines the rights and responsibilities of national in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of natural resources.	The SEA should reflect objectives to protect and enhance the water environment.
National (legislation)		
Marine (Scotland) Act 2010 **[See reference** 80**]**	The Act provides a framework which will help balance the competing demands of Scotland's seas. It introduces a duty to protect and enhance the marine environment and includes measure to help boost economic investment and growth in areas such as marine renewables. The main measures include: ■ Marine Planning - a new statutory marine planning system to sustainably manage the increasing, and often conflicting, demands on Scotland's seas	The SEA should reflect objectives to protect and enhance the marine environment.

Source	Key objectives	Implications/ Comments
	■ Marine Licencing - a simpler licensing system, minimising the number of licences required for development in the marine environment to cut bureaucracy and encourage economic investment ■ Marine Conservation - improved marine nature and historic conservation with new powers to protect and manage areas of importance for marine wildlife, habitats and historic monuments ■ Conservation - much improved protection for seals and a new comprehensive licence system to ensure appropriate management when necessary ■ Enforcement – a range of enhanced powers of marine conservation and licensing	
Bathing Waters (Scotland) Regulations 2008 **[See reference** 81**]**	The Act implements the EU Bathing Water Quality Directive.	The SEA should reflect objectives that relate to flood management and reduction of risk.
Flood Risk Management (Scotland) Act 2009 **[See reference** 82**]**	The Act requires local authorities to assess bodies of water to determine potential flood risk and carry out measures if required. The Act implements the EU Floods Directive.	The SEA should reflect objectives that relate to flood management and reduction of risk.

Source	Key objectives	Implications/ Comments
Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) **[See reference** 83**]**	Provides a regulatory framework for controlling activities which could have an adverse effect on Scotland's water environment including abstraction, impoundments, dredging, impoundments, surface water drainage and pollution. The primary objective of the Regulations is to protect and restore Scotland's water environment.	The SEA should reflect objectives to protect and restore the water environment.
Water Environment and Water Services (Scotland) Act 2003 **[See reference** 84**]**	The Water Environment and Water Services (Scotland) Act 2003 is the enabling legislation for the Water Framework Directive and makes major changes to the administration of water and sewerage provision in Scotland. It identifies the Scottish Environmental Protection Agency (SEPA) as the competent authority. Part 1 makes provision for protection of the water environment, whilst Part 2 deals with water and sewerage services.	The SEA should reflect objectives to protect the water environment.
Water Environment (Miscellaneous) (Scotland) Regulations 2017 **[See reference** 85**]**	The Regulations amend existing general binding rules and introduces requirements for particular projects to have a construction license in place before works can commence.	The SEA should reflect sustainability objectives to protect the natural environment.

Source	Key objectives	Implications/ Comments
The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Amendment Regulations 2017 **[See reference** 86**]**	Provides a regulatory framework for flood risk management amending the previous regulations made in 2009.	The SEA should reflect sustainability objectives to relate to flood management and reduction of risk.
National (Policies, Plans, Programmes and Strategies)		
National Marine Plan 2015 **[See reference** 87**]**	The plan covers the management of both Scottish inshore waters (out to 12 nautical miles) and offshore waters (12 to 200 nautical miles). It also applies to the exercise of both reserved and devolved functions. It provides guidance to decision-makers and users within Scotland's marine environment.	The SEA should reflect sustainability objectives to protect the sustainable use of the marine environment.
SEPA Draft River Basin Management Plans Scotland River Basin District 2021-2027 **[See reference** 88**]**/ Solway Tweed River Basin District 2021 **[See reference** 89**]**	Identifies key pressures and environmental impacts on Scottish water bodies, which may be exacerbated by climate change.	The SEA should reflect objectives that relate to flood management and reduction of risk.
Scottish Water Net Zero Emissions Routemap **[See reference** 90**]**	We are responsible for providing water and wastewater services that are essential to everyday life for households and businesses across Scotland; making a critical contribution to the country's health, wellbeing, economic prosperity and natural environment. But the changing climate will increasingly threaten our ability to deliver these services. We must therefore adapt our approaches, deal with	The SEA should reflect the Scottish Water Routemap to ensure future reliability and sustainability of water and wastewater services.

Source	Key objectives	Implications/ Comments
	the climate challenges, and secure the future reliability and sustainability of the country's water and wastewater services. While we must adapt our services to deal with climate change, we must also eliminate the greenhouse gas emissions that are contributing to the climate emergency.	

Air

Table A.7: Air

Source	Key objectives	Implications/ Comments
International		
UNECE Convention on Long Range Transboundary Air Pollution (1979) (Updated) **[See reference** 91**]**	The purpose of the UNECE Convention was to address the environmental consequences of air pollution. The main aim of the Convention was to reduce and prevent air pollution in order to improve air quality on the local, regional and national levels. To achieve this, the Convention sets out measures to be	The SEA should reflect the objectives to protect and enhance air quality from factors such as eutrophication and acidification

Source	Key objectives	Implications/ Comments
	taken by parties to cut their emissions of air pollutions. The UNECE Convention has been extended by eight other protocols that identify measures to be undertaken by Parties to cut their emissions of air pollutants. These eight protocols include the following: ■ EMEP Protocol on Long-Term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutions in Europe (1984) ■ Helsinki Protocol on the Reduction of Sulphur Emissions (1985) ■ Nitrogen Oxide Protocol (1988) ■ Volatile Organic Compounds Protocol (1991) ■ Oslo Protocol on Further Reduction of Sulphur Emissions (1994) ■ Protocol on Heavy Metals (1998) ■ Aarhus Protocol on Persistent Organic Pollutants (1998)	

Source	Key objectives	Implications/ Comments
	■ Gothenburg Protocol on Abate Acidification, Eutrophication and Ground-level Ozone (1999)	
National (Legislation)		
The Environment Act 1995 **[See reference** 92**]**	The Act requires the UK government and devolved administrations to produce a national air quality strategy. The most recent version of this national air quality strategy is The Air Quality Strategy for England Scotland Wales and Northern Ireland which defines the roles of the local and central government, as well as the Scottish Environment Protection Agency (SEPA), industry, business, transport, individuals and other groups. In addition, the Act sets objectives for specific emissions and measures for monitoring. Where limits are not met, the local authority must declare it an Air Quality Management Area (AQMA)	The SEA should reflect the objective for reducing air pollution.
The Air Quality (Scotland) Regulations 2000 **[See reference** 93**]** As amended by the Air Quality (Scotland) Amendment Regulations 2002 and the Air Quality (Scotland) Amendment Regulations 2016 **[See reference** 94**]**	Sets out air quality objectives for several substances in line with the Environment Act 1995. In contrast to EU requirement, Scotland has set stricter levels for specific pollutants including PM_{10} and $PM_{2.5}$.	The SEA should reflect the objective for reducing air pollution.

Source	Key objectives	Implications/ Comments
The Air Quality Standards (Scotland) Regulations (2010) **[See reference** 95**]**	Sets statutory targets for concentrations of pollutants in ambient air in accordance with EU Directives. The Act allows for Air Quality Management Zones to be identified and makes provision for the sharing of this information with the public. The Regulations were amended through The Air Quality Standards (Scotland) Amendment Regulations 2016.	The SEA should reflect the objective for reducing air pollution.
Pollution Prevention and Control (Scotland) Regulations 2012 **[See reference** 96**]**	Implements the requirements of the EU Industrial Emissions Directive in Scotland. The Act states that emissions to air, water and land must be considered together, and permits are considered based on the nature of the activity. The Act has been amended several times since 2012.	The SEA should reflect the objective for reducing air pollution.
National (policies, Plans, Programmes and Strategies)		
The Air Quality Strategy for England Scotland Wales and Northern Ireland (2011) **[See reference** 97**]**	The key objective of the strategy is to improve and protect ambient air quality in the UK, with the overall aim of health protection. The strategy sets out key objectives and monitoring recommendations for specific emissions.	The SEA should reflect the objective for reducing air pollution, particularly in relation to health protection.

Source	Key objectives	Implications/ Comments
Cleaner Air for Scotland 2 - Towards a Better Place for Everyone (the Scottish Government, 2021) **[See reference** 98**]**	Scotland's national air quality strategy and replaces Cleaner Air for Scotland – The Road to a healthier future (2015). CAFS 2 sets out the Scottish Government's air quality policy framework for the next five years and a series of actions to deliver further air quality improvements. The plan is shaped around 10 themes, health, integrated policy, placemaking, data, public engagement and behaviour change, industrial emissions regulation, tackling non-transport emissions sources, transport, governance, accountability and delivery, further progress review.	The SEA should reflect the objective for reducing air pollution and promote active/sustainable travel.

Cultural Heritage and the Historic Environment

Table A.8: Cultural Heritage and the Historic Environment

Source	Key objectives	Implications/ Comments
International		

Source	Key objectives	Implications/ Comments
European Convention on the Protection of the Archaeological Heritage (Valletta, 1992) Revision of the 1985 Granada Convention **[See reference** 99**]**	Protection of the archaeological heritage, including any physical evidence of the human past that can be investigated archaeologically both on land and underwater. Creation of archaeological reserves and conservation of excavated sites.	The SEA should reflect objectives to protect the archaeological heritage.
UNESCO World Heritage Convention (1972) **[See reference** 100**]**	The 1972 World Heritage Convention links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognises the way in which people interact with nature, and the fundamental need to preserve the balance between the two. The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. It also sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledged to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage.	The SEA Framework should include objectives relating to the conservation and enhancement of cultural heritage and natural heritage.
National (Legislation)		

Source	Key objectives	Implications/ Comments
Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 **[See reference 101]**	Provides main legislation to: ■ list buildings of special architectural or historic interest ■ providing requirements in relation to changes affecting listed buildings and conservation areas ■ setting out a framework for designating and managing Conservation Areas	The SEA should reflect objectives to conserve cultural heritage, particularly in relation to Listed Buildings, Conservation Areas and buildings of special architectural or historic interest.
National Parks (Scotland) Act 2000 **[See reference 102]**	Sets out for main aims for the National Parks of Scotland: ■ Conserving and enhancing the natural and cultural heritage of the area ■ Promoting sustainable use of the natural resources of the area ■ Promoting understanding and enjoyment of the area by the public ■ Promoting sustainable economic and social development of the area's communities	The SEA should reflect objectives to conserve cultural heritage in National Parks.
Historic Environment Scotland Act 2014 **[See reference 103]**	The Act established Historic Environment Scotland (HES) as a Non-Departmental Public Body (NDPB). Under the Act, HES will be a statutory consultee in relation to listed	The SEA should reflect objectives to conserve cultural heritage and the wider historic environment.

Source	Key objectives	Implications/ Comments
	buildings and conservation area consents, as well as in relation to EIA. The Act also amended statutory processes in relation to the historic environment by changing the processes for the designation of sites and buildings (by scheduling and listing) and for consents relating to scheduled monuments, listed buildings and conservation areas.	In addition, the role of Historic Environment Scotland should be taken into account.
The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 **[See reference** 104**]** The Town and Country Planning (Neighbouring Planning Authorities and Historic Environment) (Scotland) Direction 2015 **[See reference** 105**]**	Both Acts state that Historic Environment Scotland must be consulted on any development affecting a UNESCO World Heritage Site in Scotland.	The SEA should reflect objectives to conserve cultural heritage and the wider historic environment.
National (policies, Plans, Programmes and Strategies)		
Historic Environment Policy for Scotland (HEPS) **[See reference** 106**]**	This policy replaces the 2016 Policy Statement and supports the protection and enhancement of the historic environment and sets out the principles for designation.	The SEA should reflect the principles of the protection and enhancement of the historic environment.
Our Past, Our Future, Scotland's national strategy for the historic environment **[See reference** 107**]**	This strategy sets out a national mission to sustain and enhance the benefits of Scotland's historic environment, for people and communities now and into the future. This	The SEA should reflect the principles of the protection and enhancement of the historic environment.

Source	Key objectives	Implications/ Comments
	strategy targets activity where the historic environment can deliver most benefit for the people of Scotland 2023-2028. Along with outcomes aimed to be achieved, three priority areas for action have been identified: ■ Delivering the transition to net zero. ■ Empowering resilient and inclusive communities and places. ■ Building a wellbeing economy.	

Landscape and Geodiversity

Table A.9: Landscape and Geodiversity

Source	Key objectives	Implications/ Comments
National (Policies, Plans, Programmes and Strategies)		
Getting the best from our land A Land Use Strategy for Scotland 2021-2026 **[See reference** 108**]**	The Strategy supports sustainable land use and recognises the interactions between different interests and land use. The objectives of the strategy include:	The SEA should reflect the need to support sustainable land use.

Source	Key objectives	Implications/ Comments
	■ Land-based businesses working with nature to contribute more to Scotland's prosperity. ■ Responsible stewardship of Scotland's natural resources delivering more benefits to Scotland's people. ■ Urban and rural communities better connected to the land with more people enjoying the land and positively influencing land use.	
Scottish Land Rights and Responsibilities Statement 2022 **[See reference** 109**]**	This statement sets out 6 principles relating to land rights and responsibilities. It aims to work towards a Scotland with a strong and dynamic relationship between its land and people, where all land contributes to a modern and successful country, and where rights and responsibilities in relation to land are fully recognised and fulfilled. The 6 principles outlined are: ■ The overall framework of land rights, responsibilities and public policies should promote, fulfil and respect relevant human rights in relation to land contribute to public interest and wellbeing, and balance public and private interests. The framework should support sustainable economic	The SEA should reflect objectives to promote a strong relationship between Scotland's land and people.

Source	Key objectives	Implications/ Comments
	development, protect and enhance the environment, help achieve social justice and build a fairer society ■ There should be a more diverse pattern of land ownership and tenure, with more opportunities for citizens to own, lease and have access to land. ■ More local communities should have the opportunity to own, lease or use buildings and land which can contribute to their community's wellbeing and future development. ■ The holders of land rights should exercise these rights in ways that take account of their responsibilities to meet high standards of land ownership, management and use. Acting as the stewards of Scotland's land resource for future generations they contribute to sustainable growth and a modern, successful country ■ There should be improved transparency of information about the ownership, use and management of land and this should be publicly available, clear and contain relevant detail.	

Source	Key objectives	Implications/ Comments
	■ There should be greater collaboration and community engagement in decisions about land	
Scotland's Forestry Strategy 2019-2029 **[See reference** 110**]**	The strategy supports an increase in Scotland's forests and woodlands that will be sustainably managed and better integrated with other land uses. It has 3 main objectives: ■ Increase the contribution of forests and woodlands to Scotland's sustainable and inclusive economic growth ■ Improve the resilience of Scotland's forests and woodlands and increase their contribution to a healthy and high-quality environment ■ Increase the use of Scotland's forest and woodland resources to enable more people to improve their health, well-being and life chances	The SEA should reflect objectives to promote an increase in the number and use of forests and woodlands.
Natural Heritage Futures 2002 **[See reference** 111**]**	This programme aims to guide the sustainable management and use of Scotland's nature and landscapes up until 2025. The programme's six national prospectuses cover: ■ farmland ■ coasts and seas	The SEA should reflect objectives to conserve and enhance the landscape and natural environment.

Source	Key objectives	Implications/ Comments
	■ hills and moors ■ settlements ■ freshwater ■ forests and woodlands And each prospectus describes: ■ what is distinctive to each region in Scotland ■ a vision for the natural heritage for 2025 ■ objectives and actions required to pursue that vision.	
Landscape Policy Framework 2005 **[See reference** 112**]**	The policy aims to 'safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes as a whole, so as to ensure tomorrow's landscapes contribute positively to people's environment and are at least as attractive and valued as they are today'. The principles of approach are based on four propositions: ■ Scotland's landscapes are a shared responsibility. ■ All of Scotland's landscapes deserve attention.	The SEA should reflect objectives to conserve and enhance the landscape and natural environment.

Source	Key objectives	Implications/ Comments
	■ Scotland's landscapes will continue to change. ■ Scotland's landscapes deserve greater care.	

Material Assets

Table A.10: Material Assets

Source	Key objectives	Implications/ Comments
National (Legislation)		
Environmental Protection Act 1990 **[See reference** 113**]**	The Act implements the EU Waste Framework Directive (2008) and includes provisions for improved control of pollution and waste generation arising from certain industrial processes Moreover, the Act places a duty on local authorities, as the primary regulators, to identify and secure the remediation of contaminated land in their respective areas.	The SEA should reflect objectives to reduce pollution.

Source	Key objectives	Implications/ Comments
	The Environmental Protection Act comprises the following parts: Part I: Integrated Pollution and Control Part II: Waste Management Licencing Part III: Statutory Nuisances Part IV: Criminal Offences Concerning Litter Part VI: Statutory Notification and Risk Assessment for Genetically Modified Organisms (GMOs) Part VII: Creation of Nature Conservancy Council for England the Nature Conservancy Council for Scotland and the Countryside Council for Wales.	
The Management of Extractive Waste (Scotland) 2010 Regulations **[See reference** 114**]**	EU directive 2006/21/EC was transposed in the form of the Management of Extractive Waste (Scotland) 2010 Regulations, also known as 'MEW'. It sets out conditions for granting planning permission for extractive waste areas and waste facilities, along with additional requirements for category A (high risk) waste facilities.	The SEA should reflect objectives to minimise the environmental impact of waste.
Waste Management Licencing (Scotland) Regulations 2011 (as amended) **[See reference** 115**]**	Sets out requirements for the management of waste and related activities with regard to granting site licences and consolidating existing licences.	The SEA should reflect objectives to minimise the environmental impact of waste.

Source	Key objectives	Implications/ Comments
Pollution Prevention and Control (Scotland) Regulations 2012 (as amended) **[See reference** 116**]**	Implements the requirements of the EU Industrial Emissions Directive in Scotland. The Act states that emissions to air, water and land must be considered together, and permits are considered based on the nature of the activity. The Act has been amended several times since 2012.	The SEA should reflect objectives for reducing air/water/soil pollution.
Scotland Rural Development Programme (SRDP) 2021-2024 **[See reference** 117**]**	The key purpose of the SRDP 2014 - 2020 is to help achieve sustainable economic growth in Scotland's rural areas and the priorities remains broadly the same as the previous programme: The main priorities are: ■ Enhancing the rural economy ■ Supporting agricultural and forestry businesses ■ Protecting and improving the natural environment ■ Addressing the impact of climate change ■ Supporting rural communities	The SEA should reflect objectives for protecting the environment.
National (Policies, Plans, Programmes and Strategies)		

Source	Key objectives	Implications/ Comments
Scotland's circular economy: A Route Map to 2025 and beyond (The Scottish Government, 2022) **[See reference** 118**]**	Scotland's circular economy: A Route Map to 2025 and beyond has been through consultation which sets out the Scottish Government's proposals for a Route Map to 2025, our strategic plan to deliver Scotland's zero waste and circular economy ambitions. This consultation invites views on the proposed priorities and actions to reach our waste, recycling and emissions reduction targets.	The SEA should reflect objectives to support a circular economy.
Scotland's Zero Waste Plan (2010) **[See reference** 119**]**	The Zero Waste Plan presents a vision to minimise waste transport to landfills, promote recycling and enhancing collection methods. The key objective of the Plan is to maximise the economic and environmental opportunities of waste reduction and reuse.	The SEA should reflect objectives to minimise the environmental impact of waste and promote recycling.
Planning Advice Note 63: energy from waste (2013) **[See reference** 120**]**	Sets out guidance for planning authorities on proactively planning for waste management	The SEA should reflect objectives to minimise the environmental impact of waste and promote recycling.
A strategy for improving waste data in Scotland (2017) **[See reference** 121**]**	Sets out a strategy to improve the relevance, quality and availability of data on waste from all sources (e.g. households, commerce and industry). The primary objective of the strategy is to improve waste data strategies in order to enhance Scotland's waste and resources sector.	The SEA should reflect objectives to minimise the environmental impact of waste and promote recycling.

Source	Key objectives	Implications/ Comments
Agricultural Transition Plan 2021 to 2024 **[See reference** 122**]**	Aims to drive competitiveness, increase productivity, reduce carbon emissions, and generate fairer returns across the agricultural industry. The Transition Plan introduces several new schemes to improve the environment, animal health and welfare, and farm resilience and productivity.	The SEA should reflect schemes for protecting the environment.
The Scottish Energy Strategy 2017 **[See reference** 123**]**	Scotland's Energy Strategy sits alongside the aforementioned Climate Change Delivery Plan. Three key themes underpin the Strategy; ■ A whole-system view in which energy supply and consumption are seen as equal priorities ■ A stable energy transition towards renewable energies and sustainable transport A smarter model of local energy provision which promotes local energy, community involvement and community ownership of energy generation	The SEA should reflect objectives to adapt to and mitigate climate change. The draft Energy Strategy and Just Transition Plan is due for publication in summer 2024.

Appendix B

Consultation comments received in relation to the SEA Scoping Report

B.1 In order to meet the requirements of the 2005 Act, the views of the three statutory consultees were sought in relation to the scope and level of detail to be included in this Environmental Report:

- The Scottish Environmental Protection Agency (SEPA);
- NatureScot; and
- Historic Environment Scotland.

B.2 The SEA Scoping Report (December 2023) was published for a five-week consultation period between December 2023 and January 2024. A summary of their responses and how they have been addressed in this Environmental Report is provided below.

Scottish Environmental Protection Agency (SEPA)

Relationship with other Plans, Policies and Strategies (PPS)

- The table in appendix A refers to the draft River Basin Management Plans (RBMPs), the plans were published in December 2021. The RBMPs set out a wide range of actions to protect and improve the water environment and help tackle the climate emergency and biodiversity crisis. The actions are wider than flood risk management and this should be reflected in the SEA objectives.

- Cleaner Air for Scotland 2 – Towards a better place for everyone (CAFS 2) published in July 2021 is a new air quality strategy and replaces Cleaner Air for Scotland – The Road to a healthier future. CAFS 2 is shaped around 10 themes, health, integrated policy, placemaking, data, public engagement and behaviour change, industrial emissions regulation, tackling non-transport emissions sources, transport, governance, accountability and delivery, further progress review.

LUC response

Noted.

Cleaner Air for Scotland 2 – Towards a better place for everyone (CAFS 2) has been added to the table in Appendix A.

Baseline information

- SEPA holds significant amounts of environmental data which may be of interest to you in preparing the environmental baseline, identifying environmental problems, and summarising the likely changes to the environment in the absence of the PPS, all of which are required for the assessment. Many of these data are readily available on SEPA's website.
- As well as water quality classification data for groundwater bodies, and coastal waters there is also data for surface water bodies which should be included as a relevant data set under the water topic. The Scottish Flood Defence Asset database provides information on flood prevention schemes which is a useful data set for the material assets topic.
- The dynamic coast website provides useful information on coastal change and adaptation for the climatic factors topic.
- Additional local information may also be available from our Access to Information unit (foi@sepa.org.uk).

- Other sources of data for issues that fall within SEPA's remit are referenced in our SEA topic guidance notes for air, soil, water, material assets, climatic factors and human health.

LUC response

Several of SEPA's sources of data have been used to prepare the environmental baseline.

Alternatives

- We note that alternatives are still being considered and will have to meet criteria to be considered reasonable. Any reasonable alternatives identified during the preparation of the plan should be assessed as part of the SEA process and the findings of the assessment should inform the choice of the preferred option. This should be documented in the Environmental Report.

LUC response

Noted.

Chapter 5 of this Environmental Report describes the significant environmental effects expected from the Draft SNAP and the approach to reasonable alternatives.

Scoping in / out of environmental topics

- We agree that in this instance all environmental topics should be scoped into the assessment.

Methodology for assessing environmental effects

- We support the use of SEA objectives as assessment tools as they allow a systematic, rigorous and consistent framework with which to assess environmental effects.
- We are content with the proposed detailed assessment matrix. It is useful to show the link between potential effects and proposed mitigation / enhancement measures in the assessment framework.
- We would encourage you to use the assessment as a way to improve the environmental performance of individual aspects of the final option; hence we support proposals for enhancement of positive effects as well as mitigation of negative effects.

Consultation period

- We are satisfied with the proposal for a 10 week consultation period for the Environmental Report and draft SNAP3.

LUC response

Noted.

NatureScot

Scope of assessment

- We agree that the Environmental assessment should assess outcomes, objectives and policies for inclusion in the plan. We would add that the determination of climate change risk reduction should be a clear thread throughout the assessment across outcomes, objectives and policies.

LUC response

Noted.

NatureScot response to specific questions posed for SEA Consultation Authorities

- We agree that the geographical, temporal and environmental scope is appropriate for the SEA of the draft SNAP3.
- We recommend a review of UK legislation and policies listed in table 7.1. For example, The Environment Act 2021 and the 25-year Environment Plan have limited authority in Scotland, this should be reflected in the Implication and comments column of the table. We recommend the citing of relevant Scottish legislation.

LUC response

Noted.

The limited authority of The Environment Act 2021 and the 25-year Environment Plan have been noted in Appendix A.

Relevant Scottish legislation is cited in Appendix A.

Chapter 5

- Table 5.1 data sources - The Greenspace Scotland map data set would better contribute to the ‘Biodiversity, flora and fauna’ SEA topic.
- 5.10 The UK Biodiversity Action Plan (1994) has been superseded by the Scottish Biodiversity Strategy, as biodiversity policy is fully devolved in Scotland. The Scottish Biodiversity List as contained in the Nature Conservation (Scotland) Act 2004 is the statutory list of species that Scottish Ministers consider to be of principal importance for biodiversity conservation in Scotland.
- 5.109 Identifies the key aspects of the draft update including “waste management, transportation and efficiency in energy generation and land use”. However, only baseline information for energy is presented in the following section.
- Land use and land use change can significantly contribute to both climate mitigation and adaptation. We recommend that the environmental assessment includes assessment of this key area, and critically it’s link to biodiversity.
- We recommend a clearer consideration of the unpredictability of climate change and the increasing extreme events and how they impact the environment and its resilience and ability to adapt. We do not consider this to be adequately addressed in the scoping document.

LUC response

Noted.

Table 5.1 has been updated to include The Greenspace Scotland map data set.

Chapter 5 has been updated with relevant information regarding priority species.

The link between land use and biodiversity is discussed in chapter 5.

The environmental baseline has been updated with the relevant information.

Chapter 6

- Table 6.3 we recommend narrative text is provided for all effects not just those considered significant.
- Table 6.4 Interactions between topics. We do not agree that there is no interaction between biodiversity and cultural heritage. Historic sites are often special places for biodiversity, this interdependency should be reflected.
- We would reiterate our recommendation to include climate risk reduction as part of the framework for assessing the effects of the draft SNAP3.

LUC response

Noted.

Table 6.4 has been updated to include interaction between biodiversity and the cultural heritage topic.

Historic Environment Scotland (HES)

Scope of assessment

- We agree that the assessment should appraise the outcomes, objectives, policies and proposals for inclusion in the plan, and reasonable alternatives to these. We understand that five strategic outcomes (relating to the following topics: (1) Nature connects; (2) Communities; (3) Public services and Infrastructure; (4) Economy, Business and industry; and (5) International Action) have already been developed. We would expect the assessment to include these strategic outcomes, and any reasonable alternatives to them.

LUC response

Noted.

Chapter 4: Relationship with other relevant plans and programmes

- It is unclear why there is no reference to national policy and strategies for the historic environment in this chapter. In particular, we would have expected NPF Policy 7: Historic assets and places and Our Past, Our Future, Scotland's national strategy for the historic environment to be included in Table 4.1 and the narrative.

LUC response

Figure 4.1 is intended to be a high-level summary of Links between Scottish National Adaptation Plan and other relevant plans and includes NPF4.

NPF Policy 7 has been included in the discussion of NPF4 in paragraph 4.6.

Our Past, Our Future, Scotland's national strategy for the historic environment has been included in Chapter 4 and Appendix A.

Table 5.1: Environmental data sources

- Undesignated historic environment assets should be added to the list of data sources under cultural heritage. Data on these is available from Canmore.

LUC response

Noted.

Undesignated historic environment assets have been added to Table 5.1.

Baseline: Cultural heritage including architectural and archaeological heritage

- Although we agree with the information presented, we consider that it is not sufficient to facilitate an appropriate level of assessment. The understanding of pressures, trends and key points is narrow, and should be expanded to recognise:
  - The broad range of climate change impacts and adaption requirement for the historic environment, as set out in our Climate Change Impacts Guide.

- Secondary impacts as a result of climate change adaptation actions, including infrastructure developments and land use and management changes.
- The potential role of the historic environment in climate change adaptation, for example the use of historic water courses and infrastructure, or the restoration of historic landscapes.

LUC response

Noted.

The cultural heritage including architectural and archaeological heritage section of Chapter 5 has been expanded using relevant information including the Guide to Climate Change Impacts.

Table 6.4: Interaction between topics

- We do not agree that there is no interaction between biodiversity and the cultural heritage topic. Historic sites can be special for biodiversity. Many have been protected from development, particularly agricultural improvement, which has allowed the preservation of local habitats and species. Historic sites can therefore be reservoirs of wildlife which can support conservation initiatives, with important local populations of plants and animals. Larger sites and linear features, such as the Antonine Wall, are important contributors to the wildlife corridors which allow plants and animals to migrate and spread as a result of pressure from development and climate change. In many areas, blanket bogs conceal and protect ancient land surfaces which retain extensive remains of human settlement and land-use, as well as places of burial and ritual.
- The natural environment of Scotland is the product of over 9000 years of interaction between people and nature; it is a historic environment, entirely shaped by this interaction. All aspects of the environment, natural capital,

landscapes, ecosystems services and habitats, are both natural and cultural, so it is important to ensure that decision making should be properly informed and should ensure that all aspects of the environment are considered, protected and, as possible, enhanced.

- People, Place and Landscape – A position statement from Scottish Natural Heritage and Historic Environment Scotland supports this collaborative approach, which helps decision makers to recognise that natural and cultural benefits and outcomes are often interdependent.

LUC response

Noted.

Table 6.4 has been updated to include interaction between biodiversity and the cultural heritage topic.

Table 6.3: Example proposed assessment matrix by objective

- We are broadly content with the assessment matrix proposed. We recommend however that the narrative summary should explain the reasoning supporting all scores, not just those that identify significant effects.

LUC response

Noted.

Relevant PPS

- Our Place in Time has been replaced by Our Past, Our Future, Scotland's national strategy for the historic environment for the period 2023-2028. This strategy targets activity where the historic environment can deliver most benefit for the people of Scotland over the next five years. Through consultation and engagement, three priority areas for action have been identified, along with the outcomes we will work together to achieve. These are big, national-level challenge areas that require collective effort to deliver so we can realise our mission:
  - Priority 1: Delivering the transition to net zero
  - Priority 2: Empowering resilient and inclusive communities and places
  - Priority 3: Building a wellbeing economy

LUC response

Noted.

Our Place in Time has been replaced by Our Past, Our Future, Scotland's national strategy for the historic environment in Appendix A.

Appendix C

Assessment tables

Assessment framework

Outcome One: Nature Connects (NC)

Objective: Nature-based solutions (NC1)

Nature based solutions at all scales are protected, enhanced and connected to enable healthier, cooler, water resilient and nature-rich places.

Key areas of action relate to:

- Flood resilience and coastal change – promote wider uptake of blue green infrastructure to manage surface water and drainage. Promotion of natural functioning coastal landforms and habitats to reduce pressures.
- Blue-green Infrastructure Investment – establishment of an opensource platform for GBI finance
- Landscape Scale Interventions
- Freshwater Habitats
- Soil-Health

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Flood resilience	**Current**	+	++	++	++	0	+	+	+/-	+	+

and coastal change											
	Future	+	++	++	++	0	+	+	+/-	+	+
Blue-green Infrastructure Investment	**Current**	+	++	++	++	0	+	+	+	+	+
	Future	+	++	++	++	+	+	+	+	+	+
Landscape Scale Interventions	**Current**	+	+	+	+	0	+	+	+/-	+	+/-
	Future	+	++	++	++	+	+	+	+/-	+	+/-
Freshwater Habitats	**Current**	0	+	++	+	0	+	+	0	+	+
	Future	0	+	++	++	0	0	+	0	+	+
Soil-Health	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	++	++	+	++	+	+	+	+

Summary justification

Climate change mitigation:

Actions relating to flood resilience and coastal change and blue-green infrastructure investment, including wider uptake of GBI and managing coastal erosion indirectly contribute positively to climate change mitigation through the protection of man-made and natural resources including infrastructure and soil. These assets would result in additional emissions if they were impacted by flooding and coastal erosion. Furthermore, landscape scale interventions are likely to contribute towards the conservation of soil resources, reducing land-based emissions. Opportunities for increased woodland planting and habitat restoration (e.g., peatland) at a landscape scale and improved management of soils may also help reduce carbon emissions through reducing emissions and increasing sequestration. Likewise, an increase in blue-green infrastructure investment may lead to increases in the delivery of GBI which will help mitigate against the future effects of climate change by encouraging more carbon sequestration and reducing emissions from damaged soils. Existing and ongoing actions will be delivering benefits already, however future actions will bring benefits in the longer term.

Overall, the actions are expected to have a minor positive effect in relation to climate change mitigation.

Climate change adaptation:

Existing and planned actions relating to flood resilience and coastal change, landscape scale interventions, increased knowledge around wild salmon and improved management of and coordination of soil related actions all contribute towards positive effects for climate change adaptation. It is assumed that the wider uptake of GBI and additional investment in GBI is within the context of new development, and will also include enhancement and changes to GBI in existing built up areas. Increased delivery of GBI, particularly in urban areas will contribute to natural solutions for shading and cooling air, as temperatures are expected to rise with climate change. These benefits will increase as the vegetation matures. Furthermore, promotion of natural solutions to reduce flood risk will further help adapt to future climate change. Additional research, reporting and knowledge on wild salmon will support actions to allow this species to adapt to climate change in the longer term.

The flood resilience, coastal change and blue-green infrastructure actions are expected to make a significant positive contribution to climate change adaptation, whilst landscape scale interventions, freshwater habitats and soil health are expected to have minor positive effects.

Biodiversity, flora and fauna:

All of the actions make a significant positive contribution to biodiversity, flora and fauna. This includes enhancement of habitat networks within urban areas through increased blue-green infrastructure investment, delivery of landscape scale interventions with benefits for habitats and species, protection and enhancement of coastal landforms and their habitats, and enhancement of salmon rivers and soils. The enhancement of habitats (including coastal habitats) will benefit biodiversity, flora, and fauna by supporting their adaptation to climate change through improved resilience. This can be achieved by expanding and improving the connectivity across the habitat network, and by providing shade and shelter for biodiversity during extreme weather. Likewise, riparian planting along rivers increases the resilience of these watercourses and the species within them to increased water temperatures and helps filter pollutants which may enter the watercourse through surface water runoff. General improvements in knowledge and action for soil, as advocated through the soil-health subobjective, will help indirectly support the biodiversity and habitats (e.g., peatland, woodland etc.) it supports. Although some benefits will be realised in the short term, greater benefits for example from shading will be in the longer term as vegetation matures.

Overall, the actions are expected to have a significant positive effect in relation to biodiversity, flora and fauna.

Water:

All of the actions make a significant positive contribution to water. Addressing flood resilience and coastal change, expanding blue green infrastructure, expanding landscape scale interventions, and supporting freshwater habitats will all have a positive effect on the water environment both in terms of water quality and in managing flood risk. Improving flood resilience and coastal change, and promoting nature-based solutions such as delivery of GBI may help manage flood risk in the medium to long term. Naturally functioning coastal landscapes and habitats, such as wetlands, saltmarshes and sand dunes act as natural flood defences, assisting in reducing coastal flood risk. However, timescales for habitat restoration may mean that benefits are greater in the longer term. Furthermore, delivery of GBI and new habitats including riparian planting, may help manage flood risk by reducing and slowing surface water runoff. Riparian planting may also support the water environment by increasing the resilience of watercourses to increased water temperatures derived from climate change, as well as preventing pollution entering the watercourses. Likewise, improvements in knowledge and action for soils, including important peatland areas, may prevent soil erosion and sediment runoff into watercourses, and improve the quality of water. This will have subsequent positive effects on population and human health through improvements in drinking water, and also on biodiversity.

Improving flood resilience and coastal change through nature-based solutions will help manage flood risk.

Air:

Future actions regarding the greater investment in blue-green infrastructure, and delivery of landscape scale interventions is expected to lead to minor positive effects with relation to air quality. Increasing GBI, particularly tree cover, within urban areas or at a landscape-scale will help improve air quality by filtering air pollutants. Higher concentrations of pollutants are found closest to their source. For example, transport derived air pollution is found most concentrated along roads. The presence of GBI along these roads can help act as a barrier between pedestrians and preventing the dispersal of air pollution and reducing localised exposure. This could have subsequent benefits for population and human health. These benefits will increase over time as the vegetation becomes more mature.

Soil:

Improvements in knowledge and action for soils (e.g., through development of soil health indicators and specific soil related guidance) is expected to have significant positive effects in relation to soils. Improving this knowledge will help encourage soils which are healthy and rich in nutrients, support a diverse range of flora and fauna, and are more resilient to any effects of climate change (e.g., drought, flooding, erosion etc.). This is likely to be at both a strategic and project level. Furthermore, improvements in the understanding of and quality of soil may help restore areas of peatland and maximise the ecosystem services they provide. These benefits will be further enhanced as greater investment in GBI is expected to increase delivery of GBI which may further benefit soils by increasing rates of water absorption, reducing soil erosion, and improving soil fertility. Improvements in soils may have subsequent benefits on water and climate change by reducing surface water flooding. With relation to landscape-scale interventions, increased knowledge surrounding soils may lead to a more sustainable use of agricultural land at a larger scale. Benefits are likely to become greater as knowledge improves and GBI is implemented.

Landscape and geodiversity:

All actions are expected to have minor positive effects with relation to landscape and geodiversity. The increase in blue-green infrastructure investment is expected to increase the delivery of GBI. This may include the creation of woodland/ tree planting, riparian planting, and enhancement of coastal habitats and peatlands, which all contribute to the landscape character and how it is perceived. Actions relating to flood resilience and coastal change, landscape scale interventions, and soil health may also contribute positively to landscape and geodiversity. General improvements in knowledge and action for soil, as advocated through the soil-health subobjective, will help directly support geology by encouraging the restoration of peatland soils. This will have subsequent benefits for landscape as peatlands form an integral part of the Scottish landscape.

Cultural heritage and historic environment:

Actions relating to soil health, landscape scale interventions, blue-green infrastructure investment and flood resilience and coastal change are expected to have positive effects with relation to cultural heritage and the historic environment. Actions to increase resilience to flooding and reduce flood risk will help protect heritage assets from flooding and coastal erosion. The delivery of more GBI as a result of greater blue-green infrastructure investment may have positive effects on the historic environment by improving the setting of heritage assets if designed well. Likewise, nature based solutions as part of landscape scale interventions may also contribute to the positive enhancement of the historic environment. These benefits will increase over time as the vegetation becomes more mature. However, in promoting naturally function coastal landforms, there is potential that over time heritage assets near the coast may be lost to erosion. Landscape-scale interventions focussed on creating new economic opportunities in nature-based solutions, natural capital investment and maintenance, green tourism, sustainable and regenerative food production, and wood products may create activities which have an adverse effects on the historic environment or the setting of heritage assets (e.g., forestry felling, or agriculture). General improvements in knowledge and action for soil, as advocated through the soil-health subobjective, is expected to have positive effects with relation to cultural heritage, particularly as a result of peatland restoration, noting that peatlands are of great cultural significance to Scotland.

All actions except for freshwater habitats are expected to have positive effects in relation to cultural heritage. These effects are mixed with minor negative for coastal change and landscape scale interventions due to the potential for coastal erosion and new economic activities to effect cultural heritage assets.

Material assets:

All actions are expected to have minor positive effects with relation to material assets. Improving flood resilience and flood management will help protect material assets and reduce the costs of potential flood damage in the future. Likewise, landscape scale interventions such as the Land and Agriculture Just Transition Plan may increase economic opportunities for nature based solutions, natural capital investment and maintenance, green tourism, and food and wood production. Investment in GBI and expansion of knowledge surrounding salmon monitoring and soils will also provide a wide range of ecosystem services, including reducing surface water flooding, and improving soil and water quality. It will also help improve economic benefits for the agricultural and aquaculture industries amongst the other rural industries mentioned in the Land and Agriculture Just Transition Plan, and provide employment opportunities. The timescale of the effects identified is likely to be in the medium to longer term.

Population and human health:

The landscape scale interventions will in the longer term have significant positive effects for population and human health through support for developing skills and knowledge for land based and aquaculture sectors. This will indirectly also support the viability of rural communities, and particularly those in the agricultural sector (Land and Agriculture Just Transition Plan). The LAJTP seeks greater community empowerment and equality, ensuring the disadvantaged do not carry most of the

burden. This could have positive effects on population and human health. In addition, investment in coastal climate change adaptation and urban GBI may reduce the effects of climate change on population by minimising flood risk, and through GBI using natural solutions to cooling and improving air quality. However, it is anticipated that the positive effects from the review of learning pathways and the implementation of recommendations may take several years to come into effect.

The timescale of the effects identified is likely to be in the medium to longer term. All of the additional actions will take time in terms of planning, delivery and project pipeline.

Mitigation and enhancement

Actions which promote nature based solutions as part of landscape scale interventions and support naturally functioning coastal landforms should also include those which consider the protection of historic environment.

Landscape-scale interventions focussed on creating new economic opportunities should consider their effects on the historic environment or the setting of heritage assets and mitigate these.

Objective: Development planning (NC2)

Development planning (including Local Development Plans and associated delivery programmes) takes current and future climate risks into account and is a key lever in enabling places to adapt.

Current action:

- The Scottish Government is working with planning authorities and other stakeholders to support their preparation of a new round of Local Development Plans (LDPs). This is owned by local authorities to ensure it is applicable to local places. These will take into account the new NPF4 planning guidance.

Future actions:

- Scottish Environmental Protection Agency (SEPA) evidence gathering for Local Development Plans.
- Preparing and publishing the Open Space Strategies.
- Require new transport and active travel infrastructure projects to incorporate elements of blue-green infrastructure by 2030.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic	Material assets	Population and human health
SEPA evidence gathering	**Current**	+	+	+	+	0	+	0	0	0	+
	Future	+	+	+	+	0	+	0	0	0	+
New transport Infrastructure	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	+	+	+	0	+	+/-	+	+
Open Space Strategies	**Current**	+	+	+	0	+	+	+	0	+	+
	Future	+	+	+	+	+	+	+	0	+	+

Summary justification

Climate change mitigation:

SEPA are committing to being involved in evidence gathering which can be used to underpin spatial strategies within Local Development Plans. This could provide information on potential opportunities to mitigate the effects of climate change on the water environment and support resilience to future flood events. This could help to create a robust spatial strategy within Local Development Plans that will increase local authorities' resilience to climate change and provide guidance on measures that can mitigate the impacts of climate change. The preparation of Open Space Strategies and the requirement for new transport infrastructure projects to contain green/blue infrastructure could increase the level of green infrastructure and open space which could help mitigate against the future effects of climate change by encouraging more carbon sequestration and reducing emissions from damaged soils. Existing and ongoing actions will be delivering benefits already, however future actions will bring benefits in the longer term. The action in relation to SEPA evidence gathering will likely deliver indirect effects.

Overall, the future actions are expected to have minor positive effect in relation to climate change mitigation.

Climate change adaptation:

Preparing open space strategies, ensuring new transport infrastructure contains green/blue infrastructure and SEPA evidence gathering will all contribute to positive effects for climate change adaptation. It is assumed that the preparation of open space strategies and the inclusion of green/blue infrastructure alongside new transport infrastructure, will also include enhancement and changes to open space and green/blue infrastructure in existing built up areas. Increased delivery of open space and green/blue infrastructure, particularly in urban areas will contribute to natural solutions for shading and cooling air, as temperatures are expected to rise with climate change. In addition, open space strategies will require development to contribute to nature networks which will help wildlife adapt to pressures from climate change. SEPA evidence gathering could contribute to climate change adaptation through providing evidence base on the water environment, and potentially how it can adapt to climate change. SEPA can also provide evidence baseline information on flooding and water management. This evidence base could provide a baseline for spatial strategies within Local Development Plans to help local authorities adapt to severe weather events as a result of climate change. Existing and ongoing actions will be delivering benefits already, however future actions will bring benefits in the longer term.

Overall, the future actions are expected to have minor positive effect in relation to climate change adaptation.

Biodiversity, flora and fauna:

Preparing open space strategies, delivery of green/blue infrastructure as part of new transport infrastructure and SEPA evidence gathering will make positive contributions to biodiversity, flora and fauna. The scope of this lacks detail, but enhancements to open space and blue/green infrastructure could include tree planting, habitat creation, improvements to the water environment and soils. However, open space strategies and SEPA evidence gathering used to underpin Local Development Plan spatial strategies will contribute to the development of Nature Networks. These connect nature-rich sites, restoration areas and other environmental projects through a series of areas of suitable habitat, habitat corridors and stepping-stones. SEPA evidence gathering may provide details on opportunities to improve the water environment for freshwater and marine species. This will support healthy and functioning ecosystems, nature recovery and prevent further declines in species and habitats, improving biodiversity. Although some benefits will be realised in the short term, greater benefits for example from shading will be in the longer term as vegetation matures.

Overall, the future actions are expected to have minor positive effect in relation to biodiversity, flora and fauna.

Water:

All of the actions make a positive contribution to water. The requirement for new and enhanced green/blue infrastructure alongside transport infrastructure will have a positive effect on the water environment both in terms of water quality and in managing flood risk. Specifically, information gathered by SEPA could help planning authorities understand the implications and opportunities for areas such as future flood risk, coastal change and the water environment helping to deliver flood prevention and water management. This could help to manage flood risk within the medium to long term by reducing and slowing surface water runoff. In addition, the preparation of open space strategies will incorporate nature networks which could improve the quality of the water environment as a habitat for aquatic animals.

Overall, the future actions are expected to have minor positive effect in relation to water. These effects are expected to be in the long term.

Air:

The preparation of open space strategies and the requirements for green/blue infrastructure when delivering transport infrastructure is expected to lead to minor positive effects with relation to air quality. Increasing open space and green infrastructure, particularly tree cover, will help improve air quality by filtering air pollutants. Higher concentrations of pollutants are found closest to their source. For example, transport derived air pollution is found most concentrated along roads. The

delivering of green/blue infrastructure alongside new transport infrastructure can help act as a barrier between pedestrians and preventing the dispersal of air pollution and reducing localised exposure. This could have subsequent benefits for population and human health. These benefits will increase over time as the vegetation becomes more mature.

Soil:

The preparation of open space strategies and the requirement to deliver and/or enhance green/blue infrastructure alongside transport infrastructure is expected to increase delivery of green/blue infrastructure which may benefit soils by increasing rates of water absorption, reducing soil erosion, and improving soil fertility. Improvements in soils may have subsequent benefits on water and climate change by reducing surface water flooding. In addition, the gathering of information by SEPA could help protect soil functionality and support developing vacant and derelict land if the information gathered is used to underpin spatial strategies within Local Development Plans. The development of vacant and derelict land could result in less greenfield land take up. These effects are expected over the long term.

Landscape and geodiversity:

The preparation of open space strategies and the requirement to deliver and/or enhance green/blue infrastructure alongside transport infrastructure is expected to increase the delivery of green/blue infrastructure. This could include the creation of woodland/tree planting and riparian planting, which all contribute to the landscape character and how it is perceived. Overall, positive effects are expected for preparation of an open space strategy and the requirement to deliver and/or enhance green/blue infrastructure alongside transport infrastructure in relation to landscape and geodiversity. These effects are expected over the medium to long term.

Cultural heritage and historic environment:

Enhancements to green/blue infrastructure may include woodland/tree planting which can impact directly on known and unknown archaeological resources, and on the setting and views to cultural heritage features. However, as these enhancements may also deliver climate mitigation effects which benefit cultural heritage resources, these effects are likely to be mixed.

Material assets:

All actions are expected to have positive effects in relation to material assets. Preparing an open space strategy and requiring new and/or enhanced green/blue infrastructure alongside transport infrastructure will provide a wide range of ecosystem services, including reducing surface water flooding, and improving soil and water quality. Evidence gathered by SEPA could help local authorities understand the implications and opportunities in relation to future flood risk and the water environment which could support the resilience of cities and towns against the effects of climate change lowering the potential for damage to buildings and infrastructure. All of the actions will be expected to deliver in the medium to long term.

Population and human health:

Evidence gathering by SEPA, preparation of open space strategies and the requirements for green/blue infrastructure alongside transport infrastructure could have positive effects on population and human health. The delivery of open space and green/blue infrastructure will have mental and physical health benefits by providing areas for recreation and physical activity. In addition, green/blue infrastructure can act as a natural solution to cooling and improving air quality. Information gathered b y SEPA could help to ensure that vacant and derelict land is brought back into positive use for people and communities. This can have a positive effect on Therefore, minor positive effects are expected for all the actions in relation to population and human health. This could encourage vacant and derelict land to provide benefits to local communities which could include green space or be developed for housing or community uses. The timescale of the effects identified is likely to be in the long term.

Mitigation and enhancement

Reference could be included on other ways in which SEPA can support Local Authorities in preparing Local Development Plans.

Include consideration and mitigation requirements for actions which enhance to green/blue infrastructure via woodland/tree planting.

Objective: Nature Networks (NC3)

Nature networks across every local authority area are improving ecological connectivity and climate resilience, alongside other transformative national actions to halt biodiversity loss by 2030.

Key areas of action relate to:

Nature networks - Working with local authorities to implement nature networks in all local authority areas. This includes support to undertake mapping opportunities by 2030, and informing land use decision making.

Invasive non-native species – surveillance, prevention and control alongside support measures for removal, both on land and in the marine environment

- Vector borne disease - Scottish Government will continue to work with partners to provide vector-borne disease surveillance, risk assessment, incident management and public health and veterinary advice. They will also increase understanding and address vector borne disease risks through risk mapping, research on enhanced surveillance, enhanced surveillance and contingency planning, alongside horizon scanning

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Nature networks	**Current**	++	++	++	++	+	++	+	+	+	+
	Future	++	++	++	++	+	++	+	+	+	+
Invasive non-native species	**Current**	++	++	++	++	0	+	+	+	+	+

	Future	++	++	++	++	0	+	+	+	+	+
Vector borne disease	**Current**	0	0	0	0	0	0	0	0	0	+
	Future	0	+	0	0	0	0	0	0	0	+

Summary justification

Climate change mitigation:

All of the actions outlined in the sub-objectives nature networks and invasive non-native species (INNS) are likely to have positive effects in relation to climate change mitigation. The actions support research and implementation of nature networks and INNS controls. Creating ecological connectivity for blue and green spaces through improved and new woodland, peatland restoration and wetland and coastal management, as demonstrated through nature networks such as the Central Scotland Green Network (CSGN) and the GCV Green Network (GCVGN), is likely to reduce emissions. Habitat restoration and enhancement will increase and preserve carbon stores, increasing carbon sequestration. Likewise, effective management, monitoring and removal of invasive species reduces ecological stressors on ecosystem services, increasing carbon sequestration. Although some benefits will be realised in the short term, there will be greater benefits for example from INNS research and the nature networks framework once nature networks in local authorities and actions to control INNS are implemented which is likely to be in the longer term. Additionally, the extent of research, monitoring and biosecurity effectiveness will be based on the findings from research and outreach into monitoring and biosecurity measures.

Overall, significant positive effects are expected for all actions regarding climate change mitigation. No impacts are identified in relation to vector borne disease.

Climate change adaptation:

Existing and planned actions relating to implementation of the nature network framework guidance and effective management of INNS all contribute towards positive effects for climate change adaptation. Increased green and blue space through enhanced connectivity via improved and new woodland, peatland restoration and wetland and coastal management provides habitats for nature to adapt, improves ecosystem resilience and contributes to natural solutions for shading and cooling air, as temperatures are expected to rise with climate change. Research into approaches to enable better measurement of potential impacts of INNS driven by climate change will help future adaptation measures. Removal of invasive species allows recovery of native flora and fauna and soil quality which increases the resilience of natural habitats, agricultural systems and urban areas to climate change. These benefits will increase as the vegetation matures. However, timescales for habitat restoration, success of INNS research and INNS management and removal may mean that benefits are greater in the longer term. Actions related to vector borne disease bring minor positive effects in relation to climate change adaptation, as increased surveillance, risk assessment, incident management, risk management and research will support adaptation to these increased risks.

Overall, significant positive effects are expected for the actions for the subobjectives in relation to climate change adaptation.

Biodiversity, flora and fauna:

The actions for nature networks and INNS make a significant positive contribution to biodiversity, flora and fauna. This includes the current draft nature network framework, ensuring nature networks are implemented, research into INNS, INNS control plans, marine INNS monitoring and developing marine biosecurity. Implementing nature networks from the framework and guidance will benefit biodiversity, flora and fauna as it develops ecological connectivity between blue and green spaces, increasing habitat resilience to allow species to adapt to pressures such as climate change. This is shown by the existing CSGN and GCVGN implementing improved and new woodland, peatland restoration and wetland and coastal management, which have improved fragmentation, contributing to the Scottish Biodiversity Strategy 30x30 target**.** Research and outreach to effectively deliver actions to control INNS allows restoration and improves resilience of habitats and biodiversity by removing stressors, such as disease, to the ecosystem, increasing biological diversity. Although some benefits will be realised in the short term, there will be greater benefits for example from INNS research and the nature networks framework once nature networks in local authorities and actions to control INNS are implemented in the longer term. Additionally, the extent of research, monitoring and biosecurity effectiveness will be based on the findings from research and outreach into monitoring and biosecurity measures. Research on climate driven vector borne disease risks over the period of the adaptation plan, alongside horizon scanning will indirectly help to ensure that the impacts of vector borne diseases on native species are considered.

Overall, all actions are expected to have significant positive effects regarding biodiversity, flora and fauna.

Water:

The actions for nature networks and INNS make a significant positive contribution to water both in terms of improving water quality and in managing flood risk. Connecting blue spaces through the development and implementation of the current draft nature network framework and guidance through SNAP will have a positive effect on the water environment in terms of water quality, reducing run off, increasing flood attenuation and habitat enhancement. Furthermore, the implementation of actions to control marine INNS are likely to improve water quality and manage flood risk by restoring native habitats and biodiversity, and reducing ecological stressors, such as disease, to marine, coastal and freshwater environments, recovering ecosystem services. Likewise, current research and outreach into INNS control will aid understanding to effectively target INNS to improve the quality of water and habitats by restoring ecosystems. This will have subsequent positive effects on population and human health through improvements in drinking water, and also on biodiversity. However, timescales for habitat restoration, success of INNS research and INNS management and removal may mean that benefits are greater in the longer term.

Overall, significant positive effects are expected in relation to nature networks and INNS subobjectives regarding water. No impacts are identified in relation to vector borne disease.

Air:

Habitat restoration and ecological connectivity created through current and future nature networks increase vegetation, which increases the uptake and assimilation of gaseous or particulate pollutants, improving air quality. Although some benefits will be realised in the short term, there will be greater benefits for example from the nature networks framework once nature networks in local authorities are implemented. However, it is anticipated that the positive effects from the implementation of frameworks and plans may take several years to come into effect.

Overall, minor positive effects are expected for actions relating to nature networks, and negligible effects are expected for INNS subobjective actions. No impacts are identified in relation to vector borne disease.

Soil:

Enhancement of green spaces and ecological connectivity via woodland, peatland and restoration through the implementation of current and future nature networks framework is likely to result in soil restoration. Additionally, flora and fauna enhancement through habitat restoration is likely to improve soil quality. Therefore, a significant positive effect is expected for the nature network subobjective. Research and removal of invasive non-native plant species is likely to have a minor positive effect for soil health, as the recovery of native flora and fauna is likely to restore soil chemistry and ecosystem function, improving soil quality. Although some benefits will be realised in the short term, there will be greater benefits for example from INNS research and the nature networks framework once nature networks in local authorities and actions to control INNS are implemented. Additionally, the extent of research, monitoring and biosecurity effectiveness will be based on the findings from research and outreach into monitoring and biosecurity measures.

Overall, the actions relating to nature networks are likely to have significant positive effects, and the actions for INNS are likely to have minor positive effects in relation to soil. No impacts are identified in relation to vector borne disease.

Landscape and geodiversity:

All actions are expected to have positive effects in relation to landscape and geodiversity. The implementation of nature networks and removal of INNS are expected to restore and enhance green and blue spaces. This may include soil restoration and enhancement of woodland and marine habitats and peatlands, which all contribute to the landscape character and how it is perceived. General improvements in knowledge and action for INNS removal, as advocated through the INNS subobjective, will help support geology and landscape by encouraging the restoration of native habitats and biodiversity. Although some benefits will be realised in the short term, there will be greater benefits for example from INNS research and the nature networks framework once nature networks in local authorities and actions to

control INNS are implemented. Additionally, the extent of research, monitoring and biosecurity effectiveness will be based on the findings from research and outreach into monitoring and biosecurity measures.

Overall, subobjectives for nature networks and INNS are expected to have minor positive effects in relation to landscape and geodiversity. No impacts are identified in relation to vector borne disease.

Cultural heritage and historic environment:

Positive effects are likely from the nature networks objective as implementing the nature networks framework will increase and improve green and blue spaces, via increased habitat restoration and ecological connectivity, improving the setting of heritage assets if designed well. Furthermore, recovery of ecosystem services as part of nature network implementation and INNS control may also contribute to the positive enhancement of the historic environment. However, timescales for habitat restoration, success of INNS research, monitoring outreach and INNS management and removal may mean that benefits are greater in the longer term.

Overall, the actions regarding nature networks and INNS subobjectives are expected to have minor positive effects in relation to cultural heritage and historic environment. No impacts are identified in relation to vector borne disease.

Material assets:

All actions are expected to have positive effects with relation to material assets. Landscape scale interventions such implementing nature networks and control of INNS may increase economic opportunities for nature-based solutions, natural capital investment and maintenance and green tourism. Additionally, these actions may also provide a wide range of ecosystem services through improving soil, air and water quality. It will also help improve economic benefits for the agricultural and aquaculture industries and provide employment opportunities. Although some benefits will be realised in the short term, there will be greater benefits for example from INNS research and the nature networks framework once nature networks in local authorities and actions to control INNS are implemented. Additionally, the extent of research, monitoring and biosecurity effectiveness will be based on the findings from research and outreach into monitoring and biosecurity measures.

Overall, all actions are expected to have minor positive effects regarding material assets. No impacts are identified in relation to vector borne disease.

Population and human health:

Nature network implementation and INNS removal will in the longer term have minor positive effects for population and human health, through support for developing skills and knowledge for INNS management, land based and aquaculture sectors. An increase in blue and green spaces could increase visual amenity, mental and

physical health, increasing quality of life. However, it is anticipated that the positive effects from the implementation of research, frameworks and plans may take several years to come into effect. Actions on vector borne disease including vector-borne disease surveillance, risk assessment, incident management and public health and veterinary advice, increased understanding and action to address vector borne disease risks through risk mapping, research on enhanced surveillance, enhanced surveillance and contingency planning, alongside horizon scanning will have a positive effect on population and human health. This is both from direct benefits to people who may be exposed to vector borne disease and from the impacts of vector borne disease on key economic sectors, and the indirect potential mental health impacts of this.

Overall, minor positive effects are identified for all actions in relation to population and human health.

Mitigation and enhancement

None identified.

Objective: Marine Ecosystems and the Blue Economy (NC4)

Evidence informed planning and management is increasing the climate resilience of Scotland's marine ecosystems and Blue Economy, with nature-based coastal change adaptation plans safeguarding coastal communities and assets. Key areas of action relate to:

- Marine Planning

  The National Marine Plan currently provides climate change mitigation and adaptation objectives

  A new National Marine Plan is under development which will strengthen the integration of climate change adaptation and mitigation

  The Marine Climate Change Impacts Project brings together expertise from across the UK to provide evidence and scientific consensus.

- Biodiversity and Habitat Restoration

  Current action includes SMEEF funding to support marine and coastal restoration, this will be continued over the duration of SNAP3 to recover, restore or enhance the health of marine and coastal habitats

  Marine Protected Areas – future actions will deliver and plan a range of actions for these areas to improve resilience, enhance protection and increase adaptation

  Marine nature enhancement – development over the next two years of a marine restoration plan for marine habitats and species

  Future review of community involvement in safeguarding marine biodiversity

  Mainstreaming marine biodiversity into government decision making

  Future development of a Scottish Seabird Conservation Strategy

  Implementation of actions by 2025 from the UK Dolphin and Porpoise Conservation Strategy

- Coastal

  Working with local authorities to improve the resilience of natural coastal defences. Local authorities are supported by existing Coastal Change Adaptation Planning Guidance.

  SEPA will update its costal flood risk maps as required, with review and updates of all regions by 2029.

Appendix C Assessment tables

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Marine Planning	**Current**	++	++	++	++	+	+	+	+/-	+	+
	Future	++	++	++	++	+	+	+	+/-	+	+
Biodiversity and Habitat Restoration	**Current**	++	++	++	++	+	+	+	+/-	+	+
	Future	++	++	++	++	+	+	+	+/-	+	+
Coastal	**Current**	+	+	+	++	+	+	+	+/-	+	+
	Future	++	++	++	++	+	+	+	+/-	+	+

Summary justification

Climate change mitigation:

All actions relating to marine planning, biodiversity and habitat restoration and coastal are likely to have positive effects in relation to climate change mitigation. The current and future National Marine Plan (NMP), Marine Climate Change Impacts Project (MCCIP), the review of Climate Vulnerability Assessment (CVA) methodologies, the management of marine protected areas (MPAs), Scottish Marine Environmental Enhancement Fund (SMEEF) and the current coastal change adaptation guidance have a focus on climate change mitigation through effective management of marine space set out through policies, plans, funding and research. Likewise, enhancement and restoration of blue carbon space will enhance ecosystem services, increasing carbon sequestration. Furthermore, coastal monitoring and adaptation will increase climate mitigation through protecting coastal habitats, increasing the resilience of associated carbon stores. The benefits will be greater in the long term once targets of the plans and programmes are met.

Overall, significant positive effects are expected for the actions except for coastal, where a minor positive effect is identified as there is no current coastal monitoring programme set up.

Climate change adaptation:

Existing and planned actions relating to the marine planning, biodiversity and habitat restoration and coastal subobjectives are likely to have significant positive effects in relation to climate change adaptation. The current and future NMP, MCCIP, review of CVA methodologies, management of MPAs, SMEEF and the current coastal change adaptation guidance have a focus on climate change adaptation through effective management of marine space. Additionally, increased funding and effective management of marine and coastal habitats will increase the recovery and resilience of blue carbon habitats to climate risk and help mitigate flood risk, helping to adapt to future climate change. However, timescales for achieving funding, plan and marine restoration and biodiversity safeguarding mean benefits are likely to be greater in the longer term.

Overall, all actions are expected to have a significant positive effect for climate change adaptation except for coastal, where a minor positive effect is identified as there is no current coastal monitoring programme set up.

Biodiversity, flora and fauna:

Positive effects are expected for all actions regarding biodiversity, flora and fauna. The current and future NMP, MCCIP, the CVA methodologies review and SMEEF have a focus on biodiversity, flora and fauna through management of marine space. Ensuring biodiversity protection is integrated in plans and policies will enhance species richness and habitats, increase the health of ecosystem and hence benefit ecosystem services. Likewise, increasing habitat restoration through SMEEF funding focus, creating a marine restoration plan, efficient management of MPAs and increasing community participation and government decision-making in safeguarding marine biodiversity will further enhance these benefits. Additionally, protecting and enhancing the coastal habitat and associated natural features as identified through the current coastal change adaptation guidance and the future coastal monitoring programme will result in habitat resilience, enhancing biodiversity. Timescales for achieving funding, plan and policy implementation and marine restoration and biodiversity safeguarding mean benefits are likely to be greater in the longer term.

Overall, all actions are expected to have a significant positive effect for biodiversity, flora and fauna except for coastal, where a minor positive effect is identified as there is no current coastal monitoring programme set up.

Water:

All of the actions make a significant positive contribution to water. The current and future NMP, MCCIP, the review of CVA methodologies, SMEEF, management of MPAs, the future marine restoration plan, Coastal Change Adaptation Planning guidance and future coastal monitoring programme will all have a positive effect on the water environment both in terms of water quality and in managing flood risk. Improving coastal change and promoting nature-based solutions through naturally functioning coastal landscapes and habitats, such as sand dunes, act as natural flood defences and may help manage flood risk in the medium to long term. Furthermore, the protection and improved resilience of marine habitats may help manage flood risk by reducing and slowing surface water runoff. The protection and promotion of healthy ecosystems through sustainable development and habitat restoration may also support the water environment by increasing the resilience of watercourses to increased water temperatures derived from climate change, as well as preventing pollution entering the watercourses and improve the quality of water. This will have subsequent positive effects on population and human health through improvements in drinking water, and also on biodiversity. However, timescales for policies, plans and funding programmes for habitat restoration may mean that benefits are greater in the longer term.

Air:

The current and future NMP, MCCIP, review of CVA methodologies, SMEEF, management of MPAs, Coastal Change Adaptation Planning guidance and future monitoring of coastal habitats are likely to have minor positive effects with relation to air quality. As the plans, programmes and MPAs focus largely on climate mitigation, adaptation and habitat restoration, blue carbon sources are likely to be enhanced, reducing emissions through increased protection of habitats, including

blue carbon zones and vegetation which increase carbon assimilation. Although some benefits will be realised in the short term, there will be greater benefits once targets are met and plans are developed.

Overall**,** minor positive effects are expected for all three subobjectives regarding air.

Soil:

Improvements in actions for coastal habitat protection and restoration through the marine planning, biodiversity and habitat restoration and coastal subobjectives are likely to have indirect positive effects in relation to soils. Improving in land coastal habitats, through policy protection, increased funding and knowledge, management of coastal MPAs, coastal change adaptation planning guidance and the future coastal monitoring programme will help encourage soils which are healthy and rich in nutrients, support a diverse range of flora and fauna, and are more resilient to any effects of climate change (e.g., drought, flooding, erosion etc.). This is likely to be at both a strategic and project level. Improvements in soils may have subsequent benefits on water and climate change by reducing surface water flooding. Although some benefits will be realised in the short term, there will be greater benefits once targets are met and plans are developed.

Overall, minor positive effects are likely for the marine planning, biodiversity and habitat restoration and coastal subobjectives with respect to soil.

Landscape and geodiversity:

All actions are expected to have positive effects in relation to landscape and geodiversity. The current and future NMP, MCCIP, the review of CVA methodologies, SMEEF, management of MPAs, the marine restoration plan, Coastal Change Adaptation Planning guidance and the future coastal monitoring programme are expected to restore and enhance blue spaces. This may include marine, freshwater and coastal ecosystems, which all contribute to the landscape character and how it is perceived. This will have subsequent benefits for landscape as blue carbon habitats form an integral part of the Scottish landscape and improve quality life from visual amenity and climate change adaptation improvements. Improvements in coastal restoration, and associated natural features, as advocated through the current NMP, MCCIP, SMEEF, coastal change adaption planning guidance and the future coastal monitoring programme, will help support landscape, as well as geology, by encouraging the restoration of native habitats and biodiversity. Although some benefits will be realised in the short term, there will be greater benefits, for example from SMEEF and MPA management, once targets are met and plans and programmes are developed.

Overall, all three subobjectives are expected to have significant positive effects in relation to landscape and geodiversity.

Cultural heritage and historic environment:

Actions relating to marine planning, biodiversity and habitat restoration and coastal are expected to have positive effects with relation to cultural heritage and the historic environment. Actions to increase resilience to flooding and reduce flood risk will help protect heritage assets from flooding and coastal erosion. The sustainable development and the protection and enhancement of blue spaces may have positive effects on the historic environment by improving the setting of heritage assets if designed well. Likewise, the management of the eight Historic MPAs to preserve sites of historical importance around the Scottish coast also contribute to the positive enhancement of the historic environment. However, in promoting naturally functional coastal landforms, such as through the coastal change adaptation plan guidance, there is potential that over time heritage assets near the coast may be lost to erosion. Landscape-scale management focussed on creating new economic opportunities in nature-based solutions, natural capital investment and maintenance, tourism and food production may create activities which have adverse effects on the historic environment or the setting of heritage assets (e.g., recreational infrastructure or aquaculture). However, it is anticipated that the positive effects from the policies, plans and programmes may take several years to come into effect once targets are met.

Overall, the subobjectives are expected to have mixed effects (minor positive / minor negative) due to the potential for coastal erosion and new economic activities to effect cultural heritage assets.

Material assets:

All actions are expected to have positive effects with relation to material assets. Improving flood resilience through policy protection, increased funding and knowledge, management of coastal MPAs, coastal change adaptation planning guidance and the future coastal monitoring programme will help protect material assets and reduce the costs of potential flood damage in the future. This will also indirectly improve soil quality, enhancing ecosystem services. Likewise, the improvement of blue habitats with increased habitat resilience will allow biodiversity, water quality and economic opportunities for nature-based solutions, natural capital investment and maintenance, tourism, and food production. It will also help improve economic benefits, particularly for the aquaculture industries to provide employment opportunities. However, timescales for policies, plans and funding programmes for habitat restoration may mean that benefits are greater in the longer term.

Overall, minor positive effects are expected for all actions relating to material assets.

Population and human health:

The landscape scale interventions will in the longer term have minor positive effects for population and human health through support for developing skills and knowledge for recreational and aquaculture sectors. This will indirectly also support the viability of rural communities, and particularly those in the aquaculture sector. An increase in blue spaces could increase visual amenity, mental and physical health, increasing quality of life. In addition, investment in coastal climate change adaptation measures may reduce the effects of climate change on population by minimising flood risk, and through habitat restoration improving air quality. However, it is anticipated that the positive effects from the policies, plans and programmes may take several years to come into effect once targets are met.

The timescale of the effects identified is likely to be in the medium to longer term. All of the additional actions will take time in terms of planning, delivery and project pipeline.

Mitigation and enhancement

Actions which promote nature based solutions as part of landscape scale interventions and support naturally functioning coastal landforms should also include those which consider the protection of historic environment.

Landscape-scale interventions focussed on creating new economic opportunities should consider their effects on the historic environment or the setting of heritage assets and mitigate these.

Objective: Natural Carbon Stores and Sinks (NC5)

Resilient natural carbon stores and sinks (such as peatland, forests and blue carbon) are supporting Scotland's net zero pathway, alongside timber production, biodiversity gains, flood resilience and the priorities of local communities.

Key areas of action relate to:

- Peatland

  Ongoing restoration activity, and future upscaling of rates of peatland restoration

  Improved management and protection of Scotland’s peatlands

Improved evidence gathering to maximise co-benefits

SEPA land use planning

Muirburn and moorland management – changes to legislation and licencing, development of a new code of practice on grouse shooting and moorland management

- Forestry and Woodland

Future review of the Right tree in the Right Place

Commitment to deliver woodland creation target

Support for increasing species diversity in forestry and improving the resilience

- Agricultural soils

Delivery of woodland and peatland actions by farmers and crofters

Current delivery on soil carbon through preparing for sustainable farming funding

Support payments related to whole farm planning

- Blue Carbon

Increased understanding of Scotland’s blue carbon habitats

Development and publication of a Blue Carbon Action Plan

Appendix C Assessment tables

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Peatland	**Current**	+	++	++	++	+	++	+	+	+	+
	Future	++	++	++	++	+	++	+	+	+	+
Woodland	**Current**	++	++	++	++	+	+	+	+	+	+
	Future	++	++	++	++	+	+	+	+	+	+
Blue Carbon	**Current**	++	++	++	++	+	+	+	+	+	+
	Future	++	++	++	++	+	+	+	+	+	+
Agricultural soils	**Current**	++	++	++	++	+	++	+	+	++	+
	Future	0	0	0	0	0	+	0	0	0	0

Summary justification

Climate change mitigation:

Actions relating to peatland and woodland, including maximising restoration of degraded peatland, implementation of the woodland carbon code (WCC), reviewing forestry strategies and effective woodland management and creation are likely to have a significant positive effect in relation to climate change mitigation through the protection and enhancement of carbon stores, increasing carbon sequestration and reducing emissions. Although this is dependent on the extent that peatlands are restored. An increase in knowledge and restoration of Scotland's marine inshore areas is likely to contribute positively to climate change mitigation through the restoration of blue carbon hot spots, delivering greater sequestration and reduced emissions. Likewise, as set out in the vision for agriculture, there are targets to increase on-farm carbon sequestration. These actions are likely to restore ecosystem services, further enhancing climate stores. Benefits are likely to be greater in the longer term once woodland has developed and changes to the future management of blue carbon habitats are implemented.

Overall, all actions are expected to have significant positive effects in relation to climate change mitigation.

Climate change adaptation:

Existing and planned actions relating to woodland, peatland, blue carbon and agricultural soils are likely to have significant positive effects in relation to carbon adaptation. The restoration of degraded peatland, woodland and marine inshore areas and increase in sustainable and regenerative agriculture will improve carbon stores, increasing resilience to climate risk through contributing to natural solutions for shading and cooling air, as temperatures are expected to rise with climate change. These benefits will increase as the vegetation matures. Additionally, increasing the resilience of habitats through increased knowledge around blue carbon stores and the 'woodland adaptation and work programme' will further increase resilience. Furthermore, the restoration of natural solutions will indirectly help mitigate flood risk, helping to adapt to future climate change.

Overall, the actions are expected to have significant positive effects in relation to climate change adaptation.

Biodiversity, flora and fauna:

All of these actions are expected to have a significant positive contribution in relation to biodiversity, flora and fauna. This includes habitat restoration through restoration of marine inshore areas and peatlands and creation and management of woodland, as well as carrying out sustainable and regenerative farming practices, promoting naturally functioning habitats and improved soils. The enhancement of habitats (including coastal habitats) will benefit biodiversity, flora, and fauna by

supporting the recovery of multiple ecosystem services and their adaptation to climate change through improved resilience. This will be achieved by expanding and improving the connectivity across the habitat network, and by providing shade and shelter for biodiversity during extreme weather. Additionally, general improvements in knowledge and funding of blue carbon habitats as advocated by the blue carbon subobjective will help indirectly improve the biodiversity and habitats it supports. Although some benefits will be realised in the short term, greater benefits for example from shading will be in the longer term as vegetation matures.

Overall, the actions are expected to have significant positive effects in relation to biodiversity, flora and fauna.

Water:

Positive effects are expected towards both water quality and flood risk regarding the peatland action plan, the WCC, improving woodland creation, management, and resilience, marine restoration, and sustainable and regenerative agriculture. The restoration of peatland, woodland, coastal and agricultural habitats contributes towards natural flood management via intercepting precipitation, increasing water storage and reducing surface water runoff. Improved soil quality as a result of habitat enhancement will also reduce run off and sediment erosion, contributing to improved water quality. Furthermore, protection and promotion of healthy ecosystems through habitat restoration and sustainable management may also support the water environment by increasing the resilience of watercourses to increased water temperatures derived from climate change, as well as preventing pollution entering the watercourses and improve the quality of water. This will have subsequent positive effects on population and human health through improvements in drinking water, and also on biodiversity. However, timescales for policies, plans, research and funding programmes for habitat restoration and management may mean that benefits are greater in the longer term.

Overall, a significant positive effect is expected for all the subobjectives in relation to material assets.

Air:

The restoration of woodland, peatland and marine inshore habitats and sustainable and regenerative farming practices are likely to have minor positive effects with relation to air quality. The recovery of multiple ecosystem services will increase the resilience of carbon stores and vegetation, will improve air quality by filtering air pollutants. This could have subsequent benefits for population and human health. These benefits will increase over time as policies, research and plans are put into action and the vegetation becomes more mature.

Soil:

All current actions relating to peatland, woodland, blue carbon and agricultural soils are likely to have positive effects in relation to soils. Maximising the restoration of peatland will have significant benefits to soil quality, being an important carbon store in Scotland most at risk. Improving woodland creation and management through

plans, programmes and the WCC and enhancing agricultural soils through sustainable and regenerative agriculture and coastal habitat protection and restoration will help encourage soils which are healthy and rich in nutrients, support a diverse range of flora and fauna, and are more resilient to any effects of climate change (e.g., soil compaction, drought, flooding, erosion etc.). Improvements in soils may have subsequent benefits on water and climate change by reducing surface water flooding. Although some benefits will be realised in the short term, there will be greater benefits as habitats are restored and vegetation matures. Significant positive effect are therefore expected for the current actions relating to peatland and agricultural soils and minor positive effects for the woodland and blue carbon subobjectives in relation to material assets.

Future actions outlined in the agricultural soils subobjective outline that the future support framework will have measures to support our farmers to maintain and improve their carbon stores and sinks, therefore a minor positive effect is expected for future actions outlined in the agricultural soils subobjective.

Landscape and geodiversity:

All actions are expected to have minor positive effects in relation to landscape and geodiversity. Peatland and marine restoration, improving woodland creation and management through plans, programmes and the WCC and sustainable and regenerative agriculture are expected to restore and enhance green and blue spaces, restoring habitats and soils. These all contribute to supporting geology and the landscape character and how it is perceived. These subsequent benefits are particularly relevant as peatlands, agricultural land and blue carbon habitats form an integral part of the Scottish landscape. Additionally, by maximising the restoration of peatlands, the geology will be directly supported. However, timescales for policies, plans, research and funding programmes for habitat restoration and management may mean that benefits are greater in the longer term.

Cultural heritage and historic environment:

Positive effects are identified from the peatland, woodland, blue carbon and agricultural soils subobjectives as maximising restoration of degraded peatland and marine habitats, implementation of the woodland carbon code (WCC), reviewing forestry strategies and effective woodland management and creation, and implementing sustainable and regenerative agricultural practices will increase and improve green and blue spaces, and alter the setting of heritage assets. These impacts are likely to increase as habitats are restored and vegetation matures. However, forestry and woodland expansion can impact on the setting of historic environment features and assets below ground, which can be disturbed by tree planting. Adverse impacts from woodland planting and expansion on the historic environment are ongoing, reflecting annual planting targets.

Overall, the actions regarding peatland, woodland, blue carbon and agricultural soils subobjectives are expected to have minor mixed effects in relation to cultural heritage and historic environment.

Material assets:

All actions are expected to have positive effects with relation to material assets. Peatland and marine research and restoration, improving woodland creation and management through plans, programmes and the WCC and sustainable and regenerative agriculture may increase economic opportunities for nature-based solutions, natural capital investment and maintenance and green tourism, and food and wood production. Furthermore, the expansion of knowledge surrounding the maximisation of peatlands, blue carbon habitats and woodlands condition and creation will also provide a wide range of ecosystem services. The benefits of these actions for ecosystem services may be enhanced through improving soil, air and water quality. It will also help improve economic benefits for the agricultural and aquaculture industries and provide skills enhancement and employment opportunities. Although some benefits will be realised in the short term, as habitats are restored, and vegetation matures.

Overall, a significant positive effect is expected for the current actions relating to agricultural soils and minor positive effects for the peatland, woodland and blue carbon subobjectives in relation to material assets.

Population and human health:

The actions relating to peatland, woodland, blue carbon and agricultural soils are expected to have minor positive effects for population and human health. Peatland and marine restoration, woodland creation and management and sustainable and regenerative farming reduce risks of climate change on population through providing natural solutions to cooling, improving air quality and minimising flood risk. Additionally, an increase in blue and green spaces could increase visual amenity, mental and physical health, increasing quality of life. The strengthening of our knowledge base on peatland maximisation, woodland creation and management, Scotland's blue carbon habitats and sustainable farming practices offers support for developing skills and employment for land based, agriculture and aquaculture sectors. These benefits are likely to become greater as habitat restoration and management plans are implemented and vegetation matures.

Mitigation and enhancement

None identified.

Outcome Two: Communities (C)

Objective: Place Based Collaboration (C1)

Place-based collaborations across Scotland have delivered effective, inclusive adaptation action across cities, regions and localities engaging a broader range of delivery partners.

Key areas of action include:

- Scotland is already undertaking pioneering collaborations on climate adaptation
- Local authorities are already leading collaborators on climate adaptation

Future actions include:

- Establishment by COSLA and Scottish Government of a joint climate delivery framework
- Wider partnership working and collaboration on climate adaptation
- Facilitation of mature regional adaptation partnerships and adaptations across Scotland by 2029
- Clarity in understanding of partnership working roles
- Continued implementation of the Place Principle
- Improved partnership working to deliver health benefits
- Support for development of Regional Marine Plans in three of Scotland's 11 marine regions – Shetland, Orkney and the Clyde.

Appendix C Assessment tables

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Place Based Collaboration	**Current**	0	++	+	+	+	+	+	+	+	++
	Future	+	++	+	+	+	+	+	+	+	++

Summary justification

Climate change mitigation:

A number of future actions outlined in this objective will all aid in mitigating climate change, though no current actions address this. For example, the joint climate delivery framework aims to include workable solutions to overcome barriers to delivery of emissions reduction, while Regional Marine Plans include legislative requirements to set climate change objectives, which may include objectives for climate change mitigation.

The effects of greater collaborative partnership work on climate change mitigation are anticipated in the medium to longer term, reflecting the time taken to establish the partnership working and lead to changes in management actions on the ground. Therefore, the actions in this objective are expected to have a minor positive effect in relation to climate change mitigation.

Climate change adaptation:

Both current and future actions of this objective primarily support strengthening place-based collaborations to coordinate effective climate adaptation, and enhanced partnership working, capacity building and finance for climate adaptation. For example the future action that the Scottish Government will work with local partners to identify options for progressing climate adaptation in the context of local needs and priorities and support for implementation of the place principle. Additional future actions facilitating collaborations for climate change adaptation include facilitating mature regional adaptation partnerships and collaborations covering all regions in Scotland by 2029, developing a routemap to extending mature regional collaborations on adaptation to all of Scotland by 2029 and increasing investment to adaptation collaborations and extend best practice to all areas of Scotland. In addition, setting out a clearer collective understanding of partnership working roles will enhance the quality of collaborations. Climate change adaptation actions which have been shaped by both collaborative and place-based approaches will be more effective and sustainable.

Therefore, the actions are expected to have a significant positive effect in relation to climate change adaptation. Current actions, such as implementation of the place principle, will continue to deliver benefits.

Biodiversity, flora and fauna:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as includes actions that also support climate change mitigation. Effective climate change adaptation and mitigation will include actions that result in indirect positive impacts on biodiversity, flora and

fauna. For example, by fostering ecosystem resilience, habitat creation such as via rewilding and afforestation and mitigating the impact of INNS. These positive impacts will likely be realised in the medium-long term.

Overall, the actions are expected to have a minor positive effect in relation to biodiversity, flora and fauna.

Water:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as includes actions that also support climate change mitigation. Effective climate change adaptation and mitigation will result in indirect positive impacts on Scotland's water environment. For example, by mitigating the negative impacts of temperature change in the medium-long term, such as droughts and eutrophication. Effective climate change adaptation and mitigation will also result in reducing the likelihood of flooding as well as resilience. For example, by directing new development away from areas at highest risk of flooding and appropriate flood defence infrastructure development. Further actions, such as the development of Regional Marine Plans will also result in positive effects on Scotland's water environment by protecting and enhancing Scottish marine environments, including by increasing their resilience to climate change. The timeline of effects in relation to Regional Marine Plans will depend on the timing of their implementation, though the majority of their benefits will likely be realised in the medium-long term post-implementation.

Therefore, the actions are expected to have a minor positive effect in relation to water.

Air:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as including actions that also support climate change mitigation such as the creation of a joint climate delivery framework. Effective climate change adaptation and mitigation will result in indirect and direct positive impacts on Scotland's air quality in the medium-long term. For example, climate change mitigation measures, as well as health-centred actions such as the Health in All Policies approach, would likely result in the mitigation of greenhouse gas emissions, thereby improving air quality. In addition, climate change adaptation measures will also likely include measures which improve air quality, such as the creation of green spaces and green infrastructure, which will encourage a modal shift to more sustainable forms for transport and reduce emissions.

Therefore, the actions are expected to have a minor positive effect in relation to air.

Soil:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as includes actions that also support climate change mitigation. Effective climate change adaptation and mitigation will result in indirect positive impacts on Scotland's soil environment. For example through collaborative partnership working to address soil stability or management. The effects of greater collaborative partnership work on soil are anticipated in the medium to longer term, reflecting the time taken to establish the partnership working and lead to changes in management actions on the ground. Therefore, the actions are expected to have a minor positive effect in relation to soil.

Landscape and geodiversity:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as includes actions that also support climate change mitigation such as the creation of a joint climate delivery framework. Effective climate change adaptation and mitigation will result in indirect mixed minor positive and minor negative impacts on Scotland's landscape. Climate change mitigation and effective climate change adaptation would likely result in increasing the resilience of Scotland's landscapes to the effects of climate change as well as facilitate the creation of green infrastructure. Actions such as implementing the Place Principle and the Place Standard Tool will result in development appropriate to its landscape. However some adaptation and mitigation actions will also result in landscape change, which could have negative impacts on landscape character and quality. Current actions, such as implementation of the place principle, will continue to deliver benefits.

Cultural heritage and historic environment:

The actions of this objective primarily support place-based collaborations to coordinate effective climate adaptation, as well as includes actions that also support climate change mitigation such as the creation of a joint climate delivery framework. Effective climate change adaptation and mitigation will result in indirect positive impacts on Scotland's historic environment. Increased partnership working and place based collaboration on climate change mitigation and effective climate change adaptation would likely result in increased consideration of impacts on the historic environment and enhanced resilience of Scotland's historic environment to the effects of climate change.

The effects of greater collaborative partnership work on cultural heritage and the environment are anticipated in the medium to longer term, reflecting the time taken to establish the partnership working and lead to changes in management actions on the ground. Therefore, the actions are expected to have a minor positive effect in relation to cultural heritage and historic environment.

Material assets:

While none of the actions directly impact Scotland's material assets, the actions of this objective support place-based collaborations to coordinate effective climate adaptation, as well as including actions that also support climate change mitigation such as the creation of a joint climate delivery framework. Effective climate change adaptation and mitigation will result in the protection of and mitigation of material assets from the negative impacts of climate change such as damage from more extreme weather and flooding. This is via actions outlined such as promoting a whole-place collaborative approach in creating resilient places and embedding adaptation in work to support the preparation and implementation of Local Development Plans. Enhanced collaboration and partnership working will contribute to improved consideration climate adaptation in relation to material assets.

The effects of greater collaborative partnership work on material assets are anticipated in the medium to longer term, reflecting the time taken to establish the partnership working and lead to changes in management actions on the ground. Therefore, the actions are expected to have a minor positive effect in relation to material assets.

Population and human health:

Supporting strengthening place-based collaborations to coordinate effective climate adaptation will result in positive outcomes for the health of Scotland's population as resulting actions will likely take into account the needs of local people and communities. For example, the Community Climate Adaptation Routemap promotes the protection and restoration of gardens and community green spaces, afforestation, creation of green and blue spaces and accessible cool and attractive outdoor public spaces; which all promote healthy and active lifestyles which support improved wellbeing. In addition, actions in this objective supports community resilience to climate change, this includes actions to continue to facilitate a collaborative community adaptation learning programme, by enabling communities to use Adaptation Scotland resources to integrate climate adaptation into wider community priorities.

In addition, the objective outlines that the Scottish Government commits to leading a Health Impact Assessment on the draft Adaptation Plan, which will enhance the overall positive influence of the Adaptation Plan on Scotland's health via aiding in improving population health, reducing health inequalities, and improving health and care system sustainability.

The effects of greater collaborative partnership work on population and human health are anticipated in the medium to longer term, reflecting the time taken to establish the partnership working and lead to changes in management actions on the ground. Therefore, the actions are expected to have a significant positive effect in relation to population and human health.

Mitigation and enhancement
None identified.

Objective: Community and Individual support (C2)

Communities and individuals are supported, informed, and able to take locally led adaptation action, supporting local priorities and resilient, healthy, and equitable places.

Current and future actions include:

- Scottish Government will continue to facilitate a national network of Climate Action Hubs to support communities to take forward climate action in their areas
- The Scottish Government, working through Adaptation Scotland, will continue to facilitate a collaborative community adaptation learning programme.
- The Scottish Government commits to undertaking a Health Impact Assessment on the SNAP.
- Continued delivery of the National Islands Plan and future review, delivery of the Carbon Neutral Islands project, development of investment strategies for project delivery for adaptation and resilience related finance
- Working with community groups to enhance marine protection, including managing risk to coastal communities, including nature-based solutions.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health

Community and individual support	**Current**	+	++	+	+	+	+	+	+	+	++
	Future	+	++	+	+	+	+	+	+	+	++

Summary justification

Climate change mitigation:

Many of the actions outlined in this objective also support climate change mitigation, as well as adaptation, in particular by raising community awareness of local climate change-related issues and opportunities and stimulating local action. The majority of these are current actions, with one being a future action, the review of the National Islands Plan. For example, Climate Action Hubs build awareness of the climate and nature emergency across all communities, stimulate community level action and enable cooperation and collaboration on climate change-related issues as well as help groups take up funding opportunities. The Carbon Neutral Islands project also serves to mitigate climate change for example via supporting community climate change actions plans. Minor positive effects are anticipated as a result of these actions, however, as these actions stimulate local discussions around climate change and associated action unique to each area, it is uncertain to what extent these actions will result in climate change mitigation measures being implemented. Existing and ongoing actions such as the Climate Action Hubs and Carbon Neutral Islands project will be delivering benefits already, however future actions such as the National Islands Plan review, which aims to contribute to climate change mitigation, will bring medium-long term benefits.

Climate change adaptation:

The majority of actions provide communities with knowledge and tools to aid in the implementation of local climate change adaptation. Such a bottom-up local-centred approach will likely lead to more effective and sustainable climate change adaptation as it will be more appropriate for local areas and their communities. The majority of these are current actions, with one being a future action, the review of the National Islands Plan. The actions of this objective empower and enable communities to take more effective action regarding climate change adaptation, supported by the Climate Action Hubs. Actions regarding Scotland's island communities such as the National Islands Plan also foster climate adaptation and resilience at a local-scale. Therefore, significant positive effects are identified. The majority of actions such as Climate Action Hubs and those associated with community adaptation learning programmes such as the Communities Climate Adaptation Routemap and Place Standard with a Climate Lense, these will be currently delivering benefits and also result in future positive effects. Future actions such as the National Islands Plan review, which aims to contribute to climate change adaptation, will bring medium-long term benefits.

Biodiversity, flora and fauna:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to biodiversity, flora and fauna as for example, they will likely lead to the protection, expansion and increased resilience of habitats, and also

mitigate adverse impacts on habitats and species from climate adaptation-related changes to air quality, water quality and quantity. For example, the Community Climate Adaptation Routemap promotes the protection and restoration of gardens and community green spaces, afforestation and improvement of land management to regenerate nature. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on local biodiversity, flora and fauna.

In addition actions to support climate adaptation and resilience in Scotland's island communities include the use of nature-based solutions to address the impacts of storms and sea level rise, such as kelp forests or seagrass beds. The creation of these habitats will have positive effects for biodiversity, flora and fauna. Minor positive effects are identified. The majority of these actions are existing and ongoing actions, such as the Community Climate Adaptation Routemap which will be delivering benefits already, however the future action of the National Islands Plan review, which currently includes actions to protect island biodiversity, will bring medium-long term benefits.

Water:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to water as for example, the quality and quantity of water will be negatively impacted by climate change and such actions will mitigate these impacts. In addition, actions such as the Place Standard with a Climate Lens will promote future development that is conscious of the effects of climate change thereby resulting in for example, development away from areas of flood risk, more resilient infrastructure, green infrastructure and SuDS. The Community Climate Adaptation Routemap also promotes communities to create blue spaces, install property level flood protection measures and use water efficiently. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on water. In addition, the actions which relate to marine protection and coastal communities will support the management of flood risk in these areas. This includes actions regarding Scotland's island communities which outlines actions to work with community groups to enhance marine protection, including for the purpose of protecting coastal communities from the impacts of storms and sea level rise in their local area. Minor positive effects are therefore identified. The majority of these actions are existing and ongoing actions, such as the Place Standard with a Climate Lens, Community Climate Adaptation Routemap and work with island community groups which will be currently delivering benefits and also result in future positive effects. The future action of the National Islands Plan review, which aims to contribute to climate change adaptation, will bring medium-long term benefits.

Air:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to air as for example, a key action to mitigate climate change is decreasing emissions and this will directly improve air quality. In addition, mitigation and adaptation measures also are likely to include actions such as a modal shift to more sustainable transport and the creation of more green space and afforestation, which also result in improvements to air quality. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on air. The delivery of the Carbon Neutral Islands project will also support improved air quality, particularly where island communities were previously reliant on fossil fuel based energy sources. Minor positive effects are therefore identified. The majority of these actions are existing and ongoing actions which will be delivering benefits already, however the future action of the National Islands Plan review, which currently includes actions to reduce emissions, will bring medium-long term benefits.

Soil:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to soil as for example, they will mitigate the degradation of Scotland's soils due to climate change, as well as result in actions which directly protect soils such as for their carbon storage value, and also indirectly protect soils through the protection and enhancement of green space and habitats. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on soil. Actions to address coastal erosion will provide additional protection to coastal soils. Minor positive effects are therefore identified. The majority of these actions are existing and ongoing actions which will be delivering benefits already, however the future action of the National Islands Plan review, which currently includes actions to mitigate climate change, will bring medium-long term benefits.

Landscape and geodiversity:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to Scotland's landscapes and townscapes as they will likely result in the protection and enhancement of the character and quality of Scotland's landscapes, townscapes and seascapes from the adverse effects of climate change, including improving the resilience of the landscape from the adverse effects of climate change. For example the Community Climate Adaptation Routemap promotes regenerating nature including via protecting and restoring gardens and

community green spaces. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on landscape from these actions.

Minor positive effects are therefore identified. The majority of these actions are existing and ongoing, such as Climate Action Hubs and those associated with community adaptation learning programmes such as the Communities Climate Adaptation Routemap and Place Standard with a Climate Lens, which will be currently delivering benefits and also result in future positive effects. The future actions of the National Islands Plan review, aims to contribute to climate change adaptation, and will bring medium-long term mixed effects.

Cultural heritage and historic environment:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to Scotland's heritage assets and their setting as they will likely result in the protection and enhancement of the character and quality of Scotland's historic environment from the adverse effects of climate change, including improving the resilience of the historic environment from the adverse effects of climate change. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on Scotland's historic environment. Actions to support marine protection in island communities may indirectly protect cultural heritage resources in coastal locations. Minor positive effects are therefore identified. The majority of actions are existing and ongoing which will be delivering benefits already, however the future action of the National Islands Plan review, currently includes actions to support cultural and historic resources and the sustainable management of the historic environment, will bring medium-long term benefits.

Material assets:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to Scotland's material assets as for example such measures will likely improve the protection and resilience of material assets such as infrastructure from the adverse effects of climate change such as flooding. Actions under the Carbon Neutral Islands project will support the development of low carbon energy infrastructure, and support the protection of coastal infrastructure. Furthermore, renewable energy and energy efficiency will also be promoted, for example the Community Climate Adaptation Programme promotes people becoming more energy efficient and independent. In addition, actions arising as a result of this objective are likely to be more sustainable and area appropriate as they are locally led, thereby likely reducing potential negative impacts on Scotland's material

assets. Minor positive effects are therefore identified. The majority of actions are current and existing ones such as those associated with community adaptation learning programmes such as the Carbon Neutral Islands project and Community Climate Adaptation Programme which will be currently delivering benefits and also result in future positive effects. The future actions of the National Islands Plan review, which includes aims to mitigate climate change, will bring medium-long term benefits.

Population and human health:

The actions within this objective will promote locally led climate change adaptation and mitigation action. Climate change mitigation and adaptation measures will likely be beneficial to the health of Scotland's population, for example via measures such as creation of green space and modal shift to sustainable transport, which will result in increased accessibility and healthy and active lifestyles. In addition, measures to mitigate climate change and increase resilience will also mitigate its negative impacts on health and services and facilities. The actions of this objective facilitate locally led and community-based actions which will result in more beneficial, effective and sustainable climate action being taken, increasing positive effects to communities, but also supporting participation and empowerment. For example, the Place Standard Tool with a Climate Lens promotes community-led development, resulting in improvements in the quality of living environments, while the Community Climate Adaptation Routemap promotes regeneration of nature, improving housing and neighbourhoods (including by creating accessible cool and attractive outdoor public spaces), creating edible community gardens, regenerating, maintaining and creating community facilities and developing shared transport solutions. The actions to support island communities will bring positive effects to these communities which are disproportionately impacted by the effects of climate change, with positive effects.

In addition, the future action of including a Health Impact Assessment on the draft Adaptation Plan will result in the actions of the Adaptation Plan, such as those in this objective, being more likely to improve population health and reduce health inequalities. The majority of actions are existing and ongoing, which will be delivering benefits already, however the two future actions of the Health Impact Assessment on the draft Adaptation Plan and the National Islands Plan review, which currently includes actions to address population decline and ensure a healthy, balanced population profile, will bring medium-long term benefits.

Overall significant positive effects are identified.

Mitigation and enhancement

None identified.

Appendix C Assessment tables

Objective: Preparation and Response (C3)

Communities and individuals are able and supported to prepare for, respond to and recover from emergencies in a way that builds future climate resilience, complements the work of emergency responders and protects those with vulnerabilities to multiple risks. This includes current and future actions in relation to:

- Building community resilience, including through the Scottish Government guidance, Building Resilient Communities.
- Resilience (general)

  providing increased public information on severe weather through the ready.scot website, and continuing to do so.

  Strengthened community resilience in emergencies in the context of climate change risks.

  Public Health Scotland will develop an Adverse Weather Health Protection Response Plan.
- Resilience (Flooding)

  the Scottish Government is developing the first National Flood Resilience Strategy for Scotland.

  in support of community flood resilience with Scottish Government will invest in flood forecasting and warning services, continue to develop policies around property flood resilience, ensure affordable flood insurance, and continue to support the Scottish Flood Forum.

  To provide early warnings of flood risks across Scotland through continuing to deliver and improve the Scottish Flood Forecasting and Warning Service.
- Resilience (wildfires)

- Take action to reduce the risk of wildfires across Scotland, and provide an effective response to wildfire incidents through education, training, review of the Muirburn code, address fire risk in forestry plantations, review the Scottish Outdoor Access Code in relation to ignition sources, develop partnership working with the land management sector, and improve information use.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Resilience (General)	**Current**	0	++	0	0	0	0	0	0	++	++
	Future	0	++	0	0	0	0	0	0	++	++
Resilience (Flooding)	**Current**	0	++	0	+	0	+	0	0	++	++
	Future	0	++	+	+	0	+	0	0	++	++
Resilience (Wildfires)	**Current**	+	++	++	0	+	++	++	+	++	++
	Future	+	++	++	0	+	++	++	+	++	++

Summary justification

Climate change mitigation:

The actions outlined in the General and Flooding subobjectives do not contribute to minimising greenhouse gas emissions from natural and man-made sources. Actions in the wildfires subobjective include current and future actions which aid in preventing wildfires, such as supporting the ongoing promotion of training for anyone who uses fire as a land management tool. Future actions include a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible, improving information dissemination regarding reducing the risk of wildfires, and a future review of the Scottish Outdoor Access Code. These actions provide a number of additional measures which will aid in the reduction of wildfires, reducing associated emissions which contribute to climate change as well as preventing the loss of carbon stored in trees and other such sinks. Although some of these measures are ongoing, such as the work of the Scottish Wildfire Forum, delivering actions in the shorter term, others such as the review of the Muirburn Code and Scottish Outdoor Access Code, the development of partnerships will take place in the medium term.

Therefore, minor positive effects are expected for this objective in relation to climate change mitigation.

Climate change adaptation:

All of the actions within this objective serve to aid in adaptation to the effects of climate change such as extreme weather, flooding and wildfires, including by increasing community resilience and resilience to wildfires through land management. Actions also include improving the quality of information available and the way it is disseminated, making information, such as weather/flood alerts and forecasting, more accessible. This will enable more people to make better informed decisions to help individuals and communities to adapt to the effects of climate change. In addition multiple actions such as hosting the Voluntary Sector Resilience Partnership and supporting the Scottish Flood Forum will enable different sectors and communities to work together, resulting in more effective climate change adaptation action. These actions build on current activity, which is already delivering benefits, in relation to general resilience, resilience to flooding and wildfires. However future actions seek to extend the range of actions through more learning and education, strengthened partnership working, enhanced information sharing alongside review of the Muirburn Code and Scottish Outdoor Access Code. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to the Muirburn Code or Scottish Outdoor Access Code. Therefore, significant positive effects are expected for this objective in relation to climate change adaptation.

Biodiversity, flora and fauna:

The actions outlined in the General and Flooding subobjectives are generally short-term actions regarding response to extreme weather and/or flooding which will result in negligible effects, but flooding resilience actions include the future action of developing a National Flood Resilience Strategy for Scotland which will support working with nature to reduce flood impacts, which will impact positively on this objective.

The wildfires subobjective includes actions outlining more preventative measures which will result in the mitigation of wildfires in Scotland, and therefore protection of Biodiversity, flora and fauna. Current actions include supporting the ongoing promotion of training for anyone who uses fire as a land management tool, and improving information dissemination regarding reducing the risk of wildfires, linking it to long term forest plans for individual forest areas. There are also ongoing positive effects from current actions being taken by the Scottish Fire and Rescue Forum and Scottish Wildfire Forum to reduce fire risk, and indirectly to protect biodiversity, flora and fauna. Future actions include a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible and strengthening assessment of wildfire risk. This action, as part of wider contingency planning over catastrophic loss of forest areas, will directly result in the protection of forests and associated habitats. The outlined future actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to the Muirburn Code or Scottish Outdoor Access Code.

Therefore, significant positive effects are expected for this objective in relation to biodiversity, flora and fauna.

Water:

Both the current and future actions outlined in the Flooding subobjective will result in more people being aware of flood risk in their area, including how flood risk changes in response to the weather. This includes ongoing and improved flood forecasting and warning services, including the Future Flood and Incident Messaging Service and potential Future Flood and Incident Messaging Service. Current and improved flood forecasting and improved dissemination of this information will allow people to make informed decisions regarding flood risk in their area, both in terms of short term risk management and longer term planning, therefore reducing overall flood risk and mitigating associated effects. The actions build on current actions, with positive effects occurring in the short term, and also reflect actions which will take place in the short-long term from 2024-2028. Therefore, minor positive effects are expected for this objective in relation to water.

Air:

The actions outlined in the General and Flooding resilience subobjectives do not contribute to minimising greenhouse gas emissions from natural and man-made sources.

Wildfires current and future actions include those which aid in preventing wildfires. Current actions support the ongoing promotion of training for anyone who uses fire as a land management tool and improving information dissemination regarding reducing the risk of wildfires. While future actions include a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible. This will aid in the reduction of wildfires, reducing associated emissions and therefore improving air quality. There are ongoing positive effects from current actions being taken by the Scottish Fire and Rescue Forum and Scottish Wildfire Forum to reduce fire risk, and indirectly to protect biodiversity, flora and fauna, The outlined future actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to the Muirburn Code or Scottish Outdoor Access Code.

Therefore, minor positive effects are expected for this objective in relation to air.

Soil:

Climate change will exacerbate extreme events such as flooding and wildfires, which can subsequently harm soil resources. For example, floods negatively affect soil structure and stability and induce reducing conditions in soil, altering dissolved organic carbon, alkaline metals, and redox-sensitive elements. The actions outlined in the flooding subobjective will result in more people being aware of flood risk in their area, including how flood risk changes in response to the weather. This includes ongoing and improved flood forecasting. Current and improved flood forecasting and improved dissemination of this information will allow people to make informed decisions regarding flood risk in their area. This may include decisions which consider and protect Scotland's soils, including the siting of flood defences and implementation of other flood management schemes such as natural flood management. The actions build on current actions, with positive effects occurring in the short term, and also reflect actions which will take place in the short-long term from 2024-2028, with minor positive effects are expected for the flooding subobjective in relation to soil.

In addition, wildfires can negatively affect soil, for example via decreasing the total nutrient pool through processes of oxidation, volatilization, ash transport, leaching, and erosion. Wildfires on peat soils are particularly damaging to this soil resource. Actions in the wildfires subobjective include actions which aid in preventing wildfires, such as supporting the ongoing promotion of training for anyone who uses fire as a land management tool, a future comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible, improving information dissemination regarding reducing the risk of wildfires, and a future review of the Scottish Outdoor Access Code. These actions provide a number of additional measures which will aid in the reduction of wildfires, thereby protecting soils. Although some of these measures are ongoing, such as the work of the Scottish Wildfire Forum, delivering actions in the shorter term, others such as the review of the Muirburn Code and Scottish Outdoor Access Code, the development of partnerships will take place in the medium term. Therefore, significant positive effects are expected for the wildfires subobjective in relation to soil.

Landscape and geodiversity:

The actions outlined in the General and Flooding subobjectives are generally short-term actions regarding response to extreme weather and/or flooding, with limited landscape impacts. However, the Wildfires subobjective includes actions outlining more preventative measures which will result in the mitigation of wildfires in Scotland, and impact on landscape change. Impacts on landscape could arise from changes in management of the land to reduce fire risk, and reduced fire risk limiting the visual impact of a wildfire event. Landscape changes could arise from the comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible and reduced fire risk as a result of improving information dissemination regarding reducing the risk of wildfires. In addition, the action to, as part of wider contingency planning over catastrophic loss of forest areas, strengthen assessment of fire risk linking it to long term forest plans for individual forest areas, will directly result in the protection of forests and therefore short-term dramatic change in landscape character. There are ongoing positive effects from current actions being taken by the Scottish Fire and Rescue Forum and Scottish Wildfire Forum to reduce fire risk, and limit changes to landscape character, The outlined future actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to the Muirburn Code or Scottish Outdoor Access Code.

Therefore, significant positive effects are expected for this objective in relation to landscape and geodiversity.

Cultural heritage and historic environment:

All of the actions within this objective include improving the quality of information available and the way it is disseminated, making information, such as weather/flood alerts and forecasting, more accessible. Improved information provision will help those who manage cultural heritage and historic environment assets in their response to climate change. The Wildfires subobjective includes actions outlining more preventative measures which will result in the mitigation of wildfires in Scotland, and therefore likely the protection of certain historic assets and their setting. These include supporting the ongoing promotion of training for anyone who uses fire as a land management tool, a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible and improving information dissemination regarding reducing the risk of wildfires. These actions build on current activity, which is already delivering benefits, in relation to general resilience, resilience to flooding and wildfires. However future actions seek to extend the range of actions through more learning and education, strengthened partnership working, enhanced information sharing alongside review of the Muirburn Code and Scottish Outdoor Access Code. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for their delivery. Therefore, minor positive effects are expected for this objective in relation to cultural heritage and historic environment.

Material assets:

All of the actions within this objective support adaptation to the effects of climate change such as extreme weather, flooding and wildfires. Many of these actions will result in the protection and/or resilience of material assets such as buildings from such effects. For example, actions include increasing the quality of information relating to how the public can prepare their home, family, and business for disruption caused by climate change-associated extreme weather and emergencies, as well as increasing the quality of such information's dissemination, increasing its accessibility. In addition, current and improved flood forecasting and improved dissemination of this information outlined in actions in the Flooding subobjective, will allow people to make informed decisions regarding flood risk in their area, in particular regarding appropriate local development, therefore reducing overall flood risk and mitigating associated effects. The Wildfires subobjective also outlines actions to continue to provide good quality information to empower property owners to protect their properties from wildfires.

Furthermore, the Wildfires subobjective includes actions outlining more preventative measures which will result in the mitigation of wildfires in Scotland, and therefore protection of material assets. These include supporting the ongoing promotion of training for anyone who uses fire as a land management tool, a comprehensive review of the Muirburn Code to ensure vegetation/fuel management is as effective as possible and improving information dissemination regarding reducing the risk of wildfires. In addition, the action to, as part of wider contingency planning over catastrophic loss of forest areas, strengthen assessment of fire risk linking it to long term forest plans for individual forest areas, will directly result in the protection of forest-related assets. The actions build on current activity, which is already delivering benefits, in relation to general resilience, resilience to flooding and wildfires. However future actions will further enhance protection of material assets. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to the Muirburn Code or Scottish Outdoor Access Code.

Therefore, significant positive effects are expected for this objective in relation to material assets.

Population and human health:

Climate change impacts health in a myriad of ways, including by leading to death and illness from increasingly frequent extreme weather events, such as heatwaves, storms and floods, the disruption of food systems, increases in diseases, and mental health issues. Wildfires can impact directly on property and livelihoods, air quality and disrupt access to essential services. All of the actions within this objective support adaptation to the effects of climate change such as extreme weather, flooding and wildfires, thereby mitigating negative health effects. In particular, the plan outlines the creation of an Adverse Weather Health Protection Response Plan,

which will initially focus on public health messaging- this will further strengthen positive outcomes for Scotland's population's health and well-being and increasing community resilience.

For example, in the General subobjective, there are multiple actions focusing on strengthening community resilience such as via hosting the Voluntary Sector Resilience Partnership to maintain and strengthen links between those involved in resilience arrangements and support the Scottish Fire and Rescue Service together with third sector and statutory responders, to further develop the Community Asset Register to ensure access is improved to deploy voluntary sector assets. In addition, the flooding subobjective also outlines actions to continue to support the Scottish Flood Forum, an independent charity that facilitates a network of community resilience groups in areas at risk of flooding. These actions not only support community resilience but enhance community cohesion and empowerment.

In addition, the Wildfires subobjective includes actions outlining more preventative measures which will result in the mitigation of wildfires in Scotland, and therefore protection of assets beneficial to health and wellbeing in Scotland, such as forests and recreational space and the mitigation of harm to the quality of the living environment of people and communities.

The actions build on current activity, which is already delivering benefits, in relation to general resilience, resilience to flooding and wildfires. However future actions will further enhance protection of population and human health. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for these to bring benefits. Therefore, significant positive effects are expected for this objective in relation to population and human health.

Mitigation and enhancement

The actions for general resilience refer to extreme weather events, but don't specify the potential impacts of drought on vulnerable rural and island communities, which typically rely on private water supplies or have a greater reliance on rainfall to maintain water supply.

Objective: Objective: New and existing Buildings (C4)

New buildings are designed for a future climate, and opportunities for adaptation in existing buildings are taken during maintenance or retrofit.

New Buildings

- Scottish building regulations now include measures to address overheating in new homes and some other new residential buildings
- Potential revised guidance in Building Standards Technical Handbooks in relation to property flood resilience for new buildings and new building work
- Greater understanding of climate data to inform future building specifications and building regulations standards
- Current requirement of NPF4 to support adaptation to the current and future impacts of climate change

Existing and traditional buildings

- Current requirement of NPF4 to support development proposals to retrofit measures to existing developments that reduce emissions or support adaptation to climate change

To build household flood resilience, and as part of the Living with Flooding action plan:

- Scottish Government will continue to raise awareness of the benefits of property flood resilience and encourage property owners, the construction and insurance industries, and the public to implement property flood resilience measures.
- Scottish Flood Forum offers advice and information to individuals to help them protect their homes from flooding or to recover from flooding.
- Flood Re makes affordable flood insurance available to flood-prone households and businesses.

- HES is undertaking research on adapting buildings to climate change, and the impacts of climate change on traditional buildings
- HES will disseminate advice and guidance to owners of traditional buildings and other heritage assets.

To support climate resilience in the public sector estate:

- the **Scottish Government's Green Public Sector Estate Decarbonisation Scheme** supports energy efficiency including support for cooling systems.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
New Buildings	**Current**	0	++	-	+	0	0	+/-	+/-	++	+
	Future	0	++	-	+?	0	0	+/-	+/-	++	+
Existing and Traditional Buildings	**Current**	+	++	-	+	0	0	+/-	+/-	++	+
	Future	+	++	-	+	0	0	+/-	+/-	++	+

Summary justification

Climate change mitigation:

Regarding the new buildings subobjective, current requirements for Scottish building regulations to include measures to address overheating in new homes and some other new residential buildings may mean that actions that will reduce energy requirements for cooling are taken, such as increasing the solar reflectivity of walls and roofs, thus aiding climate change mitigation. However, this is not a specific requirement of the plan and thus this requirement is assessed as having negligible effects in relation to climate change mitigation for both current and future scenarios.

Therefore, negligible effects are expected for new buildings in relation to climate change mitigation.

Several of the current and future actions regarding the existing and traditional buildings subobjective will aid in climate change mitigation. This includes the current action to support development proposals that include retrofit measures to existing developments that reduce emissions. In addition, the plan includes actions outlining the research Historic Environment Scotland undertakes to supporting the innovative solutions and technologies that will be required to deliver adaptation. This includes research that supports climate change mitigation via improving energy efficiency, thereby reducing emissions, such as research regarding appropriate energy efficiency and low emission heating retrofit in traditional buildings, and on the measurable benefits of reusing, adapting and upgrading traditional buildings with appropriate materials and techniques to make them more energy efficient (in preference to demolition and new construction). In addition, some of the actions support education around climate change, which may help to encourage further action on climate change mitigation.

Future actions outlined in the existing and traditional buildings subobjective which will aid in climate change mitigation include refurbishment Case Studies covering retrofit projects to avoid maladaptation and encourage best practice, and an updated Guide to Energy Retrofit.

Existing and ongoing actions will be delivering benefits already, however future actions such as an updated Guide to Energy Retrofit and a refreshed Historic Environment Scotland Guide to Climate Change Adaptation will bring benefits and in the longer term. In particular the update of the Scottish Government's Green Public Sector Estate Decarbonisation Scheme will require overheating risk to be addressed, this may mean that actions that will reduce energy requirements for cooling are taken, such as increasing the solar reflectivity of walls and roofs, thus aiding climate change mitigation, however such actions are not a specific requirement of the plan.

Therefore, minor positive effects are expected for existing and traditional buildings subobjective in relation to climate change mitigation.

Climate change adaptation:

Existing and planned actions relating to the existing and traditional buildings sub objectives are likely to have significant positive effects in relation to climate change adaptation. In particular, actions to address overheating and food resilience and flood risk, including the Living with Flooding action plan have a focus on climate change adaptation. In addition, some of the actions support collating and disseminating information to organisations and the public, for example work to update climate data, HES research regarding traditional buildings and HES advice and guidance. This will result in more effective decision-making regarding climate change adaptation.

Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to review and consult on any changes to guidance currently being developed such as the guidance within Section 3.3 of the Building Standards Technical Handbooks and Historic Environment Scotland Guide to Climate Change Adaptation.

Therefore significant positive effects are expected for both subobjectives.

Biodiversity, flora and fauna:

The development of both new buildings and existing and traditional buildings has the potential to impact biodiversity, flora and fauna. In particular, traditional buildings can be important places for biodiversity, for example by providing places for nesting for animals such as birds and bats. Actions regarding the existing and traditional buildings subobjective includes those which support retrofit and adaptation of buildings to climate change, though do not take account of potential harm of these actions to biodiversity associated with these buildings. In addition, the development of new buildings designed for a future climate should provide alternatives so as to protect and/or enhance biodiversity.

Minor negative effects are therefore expected for both subobjectives in relation to biodiversity, flora and fauna. These are for both current and future actions as they both contribute to potential harm to biodiversity, and future actions are not assessed to either mitigate of intensify these effects.

Water:

Regarding new buildings actions which support this SEA objective include the current review and consideration of the guidance within Section 3.3 (Flooding and groundwater) of the Building Standards Technical Handbooks, with a focus on property flood resilience. The current existence of Section 3.3 aid in mitigating flooding, while its future review may result in positive effects regarding water as these aim to help mitigate future new buildings at flood risk. However there is uncertainty here

as work regarding the guidance is currently ongoing. In addition, the current action requiring planning authorities to take account the National Planning Framework 4 in the creation of LDPs include guiding development away from vulnerable areas, further supports reducing flood risk.

Regarding the existing and traditional buildings subobjective, many of the current and future actions support adapting to climate change, which may include actions which reduce flood risk and the impact of flooding to existing and traditional buildings. Future actions which support this include a refreshed Historic Environment Scotland Guide to Climate Change Adaptation and refurbishment Case Studies covering adaptation projects to avoid maladaptation and encourage best practice.

More specific actions in this subobjective which will result in positive effects regarding water are all current actions, which include those supporting increasing flood resilience, and as part of the Living with Flooding action plan. These include continuing to raise awareness of the benefits of property flood resilience and encouraging property owners, the construction and insurance industries, and the public to implement property flood resilience measures, the Scottish Flood Forum offering advice and information to individuals to help them protect their homes from flooding or to recover from flooding, and Flood Re making affordable flood insurance available to flood-prone households and businesses.

Existing and ongoing actions such as the Living with Flooding action plan and will be delivering benefits already as well as into the medium-term due to the time taken for learning and education in relation to education-based actions, however future actions such as the update of guidance within Section 3.3 of the Building Standards Technical Handbooks will bring benefits in the longer term as they will influence design of buildings to reduce flood risk.

Therefore, minor positive effects are expected for existing and traditional buildings in relation to water.

Air:

The actions of this objective do not directly affect air. Therefore, negligible effects are expected for both new buildings and existing and traditional buildings in relation to air.

Soil:

The actions of this objective do not directly affect soil. Therefore, negligible effects are expected for both new buildings and existing and traditional buildings in relation to soil.

Landscape and geodiversity:

This objective will aid in the mitigation of negative effects of climate change on Scotland's landscapes and townscapes by supporting the protection and increased resilience of heritage assets from climate change impacts. Regarding new buildings, this also includes actions which will take into account climate risks and result in the siting of buildings in less vulnerable areas.

However, the adaptation of both new and existing buildings to climate change may negatively affect the quality of landscapes and townscapes. The actions, particularly regarding new buildings, do not address this potential for harm to Scotland's landscapes.

Existing and ongoing actions such as the Living with Flooding action plan and will be delivering benefits already as well as into the medium-term due to the time taken for learning and education in relation to education-based actions, however future actions such as the update of guidance within Section 3.3 of the Building Standards Technical Handbooks will longer term effects as they will influence design of buildings.

Therefore, mixed minor effects are identified for both new buildings and existing and traditional buildings subobjective in relation to landscape.

Cultural heritage and historic environment:

This objective will aid in the mitigation of negative effects of climate change on Scotland's historic environment by supporting the protection and increased resilience of heritage assets from climate change impacts.

However, the adaptation of both new and existing buildings to climate change may negatively the quality and setting of Scotland's historic environment. The actions, particularly regarding new buildings, do not address this potential for harm to Scotland's historic environment. Though the actions regarding existing and traditional buildings do support the undertaking of research and public education regarding appropriate adaptation and minimising maladaptation.

Existing and ongoing actions which support the protection and increased resilience of heritage assets such as the Living with Flooding action plan and will be delivering benefits already as well as into the medium-term due to the time taken for learning and education in relation to education-based actions. However actions affecting the design of buildings such as the future update of guidance within Section 3.3 of the Building Standards Technical Handbooks will longer term effects as they will influence design of buildings.

Therefore, mixed minor effects are identified for both new buildings and existing and traditional buildings subobjectives in relation to cultural heritage and historic environment.

Material assets:

All of the actions of this objective aid in mitigating negative effects of climate change on current and future buildings, including by supporting building design taking into account and enabling adaptation to risks, increasing their resilience to the effects of climate change and siting future development in areas of lower risk, for example regarding flood risk. In addition, a number of the actions in this objective encourage increasing the energy efficiency of existing and traditional buildings, in particular through the Scottish Government's Green Public Sector Estate Decarbonisation Scheme.

Existing and ongoing actions will be delivering benefits already, however future actions such as an updated Guide to Energy Retrofit and a refreshed Historic Environment Scotland Guide to Climate Change Adaptation will bring benefits and in the longer term. In particular the update of the Scottish Government's Green Public Sector Estate Decarbonisation Scheme will require overheating risk to be addressed, this may mean that actions that will reduce energy requirements for cooling are taken, such as increasing the solar reflectivity of walls and roofs, thus aiding climate change mitigation and associated protection of material assets, however such actions are not a specific requirement of the plan.

Therefore, significant positive effects are identified for both new buildings and existing and traditional buildings in relation to material assets.

Population and human health:

Many of the actions support adapting to climate change, including actions which will improve the resilience of buildings to climate change as well as reducing climate change risks, through supporting siting new buildings in areas of less risk to climate change impacts such as flooding. These actions will result in the mitigation of negative climate change impacts on the quality of Scotland's living environment as well as on community and health-related buildings and associated services such as GPs and community centres.

In particular, regarding new buildings, the action outlining that current Scottish building regulations including measures to address overheating in new homes and some other new residential buildings, directly improves the health and wellbeing of Scotland's population. Regarding existing buildings, the Scottish Government's Green Public Sector Estate Decarbonisation Scheme also supports the mitigation of overheating risk.

Existing and ongoing actions such as measures to address overheating will be delivering benefits already, and actions which involve educating people and communities regarding improving resilience of buildings will occur in the short-medium term, reflecting the time taken for learning and education. However future actions such as the refreshed Historic Environment Scotland Guide to Climate Change Adaptation and update to the Scottish Central Government Energy Efficiency Grant Scheme will bring benefits and in the longer term.

Therefore, minor positive effects are identified for both new buildings and existing and traditional buildings in relation to population and human health.

Mitigation and enhancement

Provide requirements supporting protections to biodiversity in both the design of new buildings and regarding adaptation and retrofitting of existing and traditional buildings.

Provide requirements supporting the protection of landscape and historic environment regarding the design and adaptation of both new buildings and existing and traditional buildings.

Objective: Culture and Historic Environment (C5)

Scotland's historic environment is preparing for a future climate, and the transformational power of culture, heritage and creativity supports Scotland's adaptation journey. Key areas of action relate to:

Historic Environment

Culture

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Historic Environment	**Current**	+	++	+/-	+	+	+	+	++	+	+
	Future	+	++	+	+	+	0	+	++	+	+

Culture	**Current**	+	++	+	0	0	0	+	++	+	+
	Future	+	++	0	0	0	0	0	++	+	+

Summary justification

Climate change mitigation:

Actions relating to historic environment and culture, including the Our Past, Our Future (OPOF) strategy and Historic Environment Scotland (HES) climate resilience interventions, the policies and principles in Historic Environment Policy for Scotland (HEPS) and commitment to the forthcoming culture strategy action plan are likely to have significant positive effects in relation to climate change mitigation. Carbon emissions will be reduced from low carbon interventions, such as energy efficiency improvements, and repairing and improving the resilience of historic buildings and sites, as well as promoting change mitigation through culture. These include through actions such as targets set out in plans and strategies, education, support and guidance, HES grants framework grant policy 4, improving the delivery of heritage skills training and mainstreaming climate change risk assessment into policy. Additionally, commitments to the culture action plan refresh are likely to positively influence climate mitigation through engagement with Scottish National Culture for Climate (SNaCC) group, Creative Scotland reporting on the progress of the climate emergency and sustainability plan and integrating the environmental sustainability funding criteria, and Museum Galleries Scotland developing a climate network to facilitate sharing of best practice, resources and expertise. Benefits are likely to be greater in the longer term once plans have been updated and actions are implemented.

Overall, all actions are expected to have significant positive effects in relation to climate change mitigation except future actions for the culture subobjective where a minor positive effect is expected as no direct actions are set out for climate change mitigation.

Climate change adaptation:

Existing and planned actions relating to historic environment and culture are likely to have significant positive effects in relation to climate adaptation. Through the OPOF strategy, the HEPS policies, HES grants framework grant priority 4, education and guidance, the climate action plan, mainstreaming climate change risk assessment into policy, low carbon building solutions, the historic environmental skills investment programme, future climate adaptation plan, Creative Scotland's environmental sustainability funding criteria and developing capabilities using the Adaptation Capability Framework, historical and cultural assets will be sustainably repaired and maintained, reducing historical building vulnerability to become more resilient to climate change threats. Furthermore, embedding environmental and climate resilience priorities into new developments across National Galleries of Scotland sites and identification of opportunities for nature-based adaptation solutions, as well as building resilience across the sector through development of a climate network will help reduce the impact of climate change on vulnerable sites. Although the benefits are likely to be greater in the longer term once plans have been updated and actions are implemented.

Biodiversity, flora and fauna:

Certain actions regarding 'Historic Environment' and current 'Culture' are expected to have a minor positive contribution in relation to biodiversity, flora and fauna. This includes actions to safeguard and enhance the climate resilience of heritage sites which will indirectly benefit the associated biodiversity, fauna and flora, such as delivering a climate vulnerability index to all Scottish World Heritage Sites, such as St Kilda where Soay sheep inhabit, as well as providing advice and heritage grant programmes for adaptation measures, expanding the skills investment, sustainable asset management, protecting sites from coastal erosion, expanding sector knowledge and the conservation Area Regeneration Scheme / Heritage and Place Programme. Additionally, biodiversity will be directly positively influenced through the HES climate action plan, which currently includes actions to conserve and increase biodiversity, and the National Galleries of Scotland environmental sustainability report and the National Library of Scotland 2023 climate action plan which identifies opportunities for nature-based adaptation solutions to help improve biodiversity on sites and highlights local opportunities for staff to get involved in to contribute to Scotland's biodiversity targets. However, biodiversity may be negatively affected in the short term from SCAPE projects, as excavation projects to protect heritage assets from erosion could disturb habitats, reducing biodiversity, flora and fauna. Although, some benefits will be realised in the short term, greater benefits, for example from the conservation Area Regeneration Scheme, will be in the longer term once conservation actions are implemented and vegetation matures.

Overall, the actions are expected to have **minor positive** effects in relation to biodiversity, flora and fauna, except for current 'historic environment' actions, where a mixed (minor positive / minor negative) effect is expected. For future actions for 'culture' a **negligible** effect is identified.

Water:

Positive effects are expected towards water quality, quantity, and flood risk regarding the OPOF, HES grants frameworks grant priority 4 and the HES current and future climate action plan. This includes repairing, sustainably managing and adapting historic assets, for example through increasing the size of rainwater goods or heavier gauge lead sheeting, as well as for HES to provide education, guidance and support, which will improve the resilience of assets to flood risk. Additionally, the current HES action plan reduces water consumption across by setting specific reduction targets, improving monitoring, and looking at innovative approaches to water efficiency and reuse. Although targets for the future action plan are unknown. Furthermore, timescales for policies, plans, and funding programmes for historic asset restoration and enhancement may mean that benefits are greater in the longer term.

Overall, minor positive effects are expected for historic environment and **negligible** effects are identified for culture in relation to water.

Air:

The restoration and enhancement of historic buildings and sites through the OPOF strategy, HES grants framework, education, climate action plan, historic skills investment plan under the 'Historic Environment' subobjective are likely to have positive effects with relation to air quality. The sustainable recovery of buildings and assets and implementation of low carbon solutions increase the efficiency of buildings, reducing emissions and the associated pollutants and therefore improving air quality. This could have subsequent benefits for population and human health. These benefits will increase over time as policies, funding and plans are put into action.

Overall, minor positive effects are expected for the historic environment actions regarding air, whereas negligible effects are identified for actions relating to culture.

Soil:

Minor positive effects are identified for current 'historic environment' actions as through the protection of sites from coastal erosion, soil associated with the site will be indirectly safeguarded from erosion. No significant effects are identified for the remaining subobjectives regarding soil.

Landscape and geodiversity:

All actions are expected to have minor positive effects in relation to landscape and geodiversity. HEPS, SCAPE (Scotland's Coastal Archaeology and the Problem of Erosion) HES' grants framework grant priority 4, conservation area regeneration scheme/ heritage and place programme and expanding the skills investment plan are expected to restore and build the climate resilience of important heritage assets. The maintenance of these buildings and sites all contribute to supporting geology and the landscape/ townscape character and how it is perceived. For example through implementing a climate vulnerability index to Scottish World Heritage Sites will aid the understanding of threats to the sites that are integral to the Scottish landscape. Additionally, improving opportunities for nature-based adaptation solutions on national gallery sites will improve the visual amenity of the landscape/townscape setting. These effects have the potential to exasperated in the future climate adaptation plans. However, timescales for policies, plans, funding programmes for historic asset restoration and enhancement may mean that benefits are greater in the longer term.

Cultural heritage and historic environment:

All existing and planning actions are expected to have significant positive effects regarding cultural heritage and historic environment. Historical and cultural assets will become more resilient to climate change hazards such as flooding through education, HEPS, SCAPE, HES grants frameworks grant priority 4, OPOF strategy, HES climate action plan, Climate Vulnerability Index, Historic Environment skills investment plan, engaging with the SNaCC group who safeguard and promote cultural heritage to contribute to climate change solutions the National Galleries of Scotland Environmental Sustainability Report and National Library of Scotland

2023 Climate Action Plan, the National Museums Scotland Climate Adaptation Plan, Creative Scotland integrating Environmental Sustainability Funding Criteria and develop adaptation capabilities using the Adaptation Capability Framework and Museums Galleries Scotland building a climate network. These effects have the potential to exasperated in the future climate adaptation plans. However, timescales for policies, plans, funding programmes for historic and cultural asset restoration and enhancement may mean that benefits are greater in the longer term.

Material assets:

All actions are expected to have minor positive effects with relation to material assets. A number of actions outlined in this objective are likely to increase monitoring of climate risks, repairing and improving historic and cultural assets to improve resilience to climate threats and improving material assets and economic opportunities for tourism including the HEPS, SCAPE, HES Grants Framework's Grant Priority 4, OPOF, HES climate action plan, Climate Vulnerability Index to all Scottish World Heritage Sites, National Library of Scotland 2023 Climate Action Plan, National Galleries of Scotland Environmental Sustainability Report, National Museums Scotland Climate Adaptation Plan and SNaCC group which promotes cultural heritage. Benefits are likely to be greater in the long term once the actions set out in the plans are implemented.

Population and human health:

All actions are expected to have minor positive effects with relation to population and human health. The HEPS, SCAPE, HES Grants Framework's Grant Priority 4, OPOF, HES climate action plan, Climate Vulnerability Index to all Scottish World Heritage Sites, National Library of Scotland 2023 Climate Action Plan, National Galleries of Scotland Environmental Sustainability Report, National Museums Scotland Climate Adaptation Plan, SNaCC group which promotes cultural heritage and Creative Scotland to include an environmental sustainability funding criteria and develop adaptation capabilities are likely to increase monitoring of climate risks, repairing and improving historic and cultural assets to improve resilience to climate threats, developing skills and employment, and improving public recreational enjoyment and cultural benefits. Additionally, improving air quality and minimising flood risk through restoring and creating more efficient buildings and sites are likely to improve mental and physical health. Benefits are likely to be greater in the long term once the actions set out in the plans are implemented.

Mitigation and enhancement

None identified.

Outcome 3: Public Services

Objective: Public service providers (PS1)

Providers of public services have the governance, culture, skills and resources and are collaborating in effective, inclusive adaptation action. Actions to deliver this objective are focused on maturing the public sectors capacity to adapt, as a necessary foundation for taking effective and inclusive adaptation action.

Key areas of action relate to:

- Continual support for the delivery of the Public Bodies Climate Change Duties (PBCCD) including updated statutory guidance on public bodies climate change duties by 2025, with continued annual reporting by public bodies, and increased use by Scottish Government of the analysis of these returns
- Continued support for the use of the Adaptation Scotland programme including enhanced learning and best practice through the Public Sector Climate Adaptation Network, and expansion of membership.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic	Material assets	Population and human health
Public service providers	**Current**	0	++	0	0	0	0	0	0	0	0
	Future	0	++	0	0	0	0	0	0	0	0

Summary justification

Climate change mitigation:

No significant effects identified.

Climate change adaptation:

The actions under public service providers include supporting the Public Bodies Climate Change Duties and continuing to support the Adaptation Scotland Programme. Supporting public sector organisations will help to enhance climate change adaptation across local authorities and Scotland. Publishing updated statutory guidance on public bodies climate change duties will provide further guidance and information to help the public sector adapt. Supporting advanced adaptation capabilities will further support and enhance the ability of the public sector to adapt to climate change. However, it is unclear what these adaptation methods could be.

Overall, significant positive effects are expected in relation to climate change adaptation. These effects are expected to be in the short to long term, as the updated statutory guidance on public bodies climate change duties and the development of further resources for the Adaptation Capability Framework are anticipated by 2025. Other actions such as improved use of the analysis of PBCCD returns and shared learning and best practice from expansion of the Public Sector Adaptation Network are anticipated to result in effects in the medium to longer term.

Biodiversity, flora and fauna:

No significant effects identified.

Water:

No significant effects identified.

Air:

No significant effects identified.

Soil:

No significant effects identified.

Landscape and geodiversity:

No significant effects identified.

Cultural heritage and historic environment:

No significant effects identified.

Material assets:

No significant effects identified.

Population and human health:

No significant effects identified.

Mitigation and enhancement

The Public Bodies Climate Change Duties requires public bodies to contribute to climate change mitigation and adaptation and act sustainably. By acting sustainably, there is the potential for positive effects against all SEA topics. However, in the context of these actions it is unclear whether this is still the case as the actions focus on adapting to climate change only. The actions could consider mitigating the impacts of climate change through the Public Bodies Climate Change Duties.

Objective: Accessing Public Services (PS2)

People are able to access the public services they need - including health, education, social care and infrastructure - by the designing, managing and maintaining services, estates and assets to be resilient and equitable in the changing climate. Key areas of action relate to:

Essential Services and Critical Infrastructure in Scotland

Health and Social Care

Education

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Essential Services and Critical Infrastructure in Scotland	**Current**	0	++	0	0	0	0	0	0	++	++
	Future	0	++	0	0	0	0	0	0	++	++
NHS and Social Care	**Current**	0	++	0	+	0	0	+	0	++	++
	Future	0	++	+	+	0	+	++	0	++	++
Education	**Current**	0	++	+	+	+	+	++	0	++	++
	Future	0	++	+	+	+	+	++	0	++	++

Summary justification

Climate change mitigation:

No significant effects identified.

Climate change adaptation:

The actions under essential services and critical infrastructure in Scotland, NHS and social care, and education are likely to have significant positive effects in relation to climate change adaptation. The actions under essential services and critical infrastructure in Scotland and NHS and social care will increase adaptation and resilience of buildings and infrastructure to climate change including extreme weather events such as flooding. Additionally, building the resilience of school estates through the education actions will further exasperate adaptation measures by creating climate resilient infrastructure. This will reduce the risk of damage to buildings and infrastructure as a result of climate change. The effects are likely to be in the long term as existing infrastructure will have to be enhanced.

Overall, all actions relating to Essential Services and Critical Infrastructure in Scotland, NHS and Social Care and Education are expected to have significant positive effects with respect to climate change adaptation.

Biodiversity, flora and fauna:

Positive effects are expected for actions regarding NHS and social care and actions outlined within education with regards to biodiversity, flora and fauna. Actions to develop and manage green spaces and other green infrastructure such as green roofs could provide spaces for wildlife and increase vegetation cover. In relation to education, the LEIP and the future climate ready school groups project, could result in ta richer and more resilient biodiversity. For example, the Nature restoration of 5 acres of unused school grounds at Levenmouth Academy. Additionally, funding through the SFC Net Zero Framework enables projects which will indirectly benefit biodiversity, such as the sustainable aquaculture innovation centre and the GALLANT project in Glasgow, which takes a whole-systems approach to the transition including nature adaptation. Timescales for funding, plan development, habitat restoration and infrastructure development mean benefits are likely to be greater in the longer term.

Overall, minor positive effects are expected for NHS and social care and education in relation to biodiversity, flora and fauna.

Water:

Actions relating to NHS and Social Care and education could directly mitigate flood risk through the creation of greenspace and raingardens and building the resilience of school estates to help manage periods of drought and flooding. This also includes through projects required to be approved by Local Authority Flood Officers with input from Scottish Environmental Protection Agency and Scottish Funding Council supporting projects such as sustainable aquaculture and vertical farming and reducing pollutants entering watercourses. Additionally, Climate Ready School Grounds project seeks to address water management via outdoor learning, using school climate surveys and advising mitigation measures. As well as this, actions under the NHS and Social Care require the assessment of flood risk for all sites and the incorporation of water saving measures. Overall, these actions will have a positive effect on minimising the impacts of flood risk and lowering water use.

Overall, minor positive effects are expected for NHS and Social Care and Education in relation to water.

Air:

Positive effects are expected for the actions for education. Through the Learning Estate Investment Programme and Climate Ready School Grounds project, the Scottish Government and Local authorities will continue to build the resilience of school estates which could improve air quality. However, the actions under Education are not clear in what measures will improve air quality. These effects are expected in the short to long term.

Minor positive effects are expected for education in relation to air.

Soil:

Improvements in managing and enhancements to greenspace / green infrastructure through actions under education and NHS and social care are likely to have positive effects in relation to soils. Developing and managing greenspace could safeguard and enhance soil structure. Furthermore, measures that educational institutions will take to respond to the climate emergency, such as hedgerow planting, water management and classroom lessons on decomposition through the climate ready school grounds project is likely to improve the resilience of soils. Improvements in soils may have subsequent benefits for water and climate change by reducing surface water flooding. Although some benefits will be realised in the short term, there will be greater benefits as habitats are restored and vegetation matures.

Overall, minor positive effects are expected for NHS and social care and education in relation to soil.

Landscape and geodiversity:

All actions are expected to have positive effects in relation to landscape and geodiversity. The townscape/landscape and geodiversity is likely to be indirectly safeguarded through actions that adapt health and educational infrastructure to improve resilience to future climate risks, such as through the KSR programme, increased collaboration and engagement regarding climate risks, supporting resilience of public services, carrying out climate change and flood risk assessments, following requirements of the ISO 14090: Adaptation to climate change, engagement to understand risks, data sharing within resilience planning and implementing the GIS climate change hazard and vulnerability mapping tool. These actions identify the likelihood and impact of future climate hazards and allow resilience planning to preserve important features of townscapes/landscapes, supporting geology and the landscape character and how it is perceived. The benefits are particularly significant for future actions to create and restore green spaces for health and social care, and for all actions relating to education due to the resilience building of schools to create richer landscapes, for example the Nature restoration of 5 acres of unused school grounds at Levenmouth Academy under the climate ready school grounds project. However, timescales to develop plans and actions taken to mitigate risks will mean benefits are likely to be greater in the longer term.

Minor positive effects are identified for essential services and critical Infrastructure in Scotland and current health and social care actions, education and future health and social care subobjectives in relation to landscape and geodiversity.

Negligible effects are identified for Essential Services and Critical Infrastructure in Scotland.

Cultural heritage and historic environment:

No significant impacts identified.

Material assets:

All actions are expected to have significant positive effects in relation to material assets. The actions under Essential Services and Critical Infrastructure in Scotland, NHS and Social Care and Education will support the resilience of healthcare facilities and educational establishments to climate change. This will help protect them from damage caused by extreme weather events as a result of climate change, reducing the costs of repairs to buildings in the future. Additionally, the enhancement of green spaces, investment into natural capital research and sustainable agriculture and aquaculture will enhance ecosystem services and economic opportunities for nature-based solutions, natural capital investment, and food production. These benefits are likely to be in the long term as new infrastructure will be required to support the resilience of buildings.

Population and human health:

The actions relating to essential services and critical infrastructure in Scotland, NHS and social care and education are expected to have significant positive effects for population and human health. The enhancement of health and educational infrastructure to make them resilient to the effects of climate change will help ensure that these services continue to be available even during extreme weather events. This will ensure that key services, such as healthcare, social care, education and public health services, remain available having a positive impact on health and wellbeing particularly for those within vulnerable communities. These benefits are likely to be in the long term as new infrastructure will be required to support the resilience of buildings.

Mitigation and enhancement

The actions relating to essential services and critical infrastructure in Scotland, NHS and social care and education are expected to have significant positive effects for population and human health. The enhancement of health and educational infrastructure to make them resilient to the effects of climate change will help ensure that these services continue to be available even during extreme weather events. This will ensure that key services, such as healthcare, social care, education and public health services, remain available having a positive impact on health and wellbeing particularly for those within vulnerable communities. These benefits are likely to be in the long term as new infrastructure will be required to support the resilience of buildings.

Objective: Power Assets and the Energy System (PS3)

Power assets and the energy system have reduced vulnerability to the impacts of climate change, and the most vulnerable people are identified and supported during and after instances of power failure. The actions under this objective relate to ensuring the resilience of the energy and electricity networks while transitioning to net zero.

Key areas of action include:

- Engage with the UK Government through their Review of Electricity Market Arrangements.
- Update our Energy Strategy and Just Transition Plan.

- Engage with UKG counterparts with a view to securing appropriate SG representation on governance bodies set up to implement the recommendations of the independent electricity network commissioner Nick Winser for accelerating electricity transmission network deployment.
- Scottish Government and local authorities will roll out the Persons at Risk Distribution (PARD) system across Scotland.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic	Material assets	Population and human health
Power assets and the Energy System	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	0	0	0	0	0	0	0	+	+

Summary justification

In relation to action 3 under this objective, the aim of the Nick Winser Review is to make grid improvements easier and quicker to implement. This could have environmental impacts due to the installation of new grid lines resulting in negative effects on the SEA topics. However, the action under this objective relates to engagement with and representation on appropriate governance bodies to implement the Nick Winser review. Therefore, negligible effects have been identified in relation to most of the SEA Topics as the action will not result in grid improvements as provided within the Nick Winser review.

Climate change mitigation:

One of the actions under the Power assets and the energy system supports progressing towards net zero through engaging with the UK Government through their review of Electricity Market Arrangements. Transitioning to net zero will help in reducing the consumption of fossil fuels lowering greenhouse gas emissions and mitigating the effects of climate change.

Overall, minor positive effects are expected in relation to climate change mitigation.

Climate change adaptation:

No significant effects identified.

Biodiversity, flora and fauna:

No significant effects identified.

Water:

No significant effects identified.

Air:

No significant effects identified.

Soil:

No significant effects identified.

Landscape and geodiversity:

No significant effects identified.

Cultural heritage and historic environment:

No significant effects identified.

Material assets

The actions under Power assets and the Energy system will help enhance the resilience of the energy systems in Scotland. The actions also support reducing the use of fossil fuels for energy which could lower the extraction of natural resources that are finite. Increasing energy storage through updating the Energy Strategy and Just Transition Plan will further increase the resilience of Scotland's energy network by helping to reduce the incidences of blackouts by having a back up supply of energy when required.

Overall, minor positive effects are expected in relation to material assets. These effects are expected in the long term.

Population and human health:

Ensuring the resilience of the energy networks through the actions under Power assets and the Energy system will help ensure an adequate supply of energy to homes and businesses. In addition, progressing to net zero will encourage the use of low carbon and renewable energy instead of fossil fuels. In addition, the Nick Winser Review supports enhancements to grid infrastructure which will support decarbonising the economy and providing clean and affordable electricity to households. This could have a positive impact on reducing energy costs for households and businesses as fossil fuels can be impacted by changing market conditions and supply and demand that can raise energy costs. Rolling out the Persons at Risk Distribution (PARD) system across Scotland will help local authorities and the NHS to identify vulnerable individuals during an emergency, such as an extreme weather event. This will ensure that the people most in need are reached which could include vulnerable people, ensuring they have a continual supply of electricity to their homes.

Overall, minor positive effects are expected in relation to population and human health. these effects are expected in the long term. **Mitigation and enhancement** There are no actions within this objective in relation to the use of renewable energy.

Objective: Transport system (PS4)

The transport system is prepared for current and future impacts of climate change and is safe for all users, reliable for everyday journeys and resilient to weather-related disruption.

- Trunk Roads – development and publication of a Trunk Roads Adaptation Plan by 2025, building network resilience, develop a biodiversity strategy by 2025, incorporating how biodiversity can increase resilience, management of disruption risk, review and update of high wind, flood and landslide management plans, Continued engagement and collaboration with Transport Scotland on trunk road adaptation and resilience.
- Rail Network – increased adaptation and resilience of the rail network
- Aviation Network
- Maritime Network
- Canals

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health

Trunk Roads	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	++	+	+	0	+	+ ?	0	++	+
Rail Network	**Current**	0	++	0	0	0	0	0	0	++	+
	Future	0	++	0	+	0	0	0	0	++	+
Aviation Network	**Current**	0	++	0	0	0	0	0	0	++	+
	Future	0	0	0	0	0	0	0	0	0	0
Maritime Network	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	+	0	0	0	0	0	0	++	+
Canals	**Current**	++	++	++	++	+	0	+?	+	++	+
	Future	0	0	0	0	0	0	0	0	0	0

Summary justification

Climate change mitigation:

Actions set of out in Transport Scotland's 2023 Approach to Climate Change Adaptation and Resilience and in Scottish Canals Corporate Plan 2023-28 are likely to have significant positive effects with respect to climate mitigation. Scottish canals will implement a net zero action plan, aiming to reduce direct carbon emissions and define scope 3 emissions, as well as embrace new research and partnerships to support renewable energy production, reducing emissions and carbon footprint. Additionally, the 2023 Approach to Climate Change Adaptation and Resilience sets out aims to decarbonise transport, reducing emissions from the transport sector. Although these effects are likely to become greater as actions set out in the plans are implemented. The remaining actions are identified to have negligible effects for climate change mitigation.

Climate change adaptation:

Actions relating to 'Transport Scotland', 'Rail Network', current 'Aviation Network', future 'Maritime Network' and current 'Canals' are expected to have significant positive effects with respect to climate change adaptation. Actions to monitor climate risks and support the adaptation and resilience of transport infrastructure include developing adaptation plans, knowledge sharing and collaboration on climate change adaptation and resilience, managing disruption risk, reviewing high wind, flood and landslide management plans, delivering action plans associated with the Weather Risk Taskforce recommendations, climate risk assessments and investing in renewable energy and adaptive technologies will increase the resilience of transport infrastructure to climate hazards. This increased resilience will ensure operating companies are prepared for any effects of climate change in the future. This effect is likely to become greater as objectives set out in plans are put into place in the medium to longer term.

Biodiversity, flora and fauna:

Actions identified regarding Transport Scotland, Scottish Canals and plans for future trunk roads are expected to have minor positive effects in relation to biodiversity, flora and fauna. Through the transport Scotland 2023 Approach to Climate Change Adaptation and Resilience, biodiversity will be enhanced through habitat creation and preservation. Additionally, trunk roads will develop a biodiversity strategy by 2025, which is likely to increase biodiversity, flora and fauna through these actions. Through the Scottish Canals corporate plan 2023-28 aims, new research, technology, stewardship action and monitoring and improving the resilience of canal assets

will address biodiversity loss and maximise the biodiversity value of the canal network. These effects are likely to become greater as actions set out in the plans are implemented in the medium to longer term. The remaining actions are identified to have negligible effects for biodiversity, flora and fauna.

Water:

The 'Transport Scotland', future 'Trunk Road' and 'Rail Network' and current 'Canal' actions are expected to have a positive contribution in relation to water. Through the transport for Scotland 2023 Approach to Climate Change Adaptation and Resilience, water use will be reduced through installing utility water metering, water saving flush and tap systems and maintenance. Improved rail drainage strategy and trunk road management through the regular review of flood management plans and building resilience, such as tree planting schemes to reduce surface water runoff during heavy rainfall events, will reduce flooding risk. For the remaining actions, negligible effects are identified.

Air:

Minor positive effects are identified for actions regarding Transport Scotland's 2023 Approach to Climate Change Adaptation and Resilience and Scottish Canals corporate plan. Through the decarbonisation of transport and investment in renewable energy production, emissions from petrol and diesel vehicles are expected to reduce, reducing the pollutants in the atmosphere, and therefore improving air quality. As actions set out in the plans are implemented, this effect is likely to become greater.

No significant effects are identified for remaining actions.

Soil:

Landslide management plans will contribute positively to manage impacts on soils, with minor positive effects identified.

Landscape and geodiversity:

The 'Transport Scotland', future 'Trunk Road' and 'Rail Network' and current 'Canal' actions are expected to have a minor positive contribution in relation to landscape and geodiversity. The transport Scotland's 2023 Approach to Climate Change Adaptation and Resilience sets out that work undertaken on trunk roads must take account of the impact on the environment and local landscape character. Additionally, actions to enhance the trunk road environment such as tree planting, and the future biodiversity strategy are likely to support landscape settings and geology. This effect is also likely to benefit the landscape and geodiversity of Scottish canals

through safeguarding and enhancing Scottish Canals. Although as actions from the plans are implemented and vegetation matures, benefits are likely to become greater in the long term. For the remaining actions, negligible effects are identified.

Cultural heritage and historic environment:

Negligible effects are expected for all actions except the current canal actions, where a **minor positive** effect is identified with regards to cultural heritage and historic environment. Through the corporate plan 2023-28, heritage assets will be protected and enhanced through monitoring, designing new and replacement infrastructure using traditional materials, and modelling and quantifying the physical and social impact on heritage structures, to build the resilience of assets. This effect is likely to become greater in the long term as targets to build heritage canal infrastructure resilience of are put into action.

Material assets:

Actions relating to 'Transport Scotland', 'Rail Network', current 'Aviation Network', future 'Maritime Network' and current 'Canals' are expected to have significant positive effects with respect to material assets. Increasing awareness and improving the resilience of transport infrastructure through monitoring climate risks, adaptation plans, knowledge sharing and collaboration on climate change adaptation and resilience, managing disruption risk, reviewing high wind, flood and landslide management plans, delivering action plans associated with the Weather Risk Taskforce recommendations, climate risk assessments and investing in adaptive technology will safeguard transport assets and increase the resilience of transport infrastructure to climate hazards to any future climate risks. This effect is likely to become greater in the long term as targets to build resilience are put into action.

Population and human health:

All actions are expected to have minor positive effects with relation to population and human health. The monitoring of climate risks and enhancement of transport infrastructure through adaptation plans, knowledge sharing and collaboration on climate change adaptation and resilience, managing disruption risk, reviewing high wind, flood and landslide management plans, delivering action plans associated with the Weather Risk Taskforce recommendations, climate risk assessments and investing in adaptive technology will ensure there are no significant disruption to services, improving the reliability of flight and sustainable transport options. Increased awareness of climate risk may also benefit people in their personal lives. Additionally, enhancing the associated landscape and biodiversity, such as through actions that will be set out in the trunk road biodiversity strategy, the visual amenity of transport areas will be increased, improving mental health. This effect is likely to become greater in the long term as targets to build resilience are put into action and vegetation matures.

Mitigation and enhancement

None identified.

Objective: Water, Sewerage and Drainage (PS5)

The management of water, sewerage and drainage services builds resilience to drought and flooding and protects water quality and quantity.

Key areas of action relate to:

- Water:

  invest more to protect and enhance our water services.

  The Scottish Government will consider responses to the Water, wastewater and drainage public consultation, with outcomes to be reflected, where relevant, in the final Adaptation Plan.

- Flooding:

  Develop a Hydrology Monitoring Framework and review how our Future Hydrometric Design can build evidence around climate change.

  Update our coastal and surface water flood hazard maps to include the latest information including climate change projections.

Review and publish areas most at risk within Scotland. This will include a review of Potentially Vulnerable Areas in 2024 and the Flood Risk Assessment Scotland (FRAS) in 2025. FRAS is reviewed every six years and identifies the current and future risk of flooding to communities, businesses and infrastructure.

work closely with other organisations responsible for managing flood risk to ensure that a nationally consistent approach to flood risk management is adopted; provide flood risk advice to land use planning in Scotland when requested; and raise awareness of flooding at a national level through education initiatives, community engagement and campaigns.

During severe flooding, local authorities will work with the emergency services and co-ordinate shelter for people evacuated from their homes.

- Drought / Water Scarcity:

  Updating Scotland's National Water Scarcity Plan.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Water	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	+?	+?	++?	0	0	+?	0	+?	+?
Flooding	**Current**	0	+	0	++	0	0	+	+	++	+
	Future	0	+	0	++	0	0	+	+	++	+
	Current	0	+	+	++	0	+	0	0	0	+

Drought / Water Scarcity	**Future**	0	+	+	++	0	+	0	0	0	+

Summary justification

Climate change mitigation:

No significant effects identified.

Climate change adaptation:

Actions under water, flooding and drought / water security are likely to have significant positive effects in relation to climate change adaptation. The water, wastewater and drainage public consultation and its effect on the final Adaptation Plan, updates to the National Water Scarcity Plan, flood risk and hazard maps, Local Flood Risk Management Plans and future Hydrology Monitoring Framework have a focus on climate change adaptation, including through the sustainable management of water resources and collection and dissemination of information to enhance decision making and reduce risk posed by climate change impacts.

Overall, minor positive effects are expected for the actions, though uncertainty exists in relation to the water subobjective as the consultation is primarily exploratory work, so there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

Biodiversity, flora and fauna:

The Water action outlines the ongoing water, wastewater and drainage public consultation, of which the Scottish Government will consider responses to with outcomes to be reflected, where relevant, in the final Adaptation Plan. The Water, wastewater and drainage public consultation will likely aid in the mitigation of water-related issues which could have an impact on Scotland's marine environment, including water pollution and the impacts of drought and flooding, through exploring how to adapt Scotland's water, sewerage and drainage services in the face of climate change. In addition considering networking small blue-green infrastructure into bigger networks could support habitat creation. However, as this is primarily exploratory work, there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

Therefore, uncertain minor positive effects are expected for Water in relation to Biodiversity, flora and fauna.

Furthermore, Scotland's National Water Scarcity Plan aids in mitigating the impacts of prolonged dry weather on the environment via the sustainable management of water resources, this includes the negative effects of droughts on biodiversity, flora and fauna such as the degradation and destruction of habitats.

Therefore, minor positive effects are expected for Drought / Water Scarcity in relation to Biodiversity, flora and fauna.

Water:

All of the actions within this objective will have significant positive effects on water.

The water, wastewater and drainage public consultation explores options which will aid in improving the quality and quantity of Scotland's water, such as a legal requirement to plan for Scotland's water resources to understand what amount will be needed, where it will be required and have a system for allocating it fairly, catchment management, and reducing the risk of spills from sewer overflows. The consultation also explores options to network small blue-green infrastructure into bigger networks, which will result in more effective management of surface water and drainage. However, as this is primarily exploratory work, there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

Actions regarding flooding, such as those which involve the collection and dissemination of information regarding flooding, developing a Hydrology Monitoring Framework, updating coastal and surface water flood hazard maps and reviewing and publishing areas most at risk within Scotland, will result in more informed decisions and direct new development away from areas at highest risk of flooding. This will help avoid inappropriate development in areas at risk of flooding.

Scotland's National Water Scarcity Plan aims to sustainably manage water resources prior to and during periods of prolonged dry weather, thereby helping to preserve and enhance the quantity of Scotland's waterbodies and groundwater.

Air:

No significant impacts identified. Soil:

Scotland's National Water Scarcity Plan aids in mitigating the impacts of prolonged dry weather on the environment via the sustainable management of water resources. This will also result in benefits to Scotland's soils, as droughts can degrade soil quality, for example by impacting the soil's underlying organisms and microbial networks[1]. These effects are expected in the medium to long term.

Therefore, minor positive effects are expected for Drought / Water Scarcity in relation to soil.

Landscape and geodiversity:

The action for Water outlining the ongoing water, wastewater and drainage public consultation and subsequent reflection of these findings in the final Adaptation Plan, may result in positive outcomes for Scotland's landscapes. This is because it explores adapting water, sewerage and drainage services in the face of climate change,

with options including ones which would aid in the mitigation of the negative effects of climate change on the landscape. In particular the option for networking small blue-green infrastructure into bigger networks would aid in protecting landscape character. However, as this is primarily exploratory work, there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

The actions outlined regarding flooding will also aid in protecting the landscape from the negative impacts of flooding, the risk of which will increase over time due to climate change. For example, a number of actions involve the collection and dissemination of information regarding flooding, such as updating coastal and surface water flood hazard maps and reviewing and publishing areas most at risk within Scotland. This information will support organisations and individuals in protecting landscape and townscapes from the impacts of flooding.

Therefore, minor positive effect is expected for water and flooding in relation to landscape and geodiversity. A degree of uncertainty is expected in relation to the actions under water. These effects are expected in the medium to long term.

Cultural heritage and historic environment:

The actions outlined regarding flooding will aid in protecting Scotland's historic environment from the negative impacts of flooding, the risk of which will increase over time due to climate change. For example, a number of actions involve the collection and dissemination of information regarding flooding, such as updating coastal and

[1] https://www.nature.com/articles/s41467-018-05516-7

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surface water flood hazard maps and reviewing and publishing areas most at risk within Scotland. This information will support organisations and individuals in protecting historic assets and their settings from the impacts of flooding.

Therefore, a minor positive effect is expected in relation to flooding for cultural heritage and historic environment.

Material assets:

The action for Water may result in the increased efficiency of water usage. In particular, the water, wastewater and drainage public consultation explores the options of a legal requirement to plan for water resources to understand requirements, areas of water need and have a system for allocating it fairly, using less drinking water and actions to better manage rainwater. However, as this is primarily exploratory work, there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

The actions outlined in relation to flooding will also have positive effects regarding Scotland's material assets, including buildings and infrastructure, as they are enhanced to mitigate the impacts of flooding. For example, a number of actions involve the collection and dissemination of information regarding flooding, such as developing a Hydrology Monitoring Framework, updating coastal and surface water flood hazard maps and reviewing and publishing areas most at risk within Scotland. This information will support organisations and individuals to protect their material assets from the impacts of flooding.

Population and human health:

The action for Water outlining the ongoing water, wastewater and drainage public consultation and subsequent reflection of these findings in the final Adaptation Plan, will likely have positive effects on the health of Scotland's population. The availability of good quality water is vital to human health and climate change will affect this via impacts such as increased frequency of periods of prolonged dry weather. The consultation explores options which help mitigate such impacts such as for a legal requirement to plan for Scotland's water resources to understand what amount will be needed, where it will be required and have a system for allocating it fairly, and using less drinking water for general purposes, and a quicker process for responding to water shortages. The consultation also explores options which aid in improving water quality, which will have a direct positive impact on health via improved drinking water. Also, the quality of recreational waters may improve, encouraging more people to have healthier and active lifestyles. In addition, the consultation explores networking small blue-green infrastructure into bigger network, which will encourage healthier and more active lifestyles, as well as aid in the improvement of mental wellbeing. These actions will also generally help improve the resilience of communities, particularly those most vulnerable to climate change. However, as this is primarily exploratory work, there is uncertainty around to what extent and in what ways the findings of the consultation will be implemented to create effective positive change.

The actions outlined regarding flooding also aid in improving the health of Scotland's population by helping organisations and individuals to mitigate the negative impacts of flooding on people and communities. Local Flood Risk Management Plans will also increase the effectiveness of decisions made regarding mitigating flood risk, as they contain more place-specific information.

Scotland's National Water Scarcity Plan has positive effects on the health of Scotland's population as the sustainable management of water resources aids in the mitigation of impacts of prolonged periods of dry weather on people and communities. This will likely be enhanced by the plans planned update which will consider lessons learned and the water usage framework to be implemented by SEPA.

Mitigation and enhancement

None identified.

Outcome Four: Economy, Business and Industry (B)

Objective: Increasing business awareness of climate risks (B1)

Businesses are supported to embed the risks of climate change into governance, investment and operations, and are collaborating in effective, inclusive adaptation action.

Key areas of action relate to:

- Increasing awareness of climate risk;
- Support and advice;
- Business and flooding;
- Business and coastal erosion; and,

- Business and water scarcity.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Increasing awareness of climate risk	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+?	++	0	0	0	0	0	0	+	+
Support and advice	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+?	++	0	0	0	0	0	0	+	+
Business and flooding	**Current**	0	0	0	+	0	0	0	0	0	0
	Future	+	+	0	+	0	0	0	0	++	+
Business and coastal erosion	**Current**	0	+	0	0	0	0	0	0	0	+
	Future	0	+	0	0	0	0	0	0	0	+

Business and water scarcity	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	+	0	+	0	0	0	0	+	+

Summary justification

Climate change mitigation:

Actions to improve businesses awareness of the risks of climate change and prepare them for adaptation to climate change may have indirect positive effects on climate change mitigation. Educating businesses about the potential impacts of climate change and how they can adapt to a changing climate may encourage them to change their behaviours. For example, this could include switching from fossil fuel derived to renewable forms of energy. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education.

Minor positive but uncertain effects are identified for 'Increasing awareness of climate risk' and 'Business and Flooding'.

Climate change adaptation:

Actions to support innovation in adaptation and resilience in a range of businesses and the development of climate resilient products and services is expected to have positive effects in relation to climate change adaptation. The increased awareness and understanding of climate risks and adaptation measures for businesses will help ensure they are prepared for any effects of climate change in the future. The actions include disseminating information on climate risk and providing business with a suite of tools, resources and training material to assist them in being ready for the future effects of climate change. In addition, the 'Business and Flooding' actions include incorporating recommendations made in the Water Resilient Places Policy Framework (2021) into relevant policies, including recently the Fourth National Planning Framework (NPF4). The 'Business and Water Scarcity' actions include implementing legislation which seeks to ensure sewerage and drainage services can adapt to the impacts of climate change. In addition, investment in flood resilience delivery plans and flood risk information, will help reduce the severity of impact from future flooding events. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education, the development of partnerships and the likely time required to incorporate recommendations made in the Water Resilient Places Policy Framework (2021) into relevant policies.

Biodiversity, flora and fauna:

No significant effects identified.

Water:

The ‘Business and Flooding’ and ‘Business and Water Scarcity’ actions are expected to have a positive contribution in relation to water. Actions to support the long-term water supply for businesses and further investment in water and sewerage services is expected will have benefits on the water environment. This positive effect is expected to be enhanced with the consideration of climate change adaptation to avoid water scarcity in legislation. In addition, the dissemination of knowledge surrounding flooding information and strategies to Scottish businesses and the collaboration of the Scottish Government, Met Office and SEPA during flooding events is expected to have current and future positive effects on water, by minimising flood risk and the effects of it. Actions which build on current activity will be delivered in the shorter term, and additional actions are anticipated in the short to medium term, reflecting the time taken for learning and education.

Air:

No significant effects identified.

Soil:

No significant effects identified.

Landscape and geodiversity:

No significant effects identified.

Cultural heritage and historic environment:

No significant effects identified.

Material assets:

All actions are expected to have positive effects with relation to material assets. Increased awareness and understanding of climate adaptation and climate risks for businesses will support the resilience of businesses across Scotland. Actions which support adaptation to coastal erosion will support protection of coastal assets including property and infrastructure. Actions include disseminating information on climate risk and providing business with a suite of tools, resources and training material to assist them in being ready for the future effects of climate change. They also seek to ensure the long-term supply of water for businesses and that water infrastructure can adapt to climate change. In addition, investment in flood resilience delivery plans and flood risk information, and collaboration between the Scottish Government, Met Office and SEPA during flooding events will help reduce the severity of impact from future flooding events, having positive effects on material

assets. Overall, providing this information to businesses and investing further in flood resilience will help increase the viability of businesses, with subsequent benefits for population and human health.

Therefore minor positive effects have been identified in relation to future actions of the subobjectives Increasing awareness of climate risk, Support and advice and Business and water scarcity. The subobjective of Business and flooding is identified to have a significant positive effect as flooding is a key impact of climate change on business.

Population and human health:

All actions are expected to have positive effects with relation to population and human health. Increased awareness and understanding of climate adaptation and climate risks for businesses will increase their resilience, with positive effects expected. Actions include consideration of coastal change risks to business, disseminating information on climate risk, providing resources and support for businesses to plan and protect their staff from weather-related emergencies is also expected to result in positive effects on the population in the medium-long term. Business resilience will indirectly support population and human health in the long term as a result of improved financial stability and the health and wellbeing of those employed in these industries. Increased awareness of climate risk may also benefit people in their personal lives, and not just when related to business. Actions also seek to ensure the long-term supply of water, which is crucial for the health and wellbeing of the population.

Mitigation and enhancement

None identified.

Objective: Farming, Fishing and Forestry (B2)

Farming, fishing and forestry businesses are supported to adapt production and operations in a way that benefits livelihoods, resilience and the economy in a changing climate.

Key areas of action relate to:

- Advice, Skills and Funding;
- Agriculture Opportunities Research;
- Pests and Agriculture;
- Forestry Sector;
- Fishing and aquaculture

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Advice, skills and funding	**Current**	0	+	+	0	0	0	0	0	+	+
	Future	+	++	++	0	+	0	+/-?	+/-?	+	+
Agricultural opportunities research	**Current**	0	0	0	0	0	0	0	0	+	0
	Future	0	+	0	0	0	0	0	0	+	0
Pests and agriculture	**Current**	0	+	+	0	0	0	0	0	+	+

	Future	+	+	+	+	0	0	0	0	+	+
Forestry sector	**Current**	+	+	+	0	0	0	0	0	+	0
	Future	+	+	+	+	0	0	0	0	+	0
Fishing and aquaculture	**Current**	0	0	+	0	0	0	0	0	+	0
	Future	+	+	+	+	0	0	0	0	++	+

Summary justification

Climate change mitigation:

Actions to support farming, fishing and forestry businesses in relation to climate change mitigation include requiring half of all agricultural funding to be conditional for delivering for climate and nature, including climate adaptation. This is likely to result to result in reductions in carbon emissions, which will have positive effects on climate mitigation. Similarly, the continued promotion of tree planting through the Forestry Grant Scheme will increase tree planting and subsequently carbon sequestration, with further benefits for climate change mitigation.

In addition, actions which support increasing awareness of the risks of climate change, and helping these businesses prepare for adaptation to climate change, such as research and knowledge sharing may have indirect positive effects on climate change mitigation. Actions identified for 'Fishing and aquaculture' include delivering emission reductions across the sector in line with Net Zero targets, with direct positive effects on climate change mitigation.

Minor positive effects are identified for 'Forestry sector' and 'Fishing and aquaculture', and 'advice, skills and funding'. Benefits are likely to be greater in the long term as vegetation matures.

Climate change adaptation:

Except for 'Farming and the wider agriculture sector', all sectors are expected to have positive effects with relation to climate change adaptation. Many actions included under this objective are focussed on climate change adaptation. These actions range from supporting innovation, to promoting training, skill development and knowledge sharing across peers. The increased awareness and understanding of climate risks and adaptation measures will help inform new policies and will help ensure businesses are prepared for any effects of climate change in the future. In addition, actions include improvements in funding and financial support for farmers and crofters will help support them in adapting to and increasing the resilience of their businesses to climate change. It is expected that from 2025, half of agricultural funding will be condition on delivering for climate, including climate adaptation. This will likely increase the uptake of climate adaptation measures across the agricultural industry, having positive effect.

Additionally, agricultural related actions include the Rural and Environment Science and Analytical Services Division (RESAS) investing in innovation and research about crop and livestock resilience as part of creating a sustainable food system, and research into how land management can slow water flow through and over land,

and store water during wet weather events. These actions will help improve the resilience of the agricultural industry to climate change, in terms of producing crops and livestock, and will help adapt to climate change during wet weather when there may be flooding or surface water.

With relation to forestry, actions include working with steering groups to identify barriers to adaptation in the industry, creating resilience action plans, and providing additional information on adaptation measures. In addition, actions seek to strengthen the assessment of species suitability for Forestry Grant Scheme woodland creation to ensure the best species are selected based on climate change predictions. These actions are likely to have positive effects in helping the forestry industry adapt and remain resilient to the effects of climate change.

Similar research and knowledge sharing is proposed in the fishing and aquaculture sector, including identifying commercially or environmentally important species which are vulnerable to climate change and preparing climate resilience plans to help manage risks and opportunities. Such actions are expected to help the aquaculture industry adapt to climate change.

Overall, positive effects are expected for all sectors with relation to climate change adaptation. These positive effects are expected to be significant with relation to 'Advice, skills and funding' as actions will require half of all agricultural funding to be conditional on delivering climate and nature benefits, including climate adaptation. Overall, it is considered that the actions across this objective could lead to significant positive effects. Benefits are likely to be greater in the long term as research is completed and vegetation matures.

Biodiversity, flora and fauna:

Overall, actions relating to the farming, forestry and fishing industries are expected to have positive effects with regards to biodiversity, flora and fauna. Many of the actions relating to the forestry sector include supporting tree planting through the Forestry Grant Scheme, and surveying and improving the health of trees through schemes such as The Plant Health Centre, Scottish Forestry's Tree Health Service, Scottish tree Health Advisory Group, Support Tree Alert (Forest Research) and Observatree. This helps identify damaged trees and trees in poor health (e.g. diseased), allowing them to be managed back to health or replanted. Promoting high quality and healthy trees itself improves woodland/ forestry habitats, but also better supports the biodiversity that depend on these habitats. Therefore, positive effects are expected with relation to biodiversity.

In addition, actions include offering higher grant rates for riparian woodlands as part of the Forestry Grant Scheme. It is recognised that riparian woodland provides multiple benefits, including for water quality and biodiversity that thrives near and within watercourses. Additionally, actions relating to aquaculture support reducing pressure on marine habitats most at risk, by introducing fisheries management measures within Marine Protected Areas (MPAs). Benefits are likely to be greater in the long term as research is completed and vegetation matures.

Overall, positive effects are expected for all sectors with relation to climate change adaptation. These positive effects are expected to be significant with relation to 'Advice, skills and funding' as actions will require half of all agricultural funding to be conditional on delivering climate and nature benefits, which is likely to result in benefits for biodiversity. Overall, it is considered that the actions across this objective could lead to significant positive effects.

Water:

Several actions relate to the water environment. These include promoting riparian planting through increased grant rates as part of the Forestry Grant Scheme. Increased riparian planting will help improve the quality of watercourses by providing shading and reducing surface water runoff into the watercourse. Likewise, the review of the Forestry Grant Scheme will help ensure woodland creation as part of the wider water catchment for adaptation purposes (e.g., reducing surface water runoff and flooding). Other actions relate to the management of water resources during periods of low rainfall, which will involve liaison with the farming community on how to best manage their needs during periods of water scarcity. Linked to this RESAS will research how to make crops which are more resistant to water stress and develop models to improve forecasting of water scarcity and to help farmers plan for adaptation during these periods, and analysing how land use management can be used as natural flood management to slow the flow of water through and over land during wet weather.

Overall, positive effects are expected with relation to 'pests and agriculture', 'forestry sector; and 'fishing and aquaculture'. Benefits are likely to be greater in the long term as research is completed and vegetation matures.

Air:

Actions relating to the promotion of tree planting throughout the lifetime of the Plan under 'advice, skills and funding', is expected to have long term indirect positive effects on air quality due to the increased number of trees helping to filter pollutants from the air. These positive effects are expected to be of minor significance and are likely to become greater in the long term as vegetation matures.

Soil:

No significant effects are identified with relation to soil.

Landscape and geodiversity:

Actions relating to the promotion of tree planting throughout the lifetime of the Plan under 'advice, skills and funding' or planting of riparian woodland under 'forestry sector', is expected to have potential positive effects on landscape as a result of increasing tree cover and woodlands throughout the landscape. These landscape

features can lead to an improvement in landscape character. However, potential negative effects may arise as a result of planting in unsuitable locations, which could adversely affect the character of the landscape. As such, mixed minor positive and minor negative effects are expected, however these are uncertain. These effects are likely to become greater in the long term as vegetation matures.

Cultural heritage and historic environment:

Actions relating to the promotion of tree planting throughout the lifetime of the Plan under 'advice, skills and funding' or planting of riparian woodland under 'forestry sector', is expected to have potential positive effects on cultural heritage as a result of increasing tree cover and woodlands throughout the landscape which often forms the setting to heritage assets. These features can lead to an improvement in the setting of heritage assets and historic environments. However, potential negative effects may arise as a result of planting in unsuitable locations, which could adversely affect the setting of heritage assets and/or affect buried archaeology. As such, mixed minor positive and minor negative effects are expected, however these are uncertain. These effects are likely to become greater in the long term as vegetation matures.

Material assets:

All actions (excluding 'Farming and the wider Agriculture sector') are expected to have positive effects with relation to material assets. Increased awareness and understanding of climate adaptation and climate risks for businesses will support the resilience of businesses across Scotland. Actions include disseminating information on climate risk through training, skills development, advice surrounding climate adaptation and agriculture, and development of a new Agricultural Knowledge and Innovation System (AKIS). In addition, support for potato growers with Potato Cyst Nematode (PCN) and aphid viruses will be provided, as will research into crop and livestock resilient agricultural production. This will help make agricultural businesses more resilient to the effects of climate change.

With relation to forestry, development of resilience action plans will increase the resilience of forests and the materials they provide to increasing threats associated with climate change. In addition, guidance will be provided on designing and managing species within forests to improve the forest's resilience. This will have positive effects with relation to material assets. Benefits are likely to be greater in the long term as vegetation matures.

In terms of the fishing and aquaculture industry, actions seek to develop Fisheries Management Plans to increase and maintain sustainability of fish stocks. They also seek to produce more seafood whilst reducing waste in the industry. This will be achieved by developing a suite of technical and spatial measures to reduce levels of 'unwanted' fish catch which is discarded, capturing more organic waste for the circular economy, finding further opportunities for the best use of aquaculture by-

products, using 100% responsibly sourced marine and vegetable ingredients in feedstock and using other by-products, and minimising marine debris through recovery and recycling.

Overall, significant positive effects are identified for 'fishing and aquaculture', and minor positive effects for all other sectors.

Population and human health:

Most actions are expected to have positive effects with relation to population and human health. Increased awareness and understanding of climate adaptation and climate risks for businesses will increase their resilience, with positive effects expected on the population. Actions include delivering training, skills and advice to farmers and crofters, and supporting research on crop and livestock resilience to help create a sustainable food system supply. Increasing business resilience will indirectly support population and human health as a result of improved financial stability and the health and wellbeing of those employed in these industries. Likewise, improved research into the resilience of crops and livestock will help ensure a more secure supply of food which will indirectly support population and human health. Increased awareness of climate risk may also benefit people in their personal lives, and not just when related to business. Benefits are likely to be greater in the long term once research is completed.

Mitigation and enhancement

Actions regarding tree planting should include consideration and mitigation of any potential adverse impacts on landscape character, historic environment, archaeology and the setting of heritage assets.

Objective: Adaptation Innovation (B3)

Scotland is an innovation hub for adaptation solutions and opportunities.

Key areas of action relate to:

- Adaptation and Resilience Economy – Evidence + Innovation Support ;
- CivTech;

- Innovative Research;
- Financial Innovation;

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Adaptation and Resilience Economy – Evidence + Innovation Support	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	0	0	0	0	0	0	+	+
CivTech	**Current**	+	+	+	+	0	+	0	0	+	+
	Future	0	0	0	0	0	0	0	0	0	0
Innovative Research	**Current**	+	+	+	+	+	+	0	0	+	+
	Future	+	+	0	0	0	0	0	0	+	+

Financial Innovation	**Current**	+	+	+	+	+	+	+	+	+	+
	Future	+	+	+	+	+	+	+	+?	+	+

Summary justification

Climate change mitigation:

Actions to improve access to finance for projects and activities that are focussed on climate change adaptation or have co-benefits for emissions reduction and resilience will likely result in reductions in greenhouse gas emissions across businesses in Scotland. In addition, actions to increase knowledge sharing with relation to adaptation measures across businesses may encourage them to change their behaviours. For example, this could include switching from fossil fuel derived to renewable forms of energy. Benefits are likely to become greater as actions and behaviours are implemented.

Therefore, minor positive effects are expected with relation to climate change mitigation for all actions except for 'CivTech'.

Climate change adaptation:

Actions to support adaptation and resilience amongst businesses is expected to have positive effect with relation to climate change adaptation. Improving the evidence base and subsequently improving the understanding of the future effects of climate change and need for adaptation will help better prepare businesses for the future effects of climate change. Sharing this information widely across the business sector through enterprise agencies, the Business Support Partnership and an adaptation forum will help these businesses prepare and adapt accordingly. Additional research into barriers preventing businesses from realising adaptation opportunities may also result in these barriers being overcome, with associated benefits for climate change adaptation. Additionally, increased opportunities for private sector finance for project and activities which are adaptation focussed and increase resilience will help achieve greater uptake of adaptation measures, with positive effects for climate change adaptation expected. Benefits are likely to become greater in the long term as knowledge improves and adaptation measures are implemented.

Therefore, minor positive effects are expected with relation to climate change adaptation for all actions except for 'CivTech'.

Biodiversity, flora and fauna:

Actions to establish private investment in natural capital, is likely to result in benefits for biodiversity, flora and fauna as a result of greater uptake of projects to improve the natural environment. In addition, investment in nature-based solutions and natural capital which builds on the existing Woodland Carbon Code and

Peatland Code is likely to result in greater enhancements to woodland and peatland which will benefit biodiversity. Benefits are likely to be greater in the long term as vegetation matures.

Therefore, minor positive effects are identified for 'Financial Innovation'.

Water:

Actions to establish private investment in natural capital, is likely to result in positive effects for water quality as a result of greater uptake of nature-based projects which are subsequently likely to lead to improvements in the water environment. In addition, investment in nature-based solutions and natural capital which builds on the existing Woodland Carbon Code and Peatland Code is likely to result in greater enhancements to areas of woodland and peatland which are intrinsically linked to the water environment by slowing the flow of surface water and filtering pollutants etc. Benefits are likely to be greater in the long term as vegetation matures.

Therefore, minor positive effects are identified for 'Financial Innovation'.

Air:

Actions to establish private investment in natural capital is likely to result in positive effects for air quality, as a result of greater uptake of nature-based projects such as woodland creation. Woodland creation subsequently will help filter pollutants from the air. Therefore, minor positive effects are identified for 'Financial Innovation'. Benefits are likely to be greater in the long term as vegetation matures.

Soil:

Actions to establish private investment in natural capital, is likely to result in positive effects for soil quality as a result of greater uptake of nature-based projects which are subsequently likely to lead to improvements in the soil quality. In addition, investment in nature-based solutions and natural capital which builds on the existing Woodland Carbon Code and Peatland Code is likely to result in greater enhancements to areas of woodland and peatland which are intrinsically linked to developing new soils and improving the condition of existing soils. Therefore, minor positive effects are identified for 'Financial Innovation'. Benefits are likely to be greater in the long term as vegetation matures.

Landscape and geodiversity:

Actions to establish private investment in natural capital is likely to result in positive effects for landscape. The greater uptake of nature-based projects relating to a variety of different habitat types is likely to positively contribute towards landscape character. For example, woodland creation, peatland restoration, or creation of wetlands. As such, minor positive effects are identified for 'Financial Innovation'.

Cultural heritage and historic environment:

Actions to establish private investment in natural capital may result in positive effects for cultural heritage. The greater uptake of nature-based projects relating to a variety of different habitat types is likely to create and enhance landscape features which often forms part of the setting of heritage assets. For example, woodlands/trees and peatlands. As such, minor positive effects are identified for 'Financial Innovation' but there is uncertainty attached to these effects. Benefits are likely to be greater in the long term as vegetation matures. Benefits are likely to be greater in the long term as vegetation matures.

Material assets:

All actions (excluding 'CivTech') are expected to have positive effects with relation to material assets. Increased awareness and understanding of climate adaptation and climate risks for businesses will support the resilience of businesses across Scotland. Actions include improving the evidence base used to inform climate adaptation, and subsequently improving the understanding of the future effects of climate change and need for adaptation. This will help better prepare businesses for the future effects of climate change. Additional research into removing any barriers preventing businesses from realising adaptation opportunities may also result in more opportunities for adaptation and as such increased resilience of the businesses. Increased sharing of knowledge and information across businesses (e.g., through Business Support Partnership and enterprise agencies) will improve the skills within the sector, providing economic benefits. Benefits are likely to become greater in the long term as knowledge improves and adaptation measures are implemented. Overall, providing this information to businesses will help increase the viability of businesses, with subsequent benefits for population and human health.

Therefore, minor positive effects are expected with relation to climate change adaptation for all actions except for 'CivTech'.

Population and human health:

All actions (excluding 'CivTech') are expected to have positive effects with relation to population and human health. Actions include improving the evidence base used to inform climate adaptation, and subsequently improving the understanding of the future effects of climate change and need for adaptation. This will help better

prepare businesses and the people's personal lives in general for the future effects of climate change. Improved business resilience will indirectly support population and human health as a result of improved financial stability. Actions also seek the improved financial support for delivering nature-based solutions and natural capital which provide ecosystem services in terms of improved air and water quality, and opportunities for recreation, which all contribute towards better health of the population. Benefits are likely to become greater in the long term as knowledge improves and adaptation measures are implemented.

Therefore, minor positive effects are expected with relation to climate change adaptation for all actions except for 'CivTech'.

Mitigation and enhancement

None identified.

Objective: Economic Development (B4)

Economic development is informed by climate risks and opportunities to support resilient, healthy and equitable places.

Key areas of action relate to:

- Financial;
- Scottish National Investment Bank;
- Enterprise Agencies;
- Regional Economic Development;
- Regional Just Transition Plans;

- Supply Chains and International trade;
- International Trade and Global Supply Chains;
- Food Safety and Food Security;
- Food and Drink Industry Supply Chain Resilience;
- Public Sector Procurement and Supply Chains; and,
- Transportation and Distribution.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
Financial	**Current**	+	+	0	0	0	0	0	0	+	0
	Future	+	+	0	+?	0	0	0	0	+	0
Scottish National Investment Bank	**Current**	+	+	0	0	0	0	0	0	+	+
	Future	0	0	0	0	0	0	0	0	0	0
Enterprise Agencies	**Current**	0	+	0	0	0	0	0	0	0	0

	Future	+	+	0	0	0	0	0	0	+	0
Regional and Economic Development	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	0	0	0	0	0	0	+	0
Regional Just Transition Plans	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	0	0	0	0	0	0	+	+
Supply Chains and International Trade	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	0	0	0	0	0	0	0	+	+
International Trade and Global Supply Chains	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	+	+	0	0	0	0	0	0	+	0

Food Safety and Food Security	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	+	0	0	0	0	0	0	+	+
Food and Drink Industry Supply Chain Resilience	**Current**	0	+	0	0	0	0	0	0	+	+
	Future	+	+	0	0	0	0	0	0	+	+
Public Sector Procurement and Supply Chains	**Current**	+	+	+?	+?	+?	+?	+?	+?	+	0
	Future	+	+	0	0	0	0	0	0	+	+
Transportation and Distribution	**Current**	0	0	0	0	0	0	0	0	0	0
	Future	0	+	0	+	0	0	0	0	+	+

Summary justification

Climate change mitigation:

Overall, minor positive effects are identified with relation to climate change mitigation. Actions to support this objective include the Scottish Government providing mandatory information on climate risk for large and listed private sector organisations in Scotland. Providing such information will help organisations better understand climate risks and may help alter their behaviours to minimise contribution to climate change. For example, by switching to renewable energy sources. Additional actions by the Scottish Government to assist in climate change adaptation include working with the UK Government to ensure adaptation is integrated into the UK Green Taxonomy, noting that adaptation to climate change provides opportunities to support the transition to net-zero. This may result in less contribution to climate change in the future.

With relation to supply chains, the Scottish Government will publish policy, guidance and support for public bodies with respect to climate adaptation, mitigation and circular economy considerations. These publications will help raise awareness about the drivers and impacts of climate change, and may help facilitate a shift in behaviours to reduce the contribution of public bodies to climate change. With relation to food, actions seek to support improved research and filling of evidence gaps about the relationship of climate change and food safety risks. Sharing of this knowledge could help ensure future crops are successful and unaffected by the effects of climate change.

In addition, enterprises agencies such as Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will be required to incorporate adaptation in any of their forthcoming corporate plans. This increased awareness will help support the transition to a net zero economy.

The promotion of Regional Just Transition Plans which will outline the challenges and opportunities faced by regions and identify appropriate action will assist in climate change adaptation and also mitigation by helping to change behaviours which contribute to climate change.

Benefits are likely to be greater in the long term once actions from behaviour shifts and plans are implemented.

Climate change adaptation:

Overall, significant positive effects are identified with relation to climate change adaptation. Actions to support this objective include the Scottish Government providing mandatory information on climate risk for large and listed private sector organisations in Scotland. Providing such information will help organisations better understand climate risks and make better, climate-resilient decisions with relation to their organisation. For example, increased awareness could steer investment

aways from areas with high risks associated with climate change (e.g. flooding). Additional actions by the Scottish Government to assist in climate change adaptation include working with the UK Government to ensure adaptation is integrated into the UK Green Taxonomy and refers to the Climate Change Committees Risk Assessment as a framework to define climate risk. In addition, development of regional adaptation partnerships across Scotland will aid in delivering climate change adaptation across the business sector, and in supporting regional adaptation initiatives will deliver regional Climate Change Risk and Opportunity assessments. These risk and opportunity assessments will help facilitate adaptation to the effects of climate change.

With relation to supply chains, the Scottish Government urges climate resilience and vulnerability to be considered as part of the impact assessment for any new Free Trade Agreements, and will undertake further research on the implications and risks of a changing climate for global trade routes and international supply chains. Similarly, consideration of climate change adaptation in public procurement is encouraged, with collaborative cross-sectoral working with the Climate and Procurement Forum encouraged. In addition, enterprises agencies such as Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will be required to incorporate adaptation in any of their forthcoming corporate plans. This will help support actions that businesses can take to adapt to climate change and may also help contribute towards the transition to a net zero economy.

Similarly, the promotion of Regional Just Transition Plans which will outline the challenges and opportunities faced by regions and identify appropriate action will assist in climate change adaptation and also mitigation by helping to change behaviours which contribute to climate change. The implementation of Transport Scotland's Approach to Climate Change Adaptation and Resilience and development of a Trunk Road Adaptation Plan will help protect and adapt the Scottish trunk road network from predicted adverse effects of climate change based on climate change projections. For example, by alleviating flood risk along problematic sections of trunk roads.

Benefits are likely to be greater in the long term once actions from knowledge sharing and adaptation measures are implemented.

Actions also support the implementation of controls which verify measures applied by food businesses in Scotland to ensure the safety of the food chain. Implementation of these controls will help assess risk of bacterial pathogens and natural toxins in food which may be climate/weather related. In addition, actions seek to improve research and fill evidence gaps relating to the understanding of climate change impacts on food safety. This will have subsequent benefits for population and human health by ensuring a supply of healthy food for the population.

Biodiversity, flora and fauna:

No significant effects are identified with relation to biodiversity, flora and fauna.

Water:

Overall, minor positive effects are expected with relation to water. To achieve Objective B4: Economic Development, actions include the Scottish Government providing mandatory information on climate risk for large and listed private sector organisations in Scotland. Providing this information will increase transparency and understanding of climate risks which will help support a shift in investment away from areas where there is a high risk posed by climate change e.g., areas of high flood risk. Additionally, the development of a Trunk Road Adaptation Plan by Transport Scotland will identify areas of the Scottish trunk road network vulnerable to the impacts of climate change and will plan for the interventions to address these such as alleviating the impact of flooding. Benefits are likely to be greater in the long term once actions from plans and guidance are implemented.

Air:

No significant effects are identified with relation to air.

Soil:

No significant effects are identified with relation to soil.

Landscape and geodiversity:

No significant effects are identified with relation to landscape and geodiversity.

Cultural heritage and historic environment:

No significant effects are identified with relation to cultural heritage and historic environment.

Material assets:

Overall, minor positive effects are identified with relation to material assets. Actions seeking to ensure food security and supply will have positive effects on material assets. Such measures include implementing official controls to verify safety of the food chain in terms of pathogens and toxins. Furthermore, ongoing surveillance and monitoring of risks and threats to the food supply chain, including food produced in and imported into Scotland will help build resilience of supply to a changing

climate. In addition, additional research into sustainable food supply and development of new food products, production system and packaging innovations will help promote more sustainable food supply, with associated benefits for material assets in the longer term.

The provision of information on climate risk for private sector organisations in Scotland will help organisations better understand climate risks and make better decisions with relation to their organisation. This could therefore make the businesses more resilient to the future effects of climate change, with subsequent benefits in relation to material assets. Furthermore, greater access to green finance and investment to support reaching net zero will also support businesses, having positive effects on material assets.

With respect to supply chains for food and drink, the Scottish Government seeks to build supply resilience to mitigate risks associated with climate change and improving supply chain efficiency. Further research on how the climate may impact global trade routes and supply will also be undertaken. This will help to maintain a secure supply of food and drink, with positive effects on material assets. In addition, enterprise agencies such as Scottish Enterprise, Highlands and Islands Enterprise and South of Scotland Enterprise will support action that businesses can take to adapt to climate change and invest in innovative opportunities. This includes with relation to supply chain resilience. Improving adaptation of businesses and resilience of supply with have positive effects on material assets.

The implementation of the Approach to Climate Change Adaptation and Resilience by Transport Scotland will help ensure the Scottish transport network is resilient to the impacts of climate change. The transport network are important material assets, and the protection of these is expected to have positive effects with relation to material assets.

Benefits are likely to be greater in the long term once actions from research and adaptation plans are implemented.

Population and human health:

Overall, minor positive effects are identified with relation to population and human health. Actions to support this objective include raising awareness and sharing knowledge about drivers and potential effects of climate change. This includes through sharing information on climate risks more generally, and for those involved with procurement to ensure better understanding of climate, circular economy, resource-efficiency and sustainability etc. Although targeted at businesses, sharing of this information will have positive effects on population and human health by promoting the increased resilience of businesses and organisations which employ people, and through improving people's general awareness of climate change in their personal lives. It also will help improve people's skills relating to climate, particularly for those working within the business sector. In addition, these improved skills may help better manage businesses and make them more resilient, with subsequent benefits for the people who are employed by these organisations.

The promotion of Regional Just Transition Plans will identify challenges and appropriate adaptation actions for each region, with the aim of reducing Scotland's contributions to climate change in a way that is fair and inclusive across society. Regional Just Transition Plans are therefore likely to benefit communities and the population in each respective region, seeking their engagement throughout.

Additional benefits for population and human health are likely to arise by actions that seek to ensure access to vital goods, foods and services through resilient supply chains. In addition, measures to ensure food safety and security will also have positive effects. Measures such as implementing official controls (for checking bacterial pathogens and natural toxins arising from climate change), food sampling, and monitoring trends in foodborne illnesses will help ensure public health is protected. Furthermore, greater research into the effects of climate change on food supply will help protect from food shortages and food related illnesses in the future.

In addition, future actions outlined in the transportation and distribution subobjective will result in more resilient transport infrastructure. This will benefit people and communities, particularly in rural, remote and island areas.

Benefits are likely to be greater in the long term once actions from research and plans are implemented.

Mitigation and enhancement

None identified.

Outcome 5: International action (IA)

Objective: Vulnerable communities (IA1)

Scotland's international programmes support communities vulnerable to the impacts of climate change to adapt and thrive.

This includes the following programmes that the Scottish Government are currently involved in:

- Climate Just Communities Programme
- Climate Justice Resilience Fund

- Feminist Action for Climate Justice

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health
	Current	+	+	+	+	+	+	+	+	+	+
	Future	0	0	0	0	0	0	0	0	0	0

Summary justification

The actions within this objective focus on supporting the Global South to adapt to the impacts of climate change and deliver climate justice. This will include involvement in the following programmes; Climate Just Communities Programme, Climate Justice Resilience Fund and the Feminist Action for Climate Justice. Therefore, these actions are expected to have positive effects across all the SEA topics. In particular, the current actions will have a minor positive effect in relation to climate change adaptation and population and human health. this is because the current actions will support adaptation to climate change including extreme weather events. In addition, supporting adaptation to climate change will have a positive effect on communities making them more resilient to the effects of climate change and reduce the potential for negative impacts on livelihoods as a result of climate change. In particular the actions will support those most vulnerable including woman and children.

The vulnerable communities objective does not provide any future actions. Therefore, there is little to be appraised in terms of future actions under this objective. However, given that Scotland has announced its intention to become a commitment maker under the Feminist Action for Climate Justice, future actions could be included in relation to this.

Objective: International advocacy (IA2)

Scotland is an advocate in international fora for those most affected by climate change and least able to adapt. Through membership of international organisations it pushes states and international bodies to increase ambition on adaptation and biodiversity loss.

Key areas of action relate to:

International Conventions

Current actions:

- Participation at United Nations Framework for the Convention on Climate Change Conferences of the Parties
- Scotland will continue to align with global adaptation and biodiversity frameworks, for example; UNFCCC, Carbon Disclosure Project and Global Biodiversity Framework.

Future actions:

- Work with key stakeholders to hold a diverse range of events at COP with high level ministerial engagement and engagement with a wide range of relevant stakeholders
- Ensure that there is at least one adaptation-focused event organised fully or in part by Scottish Government at each attended COP

International engagement

Current actions

- In our role as European co-chair, Scottish Government hosted the European ministerial meeting in Brussels in 2023. Thirteen states and regions attended and shared the challenges and successes they have experienced implementing ambitious climate policies.
- Scotland will continue to play an active role in Regions4, contributing annually to the running of RegionsAdapt and seeking opportunities to support Regions4 projects that include an emphasis on adaptation.

Future actions

- By 2029 we will have worked with the networks on adaptation action and contribute annually to running of RegionsAdapt.
- The Scottish Government will engage with the climate adaptation sub group to facilitate knowledge sharing, cooperation and shared learning on adaptation action best practice.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic	Material assets	Population and human health
International conventions	**Current**	+	+	0	0	+	0	0	0	0	0
	Future	+	+	0	0	+	0	0	0	0	0
International engagement	**Current**	+	+	0	0	0	0	0	0	0	0
	Future	0	+	0	0	0	0	0	0	0	0

Summary justification

RegionsAdapt is a project of Regions4 which is a global initiative to plan, take action and report efforts on climate adaptation. The RegionsAdapt is a knowledge sharing tool where information can be shared on best practise and latest innovations and tools. Therefore, any effects will be indirect as the actions will not directly result in positive effects on the SEA objectives.

The Climate Change COP tends to focus on different topics areas each year and therefore, it is unknown what the focus of future COPs will be. This means that is difficult to appraise the effects of the actions under international conventions against the SEA topics.

The climate adaptation sub group is one of four sub-groups that come under the umbrella of the British-Irish Council Environment work sector, along with marine environment, marine litter, and Invasive Non-Native Species (INNS). Each sub group has its own membership drawn from the eight British-Irish Council Member Administrations who then feed into the main British-Irish Council Environment work Sectors.

Climate change mitigation:

COP is the main decision-making body of the UNFCCC. COP assesses the effects of measures introduced by the Parties to limit climate change against the overall goal of the UNFCCC. The UNFCCC is an agreement between 197 countries, agreeing to stabilise greenhouse gas concentrations at a level that would prevent human-induced interference with the climate system. The actions under international conventions supports continued participation at Climate COP. Additionally, as set out in international engagement, the Scottish Government hosted the European ministerial meeting in Brussels in 2023 where challenges and successes experienced implementing climate policies were shared. Therefore, the actions are expected to help mitigate the impacts of climate change and support a reduction in greenhouse gas emissions. Effects are likely to be greater in the longer term as actions from policies, conventions and engagement are implemented. Overall, minor positive effects are expected for international conventions and current international engagement.

RegionsAdapt are involved in climate change adaptation projects at an international scale. Therefore, the future action under international engagement focuses on climate change adaptation rather than climate change mitigation. Therefore, negligible effect is expected for future international engagement.

Climate change adaptation:

The actions under international conventions will support Scotland and at an international level adapt to climate change. Including participation at UNFCCC, continuing to align with global adaptation and biodiversity frameworks, one adaptation-focused event at each COP could enhance knowledge base on adapting to climate change and allow new opportunities to present new ways to adapt.

The action under international engagement involves contributing to RegionsAdapt. There is also an action in relation to the Scottish Government's European ministerial meeting in Brussels in 2023 where challenges and successes experienced implementing climate policies were shared and involvement in the climate adaptation sub group as part of the British-Irish Council. RegionsAdapt are involved in climate change adaptation projects at an international scale. In addition, involvement in the climate adaptation sub group will support knowledge sharing, cooperation and shared learning on adaptation action. This will support adaptation to climate change at a global and national level and allow the sharing of ideas and tools that are having a positive effect in countries in managing the effect of climate change, such as extreme weather events.

Overall, minor positive effect is expected in relation to climate change adaptation. These effects are expected to be in the medium to long term.

Additionally, as set out in international engagement, the Scottish Government hosted Biodiversity, flora and fauna:

No significant effects identified.

Water:

No significant effects identified.

Air:

The actions under international engagement and the purpose of Climate COP is to limit climate change which includes reducing greenhouse gas emissions. Reducing the levels of greenhouse gas emissions will have a positive effect on air quality and help improve air quality within Scotland and at an international level.

Overall, minor positive effect is expected in relation to international conventions. These effects are expected to be in the medium to long term.

Soil:

No significant effects identified.

Landscape and geodiversity:

No significant effects identified.

Cultural heritage and historic environment:

No significant effects identified.

Material assets:

No significant effects identified.

Population and human health:

No significant effects identified.

Transboundary effects

All the actions under international conventions and international engagement are expected to have effects at an international scale particularly through supporting a global evidence base and co-operating at a subnational level.

Mitigation and enhancement

There are a number of different kinds of COP. However, this objective only makes reference to the Climate change COP. The objective could include reference to other COP which reflect adaptation to climate change.

Objective: A global hub for adaptation research (IA3)

Scotland is a global knowledge hub for research and innovation on climate adaptation, loss and damage and climate justice and facilitates knowledge sharing between Global South/Global North.

Key areas of action relate to:

- Research expertise
  - ClimateXChange
  - SAMS/MASTS (Marine Scotland Science)
  - James Hutton Institute (Hutton)
  - National Centre for Resilience (NCR)
- Loss and damage
  - By 2029, we will continue to support the development of the global evidence base on addressing non-economic and slow-onset loss and damage, in a way that is gender-responsive.
  - We will also work with our partners to build momentum from non-state actors, using our position as European co-chair of the Under 2 Coalition and on the steering group of Regions 4 to understand how best to unlock loss and damage finance at a subnational level.

		CC mitigation	CC Adaptation	Biodiversity, flora and fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material assets	Population and human health

Research expertise	**Current**	0	+	+	+	+	+	0	0	+	+
	Future	0	0	0	0	0	0	0	0	0	0
Loss and damage	**Current**	0	+	+	+	+	+	+	+	+	+
	Future	0	++	+	+	+	+	+	+	++	++

Summary justification

Loss and damage refer to the negative consequences of climate change on human societies and the natural environment. Climate change is affecting the frequency, intensity and geographical distribution of extreme weather events such as storms, floods and heatwaves, and slow-onset events such as sea level rise, ocean acidification, loss of biodiversity and desertification. All of these result in loss and damage, which can be split between economic and non-economic loss and damage. Economic loss and damage may include damage to crops, homes or infrastructure. Non-economic loss and damage may include harm to human health and mobility; loss of access to territory, of cultural heritage and of indigenous and local knowledge; and loss of and damage to biodiversity and habitats[2].

Climate change mitigation:

Loss and damage relates to the adverse effects of climate change on the natural environment and humans that cannot be, or have not been avoided. Loss and damage actions will therefore relate more to adapting to climate change and addressing any damage as a result of climate change. Therefore, negligible effects are expected in relation to research expertise and loss and damage.

Climate change adaptation:

Both subobjectives are expected to score positively as they aim to help adaptation to climate change. Research expertise commissions projects and influences policy around adaptation measures such as National Centre for Resilience (NCR). Both actions support increasing knowledge and understanding of addressing slow-onset and non-economic loss and damage and how to unlock loss and damage finance. This will help Scotland and at an international level adapt to climate change, in particular, adapting to extreme weather events as a result of climate change. Understanding how to unlock loss and damage finance, specifically will help to adapt to the impacts caused by climate change by understanding how to get finance to repair any loss or damage caused by extreme weather events.

Overall, the current actions under research expertise and loss and damage are expected to have minor positive effects, and future loss and damage actions are expected to have significant positive effects in relation to climate change adaptation. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

Biodiversity, flora and fauna:

[2] The London School and of Economics and Political Science (2022) What is climate change ‘Loss and Damage’

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The actions under Research and expertise support the Marine Scotland Science which could have positive effects on the marine environment including marine wildlife. Non-economic loss and damage includes losses to biodiversity. Therefore, supporting the development of a global evidence base on addressing non-economic loss and damage could have positive effects on biodiversity and ecosystems. This could help in understanding the effects of loss and damage on biodiversity and ecosystems, allowing better understanding of how to address these loss and damages and providing adaptation measures to reduce any further loss and damages. This could in the long term have a positive effect on ensuring the survival of ecosystems and enhancing biodiversity. In addition, understanding how to best unlock loss and damage finance could support enhancements to ecosystems and biodiversity. Overall, the actions under Research and expertise and Loss and damage are expected to have minor positive effect in relation to biodiversity, flora and fauna. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

However, the objective could include reference to the types of non-economic damage that the global evidence base would include.

Water:

The actions under Research and expertise support the Marine Scotland Science which could have positive effects on the marine environment. In addition, research through the James Hutton Institute could improve the understanding of key global issues which includes the use of water. Slow-onset loss and damage could include rising sea levels and water scarcity. Rising sea levels and water scarcity can have a permanent and irreversible effect on terrestrial, marine and coastal biodiversity as well as impacting the livelihoods of people who rely on the water environment for roles such as fishing. Therefore, actions under loss and damage are expected to have a positive effect on the water environment. Supporting the development of global evidence base on addressing loss and damage could help to adapt to an increase in flood risk and water scarcity as a result of extreme weather events such as heaving rain and drought. This could improve adaptation to an increase risk of flooding and lack of water availability. Understanding how to unlock loss and damage finance could support opportunities for investment into the water environment and better adaptation to water scarcity and flood events. Overall, the actions under Research and expertise and Loss and damage are expected to have minor positive effect in relation to water. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

Air:

The ClimateXChange under Research and expertise supports the transition to net zero which could help in reducing greenhouse gas emissions having a positive effect on air quality. Loss and damage could result in negative impacts on air quality as a result on climate change. This is considered non-economic loss and damage. Therefore, actions under loss and damage are expected to have a positive effect on air quality. Supporting the development of global evidence base on

addressing loss and damage and understanding how to unlock loss and damage finance could help to support adaptation measures to climate change that improve air quality and reduce the levels of harmful pollutants. These could include low emission zones, increasing the use of low-emission fuels and improving energy efficiency. Overall, the actions under Research and expertise and Loss and damage are expected to have minor positive effect in relation to air. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

Soil:

Research through the James Hutton Institute supports sustainable management of land, crops and natural resources. This could have a positive effect on soil quality and help preserve the best quality soils. Extreme weather events as a result of climate change could impacts soils and geological features. Therefore, actions under loss and damage could have positive effects on soil. Supporting the development of global evidence base on addressing loss and damage and understanding how best to unlock loss and damage finance could support measures to help adapt to the effects of climate change that could disrupt soil structures. This could support improvements to the soil structure and geological features following loss and damage. Overall, the actions under Research and expertise and Loss and damage are expected to have minor positive effect in relation to soil. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

Landscape and geodiversity:

Non-economic loss and damage includes losses of landscape features and damage to the landscape. Therefore, supporting the development of a global evidence base on addressing non-economic loss and damage could have positive effects on landscape and geodiversity. This could help in understanding the effects of loss and damage on landscape character and landscape features, allowing better understanding of how to address loss and damages. Overall, the actions under Loss and damage are expected to have minor positive effect in relation to landscape and geodiversity. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

However, the objective could include reference to the types of non-economic damage that the global evidence base would include.

Cultural heritage and historic environment:

Non-economic loss and damage includes losses to cultural heritage. Therefore, supporting the development of a global evidence base on addressing non-economic loss and damage could have positive effects on cultural heritage and historic environment. This could help in understanding the effects of loss and damage on heritage assets, allowing better understanding of how to address these loss and damages. This could in the long term have a positive effect on reducing damage to

and destruction of heritage assets including impacts on ground conditions which could effect archaeological features. In addition, understanding how to best unlock loss and damage finance could support enhancements to and retrofitting heritage assets. Overall, the actions under Loss and damage are expected to have minor positive effect in relation to cultural heritage and historic environment. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

The objective could include reference to the types of non-economic damage that the global evidence base would include.

Material assets:

The actions under Research and expertise will support adaptation to climate change which could ensure the resilience of cities and other settlements. The research initiatives ill also help to understand how to ensure water, energy, food security as well as managing finite resources. The actions under loss and damage aim to address the losses and damages that could occur as a result of climate change. Developing the global evidence base on addressing non-economic and slow-onset loss and damage will help to address losses and damages to buildings and infrastructure within towns and cities. In addition, understanding how best to unlock loss and damage finance could support investment into infrastructure and buildings that have been impacted by the effects of climate change, in particular extreme weather events. This will help ensure the sustainability of these towns and cities and allow them to thrive. Overall, any actions under Research and expertise and Loss and damage are expected to have significant positive effect in relation to material assets. However, the actions are about improving knowledge and understanding and will not result in direct effects. Therefore, effects are expected within the long term.

Population and human health:

The actions under Research and expertise will support the resilience of communities through understanding how to adapt to climate change and ensure the security of resources. This will ensure that impacts on communities and economies are minimised. The impacts of climate change can result in loss and damages, particularly for communities and countries in the developing world. Non-economic loss and damage includes loss of life and livelihoods. Supporting a global evidence base on addressing non-economic and slow-onset loss and damage in a way that is gender responsive will have a positive impact on reducing gender inequality in dealing

with loss and damage. This is particularly important as loss and damage can be disproportionately experienced by woman[3]. In addition, supporting a global evidence base could help reduce the potential non-economic and slow-onset impacts of loss and damage which could include impacts on livelihoods, damage to buildings and

[3] United Nations (2022) Loss and damage: A moral imperative to act

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infrastructure, water and energy security, displacement of communities, poverty and health impacts. This will help people and communities adapt to the effects of climate change and extreme weather events. Understanding how to unlock loss and damage finance will could support investment in infrastructure and buildings. This could have long term effects in supporting economies and towns and cities while adapting the effects of climate change. Overall, any actions under Research and expertise and Loss and damage are expected to have significant positive effect in relation to population and human health.

Transboundary effects

All the actions under Loss and damage are expected to have effects at an international scale particularly through supporting a global evidence base and co-operating at a subnational level.

Enhancement and mitigation

There do not appear to be any future actions for in relation to other areas of research expertise.

Appendix D

Overview of scores

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Table D.1: Summary of SEA Scores by Objective

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Outcome 1: Nature Connects										
Objective: Nature-based solutions (NC1)										
Flood resilience and coastal change	+	++	++	++	0	+	+	+/-	+	+
Blue-green Infrastructure Investment	+	++	++	++	+	+	+	+	+	+
Landscape Scale Interventions	+	+	++	++	+	+	+	+/-	+	+/-
Freshwater Habitats	0	+	++	++	0	0	+	0	+	+
Soil-Health	+	+	++	++	+	++	+	+	+	+

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Objective: Development planning (NC2)										
SEPA evidence gathering	+	+	+	+	0	+	0	0	0	+
New transport Infrastructure	+	+	+	+	+	0	+	+/-	+	+
Open Space Strategies	+	+	+	+	+	+	+	+	+	+
Objective: Nature Networks (NC3)										
Nature networks	++	++	++	++	+	++	+	+	+	+
Invasive non-native species	++	++	++	++	0	+	+	+	+	+
Vector borne disease	0	+	0	0	0	0	0	0	0	+

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Objective: Marine Ecosystems and the Blue Economy (NC4)										
Marine Planning	++	++	++	++	+	+	+	+/-	+	+
Biodiversity and Habitat Restoration	++	++	++	++	+	+	+	+/-	+	+
Coastal	++	++	++	++	+	+	+	+/-	+	+
Objective: Natural Carbon Stores and Sinks (NC5)										
Peatland	++	++	++	++	+	++	+	+	+	+
Woodland	++	++	++	++	+	+	+	+	+	+
Blue Carbon	++	++	++	++	+	+	+	+	+	+
Agricultural Soils	0	0	0	0	0	+	0	0	0	0
Outcome Two: Communities (C)										

Appendix D Overview of scores

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Objective: Place Based Collaboration (C1)										
Place Based Collaboration	+	++	+	+	+	+	+	+	+	++
Objective: Community and Individual support (C2)										
Community and individual support	+	++	+	+	+	+	+	+	+	++
Objective: Preparation and Response (C3)										
Resilience (General)	0	++	0	0	0	0	0	0	++	++
Resilience (Flooding)	0	++	+	+	0	+	0	0	++	++
Resilience (Wildfires)	+	++	++	0	+	++	++	+	++	++
Objective: Objective: New and existing Buildings (C4)										

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
New Buildings	0	++	-	+?	0	0	+/-	+/-	++	+
Existing and Traditional Buildings	+	++	-	+	0	0	+/-	+/-	++	+
Objective: Culture and Historic Environment (C5)										
Historic Environment	+	++	+	+	+	0	+	++	+	+
Culture	+	++	0	0	0	0	0	++	+	+
Outcome 3: Public Services										
Objective: Public service providers (PS1)										
Public service providers	0	++	0	0	0	0	0	0	0	0
Objective: Accessing Public Services (PS2)										

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Essential Services and Critical Infrastructure in Scotland	0	++	0	0	0	0	0	0	++	++
NHS and Social Care	0	++	+	+	0	0	++	0	++	++
Education	0	++	+	+	+	+	++	0	++	++
Objective: Power Assets and the Energy System (PS3)										
Power assets and the Energy System	+	0	0	0	0	0	0	0	+	+
Objective: Transport system (PS4)										
Trunk Roads	0	++	+	+	0	+	+?	0	++	+
Rail Network	0	++	0	+	0	0	0	0	++	+

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Aviation Network	0	0	0	0	0	0	0	0	0	0
Maritime Network	0	+	0	0	0	0	0	0	++	+
Canals	0	0	0	0	0	0	0	0	0	0
Objective: Water, Sewerage and Drainage (PS5)										
Water	0	+?	+?	++?	0	0	+?	0	+?	+?
Flooding	0	+	0	++	0	0	+	+	++	+
Drought / Water Scarcity	0	+	+	++	0	+	0	0	0	+
Outcome Four: Economy, Business and Industry (B)										
Objective: Increasing business awareness of climate risks (B1)										

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Increasing awareness of climate risk	+?	++	0	0	0	0	0	0	+	+
Support and advice	+?	++	0	0	0	0	0	0	+	+
Business and flooding	+	+	0	+	0	0	0	0	++	+
Business and coastal erosion	0	+	0	0	0	0	0	0	0	+
Business and water scarcity	0	+	0	+	0	0	0	0	+	+
Objective: Farming, Fishing and Forestry (B2)										
Advice, skills and funding	+	++	++	0	+	0	+/-?	+/-?	+	+

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Agricultural opportunities research	0	0	0	0	0	0	0	0	+	0
Pests and agriculture	+	+	0	+	0	0	0	0	+	+
Forestry sector	+	+	+	+	0	0	0	0	+	0
Fishing and aquaculture	+	+	+	+	0	0	0	0	++	+
Objective: Adaptation Innovation (B3)										
Adaptation and Resilience Economy – Evidence + Innovation Support	+	+	0	0	0	0	0	0	+	+

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
CivTech	0	0	0	0	0	0	0	0	0	0
Innovative Research	+	+	0	0	0	0	0	0	+	+
Financial Innovation	+	+	+	+	+	+	+	+?	+	+
Objective: Economic Development (B4)										
Financial	+	+	0	+?	0	0	0	0	+	0
Scottish National Investment Bank	0	0	0	0	0	0	0	0	0	0
Enterprise Agencies	+	+	0	0	0	0	0	0	+	0
Regional and Economic Development	+	+	0	0	0	0	0	0	+	0

Appendix D Overview of scores

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Regional Just Transition Plans	+	+	0	0	0	0	0	0	+	+
International Trade and Global Supply Chains	+	+	0	0	0	0	0	0	+	0
Food Safety and Food Security	0	+	0	0	0	0	0	0	+	+
Food and Drink Industry Supply Chain Resilience	+	+	0	0	0	0	0	0	+	+
Public Sector Procurement	+	+	0	0	0	0	0	0	+	+

	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
and Supply Chains										
Transportation and Distribution	0	+	0	+	0	0	0	0	+	+
Outcome 5: International action (IA)										
Objective: Vulnerable communities (IA1)										
Scottish Government programmes	0	0	0	0	0	0	0	0	0	0
Objective: International advocacy (IA2)										
International conventions	+	+	0	0	+	0	0	0	0	0
International engagement	0	+	0	0	0	0	0	0	0	0
Objective: A global hub for adaptation research (IA3)										

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	Climate Change Mitigation	Climate Change Adaptation	Biodiversity, Flora and Fauna	Water	Air	Soil	Landscape and geodiversity	Cultural heritage and historic environment	Material Assets	Population and human health
Research expertise	0	0	0	0	0	0	0	0	0	0
Loss and damage	0	++	+	+	+	+	+	+	++	++

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