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SPICe Briefing
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Environment: Subject Profile

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This briefing provides an overview of environmental policy and governance in Scotland - including information on key legislation, responsibilities and forthcoming areas of policy development across different subject areas. It is designed to provide Members of the Scottish Parliament with a broad overview of environmental policy and regulation at the beginning of session 6.

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Introduction

What is our environment?

Scotland's environment is a combination of people, place and nature. People depend on the environment - for clean air, water, a climate that supports life and health. We use the environment and its resources such as food, timber, water. We also co-exist with, are part of, and are inter-dependent on its biodiversity, natural ecosystems and species. How our interaction with the environment is regulated, through our laws, culture, practices and lifestyles -impacts on our health, the health of economies, and our ability to sustain ourselves as a species.

What is devolved?

Environmental policy in Scotland is mainly a devolved area. This encompasses multiple areas of policy and regulation including:

- Climate change mitigation and adaptation (see the SPICe Climate Change Subject Profile)
- Air quality
- Nature conservation and biodiversity - on land and at sea
- Waste management and the circular economy
- The water environment and flooding
- The use of chemicals, biocides and pesticides
- Environmental governance including areas such as how environmental principles underpin our law and decision-making, how regulation is enforced, and how we exercise environmental 'rights' such as access to environmental information and environmental justice

The quality of our environment, and the impact of human-interactions on biodiversity, are also heavily influenced by and interact with other devolved policy areas such as agriculture and fisheries policy, transport, planning, development and infrastructure, food, and devolved areas of economic and fiscal policy. How we use our environment to support our wellbeing can also influence outcomes in further devolved policy areas such as health and education.

Interaction with reserved areas

Devolved responsibility for environmental regulation can also interact and intersect with reserved areas such as import and export control, product standards, health and safety, and energy. In some areas this can result in coordinated UK-wide approaches, for example in areas such as chemicals regulation and some aspects of waste regulation, which can also facilitate the UK internal market. Other reserved areas can also strongly influence environmental outcomes in Scotland, or impact on how consumption in Scotland affects the global environment - such as trade policy, energy policy, and economic and fiscal decisions that impact on environmental outcomes.

Key strategic policies and goals

Scotland’s Environment Strategy

The Scottish Government published 'The Environment Strategy for Scotland: Vision and Outcomes' in 2020 with a view to providing an overarching framework for achieving our environmental goals and tackling climate change. The Strategy sits alongside other high-level Government strategies such as Scotland’s Economic Strategy. The vision for Scotland's environment set out in the Strategy is:

> “ **One Earth. One home. One shared future.** By 2045: By restoring nature and ending Scotland’s contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come.”

The Strategy recognises that the natural environment contributes to health and wellbeing in numerous ways, including through the provision of clean air and water, supporting food production, storing carbon, and protecting communities from flooding and extreme weather. Such 'services' that people derive from healthy ecosystems and habitats are often described as '**ecosystem services**'.

The Strategy also recognises the inter-dependence of a healthy environment and healthy economies, given the environment supports the productivity of many sectors. With that in mind, the Strategy refers to the Scottish Government's pursuit of a '**wellbeing economy**', which values the wellbeing of people and planet as measures of success, not just growth in Gross Domestic Product.

The Strategy refers to the need for significant action to restore natural systems, for Scotland's regulatory framework to be robust and to foster resilience. It also states that working towards this vision will help to deliver many of the National Outcomes in the National Performance Framework and support Scotland's contribution to the UN’s Sustainable Development Goals (see further below).

The six **Outcomes** identified in the Strategy are:

1. Scotland’s nature is protected and restored with flourishing biodiversity and clean and healthy air, water, seas and soils
2. We play our full role in tackling the global climate emergency and limiting temperature rise to 1.5oC
3. Our thriving sustainable economy conserves and grows our natural assets
4. Our healthy environment supports a fairer, healthier, more inclusive society
5. We are responsible global citizens with a sustainable international footprint
6. We use and re-use resources wisely and have ended the throw-away culture

The UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021 went on to enshrine the requirement for a national 'Environmental policy strategy' in law. Scottish Ministers are required, under this Act, to publish an environmental policy strategy which

sets out objectives for protecting and improving the environment, policies and proposals for achieving the objectives (or a summary of these); and arrangements for monitoring progress.

In preparing the Strategy, Scottish Ministers must have regard to the desirability of securing that environmental policy:

- aims at a high level of environmental protection,
- contributes to sustainable development,
- contributes to improving the health and wellbeing of Scotland's people,
- contributes to objectives in policy areas other than environmental policy,
- integrates environmental policy objectives into the development of policies in other areas,
- responds to global crises in relation to climate change and biodiversity.

The Strategy must be laid in the Scottish Parliament, and Scottish Ministers must, in making policies (including proposals for legislation), have due regard to the strategy.

Forthcoming policy milestone in Session 6: The Continuity Act requires the Scottish Government to publish an environmental policy strategy. The Scottish Government is required to report on progress towards this by 29 March 2022.

The UN SDGs and Scotland's National Performance Framework

The Scottish Government is committed to meeting the 2030 UN Sustainable Development Goals (SDGs), which aim to provide a shared blueprint for peace and prosperity for people and the planet (see Figure 1 below). The Goals form a core part of the UN 2030 Agenda for Sustainable Development, adopted by United Nations Member States in 2015.

Figure 1 - The 2030 UN Sustainable Development Goals

UNDP

The SDGs span environmental, economic and social goals that together aim to provide a coherent framework for wellbeing. As such, they are a helpful policy framework and lens with which to assess policy and legislative plans. SDGs also need to be localised to fit with their national context. The Scottish Government seeks to do this via its National Performance Framework.

Scotland's National Performance Framework (NPF) is the main mechanism through which the Government states it is "localising and implementing" the SDGs. The NPF is Scotland's wellbeing framework and sets out a vision for Scotland through eleven National Outcomes and associated indicators. It is intended to inform policy discussion, collaboration and planning across Scotland.

The 2018 refresh of the NPF mapped the SDGs against National Outcomes, and these Outcomes can be used in turn to support scrutiny - for example, the Scottish Government sets out in the Scottish Budget how spending in different areas aims to align with the National Outcomes.

Scotland's National Outcome - Environment: We value, enjoy, protect and enhance our environment

Vision:" We see our natural landscape and wilderness as essential to our identity and way of life. We take a bold approach to enhancing and protecting our natural assets and heritage. We ensure all communities can engage with and benefit from nature and green space. We live in clean and unpolluted environments and aspire to being the greenest

country in the world.

We are committed to environmental justice and preserving planetary resources for future generations. We consume and use our resources wisely, ethically and effectively and have an advanced recycling culture. We are at the forefront of carbon reduction efforts, renewable energy, sustainable technologies and biodiversity practice. We promote high quality, sustainable planning, design and housing. Our transport infrastructure is integrated, sustainable, efficient and reliable. We promote active travel, cycling and walking, and discourage car reliance and use particularly in towns and cities."

Performance indicators: Performance against National Outcomes is assessed against a number of indicators. For the Environment National Outcome, indicators include waste generated, sustainability of fish stocks, biodiversity and energy from renewable resources.

Significant policy milestone in Session 6: Review of the National Performance Framework

The NPF is underpinned by the Community Empowerment (Scotland) Act 2015. The Act places a duty on Scottish Ministers to consult on, develop and publish National Outcomes for Scotland and to review them every five years. The next review is due in 2028.

Covid-19 and Our National Outcomes

The Scottish Government published an assessment of its progress towards the SDGs in 2020 before the pandemic, and in 2021 published an assessment of how the Covid-19 pandemic was impacting on National Outcomes. In relation to Covid-19 impacts on the environment National Outcome, the Government's assessment stated:

> “ The steep contraction in economic activity during lockdown resulted in improvements in some environmental measures (such as some measures of air quality and early estimates of greenhouse gas emissions) and travel patterns also changed. However, some of these changes may prove to be temporary. The pandemic has also had harmful environmental impacts, such as increased use of plastics and packaging materials, reduced environmental monitoring and enforcement and delays to domestic and international negotiations and actions on climate. The future shape of travel and transport (an important source of greenhouse gas emissions) is also currently unclear and dependent on the evolution of the pandemic, the societal response, and whether any positive changes in behaviour around low carbon travel are maintained.”

Sustainable development and scrutiny in the Scottish Parliament

The Scottish Parliament is working towards embedding sustainable development across the organisation. This incorporates the Parliament's own environmental management as an institution, but also involves the need to mainstream sustainable development thinking and action across the organisation, including as part of its scrutiny function.

This work helps the Parliament meet the statutory requirements placed on all Scottish public bodies, under the Climate Change (Scotland) Act 2009, to act in the way it considers most sustainable. Standing Orders - the rules of Parliament - require the Scottish Government and others introducing legislation to assess sustainable development impacts, and for Parliament to scrutinise that assessment and the legislation itself.

Such an approach improves scrutiny by:

- Garnering a broader range of evidence highlighting social and environmental issues
- Mitigating committee silos through the more holistic approach of sustainable development
- Focusing scrutiny on what is important – the root causes of problems and potential unintended or perverse consequences of policy/legislation

The Parliament is developing and seeking to integrate use of a Sustainable Development Impact Assessment (SDIA) tool - based on the requirement for users to talk through the implications of any given piece of policy or legislation. This enables users to engage with the issues, question assumptions, and develop a deeper understanding of implications.

Significant policy milestone in Session 6: The SNP manifesto committed to bring forward a **Sustainable Development and Wellbeing Bill** including a statutory requirement for all public bodies and local authorities to consider the long term implications of their decisions on people's wellbeing and on sustainable development.

Scotland's Environmental Principles

Environmental law and its enforcement is underpinned by a set of core principles which are set out in EU law, but also feature in a host of national and international environmental law instruments all over the world.

Environmental principles can be used to guide policy development, legislation and decision-making. They can be used in the context of both environmental policy, and more broadly to ensure that all types of policy and legislation, for example, avoid unintended consequences. The principles do not in themselves create direct legal rights but have been used by courts to interpret and apply environmental law.

What are Scotland's environmental principles?

Following the UK's exit from the EU, EU environmental principles were brought into Scottish domestic law via the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021.

These 'guiding principles on the environment' as referred to in the Continuity Act are:

(a) the principle that protecting the environment should be integrated into the making of policies - sometimes referred to as the **'integration' principle**

(b) the **precautionary principle** as it relates to the environment,

(c) the principle that **preventative action** should be taken to avert environmental damage,

(d) the principle that environmental damage should as a priority be **rectified at source,**

(e) the principle that the polluter should pay - sometimes referred to as the **'polluter pays principle'**

Those principles are derived from the equivalent principles provided for in Article 11 of Title II and Article 191(2) of Title XX of the Treaty on the Functioning of the European Union.

Scottish Ministers must, in making policies (including proposals for legislation), **have due regard** to the guiding principles on the environment- except in matters relating to national defence or civil emergency, finance or budgets. Scottish Ministers are also required by the Act to publish guidance on the guiding principles on the environment, including on the interpretation of the principles and how compliance can be demonstrated. Public bodies (as specified in the Act) must also have due regard to the guiding principles on the environment when doing anything which requires a Strategic Environmental Assessment.

How the environmental principles are brought into domestic law in Scotland, in terms of their scope, application and interpretation, and whether this represents continuity with EU law, is an area of ongoing debate. This is also the case in other parts of the UK - for example in relation to how environmental principles are treated by the UK Environment Bill for England and Northern Ireland.

Significant policy milestone in Session 6: Guidance on application of the environmental principles: The Scottish Government is expected to publish draft guidance on the environmental principles early in Session 6.

Key bodies and regulators, and duties of public bodies

The specific roles and duties of environmental regulators, agencies and other public bodies in relation to the environment are discussed throughout this briefing under the relevant subject areas. Summary information on the roles of key bodies is provided in the Table below.

Table 1 - Key environmental regulators

Organisation	Type	Functions/responsibilities
The Scottish Environmental Protection Agency (SEPA)	An executive non-departmental public body* (NDPB), established by the Environment Act 1995.	Regulatory, licensing and enforcement functions (as well as policy input and operational advice) in relation to waste, pollution control, the water environment, air quality, industrial emissions, flooding, chemicals and radioactive substances.
NatureScot (formerly SNH)	An executive NDPB*	Lead public body on matters relating to the natural heritage, with advisory and licensing functions in relation to protected areas and species, wildlife management and aspects of land management.
Environmental Standards Scotland	A non-ministerial office, accountable to the Parliament, established under the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021**	Scotland's environmental governance body, oversees Scottish Ministers' and other public bodies' compliance with environmental law.
Marine Scotland	A directorate of the Scottish Government.	Manages Scotland's seas and freshwater fisheries along with delivery partners NatureScot and SEPA.

* Executive NDPBs carry out administrative, commercial, executive or regulatory functions on behalf of Government.

** ESS was established on an interim, non-statutory basis in 2020 but is expected to transition to its statutory form later in 2021.

SEPA Cyber-attack - In December 2020, SEPA announced that it was responding to a significant cyber-attack affecting its internal systems, processes and communications. SEPA stated that it was required to adapt working practices and prioritise services. Environmental implications of the cyberattack were not clear during Session 5. The Scottish Government has indicated that the cyber-attack on SEPA may be affecting certain areas of environmental policy development, for example the timeframe for the development of 2021-2026 Flood Risk Management Strategies.

The following table provides summary information about key organisations (mainly public bodies) whose functions and activities are relevant to environmental policy and outcomes in Scotland. This is not an exhaustive list - many public bodies carry out functions that are relevant to, or can impact on Scotland's environment.

Significant policy milestone in Session 6: The SNP manifesto set out a commitment to "develop a maritime strategy and **set up a dedicated agency** to put our marine assets at the heart of the blue economy" - so it is possible that some of the functions of Marine Scotland will move to a new agency in the coming years.

Table 2 - Bodies with key environmental functions and roles

Organisation	Type	Functions in relation to the environment
Zero Waste Scotland	Company limited by guarantee - but has previously stated it is working towards NDPB status and board appointments are subject to Ministerial approval.	Grant-funded by the Scottish Government to develop policies and strategies for the circular economy, waste reduction and resource efficiency.
Historic Environment Scotland	Executive NDPB, created by the Historic Environment Scotland Act 2014	Leads delivery of Scotland's strategy for the historic environment, and manages of properties of national importance.
Crown Estate Scotland	Statutory Public Corporation accountable to Scottish Ministers and to the Scottish Parliament	Manages Scottish Crown Estate assets including seabed out to 12 nautical miles.
Scottish local authorities and National Park Authorities	As described	Various functions and responsibilities relevant to the environment across planning, waste, air quality, biodiversity.
Scottish Water	A public corporation accountable to Scottish Ministers and the Scottish Parliament.	Key functions in relation to water quality and flooding.
Forestry and Land Scotland and Scottish Forestry	Executive agencies	Delivery of functions in relation to forestry and woodland relevant to nature conservation and other areas e.g. circular economy, flooding.

Environmental standards and governance (following EU exit)

EU exit has triggered a period of fundamental change in environmental governance in Scotland. Prior to leaving the EU, environmental law in Scotland was heavily driven by the development of EU standards and underpinned by EU Directives. An estimated 80% of environmental regulation in Scotland was derived from EU law. This 'level playing field' or 'common floor' of environmental standards supported the functioning of the EU Single Market.

This involved areas where EU law set overarching frameworks or targets, but regulation was largely decentralised to Member States (and thus to Scotland as part of the UK) e.g. conservation of habitats and species. There are also areas where EU regulation is much more centralised e.g. eco-design standards, emissions trading and regulation of chemicals.

Environmental governance as part of the EU relied upon a range of arrangements, from the making of legislation, and the review of its implementation and enforcement by the European Commission and Court of Justice of the European Union. The implementation of EU environmental standards is often also supported by extensive guidance, joint funding initiatives, information sharing and other cooperation activities.

Since 1 January 2021 - the end of the transition period - EU law no longer applies in the UK and these related structures have also ceased to apply in Scotland. The following sections outline some key areas in relation to the development of post-EU exit environmental governance and standards in Scotland.

Maintaining or keeping pace with EU environmental standards post EU exit

The Scottish Government's position following the EU referendum in 2016 was that it would seek to maintain EU environmental standards after leaving the EU. It later set out that it will seek to use powers created in the UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021 ('the Continuity Act') to align with or 'keep pace' with EU environmental law where it believes it is appropriate.

Retained EU law

For the purposes of legal continuity, the UK Government wished to preserve, as far as possible, the legal position which existed immediately before the end of the transition period. This is sought to be achieved by taking a "snapshot" of all of the EU law that applied in the UK at the point of EU exit and bringing it within the UK's domestic legal framework as a new category of law, known as "retained EU law". The creation of this new category of UK law was one of the main purposes of the European Union (Withdrawal) Act 2018.

The process of taking that 'snapshot' of retained law began in Session 5 and involved the scrutiny of a large volume of secondary legislation, much of it on environmental standards, both as Scottish Statutory Instruments (SSIs) and UK Statutory Instruments (SIs). For SIs,

consent of the Scottish Parliament on the exercise of devolved powers by UK Ministers was sought via an SI Protocol .

This means that, broadly, EU environmental standards (as they were at the point of EU exit) still apply in Scotland as retained law (althoughconcerns have been raised by stakeholders regarding to what extent certain aspects of EU regulation have been retained). Some areas of environmental law, which were applied through EU centralised systems and governance however - such as the regulation of chemicals, pesticides or emissions trading systems - have had to be re-created at Scotland or UK-wide level, and may not have exactly replicated or mirrored EU systems.

Keeping pace with EU environmental standards

The Scottish Government has indicated that, where appropriate, they would like to see Scots law continue to align with EU law, and committed that there will be no regression in standards [1] . There is likely to be significant interest in the coming years regarding to what extent the Scottish Government seek to and are able to align with evolving EU environmental standards, especially in the context of a climate and ecological emergency.

The Continuity Act confers a power on Scottish Ministers to allow them to make regulations with the effect of continuing to keep Scots law aligned with EU law in some areas of devolved policy - the “keeping pace” power. The Act also sets out that the purpose of use of this power is to contribute towards maintaining and advancing standards in relation to specified matters - including for 'environmental protection'.

The Act requires the Scottish Government to publish a statement setting out their policy on, and how decisions will be made about, the use of the keeping pace power. This is likely to be of interest to environmental stakeholders. The Act also requires the Scottish Government to produce an annual report of the use of the keeping pace power, which might indicate future intentions of plans regarding alignment with EU law.

Significant policy milestone in Session 6: The Scottish Government will publish a policy statement on how it intends to use its **'keeping pace' power** - relevant to the development of environmental standards in Scotland following EU exit.

The EU-UK TCA - how does the 'Brexit Deal' impact on Scotland's environmental standards?

Environmental protection is generally a devolved area, so in theory, the Scottish Government can continue to align with EU environmental law in future. However, in practice, in the absence of any baseline of standards in the UK linked to EU standards, there have been concerns that regulatory divergence across the UK, other trade agreements, UK internal market considerations, and leaving centralised EU regulatory systems could put pressure on standards in Scotland and inhibit future alignment.

The EU-UK Trade and Cooperation Agreement (TCA or ‘the Agreement’) was applied provisionally from 1 January 2021 and entered into force on 1 May 2021. In the Agreement, the UK and the EU affirm the right of the other to determine the environmental protections it deems appropriate and agree to “continue to strive to increase their respective environmental levels of protection”.

The Agreement includes Level Playing Field (LPF) provisions – the notion that there

should be comparable standards of environmental protection, and in other areas such as workers' rights, across the territory of a free trade agreement. LPF provisions in the TCA provide that a number of environmental and climate levels of protection cannot be lowered, so-called 'non-regression', in a way which impacts trade and investment between the Parties i.e. the EU and the UK.

A 'rebalancing' provision sets out that if material impacts on trade or investment between the Parties arise as a result of significant divergences in environmental or climate protection or subsidy control, either Party may take 'rebalancing measures', e.g. impose tariffs.

The Agreement can be said to maintain a 'floor' for environmental protection across the UK to some extent. However, one limitation to this is that LPF provisions legally inhibit the weakening of former EU standards only so far as divergence impacts trade, or is seen as doing so by the Parties. The LPF provisions only apply where regression 'affects' trade or investment between Parties, or in the case of rebalancing provisions, where 'material' impacts on trade or investment arise as a result of 'significant' divergences in environmental protections. The actual implications of the TCA on future divergence of environmental standards between the UK and EU remains to be tested.

Interactions with other 'pillars' of postE-U exit governance: the UK Internal Market Act, Common Frameworks and future trade deals

The EU-UK TCA is now one part or 'pillar' of Scotland's post-EU exit governance framework, each with implications for the Scottish Government's ability to maintain EU environmental standards, and more broadly, to exercise its devolved competence on those issues. Other pillars include the UK Internal Market Act, Common Frameworks and potentially future trade deals.

The UK Internal Market Act 2020 (IMA) was developed in anticipation of leaving the EU single market, which previously facilitated intra-UK trade, and aims to create a coherent approach to market access and support for the UK internal market.

Two **market access principles** for goods and services are enshrined in the Act:

- The **principle of mutual recognition** means that any good or service that meets regulatory requirements in one part of the UK can be sold in any other part, without having to adhere to the relevant regulatory requirement in that other part;
- the **non-discrimination principle** establishes a prohibition on direct or indirect discrimination based on treating local and incoming goods and services differently (with some exceptions specified, including pesticides and fertilisers)

The principle of an internal market has support from many stakeholders from the perspective of facilitating internal trade. However, there are also questions regarding whether the Act could contribute to a race to the bottom on regulation or stymie the development of environmental standards in devolved nations [2] .

On the face of it, the IMA does not affect the ability of the devolved governments in Scotland and Wales to continue to regulate environmental policy as they wish. However, in practice, the market access principles in the IMA mean that any changes that lower regulation in another part of the UK, or any unilateral increase to standards in Scotland, could place Scottish business at a disadvantage. This is because products produced in or

imported into another part of the UK may not be required to comply with the new higher standards in order to be sold in Scotland.

This could render certain policy interventions less effective, or potentially unworkable, unless pursued at UK- level, or unless there is explicit agreement about areas of divergence e.g. through Common Frameworks (see further below). Such interactions were raised in the Scottish Parliament's scrutiny of the Internal Market Bill, which the Parliament did not give its consent to, with the Scottish Government stating the Bill would "encourage deregulation". This has yet to be tested through real examples of divergence.

An early test case could be in waste regulation, with Scotland due to introduce a Deposit Return Scheme (DRS) in 2022, whereas the UK Parliament has yet to pass legislation enabling a scheme south of the Border. DRS in Scotland will mean businesses have to add a charge to certain drinks containers, and producers will be required to meet recycling targets, potentially requiring businesses to adjust practices in different parts of the UK (see more information below).

Common Frameworks

Common Frameworks will feature strongly as a 'pillar' in the post EU-exit environmental governance landscape. They are agreements on approaches to regulation being developed in a number of areas between the UK and devolved governments. Interim Common Frameworks are in place but have not been published, and none are yet finalised. They could be used to set out common ambitions or targets, regulatory floors, governance or other cooperation systems. They could thus operate to mitigate risks of competitive deregulation arising from the removal of the EU 'common floor' of standards.

Common Frameworks are expected in areas such as air quality, chemicals and pesticides, and resources and waste. Scrutinising Common Frameworks could include considering their alignment with key Scottish environmental strategies and legislation, and how they will impact on the exercise of devolved competence in that area. Environmental groups have highlighted the important role of common frameworks in areas such as waste regulation to prevent a 'race to the bottom' i.e. Governments competitively lowering standards [3] .

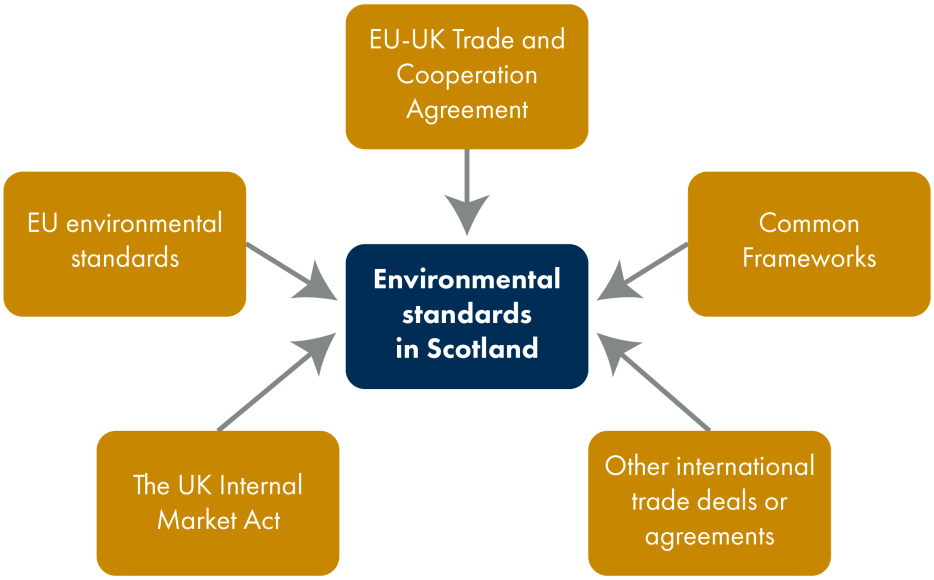
Significant policy milestone in Session 6: The publication of a number of post EU exit Common Frameworks across a number of environmental areas.

Implications of future trade deals

The EU-UK TCA is a single trade deal. The UK Government will go on to negotiate other trade agreements with potential implications for Scotland. The environmental implications of trade deals for Scotland were examined in a SPICe Briefing.

Key factors or 'Pillars' that will influence environmental standards in Scotland post EU exit, and the Scottish Government and Parliament's associated devolved competence are summarised in Figure 2 below. The real implications of this 'new order' for environmental policy are only likely to become more clear over the coming years.

Figure 2 - Factors influencing Scottish environmental standards post EU-exit



Environmental Standards Scotland

A key aspect of addressing post EU-exit governance gaps in Scotland was through the creation of a new public body, Environmental Standards Scotland (ESS).

Why was a new body needed?

As discussed above, environmental governance in Scotland - including enforcement of environmental law - included significant EU arrangements in addition to domestic ones when Scotland was part of the EU. Enforcement of EU law happened mainly through the European Commission, which supports best practice but can ultimately bring Member States before the Court of Justice of the EU (CJEU). If found to be in breach of EU environmental law e.g. in relation to laws on protecting habitats and species, air or water quality, infraction fines can be imposed on the Member States. Both the UK and Scottish Governments recognised that if unmitigated, the loss of these arrangements would result in governance gaps after leaving the EU.

How was the new body created?

The Continuity Act established a new body - a non-ministerial office, accountable to the Parliament - called Environmental Standards Scotland (ESS), designed to provide "continuity of environmental governance". ESS was established on an interim basis in 2020 prior to the Continuity Bill passing. The new body is required to develop and publish a strategy within 12 months of being formally established. Appointments to ESS are made by the Scottish Ministers but must be approved by the Scottish Parliament.

What functions will the new body have?

ESS will monitor public authorities', including Scottish Ministers', compliance with environmental law, the effectiveness of environmental law, and how environmental law is applied. It may take appropriate action to secure a public authority's compliance with

environmental law, and to secure improvement in the effectiveness of environmental law or in how it is implemented or applied. This includes a power to issue 'improvement reports' where it finds a failure to comply with environmental law. In response to such a report, Scottish Ministers must present an improvement plan to the Scottish Parliament.

Post EU-exit environmental funding including rural support

EU funding schemes were significant for environmental projects and outcomes in Scotland. Key funding streams of relevance include the Agri-Environment Climate Scheme within the Common Agricultural Policy (CAP), LIFE funding for conservation programmes, Horizon research funding, and European Structural and Investment Funds which funded green infrastructure for example.

The UK Government has proposed a UK Shared Prosperity Fund to replace EU Structural Funds, due to launch in 2022. During Session 5 the Environment, Climate Change and Land Reform Committee recommended that the Scottish Government engage with the UK Government to ensure that this Fund is designed to further environmental objectives [4] .

The development of post EU-exit regimes for rural and agricultural support is recognised as a significant issue for climate change and biodiversity, due to the large potential to influence land-use management on environmental outcomes. The Scottish Government is developing plans for post-CAP agricultural support. Though details have yet to be published, the Scottish Government has outlined key aims for this support, including shifting to low-carbon sustainable farming and improving biodiversity [5] . More information on post-EU exit rural support can be found in the SPICe Land Use Subject Profile, and in a SPICe briefing, Agriculture and Land Use - Public money for public goods?

PostE-U exit funding is also relevant for the marine environment. In March 2021, the Scottish Government launched Marine Fund Scotland (MFS) to replace the European Maritime and Fisheries Fund (EMFF). The EMFF aimed to support "sustainable growth" of the marine economy in coastal communities, in sectors such as fishing, aquaculture and seafood processing. The Scottish Government states that the new Marine Fund will support investments and jobs in "seafood sectors, the marine environment and coastal communities".

Significant policy milestone in Session 6: This Parliamentary session will see further development and implementation of post-EU exit funding mechanisms in key areas for the environment including agriculture, the marine environment and infrastructure.

Proposals for a human right to a healthy environment

Recognising environmental rights in law is an increasingly widespread practice worldwide.

In 2018, the First Minister's Advisory Group on Human Rights Leadership recommended that a new human rights framework for Scotland should include "a right to a healthy environment" [6] . The recommendation stated:

> “ This overall right will include the right of everyone to benefit from healthy ecosystems which sustain human well-being as well [sic] rights of access to information, participation in decision-making and access to justice.”

In 2019, the Scottish Government announced the National Taskforce for Human Rights Leadership, to support work towards a Scottish Bill of Rights. The Taskforce published recommendations in a report in March 2021, which contains further background and context on the proposed right to a healthy environment [7] . The report states:

> “ Through providing a right to a healthy environment the framework will demonstrate support for the Paris Agreement, demonstrate global leadership in supporting climate justice and contribute to the international cooperation so urgently needed to face the underlying climate crisis.”

Significant policy milestone in Session 6: The Scottish Government may introduce primary legislation on human rights including a right to a healthy environment.

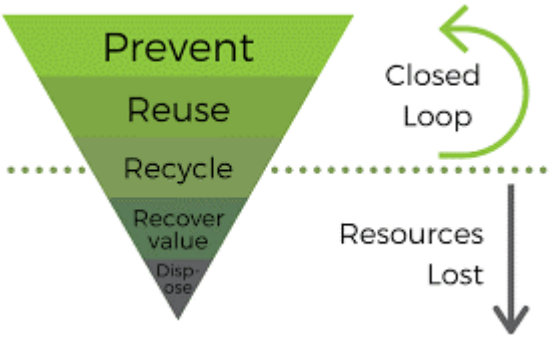
Waste and the Circular Economy

If everyone on Earth consumed resources as we do in Scotland, we would need three planets according to SEPA. Our consumption relies on unsustainable use of resources, including resources extracted in other parts of the world.

Scotland's Environment Strategy and Climate Change Plan recognise the need for Scotland to transition to a circular economy, where resources are kept circulating in the economy for as long as possible, maximising their value and minimising the impacts associated with their extraction, processing and disposal. The Scottish Government published a Circular Economy Strategy in 2016 stating that the transition to a circular economy was "an economic, environmental and moral necessity".

Waste management policy in Scotland generally seeks to divert waste away from landfill and further up the '**waste hierarchy**', set out in law in the Environmental Protection Act 1990. Under the waste hierarchy, waste prevention through efficient use and reuse of resources, recycling and recovery of value should be prioritised in that order, with landfill or other disposal a last resort (see Figure 3).

Figure 3 - The waste hierarchy



The waste hierarchy, showing proportionally how much emphasis should be placed on each area. Source: Creative Carbon Scotland

Waste is generally a devolved area, and the Scottish Government has pursued distinct approaches to waste policy to the rest of the UK under a framework of EU law, such as distinct recycling targets and developing its Deposit Return Scheme. A number of areas of waste policy and regulation have also been pursued at UK-level, due to UK internal market reasons or the overlap between devolved and reserved areas. Some specific areas of waste regulation are reserved because they fall under reserved areas of product standards or import and export control.

Circular economy policy is a broader concept than waste management and can be applied across the whole economy, for example to energy, industry, agriculture, or procurement– as it relates to the circularity of resource use. Moving towards more sustainable consumption can contribute substantially to environmental goals, but also to wider wellbeing, poverty alleviation and the transition towards low-carbon economies [8] .

Waste regulation, roles and key legislation

The Environmental Protection Act 1990 (as amended) sets out a number of duties with respect to the management of waste. Waste must be managed correctly by storing it

properly, transferring it to the appropriate persons and ensuring that when it is transferred it is sufficiently described to enable safe recovery or disposal.

The Waste (Scotland) Regulations 2012 amended the 1990 Act to implement actions in the Scottish Government's 2010 Zero Waste Plan. Holders of waste, including producers, have a duty to take reasonable steps to increase the quantity and quality of recyclable materials. The Scottish Government produced a Duty of Care Code of Practice to explain the duties which apply to anyone who produces, keeps, imports or manages controlled waste in Scotland [9] .

The Waste (Scotland) Regulations 2011 and the Waste Management Licensing (Scotland) Regulations 2011 also place a duty on all persons who produce, keep or manage waste, including local authorities, to take all reasonable steps to apply the waste hierarchy.

There are various other areas of regulation covering specific categories of waste management such as special waste i.e. waste with hazardous properties or waste electrical equipment.

SEPA is Scotland's lead agency on waste regulation, fulfilling a number of regulatory, advisory and monitoring roles including:

- Licencing and monitoring waste management facilities such as landfills and incinerators;
- Administering producer compliance schemes for particular waste streams;
- Regulating the transfrontier shipment of waste;
- Responding to pollution incidents and fly-tipping;
- Tackling illegal activities in partnership with the police such as illegal landfill, unlicensed operators and persistent dumping of waste;
- Collecting and interpreting waste data.

There is extensive guidance on waste management and licensing on the SEPA website.

Local authorities: Local authorities are responsible for collecting waste as defined in the Environmental Protection Act 1990. The Waste (Scotland) Regulations 2012 require local authorities to provide a minimum recycling service to householders. Local authorities also often act in the capacity of a waste broker. Associated responsibilities e.g. ensuring waste is transferred to someone who is authorised to receive it, are set out in the Scottish Government Duty of Care Code of Practice. The Household Recycling Charter and Code of Practice (CoP) are not legally binding but have been adopted by most local authorities, with a view to achieving a more consistent approach to the provision of recycling services across Scotland.

Zero Waste Scotland: Zero Waste Scotland is a company limited by guarantee that receives funding from the Scottish Government to support Scotland's transition to a circular economy. Key roles include supporting the implementation and development of Scottish Government circular economy policy and regulations through business support, guidance, research and administering funding e.g. the Circular Economy Investment Fund.

Revenue Scotland: Revenue Scotland administer the Scottish Landfill Tax, a devolved

tax, with support from SEPA. The Scottish Landfill Tax replaced UK Landfill Tax in Scotland in 2015, following the passage of the Scotland Act 2012 and subsequent Landfill Tax (Scotland) Act 2014. Landfill tax has escalated over time, aiming to support the transition away from landfill.

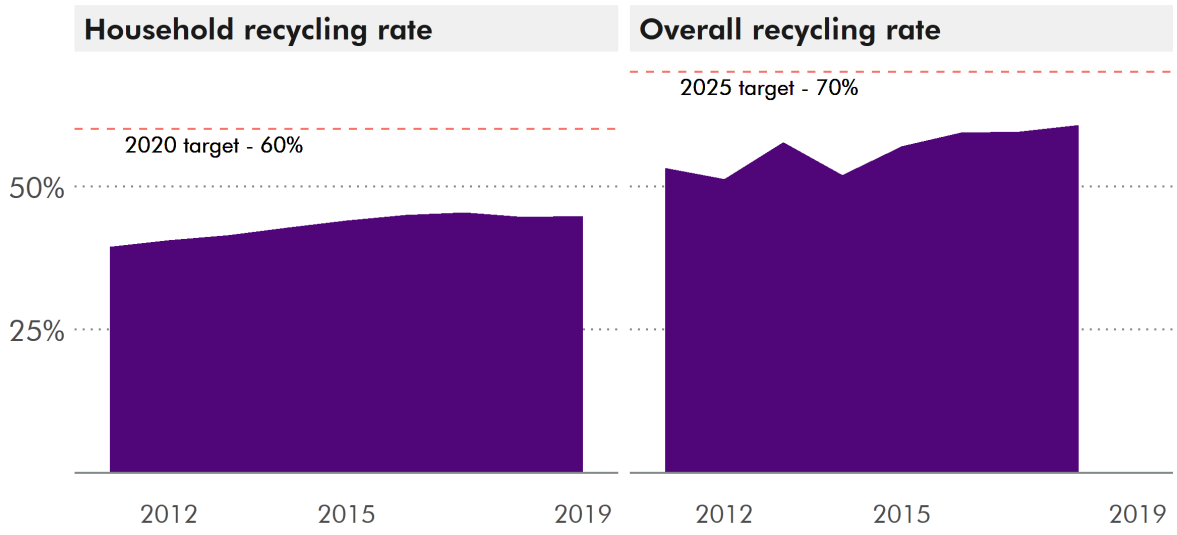
Waste and recycling targets and progress to date

Current key Scottish Government targets in relation to waste and recycling are:

1. To recycle 70% of all waste by 2025.
2. To reduce food waste by 33% from the 2013 baseline by 2025.
3. To end the landfilling of biodegradable municipal waste by January 2025.
4. To reduce the percentage of all waste sent to landfill to 5% by 2025.

Recycling rates in Scotland: The recycling rate for all waste in 2018 was 60.7%, an increase from 59.6% in 2017. In 2018 the household waste recycling rate was 44.7%, a decrease from the 45.5% rate achieved in 2017 (see Figure 4 below). The 2020 household recycling target of 60% is unlikely to be met although final figures are not yet published.

Figure 4 - Recycling Rates in Scotland



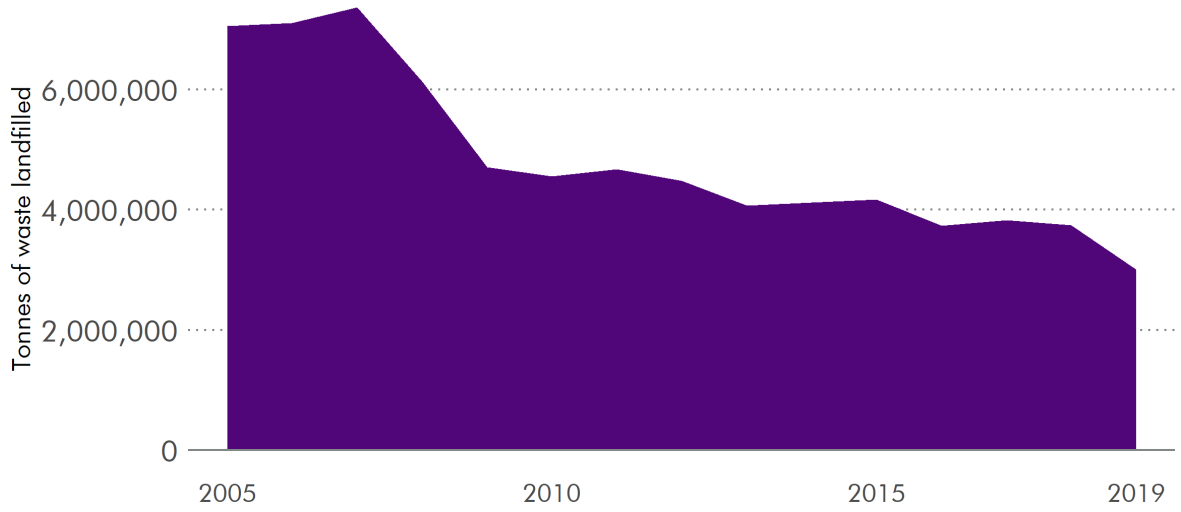
Data source: SEPA waste data

Food waste: The Scottish Government states that Zero Waste Scotland's 2016 food waste report provides the best insight into the scale of food and drink waste in Scotland [10] . It set out that in 2013, an estimated 987,890 tonnes of food and drink was wasted, 60.6% by households, 25.1% in food and drink manufacturing, and 14.2% in other sectors. A review of progress is expected in 2021 [11] .

Waste to landfill: Recycling increases and escalating landfill tax have progressively reduced the amount of waste sent to landfill (see Figure 5 below) - although reductions

anticipated in the 2018 Climate Change Plan have not been achieved. Scotland sent 3 million tonnes of waste to landfill in 2019, a reduction of 20% from 2018 and 57% from 2005.

Figure 5 - Waste Landfilled in Scotland



SEPA, 2020SEPA, 2020[12]

Landfilling of biodegradeable waste: The landfilling of biodegradable municipal waste has progressively reduced in Scotland. In 2019, 0.70 million tonnes of biodegradable municipal waste were disposed to landfill in Scotland, a decrease of 32% from 2018 [13] .

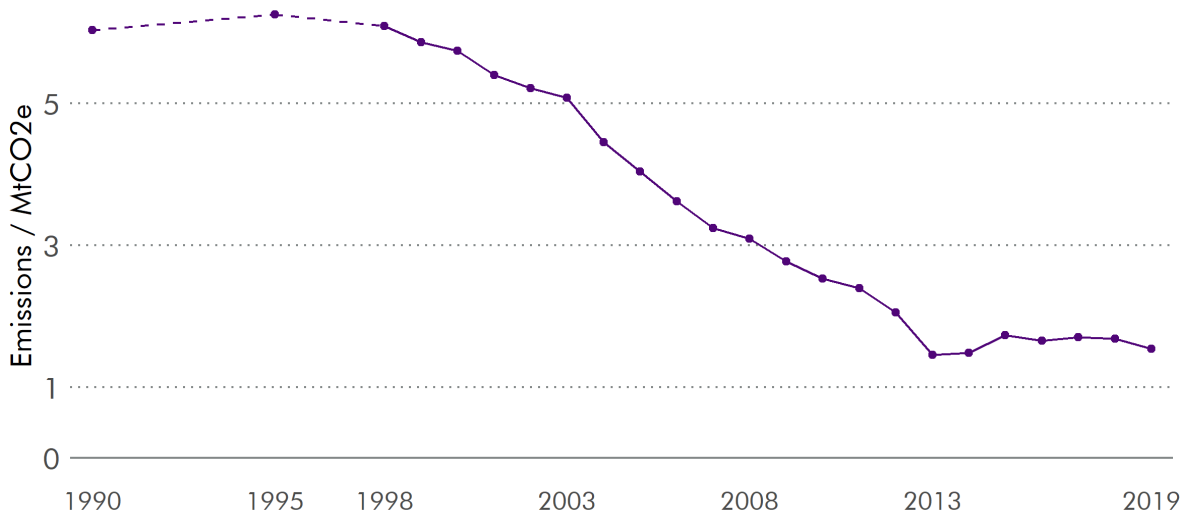
Waste generated: The Scottish Government publishes information about total waste generated as a National Performance Indicator, in relation to its National Outcome on the environment. The amount of household waste generated in Scotland rose by 0.7 % (17 thousand tonnes) between 2018 and 2019. There has been a reduction of 7 % since 2011.

Greenhouse Gas emissions associated with consumption and waste

GHG emissions associated with waste management

In 2019, emissions from waste represented around 3% of total Scottish GHG emissions, compared to approximately 8% in 1990 [14] . The majority of GHG emissions from waste are methane. Significant reductions from 1990 to 2019 (approximately 74% reduction) were achieved mainly due to landfill gas (methane) being increasingly captured and used for energy, reduction in biodegradable waste going to landfill, and increases in recycling. Emissions reductions have stalled since 2013 and slightly reversed, with emissions increasing from 1.45 $MtCO_2e$ in 2013 to 1.54 $MtCO_2e$ in 2019 [14] (see Figure 6 below). The Scottish Government's aim, set out in the Climate Change Plan update, is to reduce emissions to 1.2 $MtCO_2e$ by 2025, and 0.8 $MtCO_2e$ by 2030 [5] .

Figure 6 - Emissions from Waste in Scotland 1990 - 2019



Data source: NAEI 2021. No emissions data available for devolved administrations for 1991-1994 or 1996-1997.

Consumption emissions - Scotland's carbon footprint

Circular economy policy raises the significant issue of Scotland's consumption emissions or 'carbon footprint'. Statutory climate targets are based on emissions from sources located in Scotland. However, consumption of products and materials accounts for an estimated 74% of Scotland's carbon footprint, when those emissions are factored in [15] . This means that Scotland cannot play its part in addressing the climate emergency without tackling its consumption emissions. The Scottish Government commits in its Environment Strategy to be "responsible global citizens with a sustainable international footprint".

The Climate Change (Scotland) Act 2009 requires Scottish Ministers to report on emissions from Scottish consumption of goods and services. Whilst GHG emissions on a territorial basis in Scotland fell by 45.8% between 1998 and 2017, Scotland's carbon footprint only fell by 21.1 % over the same period, from 89.6 MtCO2e in 1998 to 70.7 MtCO2e in 2017 [16] .

Key areas of development in waste and circular economy policy

Circular Economy Bill

Prior to the pandemic, the Scottish Government was committed to introducing a Circular Economy Bill during session 5 of the Scottish Parliament. The Government consulted on proposals for legislation in 2019, with a range of proposed measures to encourage product reuse and waste reduction, and delegated powers to enable charges to be applied to unsustainable products. This followed 2019 recommendations from an Expert Panel on Environmental Charging.

The Bill was postponed due to the pandemic. The Climate Change Committee's 2020

Progress Report on Scotland recommended that progress needs to be maintained on resource efficiency, with early investment, and that a Bill should be introduced in the next Parliament [17] . The SNP manifesto re-committed to the Bill, stating that a Circular Economy Bill will include measures to encourage reuse, tackle reliance on single-use items and tackle textiles pollution or 'fast fashion'.

Forthcoming policy milestone in session 6: The Scottish Government is expected to introduce a Circular Economy Bill, having consulted on proposals for legislation in session 5.

Climate Change Plan update commitments on waste and the circular economy

The Scottish Government's 2020 Climate Change Plan update makes a number of policy commitments on waste [5] and sets out a vision that by 2045, Scotland will have moved from a 'take, make and dispose' linear economy to a circular economy. Key commitments include:

- To develop a **post 2025 route map** to identify how the waste and resources sector will contribute to net zero;
- To evaluate the Household Recycling Charter and review its Code of Practice;
- To introduce measures to encourage more sustainable consumer purchasing, including to consult on a charge on disposable drinks cups and to increase the carrier bag charge from 5p to 10p (the latter commitment was implemented in April 2021).
- To examine the range of fiscal measures e.g. environmental taxes, levies and charges used by other countries to incentivise positive behaviours and to develop proposals in this area.

The Government aims that the implementation of a Deposit Return Scheme, UK-wide reform of producer responsibility (more information is set out below), together with a review of the Recycling Charter will boost recycling rates.

Forthcoming policy milestone in Session 6: The Scottish Government is expected to bring forward a new route map to meeting waste and recycling targets for 2025.

Ending the landfilling of biodegradable municipal waste by 2025

The landfilling of biodegradable municipal waste is a source of methane emissions, a gas which tonne for tonne is 25 times more damaging than carbon dioxide (but shorter lasting in the atmosphere). The landfilling of biodegradable municipal waste was banned from January 2021 under the Waste (Scotland) Regulations 2012, but the Government announced in 2019 that enforcement will be delayed until 2025, due to a lack of progress with reprocessing infrastructure. The Scottish Government is working with partners on infrastructure requirements, and to support coordinated procurement by local authorities of alternative solutions to comply with the forthcoming ban. The Government is also exploring the role of landfill tax in supporting compliance [11] .

Review of the role of incineration in Scotland's waste management

Part of the reduction in waste to landfill in Scotland has been due to an increase in recycling, but it is also because waste has been diverted from landfill to incineration. The total quantity of waste incinerated in Scotland in 2019 was 1.23 million tonnes across 24 facilities, an increase of 72% from 2018, and an increase of 199% from 2011 [18] . SEPA has stated that this rise in incineration of waste is likely to be the start of an increasing trend as waste is diverted from landfill ahead of the 2025 ban outlined above [18] .

The role of incineration and Energy from Waste plants (where incinerators or other waste processing facilities generate energy as electricity or heat) in decarbonisation is a controversial issue and was raised during scrutiny of the 2020 Climate Change Plan update. In the plan, the Scottish Government commits to "consider measures to ensure new energy from waste plants are more efficient and how waste infrastructure can be 'future-proofed' for carbon capture and storage (CCS) technology". Zero Waste Scotland and other stakeholders raised concerns that there are risks of an unsustainable 'lock-in' to incinerating waste.

The Scottish Government has since committed to review the role of incineration in Scotland's waste hierarchy.

Reform of extended producer responsibility - UK-wide

Whilst waste is generally a devolved area, there is a history of collaboration between the UK and devolved governments on some aspects of waste management including UK-wide producer responsibility schemes - currently in place for packaging waste, Waste Electrical and Electronic Equipment (WEEE) and End of Life Vehicles.

The Scottish Government is working with the UK Government and other devolved administrations to reform and expand packaging producer responsibility - which seeks to make producers of packaging responsible for the end-of-life costs of recycling and disposal. Reforms were consulted on earlier in 2021. Other producer responsibility regulations are also being reviewed.

The UK Environment Bill sets out shared delegated powers to regulate on producer responsibility and resource efficiency - meaning that the UK Government could introduce UK-wide Regulations with the consent of Scottish Ministers, triggering scrutiny by the Scottish Parliament under the SI Protocol. In its consideration of the Legislative Consent Memorandum for the UK Environment Bill, the ECCLR Committee raised concerns that there would be a limited role for the Scottish Parliament in relation to how shared powers in the Bill are exercised [19] .

The UK Environment Bill also introduces delegated powers to enable resource efficiency or 'ecodesign' schemes to be taken forward either via parallel regulations by each of the UK and devolved Governments, or by UK Regulations with the consent of Scottish Ministers and other devolved Governments. This was previously a highly centralised area of EU law.

Forthcoming policy milestone in session 6: The Scottish Government is working with the UK Government on **reforms to producer responsibility regimes**, where Regulations may take the form of a UK Statutory Instrument using shared powers in the UK Environment Bill. This could represent an early test of the opportunities for scrutiny by the Scottish Parliament of UK-wide regulation introduced using new 'shared powers'.

Food waste (target to reduce food waste by 33% by 2025 from 2013 baseline)

In 2019, a Food Waste Reduction Action Plan was published by Zero Waste Scotland, outlining actions for reducing food waste. The Scottish Government also consulted on proposals for legislation around its 'Good Food Nation ambition' in 2018, including proposals on food waste. Plans for a Bill in Session 5 were cancelled in light of the pandemic, however the SNP manifesto included a re-commitment to a Good Food Nation Bill. The Climate Change Plan update in 2020 set out plans for consultation in 2021 on mandatory reporting of food waste by businesses, a mandatory food waste reduction target, and on requirements for food waste collections.

Forthcoming ban on certain Single-Use Plastics

In March 2021, the Scottish Government consulted on Draft Regulations which would introduce market restrictions (essentially a ban) on some plastic items. These include single-use plastic cutlery, plates and food and drink containers made of expanded polystyrene. This is based on the Scottish Government's commitment to meet or exceed the standards set out in the EU Single Use Plastics Directive.

Developing EU standards - the EU Circular Economy Package

Some areas of development of the circular economy have been heavily driven by EU policy development, such as the EU Circular Economy Package. The Scottish Government recognises this in the Climate Change Plan update and re-commits to maintaining or exceeding EU environmental standards post EU exit.

Common Frameworks and the UK Internal Market Act

A Common Framework is expected to be agreed on waste and resources. The alignment of UK-wide waste measures with Scotland's circular economy ambitions will require consideration. The UK Internal Market Act 2020 (described in more detail in above sections) also raises questions about implications for circular economy policy in Scotland post EU exit. This issue is explored in more detail in SPICe blog 'The Internal Market Bill – a threat to the circular economy in Scotland?'

Deposit Return Scheme

Under the Deposit and Return Scheme for Scotland Regulations 2020, from July 2022, people in Scotland will be required to pay a returnable deposit when buying a drink in certain single-use drinks containers. Aims include to boost recycling, reduce litter and reduce emissions.

Key aspects of the scheme include:

- The deposit (20p) will be applied to containers of all drinks that come in PET plastic, metal and glass, sized 50ml to three litres.
- Any retailer selling drinks covered by the scheme will be required to accept returns, including online retailers – unless an exemption is granted.
- The Regulations set a target of 90% of scheme packaging being recycled from 2025 onwards (with interim targets of 70% in 2023 and 80% in 2024).
- Scottish Ministers must, before 1 October 2026, review the operation of the Regulations and lay a report before the Scottish Parliament.

Detailed information can be found on the Zero Waste Scotland website. Scotland has been the first mover on DRS in the UK, with enabling powers introduced in the Climate Change (Scotland) Act 2009.

Impact of Covid-19 on DRS introduction

The Scottish Government announced in March 2021 that it has commissioned an "independent gateway review" to assess the impact of the pandemic on the go-live date for the DRS.

Potential for interoperability with other UK schemes

The UK Government is also developing plans for the introduction of a Deposit Return Scheme in England, Wales and Northern Ireland, although powers are yet to be established in primary legislation - they are contained in the UK Environment Bill. In a UK Government consultation on DRS in March 2021, it stated its intention is "to work with Regulators in Scotland to develop a coherent approach across the UK".

Implications of the UK Internal Market Act 2020

As discussed in other parts of this briefing, the UK Internal Market Act 2020 has raised questions about implications for devolved competence in areas which may be impacted by the internal market principles in the Act. The Act does not prevent the Scottish Parliament from passing circular economy legislation or enforcing any requirements on goods produced in Scotland or imported directly into Scotland from outside the UK. However, there are clearly questions around how and to what extent certain devolved policies will be able to effectively operate under this legislation, where the policy or scheme is not UK-wide and requires businesses to adjust products or practices in different parts of the UK. The UK Government's White Paper on the Bill specifically referenced recycling of drinks containers, including DRS, as an example where future divergence could be problematic.

The previous Cabinet Secretary for Environment, Climate Change and Land Reform said that the Scottish Government's initial assessment of the UK Internal Market Bill was that it could significantly undermine the effectiveness of DRS in Scotland [20] . In practice, this issue may be mitigated if there is agreement between Governments to pursue inter-operability.

Biodiversity and wildlife management

What is biodiversity and why is it important?

Biological diversity – or biodiversity – is the variety of life on earth. It includes genetic diversity within species and variation between species and ecosystems. [21] Scotland's biodiversity includes a huge variety of marine and land-based ecosystems - where living organisms interact with each other and their non-living environment - home to an estimated 90,000 species. [22]

Biodiversity is fundamental to the ability of humans to survive and thrive. Nature contributes to human survival and flourishing by providing specific benefits, called "ecosystem services". For example, 35% of global crop production depends on insect pollination [23] . Marine and terrestrial ecosystems sequester (absorb) 60% of global Greenhouse Gas emissions per year, mitigating climate change [24] . Genetic diversity underpins species diversity by providing the capacity for life to be resilient and adapt to change - buffering against extinction risk [25] - and can be harnessed by humans e.g. to improve agriculture [26] . Biodiverse environments are more likely to be resilient to disturbances like extreme high temperatures [27] , support a range of functions and, subsequently, provide benefits to humans. [28]

This is recognised in the "ecosystem approach" which is the primary framework for action under the UN Convention on Biological Diversity (the major international treaty on biodiversity). This is also applied in the current Scottish Biodiversity Strategy which takes into account interactions between different parts of ecosystems, and ecosystem services in how land, freshwater and sea environments are managed.

The global value of ecosystem services has previously been estimated by scientists as 125 trillion $US per year, though there are difficulties with such estimates [29] , and some benefits of biodiversity - such as spiritual and aesthetic values - are less tangible and difficult to measure. The Dasgupta Review - an independent, global review on the Economics of Biodiversity published in February 2021 - highlights that mainstream measures of economic value are incomplete and misleading because they tend to exclude nature. Economies are embedded in, and cannot overcome their dependence on nature. [28]

The ecological emergency - a nature crisis

Together, the climate and ecological 'twin' crises pose a real threat to human safety, health and wellbeing, economies and natural ecosystems. In the SPICe Key Issues for Session 6 briefing, the climate and ecological emergencies, and consequent requirement for a green recovery from Covid-19, are identified as a cross-cutting theme for the coming Parliamentary Session (alongside Covid recovery, the devolution settlement and UK relations post EU exit).

The global loss of biodiversity - a sixth mass extinction?

Recent global reviews highlight the extent of biodiversity decline on land and at sea. The landmark 2019 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem

Services or 'IPBES review' issued a stark warning that nature is declining at unprecedented rates, and that most of the 2020 targets under the UN Convention on Biological Diversity will be missed [24] .

New global goals for 2030, expected to be agreed at the 15th biodiversity COP in China in May 2022 (with negotiations kicking off virtually in October), will only be achieved, the review states, through 'transformative change'. The latest CBD reports agree with IPBES research findings that urgent, transformative change is required to address the nature crisis.

IPBES reports widespread declines in ecosystem, species and genetic diversity including that:

- 75% of the land surface and 66% of the ocean area has been significantly altered by humans while more than 85% of wetland area has been lost.
- An average of around 25% of species in assessed animal and plant groups are threatened with extinction (around 1 million species). Average abundance of native species in most major land-based habitats has fallen by at least 20%, mostly since 1900.

Extinctions have occurred at a relatively stable rate throughout history - known as the background extinction rate - aside from five mass extinction events caused by geological processes and changes to Earth's atmosphere and climate. Current vertebrate extinction rates are estimated to be up to 100 times greater than the background rate and scientists argue that we are in the midst of a 'sixth mass extinction': the first ever to be caused by humans [30] .

Biodiversity loss in Scotland - intrinsically linked to the climate crisis

Evidence of biodiversity decline and its implications led the previous Scottish Government to commit in 2020 to a step change in efforts to address it.

The 2019 State of Nature in Scotland report mirrored the global picture set out by IPBES, illustrating that there has been no letup in the net loss of nature in Scotland (see Figure 7 below) [31] . Nearly half of the country's species have declined in the last 25 years, and one in nine is threatened with extinction from Great Britain (the scale at which assessments are made).

Scotland failed to meet 11 of the 20 global Aichi biodiversity targets for 2020 [32] (globally the CBD reported that none of the Aichi Biodiversity Targets were met in full).

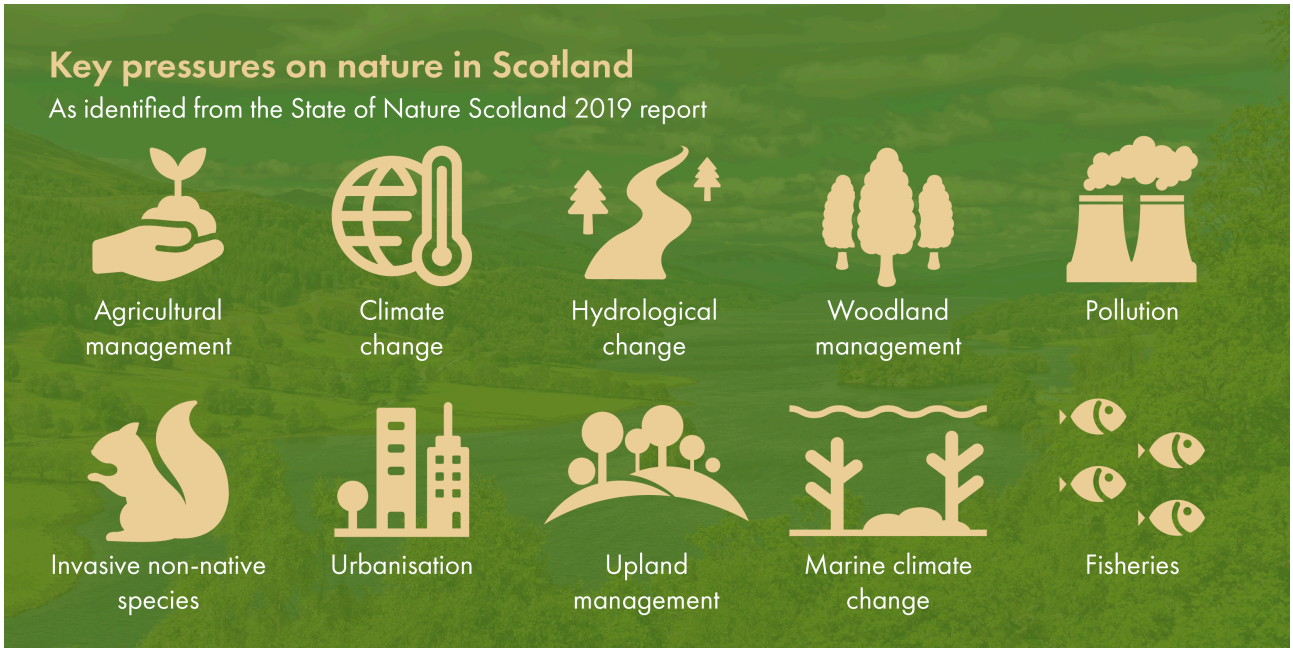
Figure 7 - A nature crisis in Scotland and globally

Sources: IPBES review, State of Nature Scotland, NatureScot

Key pressures on biodiversity in Scotland include agriculture, climate change, urbanisation, invasive species, upland management and fisheries (see Figure 8 below).

The Environment Strategy for Scotland, published in 2020, recognised that the climate and nature crises are intrinsically linked. Climate change is a significant contributor to biodiversity loss and impacts on biodiversity are expected to be significantly greater if warming exceeds 1.5 degrees. Scaling up nature-based solutions to climate change such as peatland restoration and enhancing woodlands, could, on the other hand, be significant in delivering climate goals.

Figure 8- Drivers of biodiversity loss in Scotland



Pressures on nature identified in the State of Nature Scotland 2019 report.

Biodiversity strategies and key legislation

NatureScot and the Scottish Government co-lead the Scottish Biodiversity Programme which oversees activity on biodiversity including policy, reporting and funding. This work is supported by SEFARI which delivers the Strategic Research Programme on environment, food, agriculture, land and communities.

Forthcoming biodiversity COP - a key opportunity to tackle the nature crisis

The United Nations Convention on Biological Diversity (CBD) is the key international treaty on biodiversity. Since its initiation, there have been fourteen meetings of the Conference of the Parties (COP), the decision making body for the Convention. COP15 is due to be held in April-May 2022 with virtual meetings starting in October 2021 - it was postponed from 2020 due to the pandemic.

The Edinburgh Declaration published by the Scottish Government in August 2020 outlines hopes for the post-2020 global biodiversity framework of sub-national Governments. In December 2020 Scottish Government also published a Statement of Intent on Scotland's post-2020 biodiversity strategy which includes a commitment to publish a new biodiversity strategy for Scotland within 12 months of COP15.

Scotland's Biodiversity - It's In Your Hands was Scotland's first biodiversity strategy to 2030, published in 2004. This has since been supplemented by the 2020 Challenge for Scotland's Biodiversity - Scotland's response to the 2020 Aichi Targets. This was supported by Scotland's Biodiversity: A Route Map To 2020 which outlined priority work.

The Nature Conservation (Scotland) Act 2004 requires reporting on progress on any biodiversity strategy every three years. The Scottish Biodiversity Strategy (SBS) Coordination Group oversees reporting and delivery. Under the 2004 Act, public bodies in Scotland also have a statutory duty to further the conservation of biodiversity. The Wildlife

and Natural Environment (Scotland) Act 2011 requires every public body in Scotland to produce a report on compliance with the Biodiversity Duty every three years. Further key legislation relevant to biodiversity is spread across a number of areas e.g. protected areas, the marine environment and wildlife crime - referenced in below sections.

The Environment Strategy

The Environment Strategy for Scotland's overarching vision is:

> " One Earth. One home. One shared future. By 2045: By restoring nature and ending Scotland's contribution to climate change, our country is transformed for the better - helping to secure the wellbeing of our people and planet for generations to come."

The strategy takes into account the necessity to deliver positive outcomes for nature across a range of connected policy areas. For example, one Strategy outcome is "Scotland's nature is protected and restored with flourishing biodiversity and clean and healthy air, water, seas and soils".

Other priorities for Scotland

In her Priorities of Government Statement in 2021, the First Minister announced the aim to "protect and enhance our natural habitats", increase woodland creation by 50% and invest £250 million in peatland restoration this decade. 22.7% of Scottish land area is currently protected and the Government has committed to increasing protection on land to at least 30% by 2030.

Some key interactions between biodiversity policy and other policy areas, which are likely to be live issues this session include:

- **Nature-based solutions** to climate change policy and delivery (see further below);
- Development of **post EU exit support systems for agriculture** and interactions with other land-use policy (see SPICe Subject Profile on Land Use and Rural Policy) and post EU exit governance of fisheries (see SPICe Subject Profile on Marine and Fisheries);
- How nature interests are represented in the forthcoming **National Planning Framework 4**;
- Policies and legislation to **decarbonise and build a circular economy**.

Protected areas, protected species and nature networks

What are protected areas?

One mechanism for the conservation of habitats and species is through designating sites as protected areas. Scotland's system of protected areas for nature began in the 1940s and subsequently was heavily shaped by EU law. Protected areas are designed to ensure that their natural features of special interest remain in good health.

Types of protected area

Sites can be protected based on international directives and treaties, domestic legislation and policy, or voluntarily based on local needs and interests. Key types of protected area are:

European sites – Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) – were originally designated under the EU Habitats and Birds Directives and known as Natura sites. They continue to be protected under domestic law, now known as 'European sites', as a snapshot of EU law was transferred into domestic law as 'retained law'. European sites are internationally important areas for threatened habitats and species - and their designation creates legal objectives to work towards their favourable conservation status (FCS). They can be terrestrial or marine. They are designated under the Conservation (Natural Habitats, &c.) Regulations 1994.

The condition of protected nature sites is a performance indicator under the National Performance Framework. In March 2021, 78.3% of natural features were assessed as being in a favourable condition.

Sites of Special Scientific Interest (SSSI) - are areas of land and water designated by NatureScot as representing the best of Scotland's natural heritage in terms of flora, fauna, geology and geomorphology (landforms). It is a statutory designation made under the Nature Conservation (Scotland) Act 2004. Scotland has 1,422 SSSIs, covering 12.6% of Scotland's land area. SSSIs are terrestrial i.e. areas above mean low water springs. Many SSSIs are also designated as European sites. NatureScot work with land owners and managers with a view to ensuring appropriate management of a site's natural features. NatureScot must also consent to certain operations on SSSIs.

Ramsar sites are designated under the Convention on Wetlands of International Importance.Scotland has 51 Ramsar sites designated as internationally important wetlands, covering about 313,000 hectares. There is no dedicated legislation for the protection of Ramsar sites in the UK; all Scottish Ramsar sites are either SPAs, SACs or SSSIs and are protected under those statutory regimes. In 2019 the Scottish Government published a policy statement on how it expects Ramsar sites to be protected.

Marine Protected Areas are discussed in the following section.

Other types of protected area include National Nature Reserves (NNRs), National Parks, Local Nature Reserves and World Heritage Sites.

The NatureScot webpage SiteLink can be used to view and download information on designated sites across Scotland.

Who manages and monitors protected areas?

Protected areas are not necessarily publicly owned. NatureScot directly manages some, advises on the management of others and monitors the condition of SSSIs and European sites.

Implications of COP15 for protected areas

Currently, 37% of Scotland's marine environment receives protection with 22.7% of terrestrial land protected for nature.

The first Draft of the CBD post 2020-biodiversity framework, published in July 2021, includes a proposed new global target to "ensure that at least 30 per cent globally of land

areas and of sea areas, especially areas of particular importance for biodiversity and its contributions to people, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes".

The European Commission's Biodiversity Strategy for 2030 already commits to at least 30% of seas designated as protected areas by 2030, with at least a third of these strictly protected.

The Scottish Government announced in 2020 that it plans to meet this proposed target and protect at least 30% of Scotland's land for nature by 2030 – and to examine options to extend this further.

Despite the focus that the 30% target has created, debate around protected areas in Scotland is more often related to how protected sites are managed, how well site objectives are implemented and the level of protection those designations actually provide (especially in relation to the marine environment), as opposed to the overall size of the network. There is also increasing focus on how measures outwith protected areas ensure that there is ecological connectivity to adequately protect and enable restoration of priority habitats and species e.g. through nature networks.

Marine protected areas and other approaches

Key legislation

The overarching legal framework for the protection of marine habitats and species in Scotland is provided by the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 ('the Marine Acts'). More information on this legal framework is provided in the SPICe Marine and Fisheries Subject Profile.

The Marine (Scotland) Act 2010 gives Scottish Ministers powers over Scotland's territorial waters (waters up to 12 nautical miles off the coastline, known as the Inshore Zone). The Marine and Coastal Access Act 2009 gives Scottish Ministers powers over Scottish offshore waters (the Exclusive Economic Zone and continental shelf).

Section 3 and 4 of the Marine (Scotland) Act 2010 require that when exercising powers under the Act, Scottish Ministers and other public authorities must (emphasis added):

> " act in the way best calculated to further the **achievement of sustainable development**, including the **protection** and, where appropriate, **enhancement** of the health of that area, so far as is consistent with the proper exercise of that function"

And -

> " act in the way best calculated to **mitigate, and adapt to, climate change** so far as is consistent with the purpose of the function concerned."

More specific requirements for marine conservation fall under the setting out and implementation of a National Marine Plan and Nature Conservation Marine Protected Areas.

The National Marine Plan

The Marine Acts require Scottish Ministers to publish a National Marine Plan (NMP) covering inshore and offshore waters. The National Marine Plan must set:

- economic, social and marine ecosystem objectives
- objectives relating to the mitigation of, and adaptation to, climate change.

When preparing a marine plan, Scottish Ministers are required to prepare an assessment of the condition of the Scottish marine area including significant pressures. The most recent Marine Assessment was published in 2020 – it highlighted pressures associated with non-indigenous species, climate change and ocean acidification. Pressures associated with bottom-contacting and pelagic (mid-water) fishing were cited as the most geographically widespread. A review of the NMP was published earlier in 2021 and Ministers must now decide if replacement or amendment of the Plan is required.

Marine Protected Areas

Marine Protected Areas (MPAs) are intended to conserve Scotland's marine biodiversity and help Scotland achieve its international commitments towards enhancing biodiversity. The network of MPAs is overseen by Marine Scotland, a Directorate of the Scottish Government. Marine Scotland work with NatureScot and the Joint Nature Conservation Committee (JNCC) which provide support on biodiversity features in the designation of an MPA.

There are several types of MPAs which make up Scotland's MPA network which can be designated based on powers set out in the Marine Acts and the Conservation (Natural Habitats, &c.) Regulations 1994. The majority of MPAs (225 sites) are designated on the basis of conserving natural environmental features (termed **Nature Conservation MPAs**). Nature Conservation MPAs can be designated on the basis of conserving:

- Flora or fauna
- Marine habitats or ecosystems
- Features of geological or geomorphological interest.

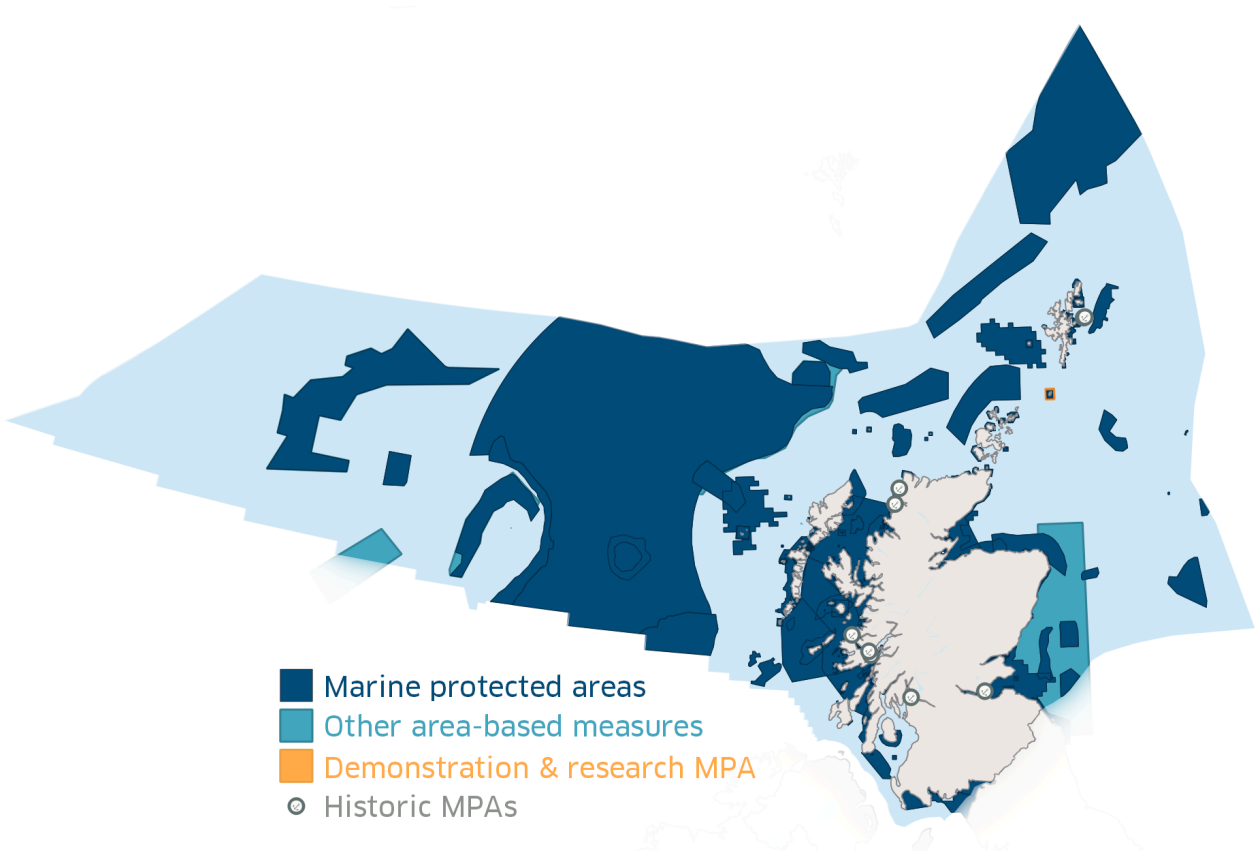
The designation of Nature Conservation MPAs is based on MPA search features which are informed by Priority Marine Features (PMFs) - a list of habitats of conservation priority including kelp beds, seagrasses and biogenic reefs.

Areas of the sea can also be designated as European sites as described in the previous section. Special Areas of Conservation (SAC) cover marine habitats including biogenic reefs, sand dunes and machair.

MPAs can also be designated for the purpose of demonstrating or carrying out research on sustainable methods of marine management or exploitation in Scottish territorial waters (Demonstration and Research MPAs) or to protect marine historic assets e.g shipwrecks of national importance within Scottish territorial waters (Historic MPAs). There is currently one Demonstration & Research MPA , and there are eight Historic MPAs [33]

Figure 9 below shoes the current location of MPAs in Scottish waters. MPAs cover approximately 37% of Scotland's seas.

Figure 9 - Scottish Marine Protected Area Network



Source: Scottish Government

Legislation provides basic protective provisions requiring Scottish Minsters to identify specific features (marine flora, fauna or geological features) and set conservation objectives for sites. MPA designation alone does not provide specific restrictions prohibiting marine activities that may damage species, features and habitats. Site specific management measures such as 'no-take zones' e.g. Lamlash Bay No Take Zone can be introduced by Marine Conservation Orders under s85 of the Marine (Scotland) Act 2010.

Public Authority responsibilities for the management of marine protected areas are summarised in the table below:

Table 3 - Public Authority responsibilities for the management of Marine Protected Areas

Authority	Function
Crown Estate Scotland	Seabed management (inshore MPAs)
NatureScot	Nature conservation advice and licensing
Scottish Environmental Protection Agency (SEPA)	Environmental licensing, including polluting discharges
Marine Scotland	Marine licensing, Electricity consents, Regulation of fishing
Maritime and Coastguard Agency	Regulation of shipping
Local Authorities	Development consent, including aquaculture
Marine Scotland Compliance	Enforcement of nature conservation and fisheries regulations

Source: adapted from Harrison (2019) [34]

Protection outwith MPAs

Protection for habitats and species outwith MPAs can be provided through inclusion on the

list of Priority Marine Features (PMFs) - habitats and species of conservation importance in Scotland's seas. Examples of PMFs include:

- Flame shell beds
- Kelp beds
- Minke whale
- Basking shark
- Cold-water coral reefs

Public Authorities are required to give regard to policies under the National Marine Plan when taking decisions that may impact the marine environment. The NMP states:

> “ Development and use of the marine environment must not result in significant impact on the national status of Priority Marine Features. Impacts of development and use on the national status of Priority Marine Features must be considered when decisions are being made, taking account of the advice of Statutory Advisors. Where planned developments or use have potential to impact PMFs, mitigation, including alternative locations, should be considered. Actions should be taken to enhance the status of PMFs where appropriate.”

Nature-based solutions within a green recovery

Nature-based solutions to climate change are actions to restore ecosystems and provide greenspaces which store or sequester carbon. They can also provide habitats for biodiversity, jobs, climate adaptation benefits such as flood risk management, and health benefits from access to amenity. The Environment Strategy for Scotland suggests that globally, nature-based solutions could provide over a third of the global effort to deliver the Paris Agreement, highlighting that "the climate and nature crises are intrinsically linked".

Nature-based solutions have been identified as one of the key priorities of COP26, the forthcoming international conference on climate change.

Nature-based Solutions (NbS) are defined by the International Union for the Conservation of Nature (IUCN) as:

> “ actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits.”

Nature-based solutions are closely linked to the term **natural capital -** which can be defined as our natural assets including geology, soil, air, water and all living things. Scotland's Climate Change Plan states that:

> “ Scotland’s natural capital is one of our greatest assets and is central to our future net zero economy, developing thriving rural economies based around woodland creation, peatland restoration and biodiversity as well as sustainable tourism, food and drink and energy.”

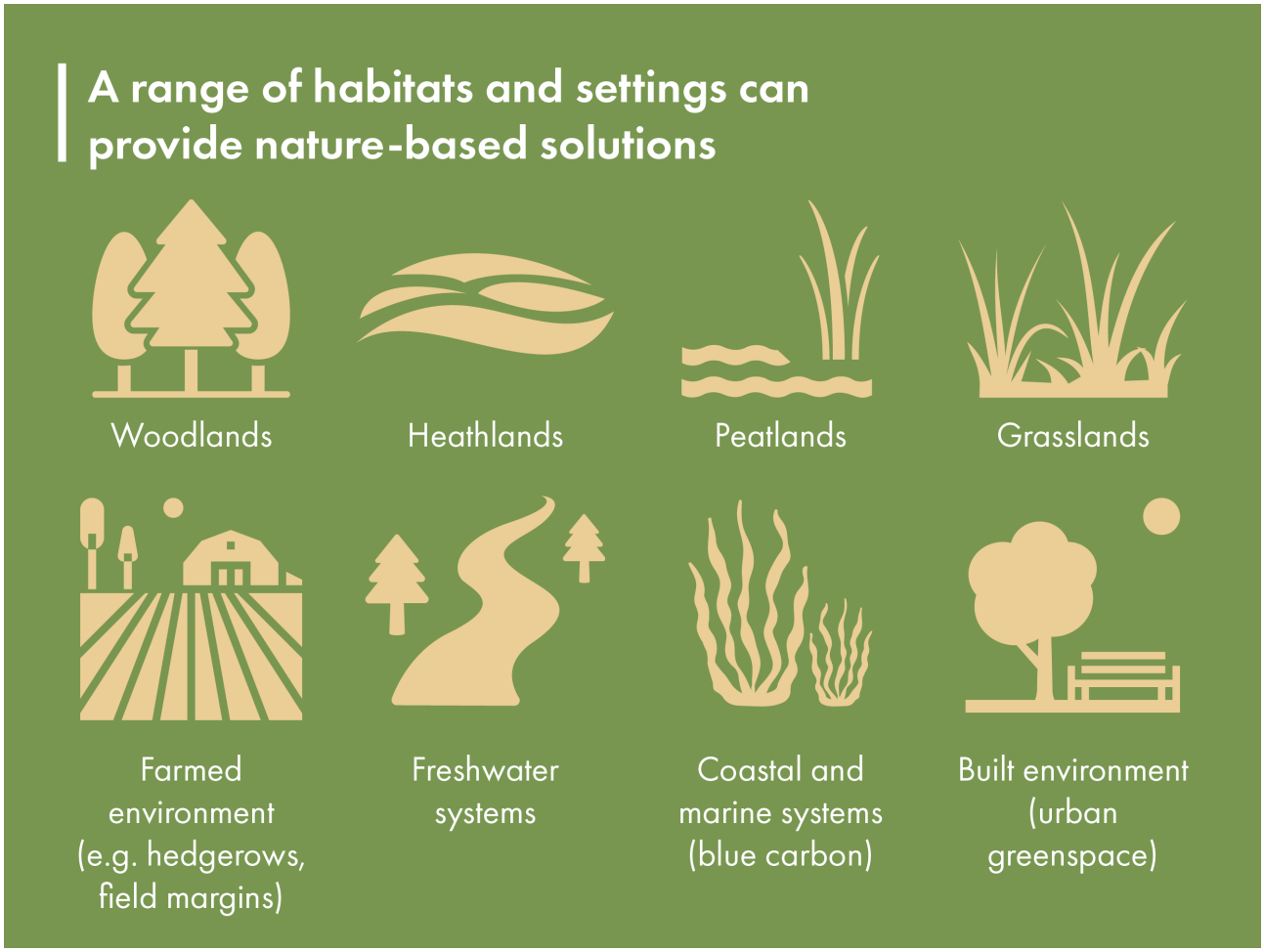
Nature-based solutions could be delivered through a variety of policy mechanisms such as direct public funding or via rural support schemes, integration into planning or infrastructure delivery e.g. natural flood risk management schemes or via market mechanisms. Peatland and forestry nature-based-solutions have been driven by setting and monitoring annual targets (see further below).

Policy on nature-based solutions, and mechanisms to mainstream their delivery, may also be relevant across a number of other policy discussions – including on deer management and grouse moor licensing, and financial stimulus packages as part of a green recovery from the pandemic. The 2020 Report of the Independent Advisory Group on Economic Recovery said that the financial sector and Scottish Government should develop investments for nature-based solutions.

The Scottish Government published an Infrastructure Investment Plan in February 2021, which states that public infrastructure investment has a critical role to play in tackling the twin climate and biodiversity crises, and commits to increase spending on low carbon measures, climate resilience, and nature-based solutions. A Position Statement on NPF4 published in 2020 also committed to explore how to promote nature-based solutions to climate change.

Nature-based solutions can be provided in a range of habitats and settings (see Figure 10 below) - a 2021 review of NbS by the British Ecological Society presents evidence of the potential for NbS across woodlands, heathlands, peatlands, grasslands, arable systems, freshwater systems, coastal and marine systems, and within the built environment. Further information is provided in the below sections on peatlands, forestry and blue carbon as areas that have generally attracted more focus in Scotland to date in relation to NbS policy - however the potential for NbS in Scotland is not limited to these areas.

Figure 10 - Habitats and settings that can provide NbS



Peatlands

Peatlands cover more than 20% of Scotland's land area. There are four main natural peatland habitat types in Scotland: blanket bog, raised bog, fen and bog woodland. Blanket bog is found throughout the Scottish uplands, with peat depths of up to 8 metres. It covers around 1.8 million hectares, but is rare globally - Scotland holds a significant proportion of the world resource.

Healthy peat plays a vital role in carbon storage, storing more carbon in the terrestrial environment than forestry, and also maintaining water quality and reducing flood risk, and providing habitat for biodiversity. Peatlands also have cultural value. Much of our peatland, however, is in poor condition as a result of historical land management practices and requires restoration. The benefits of healthy peatlands, types of peatland habitat in Scotland and actions required for restoration are set out in Scotland's National Peatland Plan published in 2015.

Peatland restoration

Peatland restoration has moved up the agenda in recent years, as understanding has increased about the significance of restoring degraded peatlands as a response to the climate and ecological crises. Changes to GHG inventories (how GHGs are accounted for and monitored) have also meant that more peatland emissions are due to be included in Scotland's domestic emissions for the purposes of its climate targets. Scotland's peatlands are a net source of carbon emissions, and an estimated 6 to 10Mt of carbon dioxide

equivalent being released on an annual basis from peatlands is due to be added to Scotland's national emissions inventory.

Scotland's Climate Change Plan sets out a target for 20,000 ha peatland restoration per year. However it also states that to deliver on the 2032 emissions reduction envelope, annual peatland restoration "needs to be far higher than the current 20,000 hectare annual target" and the Government commits to work closely with partners and land managers to encourage more restoration. The Scottish Government committed in its 2020-21 budget to provide £250 million over 10 years to restore 250,000 hectares of peatland by 2030.

Peatland restoration is currently delivered through the Peatland Action programme – administered by NatureScot and funded by the Scottish Government. In 2019-20, approximately 6,000 hectares of peatland were put under restoration - a similar figure to 2018-2019 (5800ha) but off-track against the target of 20,000 hectares per year. 2020-21 figures are expected to be impacted by the pandemic [11] . Peatland restoration can also be delivered through other funding and delivery routes, such as through rural support schemes, conservation NGOs, and through projects certified to the IUCN Peatland Code.

Safeguarding peat resources

Peatland policy is both about how peatland restoration is delivered and funded, and about how existing peat resources and habitats are appropriately safeguarded from activities such as development and peat extraction. The CCC has called for the sale of peat for horticultural use to be banned [35] , and the SNP Manifesto said "we will ban the sale of horticultural peat". The Climate Change Plan already commits the Scottish Government "to seek to phase out the use of horticultural peat in Scotland", as well as to "seek to strengthen the role of the planning system in not supporting applications for new commercial peat extraction in NPF4 and look to strengthen controls on development on peatland".

While Scottish Planning Policy (to be reviewed as part of NPF4) set out a presumption against new commercial peat extraction consents in 2014, an IUCN review of commercial extraction in Scotland found that existing and historic permissions are lengthy and poorly regulated.

Forestry

Forests and woodlands are generally ‘carbon sinks’, meaning that they remove carbon from the atmosphere and store it. Scottish woodlands also play a role as habitat for a wide variety of species, and in ecosystem services including water supply and regulation and cultural value, and providing areas for recreation, supporting health benefits and wellbeing.

Forestry planting is a significant pillar of Scotland's Climate Change Plan, with a target to increase woodland creation to 18,000 hectares per year by 2024/25. Planting of new woodlands was 11,210 and 11,050 hectares in 2018-19 and 2019-20 respectively, a substantial increase on previous years, and in line with planting targets for these years.

The Scottish Government's 2021 Climate Change Plan Monitoring Report states that there is a "strong pipeline of woodland creation projects at present, and it is expected that the 2020-21 target of 12,000 hectares will be exceeded". Further scaling up will be required to meet the 18,000 hectare annual target by 2024/25. As part of the Low Carbon Fund, the

Government has committed to provide an additional £100 million to increase planting plus additional funding for Forestry and Land Scotland (previously Forestry Commission Scotland).

The extent to which forest and woodland creation acts as a nature-based solution, contributing to climate change mitigation and nature recovery, depends on how they are created and managed. Scotland's Forestry Strategy seeks to adhere to the principle of "the right tree, in the right place" - recognising these complexities. A recent SPICe briefing, The Multiple Roles of Scottish Woodlands, highlights the complex dynamics of woodland creation and management. The location of planted trees - and what existing habitats and landscapes new woodlands replace - determines both the climate mitigation value and the benefit for biodiversity. In terms of carbon storage, it also matters what happens to any wood that is harvested.

Environmental challenges such as climate change can also affect forests and woodlands. For example, changes to temperatures, rainfall and weather patterns can affect the susceptibility of trees to pests and diseases. Policy on nature-based solutions can therefore be highly relevant to climate adaptation, as there will be an increasing need to consider and support resilience to climate change in relation to how land and ecosystems are managed.

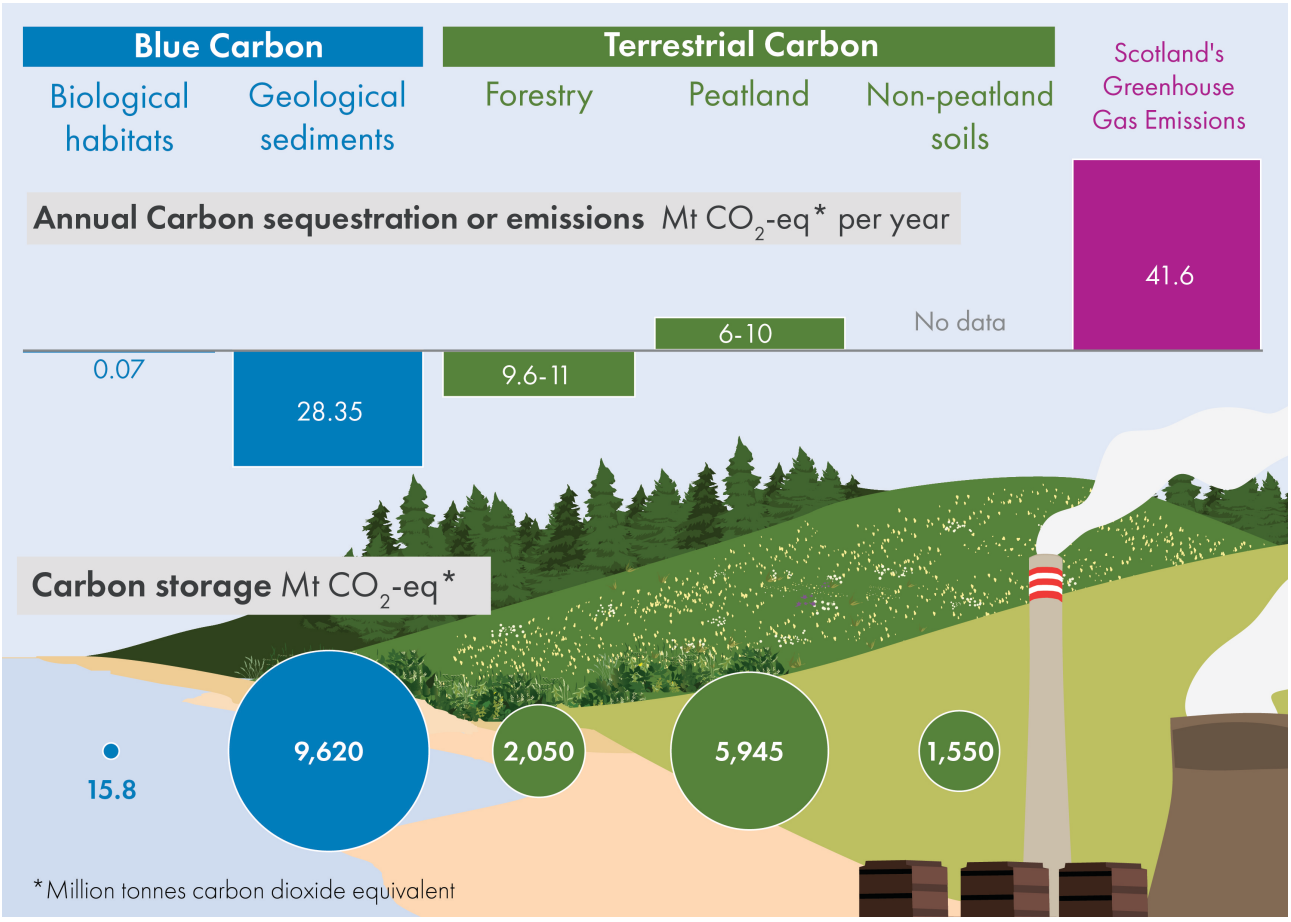
More information on Scottish forestry can be found in the SPICe Subject Profile on Land Use and Rural Policy.

Blue carbon

Scotland’s marine and coastal environment stores significant quantities of carbon both in living ecosystems e.g. cold-water corals, seagrasses, sand dunes, saltmarshes, and in the sediments on the seabed. These carbon stores are referred to as ‘blue carbon’. SPICe has published a detailed briefing on blue carbon.

Scotland’s blue carbon environments are known to capture and store a greater quantity of carbon than Scotland’s land-based ecosystems e.g. peatland, forestry and non-peatland soils (see Figure 11 below). Protection and restoration of blue carbon habitats is also relevant to conserving Scotland’s marine biodiversity.

Figure 11 - Comparison of blue carbon storage and sequestration with terrestrial carbon, and Scotland's greenhouse gas emissions



SPICe blue carbon policy briefing

Threats

Human activities such as bottom-towed fishing, climate change and land-use changes can cause damage to Scotland's blue carbon stores – with the potential to release stored carbon and prevent future carbon capture. Scotland's Marine Assessment 2020 concluded that disturbance caused by towed, bottom-contacting fishing was widespread across most Scottish Marine Regions and Offshore Marine regions.

Blue Carbon and Marine Protected Areas

Policy designed to protect and enhance blue carbon is less developed compared with that of terrestrial environments e.g. peatlands and forestry, in part due to the fact that research around blue carbon is a developing area. The Scottish Government has provided £570,000 to a Blue Carbon Research Programme.

Some Scottish blue carbon habitats are protected from threats based on their contributions to Scotland's biodiversity in Marine Protected Areas (both Nature Conservation MPAs and Special Areas of Conservation as described above) and Priority Marine Features. Examples include:

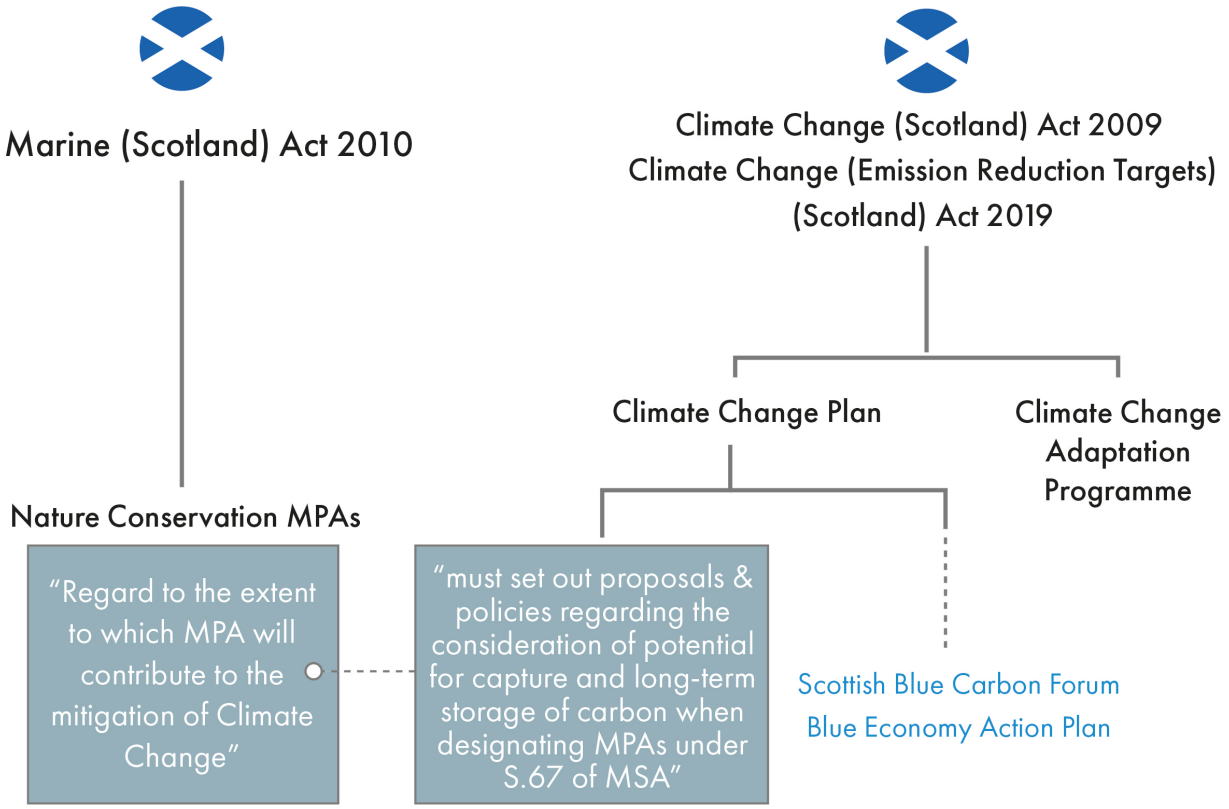
- Maerl beds
- Seagrass

- Biogenic reefs e.g. horse mussel beds and flame shell beds

However, the designation of an MPA does not automatically introduce restrictions on activities that can be harmful to blue carbon or provide for restoration. There are currently no MPAs designated purely or partially to protect carbon stores. There are powers for Scottish ministers to do so under the Marine (Scotland) Act 2010. The Climate Change (Scotland) Act 2009, as amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, requires that Scotland's Climate Change Plans must:

> " set out proposals and policies regarding the consideration of potential for capture and long-term storage of carbon when designating Marine Protected Areas under S.67 of the Marine (Scotland) Act 2010."

Figure 12 - Plans and Programmes required by the Climate Change Acts.



Blue Carbon and Scottish Government Policy

Scotland's National Marine Plan does consider marine carbon storage, stating that:

> " Reducing human pressure and safeguarding ecosystem services such as natural coastal protection and natural carbon sinks (e.g. seagrass beds, kelp and saltmarsh) should be considered. In some cases, compensatory habitat creation or enhancement may be possible and should be considered as a last resort if significant harm cannot be avoided. Appropriate proactive opportunities for enhancing natural carbon sinks and allowing natural coastal change where possible should also be considered."

The Scottish Government has committed to publish a Blue Economy Action Plan which aims to "unlock the significant inclusive growth potential of Scotland's marine space whilst supporting a transition to net zero" - this may be relevant to development of blue carbon

policy.

Forthcoming policy milestone in session 6: In the 2020-2021 Programme for Government the Scottish Government committed to the development of a Blue Economy Action Plan to support marine industries whilst recognising the vital importance to our marine economy of the abundant natural capital in Scotland's seas and rivers. The plan is likely to be relevant to a number of areas of policy affecting the marine environment.

Invasive species

An Invasive Non-Native Species (INNS) is any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health or the way we live. INNS are a significant threat to native wildlife [31] and global biodiversity [24] . NatureScot have assessed that invasive species are the single biggest reason for features of protected nature sites in Scotland being in unfavourable condition, representing 21% of all negative pressures (followed by overgrazing at 17.6%). Problem species include rhododendron, Japanese knotweed, American mink, grey squirrels and North American signal crayfish.

The key legislation is the Wildlife and Countryside Act 1981 as amended by the Wildlife and Natural Environment (Scotland) Act 2012 . In Scotland, it's an offence to release an animal to a location outside its native range or to plant, or otherwise cause to grow, a plant in the wild at a location outside its native range.

The spread of invasive species and wildlife disease is often driven by the global trade of plants and animals, creating the need for 'biosecurity' measures and practices in order to limit risks. The spread of INNS is also likely to be intensified by climate change.

There is a Code of Practice on Non-Native Species for Scotland which sets out a framework of responsibilities for bodies relating to non-native species. NatureScot is the lead organisation for INNS on land. Other responsibilities are held by Marine Scotland (for the marine environment), SEPA (for freshwater) and Forestry and Land Scotland (for woodland and other habitats on the National Forest Estate). There is also coordinated action to address non-native invasive species across Great Britain via a GB Programme Board to give strategic consideration to the threat of invasive species across Great Britain.

The public cost of managing invasive species can also be significant, in particular if issues are not addressed at sufficient scale or over a sufficient length of time leading to later ineffectiveness. The Scottish Government estimate that the annual cost of managing INNS in Scotland may be £200 million. This has led to calls for INNS initiatives and investment in control to take place at larger-scales as a form of 'preventative spending', explored by the ECCLR Committee in session 5 as part of its financial scrutiny.

Wildlife crime

What is wildlife crime in Scotland?

Wildlife crime is any illegal act in Scotland affecting certain birds, animals, and plants including their habitats. It includes the illegal disturbance, destruction, theft, and sale of animals and plants both in the countryside and urban areas, and also the damage and destruction of protected habitats.

Examples of types of wildlife crime include:

- Illegal persecution of birds of prey, badgers and bats
- Damage to Sites of Special Scientific Interest
- Illegal use of traps and snares and possession of illegal pesticides
- Poaching e.g. fish, deer
- Hunting with dogs including hare coursing and fox hunting
- Freshwater pearl mussel fishing

Wildlife crimes can have a serious impact on the conservation status of species, resulting for example in the loss of local bird of prey populations or the extinction of freshwater pearl mussels from certain rivers. Police Scotland state that wildlife crime "poses significant harm to the species targeted by the criminals, as well as the communities who rely on wildlife for employment and tourism".

Key legislation

Wildlife legislation is spread across several instruments. Key pieces of legislation include:

- Wildlife and Countryside Act 1981
- Protection of Wild Mammals (Scotland) Act 2002
- Nature Conservation (Scotland) Act 2004
- The Conservation (Natural Habitats Etc) Regulations 1994
- Wild Mammals (Protection) Act 1996
- Deer (Scotland) Act 1996
- Control of Trade In Endangered Species (Enforcement) Regs 1997
- Protection of Badgers Act 1992
- Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003

For most species, the Wildlife and Countryside Act 1981 or the Habitats Directive and Habitats Regulations apply.

Recently, the Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020 increased maximum penalties for the most serious wildlife offences. This followed an independent review of wildlife crime penalties which made a number of recommendations in 2015 (‘the Poustie review’). The Act increased maximum penalties for over 50 separate wildlife offences and allowed Police Scotland more time to investigate potential crimes.

The 2020 Act also expanded the use of vicarious liability - where a person who has or manages land can be held responsible for crimes committed by someone else on that land. Vicarious liability was introduced by the Wildlife and Natural Environment (Scotland) Act 2011 in relation to certain offences against birds of prey. The 2020 Act expanded vicarious liability for certain offences relating to the trapping and snaring of animals.

Policing, enforcement and wildlife crime priorities in Scotland

The police are the lead agency for enforcing wildlife law in Scotland. Police Scotland divisions have their own Wildlife Crime Liaison Officer. NatureScot assist both the police and the Crown Office and Procurator Fiscal Service by providing expert advice for wildlife crime cases. Police Scotland is also a member of the Partnership for Action against Wildlife Crime (PAW) which brings together law enforcement, land managers, conservationists, and the Scottish Government.

The Scottish Society for the Prevention of Cruelty to Animals (SSPCA) and their Special Investigations Unit (SIU) can lead or support certain wildlife crime investigations in Scotland, if the circumstances fall under the terms of the Animal Health and Welfare (Scotland) Act 2006. During scrutiny of the Animals and Wildlife (Penalties, Protections and Powers) (Scotland) Act 2020, the potential benefits of expanding the SSPCA's powers to investigate crime were discussed, and the Scottish Government agreed to establish a taskforce to explore this further. It is not clear how this has progressed.

Police Scotland also piloted the use of Special Constables for wildlife crime in 2018 in the Cairngorms, announced by the Scottish Government following the publication of a report about golden eagles disappearing in suspicious circumstances. It is unclear what the outcomes of that pilot have been and whether they have been evaluated.

Detecting and obtaining sufficient evidence to prosecute wildlife crime presents challenges, for example where crimes take place in remote, rural areas. PAW Scotland state regarding bird of prey persecution for example:

> “ Wildlife crime, especially that against birds, remains a significant threat to the conservation of a number of species in Scotland… This problem is increasingly well documented in the scientific literature and deliberate human killing has been demonstrated to be one of the main threats to species such as golden eagles, hen harriers and the reintroduced red kites… It is likely that those bird or mammal victims that are found each year are a small proportion of the actual deaths. Those engaged in this activity have a good opportunity to conceal evidence and the chance of finding evidence that hasn't been removed is slim.””

Wildlife crime priorities

Wildlife crime priorities are set at UK-level by the UK National Wildlife Crime Unit, with input from statutory agencies and NGOs. There are currently seven priorities:

1. **Bat crime**
2. **Badger persecution**
3. **Raptor (birds of prey) persecution**
4. **Freshwater pearl mussels persecution -** Freshwater pearl mussels are an endangered species found in rivers in the north of Scotland, the last stronghold of

them in the world.

5. **CITES** (Convention on International Trade in Endangered Species) issues
6. **Poaching** e.g. hare coursing, fish poaching, deer poaching
7. **Cyber enabled wildlife crime -** crimes which either take place online or where technology is a means for the crime e.g. on-line trade in endangered species, or organising hare coursing.

Wildlife crime annual report

The Scottish Government is required to publish an annual report on wildlife crime under the Wildlife and Natural Environment (Scotland) Act 2011, which amended the Wildlife and Countryside Act 1981. The report must include information on incidence and prosecutions during that year, and on research and advice relevant to those offences. The Wildlife Crime in Scotland: Annual Report 2019 (published December 2020) set out that in 2018-19 there were 171 offences relating to wildlife recorded by the police. Crimes against birds were the most commonly recorded type of crime with 46 offences, followed by cruelty to wild animals, fish poaching and hunting with dogs.

Areas of policy development - actions to tackle persecution of birds of prey

The persecution of birds of prey is a high-profile issue in relation to wildlife crime and there are ongoing debates around monitoring, regulatory and enforcement methods such as the use of satellite tagging, video surveillance, and the approach to the regulation of grouse moors. The Scottish Government states that "raptor persecution is a serious problem in some parts of Scotland, particularly in areas linked to driven grouse shooting". There is more information about grouse moor management in the below section.

Wildlife management - including deer, grouse moors and beavers

'Wildlife management' is about the interaction between people and nature. It is often used as a term when species management is employed e.g. to protect habitats or to mitigate conflicts or tensions between wildlife and human activities. Wildlife management can also involve species reintroductions or translocations, where species have become locally extinct.

Examples of wildlife management include the reintroduction of beavers and sea eagles, management of deer numbers, control of geese numbers to mitigate conflicts with agriculture and crofting, eradicating invasive species such as American mink or rats on islands with vulnerable nesting birds, and the proposed regulation of grouse moors. More detail on some key areas is set out below.

NatureScot is the Scottish Government's lead adviser on wildlife management. It defines wildlife management as:

> " the deliberate and targeted intervention by people to change the population, structure or distribution of wild species, particularly terrestrial mammals and birds."

Shared Approach to Wildlife Management

In 2020, NatureScot published a Shared Approach to Wildlife Management Concordat, setting out how a range of organisations intend to work together to "help establish healthy and valued populations of wildlife". Commitments include to pursue partnership working, to balance environmental, social and economic objectives - recognising the potential for tensions between objectives such as food production, forestry, renewables and conservation, and to safeguard animal welfare. More information on animal welfare aspects of wildlife management can be found in the SPICe Subject Profile on Animal health and welfare.

Grouse moor management

A Grouse Moor Management Group was established by the Scottish Government in 2017 to examine the environmental impact of practices on grouse moors and advise on the option of licensing. This followed publication of a report by NatureScot which found that golden eagles had disappeared in suspicious circumstances on or adjacent to grouse moors [36] .

The final report (the 'Werritty report') in 2019 made a number of recommendations for legislative and non-legislative measures [37] . The Scottish Government's response to the report in 2020 announced plans, if re-elected, to legislate to license grouse moor businesses during the next parliamentary term, preceded by consultation, as well as plans to make other regulatory and non-regulatory changes in relation to grouse moor management practices such as muirburn. This legislation is likely to attract significant debate and may link to wider issues around the management of Scotland's uplands.

Forthcoming policy milestone in Session 6: Legislation is expected to introduce a licensing regime for grouse moors.

Deer management

Red deer and roe deer are iconic Scottish species associated with the Scottish landscape, and are our largest wild land mammals. However, high deer populations can cause extensive damage and conflict with land-management interests via overgrazing and trampling of vulnerable habitats, and preventing young trees from growing, inhibiting woodland restoration and regeneration. Deer management raises issues in relation to animal welfare, biodiversity and climate change.

An independent Deer Working Group was established by the Scottish Government in 2017 in response to concerns about standards in deer management. It was asked to review existing arrangements for the management of wild deer, and to make recommendations to ensure the sustainable management of wild deer. The management of wild deer in Scotland: Deer Working Group report, published in 2020, includes extensive recommendations including for changes to the Deer (Scotland) Act 1996, changes to the circumstances in which deer can be kllled lawfully, and for updated guidance.

In response to recommendations, the Scottish Government said in March 2021 that "now is the time to step-up our deer management work", stating:

> “ The twin climate and biodiversity crises require a much greater urgency to our efforts to ensure sustainable deer management and we must recognise that more can and must be done to better realise our ambitious targets on vital issues such as forestry regeneration, woodland creation, peatland restoration and habitat improvement.”

The Government accepted most of the recommendations in the report in full or in principle, with the caveat that many are detailed and will require further consideration or consultation. As part of its response, the Government committed to bring forward proposals to modernise the Deer (Scotland) Act in the next parliamentary term.

Forthcoming policy milestone in Session 6: It is expected that the Scottish Government will introduce primary legislation in response to recommendations of the Deer Working Group.

Beavers

Beavers are protected by law in Scotland as a European Protected Species. This protection came into force on 1st May 2019 under The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2019 and was the culmination of a decade-long process since beavers were released in a trial reintroduction in 2009. This represented the first ever example of mammal reintroduction to Scotland, and the “official”’ return of a species that lived in Scotland for thousands of years before they were hunted to extinction around the 16th century.

The Scottish Beaver Trial began in Argyll in 2009, though it later became apparent that beavers were also present through unauthorised releases in the Tayside area. A 2018 survey by NatureScot (then SNH) found that they were spreading, and a further survey was commissioned over winter 2020/21 to provide an update on current population and range. The survey found:

- The number of active territories has more than doubled from that found in 2017/18, with evidence of 251 active territories compared with 114 in 2017/18 - estimated to equate to a population in the range of 602 to 1381 beavers.
- Overall the population has expanded annually by between 17% and 30%, with the upper estimate considered more likely. This is a greater rate of increase than between 2012 and 2017/18 (8-24%).

Beavers act as ‘ecosystem engineers’ by building dams which create pools and wetlands. This can enhance biodiversity and slow water flow, assisting with flood risk management and water quality. However, their presence can also be controversial with land managers due to interactions with land uses such as farming, via damage to drainage systems or flood banks.

NatureScot can issue licences for the control of beavers including for lethal control and dam removal, under its Scottish Beaver Management Framework . Some beavers have also been trapped and translocated to projects in England. The extent of use of lethal control as part of this new management regime has been the subject of debate, with concerns from some NGOs about the extent of use of lethal control, and there has been a recent (as yet undecided) judicial review of NatureScot's licensing practices in this area. In 2020, 115 beavers were killed under 19 licences.

Air Quality

Poor air quality represents a major threat to human health. The World Health Organization (WHO) state that by reducing air pollution, countries can reduce the burden of disease from stroke, heart disease, lung cancer, and chronic and acute respiratory diseases including asthma.

Elevated pollution levels, usually located in urban areas with high volumes of road traffic are associated with a number of health issues, in particular respiratory and cardiovascular diseases. Health Protection Scotland estimate that approximately 1,700 premature deaths in Scotland annually are attributable to air quality issues.

Air pollution can also have damaging effects on the environment and reduce crop productivity. Sources of air pollution are distributed across many sectors, including transport, agriculture, energy industries and domestic (household) sources.

WHO air quality guidelines offer global guidance on thresholds and limits for key air pollutants that pose health risks. The Guidelines apply worldwide and are based on current evidence for:

- particulate matter (PM)- made up of particles (tiny pieces) of solids or liquids that are in the air. These particles may include dust, dirt, soot, smoke or drops of liquid.
- ozone (O_3)
- nitrogen dioxide (NO_2)
- sulfur dioxide (SO_2).

Air quality in Scotland

The Scottish Government states that Scotland is performing well by UK, European and global comparison, with both ambient concentrations and mass emissions of the main air pollutants largely continuing to fall (with the exception of ammonia). However it also states that:

> “ Evidence continues to accumulate on the impacts of poor air quality, expanding our understanding of how air pollution is harmful to public health and the environment. Although many of the most important pollutants are now below accepted existing health based limits, areas of concern remain. Despite the general downward trend, high levels of nitrogen dioxide persist in some urban hotspots. Scotland is fully compliant with fine particulate matter targets at EU level, and almost so domestically, but there is currently no known threshold below which health impacts don’t occur. This means that we must continue to take action on improving air quality across the country, including areas where targets are being met.”
>
> Scottish Government, 2021

Data on local air quality, supplied by local authorities, can be found on the Air quality in Scotland website.

- **Key Government policy and legislation**

The Scottish Government published Cleaner Air For Scotland 2 Towards a Better Place for Everyone in July 2021. It is the second national air quality strategy, following a consultation in 2020 and an independent review of the Cleaner Air for Scotland strategy was published in 2019. The review found that the previous strategy appeared to have had a positive impact but had an overly complex structure, was not wholly implemented and required effort to tackle governance. It also set out that more effective use of Air Quality Management Areas and Low Emission Zones (LEZs) should lead to improvements in air quality. General recommendations included taking a precautionary approach to public health, obtaining better data, conducting behavioural research, and improving governance, accountability and delivery for air quality.

The new Clean Air Strategy sets out policy commitments across 10 themes, which include:

- **Health – A Precautionary Approach -** stating that evidence justifies adopting a precautionary public health approach to air pollution reduction, and efforts should be made to go beyond legal compliance.

- **Integrated Policy** - Highlighting linkages between air quality policy and strategies around placemaking, transport and climate change . It also emphasises the key roles played by local government, largely responsible for implementing the Local Air Quality Management System as well as planning, transport delivery, public health and regulatory roles.

- **Placemaking**. - stating that the fourth National Planning Framework will "transform how Scotland's planning system shapes our places and society". The Scottish Government committed in Session 5 that NPF4 "will be redesigned to support the population's health and wellbeing and address longstanding health inequalities", and stated "We know that planning and place can compound problems such as poor diet and obesity, noise or air pollution, or it can be part of a solution".

- **Industrial Emissions Regulation -** stating a commitment to maintain or exceed EU standards.

- **Transport -** With objectives to increase active travel, provide better public transport and establish Low Emission Zones (LEZs). The National Transport Strategy published in 2020, is strongly related to the Clean Air Strategy, as is the Climate Change Plan update, which includes a commitment to reduce motor vehicle kilometers by 20% by 2030. LEZs enable local authorities to restrict the entry of certain types of vehicle into specified areas. The pandemic caused a delay to the roll out of LEZs. In 2017, the Scottish Government committed to the introduction of LEZs into Glasgow, Edinburgh, Aberdeen and Dundee by 2020. Glasgow's LEZ came in to force in 2019 but LEZs in Edinburgh, Aberdeen and Dundee, due to start in 2020, were put on hold. The Scottish Government has committed that LEZs will now be established in these cities by May 2022.

Session 6 forthcoming policy milestone: The Government is expected to consult on NPF4 later in 2021. The Planning (Scotland) Act 2019 requires that the National Planning Framework must have regard to the air quality strategy.

Regulation of air quality - roles and responsibilities

- **Local authorities and Local Air Quality Management**

Local authorities are primarily responsible for managing and improving local air quality, under Section 85 of the Environment Act (1995). Local authorities are required to monitor air quality in their area under the framework of Local Air Quality Management (LAQM). The Air Quality (Scotland) Regulations 2000 and Amendment Regulations in 2002 and in 2016 set out the standards and objectives for air quality which must be achieved under LAQM in Scotland.

The LAQM system is implemented according to policy and technical guidance, which prescribes the circumstances under which a local authority is required to monitor air quality, at locations relevant for public exposure, and the methodologies to be used. A local authority will monitor at those locations where it has reason to believe an air quality problem may exist, or to provide background information on air quality in the wider area.

If any objective is unlikely to be met by a required date, the local authority must declare an Air Quality Management Area (AQMA), and produce an action plan outlining how issues will be addressed. There arecurrently 36 AQMAs in Scotland across 15 local authority areas.

- **SEPA**

SEPA have a number of regulatory, monitoring and advisory roles in relation to air quality. Under the Pollution Prevention and Control (Scotland) Regulations 2012, SEPA regulate and monitor certain industrial activities in Scotland that can generate airborne pollution, and under the Environment (Scotland) Act 1995, SEPA works with local authorities to monitor, manage and improve Scottish air quality. SEPA advise local authorities in reviewing and assessing local air quality in their area, and act as a statutory consultee in the planning process, advising on the air quality impacts of new developments.

SEPA also operates an Airborne Hazards Emergency Response (AHER) service on behalf of the Scottish Government, and maintains the Scottish Pollutant Release Inventory (SPRI) which makes information publicly available on reported annual releases of specified pollutants to air and water from regulated industrial facilities.

Flooding

Flood risk in Scotland - and implications of climate change

Flooding is a regular occurrence in Scotland with over 280,000 properties currently estimated to be at risk of flooding. Climate change increases flood risk both in relation to rainfall and the flooding of rivers, pressure on drainage systems, and risks of coastal flooding. Sea level rose by 8cm between 1900 and 1990, and is likely to have risen by a similar amount by 2030 [38] . The Scottish Government states in its fourth National Planning Framework Position Statement:

> “ Our climate is getting warmer and wetter, and more frequent extreme weather events will affect people and places. In summer, more intense rainfall could increase surface water flooding. In winter, more frequent rainfall could bring increased flooding from rivers. Sea level rise could affect the viability of some coastal communities through flooding and erosion... Some places will be more vulnerable to the impacts of climate change than others: flood risk may be particularly acute in parts of our cities, whilst the livability and accessibility of our smaller towns could be significantly affected by flooding events in the future. By future-proofing the design of our streets and buildings and investing in natural infrastructure, including creating and restoring habitats upstream in catchments, we can substantially reduce our communities’ exposure to flooding and the risks from changing temperatures. This also has the potential to provide equality, health, economic and wellbeing benefits for communities. ”

There is more information about climate change impacts in Scotland, and Scotland's Climate Change Adaptation Programme, in the SPICe Climate Change Subject Profile. Extensive information can also be found in the UK Climate Change Committee's 2021 Independent Assessment of UK Climate Risk.

Key Scottish Government policy and funding

The Scottish Government is responsible for setting the policy framework for implementing how flooding is managed in Scotland, and oversees the implementation of the Flood Risk Management (Scotland) Act 2009.

Funding is provided annually in the Scottish Budget to local authorities for flood protection. In 2016, Scottish Ministers and COSLA agreed a strategic funding plan for flood protection schemes which guarantees a minimum of £42 million per annum for local authorities until 2026. It was also agreed that the funding for flood measures should reflect the legislative framework introduced in the 2009 Act, meaning that funding is linked to local authority Flood Risk Management plans and allocated to large-scale projects, distributed according to SEPA prioritisation of flooding schemes and works set out in Flood Risk Management Strategies.

The 2020-21 Programme for Government announced increased investments in flood risk management. An extra £150 million for flood risk management (in addition to the annual £42 million for local authorities) was announced to increase the resilience of Scotland’s communities and assets. These commitments are due to be spent during the 2021 - 2026 parliamentary term. The Scottish Government also funds the Scottish Flood Forum , an organisation that works with communities to build flood resilience and provide advice.

Key legislation - the Flood Risks Management (Scotland) Act 2009

The Flood Risk Management (Scotland) Act 2009 is the key piece of legislation on flooding in Scotland and establishes powers, functions and duties of public bodies including Scottish Ministers. Key aspects include:

- A framework for cooperation between organisations involved in flood risk management
- Assessment of flood risk and preparation of flood risk management plans
- Responsibilities and functions for SEPA, Scottish Water and local authorities
- A process for flood protection schemes

Public body roles and responsibilities

The Scottish Government webpage on managing flood risk describes the roles and responsibilities allocated by the 2009 Act to the different public bodies, and there is statutory guidance on fulfilling responsibilities under the 2009 Act.

The Act creates a general duty for Scottish Ministers, SEPA and responsible authorities to exercise their functions with a view to reducing overall flood risk. Responsible authorities include local authorities, Scottish Water and other public bodies designated by Scottish Ministers.

Property owners and landowners have primary responsibility for protection of their land and property from flooding.

Local authorities have more general duties and powers to act in their area to reduce overall flood risk. Local authorities are responsible for producing Local Flood Risk Management Plans and work in partnership with SEPA, Scottish Water and other responsible authorities to develop these. Local authorities are responsible for implementing and maintaining flood protection actions according to those Plans. They also inspect, clear and repair watercourses to reduce flood risk, and routinely maintain road gullies on public roads and highways.

Section 56 of the Flood Risk Management (Scotland) Act 2009 provides local authorities with a ‘General power to manage flood risk’. This power enables a local authority to do anything which it considers will contribute to the implementation of current measures described in any relevant local flood risk management plan. It may also do anything it considers necessary to reduce an imminent risk of flooding which would be likely to have serious adverse consequences.

Scottish Water is a 'responsible authority' for flood risk management. It is responsible for the drainage of surface water from roofs and paved ground surfaces within a property boundary. Scottish Water can also help to protect properties from flooding caused by overflowing or blocked sewers.

SEPA is Scotland’s national flood forecasting, flood warning and strategic flood risk management authority. It works with the Met Office to provide the Scottish Flood Forecasting Service to predict the likelihood and timing of river, coastal and surface water flooding. In 2020, SEPA published the first climate change maps of Scotland’s rivers and the sea - reflecting the flood hazard in the 2080s for a high global emissions scenario.

SEPA is also planning the development of a suite of future flood hazard and risk information to reflect a range of climate scenarios to 2100 and beyond.

SEPA also operates Floodline, a free advance warning service for the public which provides live flooding information online and issues alerts to registered users to notify them when flooding is likely in their area.

Other Responsible Authorities with roles in relation to flood risk and management include National Park Authorities, Forestry and Land Scotland and emergency services.

Natural flood management (linkages to nature-based solutions)

The Scottish Government has recognised that natural flood management can play a key, strategic role in managing flooding and in tackling the impacts of climate change. Blue and green infrastructure are expected to be an essential part of building resilience to climate change and can also contribute to reducing emissions and carbon sequestration. Blue infrastructure refers to e.g. rivers, canals, wetlands, and floodplains. Green infrastructure refers to e.g. trees and woodlands, gardens, hedgerows and parks. The Scottish Government's position statement on the forthcoming fourth National Planning Framework (NPF4), states:

> “ It is increasingly recognised that the impacts of climate change may be best tackled at a strategic scale – i.e. managing flooding through upland management, and capturing carbon through tree planting and strategic peatland restoration... In particular, opportunities for natural infrastructure to address the long term risk of flooding, water and drainage issues, temperature management and everyday livability of places will inform our approach to planning and enhancing our spaces and places. As part of this, consideration will also be given to the integration of ecological networks to protect and restore biodiversity and ensure that habitats and species can adapt to a changing climate.”

Surface Water Management and 'water resilient places' - a climate emergency response

In February 2021, the Scottish Government published 'Water-Resilient Places A Policy Framework for Surface Water Management and Blue-Green Infrastructure'. The framework brings forward proposals to support Scottish Water’s increased use of natural, blue-green infrastructure to manage surface water away from homes and businesses (reducing pressure on the sewer system). The framework emphasises that the climate emergency presents significant challenges for surface water management in communities, stating that "As the scale of the challenge becomes more apparent, we are discovering that the rate at which we can reasonably expect to implement actions is likely to be outstripped by the increase in exposure to flooding through climate change".

The Scottish Government has also established a Property Flood Resilience Delivery Group, bringing together stakeholders to work together "to ensure that Scotland is better prepared for flood events". This Group published a Living with Flooding action plan in 2019. It highlights that flooding will become more frequent in future and some properties will flood repeatedly - yet take up of Property Flood Resilience measures is low because people are often unaware of the actions that can limit flood damage.

The freshwater environment

Scotland's water environment is a key part of our natural and cultural heritage. Our water resources - such as our rivers, lochs, wetlands and reservoirs - are important habitats for wildlife and biodiversity, they provide us with drinking water, they are used by industries such as food and drink, and they provide recreation and wellbeing opportunities as well as supporting tourism.

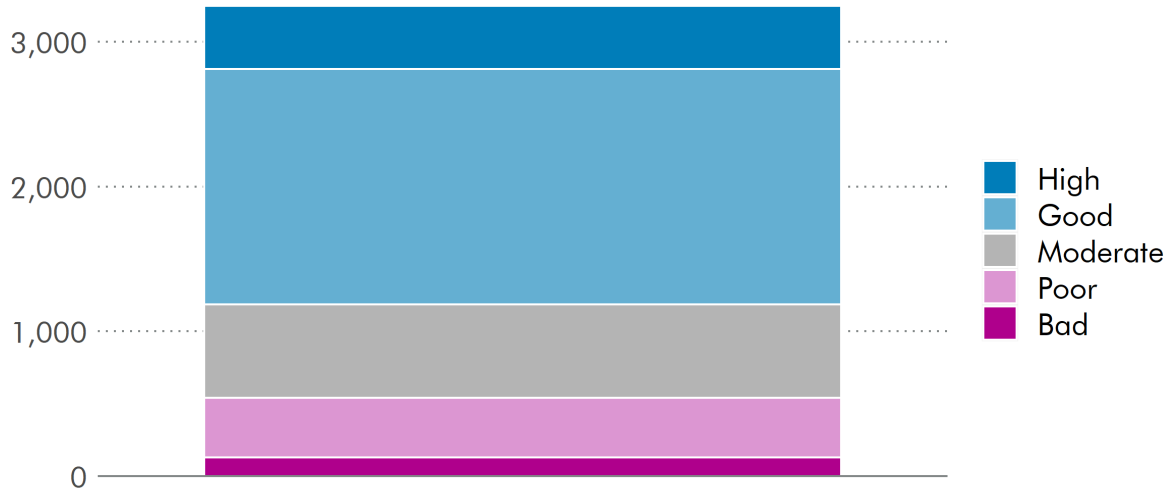
State of the water environment

There are 3652 river, loch, estuary, coastal water and groundwater bodies in Scotland. There are also 1,526 protected areas that are associated with the water environment. These are bathing waters, shellfish waters, areas protected for wildlife conservation or areas used to supply drinking water.

The freshwater environment in Scotland is affected by a range of activities. These include forestry, agriculture, aquaculture, recreation, water abstraction for industrial and domestic use, developments such as roads, engineering works, impounding of water in reservoirs, pollution from chemicals and sewage, and man made barriers to fish passage.

Data on the classification status of water resources in Scotland, including spatial data, are published on SEPA's Water Environment Hub. This shows information on the condition of surfacewater, groundwater, designated bathing waters, shellfish waters and protected areas. Data for 2018 on surfacewater condition showed that 2064 out of 3259 sites - 63% - were evaluated as being in high or good condition, with 1185 sites - 36% - were in moderate, poor or bad condition (see Figure 13 below). Combined with data for groundwater, a total of 66% of Scotland's surface water and groundwater bodies were assessed as being in a good or better condition in 2018. This is an improvement on the condition of water bodies reported in 2015 [39]

Figure 13 - Status of surface waters in Scotland (2018)



SEPA Water Environment Hub

Water, climate and the circular economy

SEPA, the main regulator in relation to the freshwater environment, states that Scotland is using too much water. SEPA sets out its strategic approach to regulating in this area in its Framework for Water. The Framework states:

> “ The ‘extract-make-dispose’ approach to natural resources in large parts of the economy is mirrored in how we use water through ‘abstract-use-discharge’. In light of the climate emergency and biodiversity crisis, this has to change. The principles of a circular economy (design out waste, keep resources in use, restore the natural environment) apply equally to water and can help ensure we live and prosper within the resources of one planet.”

Scottish Water monitor trends in water consumption and publish information in their Sustainability reports.

SEPA's functions in relation to the water environment include:

- Working as the lead authority in delivering River Basin Management Plans;
- Operating as lead authority for Flood Risk Management Planning and the flood warning authority for Scotland (see more on flooding in the previous section);
- Monitoring the water environment by assessing water quality and quantity;
- Monitoring Scotland's designated bathing waters and seeking to achieve compliance with EC Bathing Water Directive Standards, implemented in Scotland via the Bathing Waters (Scotland) Regulations 2008 (as amended).

Key legislation

A list of water environment legislation can be found on the Scottish Government website. The key piece of freshwater environment legislation is the Water Environment and Water Services (Scotland) Act 2003 (WEWS) which set out to transpose the requirements of the EU Water Framework Directive (WFD). The aim in implementing the WFD in Scotland is to achieve an effective balance between the protection of Scotland's water environment and the interests of those who depend on it.

River Basin Management Planning

The WEWS Act created a River Basin Management Plan (RBMP) regime which aims to protect and improve the water environment in a sustainable way. SEPA has responsibility for implementing Scotland’s two RBMPs.

The first RBMP cycle ran from 2009 –2015, and the second series of RBMPs run from 2015-2021. The central target of RBMPs is for 87% of water bodies to reach 'good' status by 2027.

In early 2020, SEPA consulted on a Significant Water Management Issues report to inform the development of new RBMPs which will run from 2021 to 2027. In the consultation, SEPA prioritised the most significant water management issues for the third RBMP cycle as:

- water scarcity

- waste water discharges
- rural land use
- restoring resilience in physically modified rivers
- man-made barriers to fish migration
- hydropower
- fish farming and wild fish interactions
- invasive non-native species

CAR framework

Discharges to the water environment, abstractions, and physical works in rivers and lochs can threaten the water environment. The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) – more commonly known as the Controlled Activity Regulations (CAR) regulate activities which may affect Scotland's water environment. The Regulations cover rivers, lochs, transitional waters (estuaries), coastal waters groundwater, and groundwater dependant wetlands. SEPA issue different forms of licences or authorisations under this framework.

Scottish Water and the water industry

Scottish Water was established by the Water Industry (Scotland) Act 2002. It is responsible for providing water and waste water (sewerage) services to household customers and wholesale Licensed Providers. Scottish Water exercises statutory water and sewerage functions under the provisions of the Sewerage (Scotland) Act 1968 and the Water (Scotland) Act 1980. The 2002 Act requires Scottish Ministers to issue directions to Scottish Water on how to exercise its functions.

Scottish Water obtains its funding from two sources: charges for services, to domestic, business and license providers, and borrowing from the Scottish Government to support capital expenditure.

Scottish Water and net zero

Scottish Water was one of the first public bodies to commit to its own net zero target, following the setting of the 2045 target for Scotland. In 2019 it committed to become a net zero business by 2040, and later published a Net Zero Routemap.

Water collection, treatment and distribution to customers, and the collection, pumping and treatment of waste water – require significant infrastructure and energy. Consequently, Scottish Water is one of Scotland's larger users of electricity. Since 2006/07, its emissions have fallen by 41% to 272,000 tonnes of carbon dioxide equivalent (CO2e) in 2018/19 [40] . It has a renewable power generation programme across its estate, incorporating hydro, wind and solar power, and combined heat and power from organic wastes. It is also exploring how to increase carbon sinks on its estate via peatland restoration, woodland creation or other approaches. Peatland restoration can also support water quality.

Other areas of action in relation to environmental impacts include:

- Developing research to inform approaches to climate change adaptation in relation to water infrastructure, such as water resource planning and drainage network modelling.

- Scottish Water are responsible for maintenance of public Sustainable Urban Drainage Systems (SUDS) - small-scale water management practices and facilities that are designed to drain surface water in a more sustainable manner than the conventional practice of routing run-off through a pipe to a watercourse. SUDS can minimise flooding and pollution by controlling storm water run-off at source, and they can be designed to provide biodiversity benefits and community amenity.

Scottish Drinking Water Quality Regulator

The Drinking Water Quality Regulator for Scotland (DWQR) is responsible for protecting public health by ensuring compliance with drinking water regulations. It exercises its functions in relation to both public water supply (Scottish Water) and private water supply. The DWQR monitors water samples taken by Scottish Water, enforces serious breaches of regulations, and can intervene where it is considered that Scottish Water has failed to adequately resolve a complaint. In relation to private water supplies, the DWQR reports on quality issues, checks that local authorities are regulating private supplies in their area and provides guidance.

Chemicals and pesticides regulation

The regulation of the use of chemicals and pesticides for the purposes of environmental protection are devolved issues, but there are overlaps with reserved areas - mainly product standards and health and safety in the workplace.

Chemicals regulation and pesticides regulation is also a highly centralised area of EU Regulation, so these systems have recently had to be replaced with domestic systems following EU exit. Those replacement regulatory systems are generally UK-wide. A Common Framework is also expected to be agreed on chemicals and pesticides.

UK REACH (replacing EU REACH)

EU REACH (standing for the Registration Evaluation Authorisation and restriction of Chemicals) is an EU-wide regulatory framework and market mechanism to promote the safe production, transport and use of chemicals, to manage potential impacts on human health and the environment.

Following EU exit, EU REACH has been replaced in Great Britain by UK REACH. EU REACH still applies in Northern Ireland under the Northern Ireland Protocol. The purpose of UK REACH is to provide a high level of protection for human health and the environment in relation to the use of chemicals, to facilitate information sharing at all levels within the supply chain, and to reduce animal testing. The Scottish Government stated that the aim is for UK REACH to mirror "as closely as possible the current arrangements under EU REACH".

The UK Environment Bill sets out how the UK REACH Regulation can be amended in future, with powers for Scottish Ministers in relation to devolved areas. This includes the UK Secretary of State taking powers to amend the REACH Regulation in future, subject to 'protected provisions' and a consent mechanism for Scottish Ministers. Devolved administrations can also take urgent temporary restriction action in some cases.

Under the new UK REACH regime, functions formerly fulfilled by the European Chemicals Agency (ECHA) are carried out by the Health and Safety Executive (HSE). The HSE must take advice from the Environment Agency, who in turn must collaborate with and pass on any advice received from SEPA, when exercising functions involving environmental issues. In Scotland, enforcement duties related to UK REACH sit with either local authorities, SEPA or HSE. A detailed overview of UK REACH is available in a House of Commons Library briefing [41] .

Concerns have been raised by some environmental stakeholders, and by the ECCLR Committee in session 5, about the loss of EU governance around chemicals regulation and risks of divergence from EU standards in future in a complex area of regulation (bearing in mind however that significant divergence may be problematic under the Level Playing Field provisions in the EU-UK Trade and Cooperation Agreement). There are likely to be discussions in the coming years around how new post EU-exit regulatory systems such as UK REACH evolve, including around how devolved interests are represented in the context of UK-wide systems.

Other areas of regulation on chemicals include:

- **Biocidal products:** A biocide is a chemical substance, mixture, or microorganism

intended to control any harmful organism in a way that is not purely physical or mechanical. Biocidal products in Great Britain are now regulated under the GB Biocidal Products Regulation (GB BPR). These regulations seek to ensure that when biocidal products are used properly, they do not harm people, pets or the wider environment. Similarly to UK REACH, the EU BPR has largely been copied into domestic law to create a stand-alone GB regime. The main differences between EU BPR and GB BPR are set out on the HSE website.

- The Classification, Labelling and Packaging (CLP) of substances and mixtures Regulation seeks to ensure consistent requirements on the labelling of chemicals and safety data .
- The Export and Import of Hazardous Chemicals Regulation requires exporters of certain hazardous chemicals to notify the importing country and in some cases obtain their explicit consent before export can proceed.
- The Genetically Modified Organisms (Contained Use) Regulations 2014 set out measures for the contained use (i.e. in research laboratories/institutes) of Genetically Modified Organisms with a view to protecting human health and the environment.

The above regulations were amended by the Chemicals (Health and Safety) and Genetically Modified Organisms (Amendment of Retained EU Law) (EU Exit) Regulations 2018 to ensure they were operable after EU exit.

Pesticides regulation

Farmers use pesticides to protect crops from insect pests, weeds and fungal disease while they are growing and to prevent contamination of stored foods. Information on pesticide use in different sectors in Scotland is published by the Scottish Government. 98% of arable crops were treated with a pesticide in 2018 [42] . Pesticides are also used by individuals and other land managers e.g. in gardens, parks and in forestry.

Pesticides can have harmful environmental impacts including killing non-target species. Overuse and improper use can have a negative impact on the environment, as well as on the health of plants, animals and humans. One high profile area of pesticides regulation is around the use of neonicotinoids - a class of pesticide linked to losses of wild bee and honeybee colonies - and EU restrictions on the use of certain types of neonicotinoid.

The European Commission announced two pesticide reduction targets as part to the Farm to Fork Strategy in 2020 (part of the European Green Deal) - a 50% reduction in the use and risk of chemical pesticides and a 50% reduction in the use of more hazardous pesticides.

The European Commission authorises the use of active substances contained in pesticides and maintains an EU list of approved active substances - and in turn Member States may authorise plant protection products containing active substances on the EU list. The Scottish Ministers had the powers, within that system, to withdraw or amend authorisations for use of plant protection products in Scotland. Key legislation is the Plant Protection Products (Sustainable Use) Regulations 2012 and the Plant Protection Products Regulations 2011.

From 1 January 2021, an independent pesticides regulatory regime is in operation in Great Britain (England, Scotland and Wales). Northern Ireland continue to operate under the EU

framework due to provisions of the Northern Ireland Protocol. New decisions taken under the EU regime do not apply in Great Britain. This includes active substance and maximum residue level (MRL) decisions and any new EU plant protection product (PPP) legislation. HSE will remain the national regulator for the whole of the UK, on behalf of the UK government and the devolved administrations. It does not alter the ability of governments in England, Scotland and Wales to make regulations or exercise devolved functions for their own territories.

Similarly to UK REACH, environmental stakeholders have raised concerns about how well the new UK regulatory system for pesticides mirrors or replicates former EU governance, for example around requirements for independent scientific advice [43] . The future alignment or divergence of pesticides regulation between the UK and EU is likely to attract scrutiny.

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