

Soil Governance in Scotland – Mapping the Institutional Architecture

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Executive Summary

Aims

Soil is a fundamental resource for Scotland, underpinning our society, economy and environment and we were asked to explore the mechanisms currently in place for its management. We explored the different legislative and policy mechanisms for the conservation and management of soil in Scotland, and how they relate to key national institutions.

Key findings

- Policy relating to soil is wide-ranging and on multiple scales, and close reading of the original texts indicate key relationships between different instruments. However, we confirmed the existing understanding of no single policy designed specifically for the protection of soil.
- Policy instruments can be categorised into three broad areas:
 - *Regulatory* - environmental protection and regulation
 - *Framing* - principles and standards
 - *Enabling* - shaping and encouraging direction of travel.
- Soil protection and management is a feature of a range of policy areas, including environmental protection (such as habitat, biodiversity, landscape, heritage protection, etc.), water, climate change, pollution, waste, land use & planning and land ownership; it may not however be directly mentioned in the primary legislation, but in supporting 'instruments' for delivery.
- It is clear that understanding of soil policy is held within the knowledge and experience of the responsible institutions, and the Scottish Government, although this is not well-documented.
- Gaps arise in policies specifically focused on land – for example, the Land Rights and Responsibilities Statement, or planning policy and legislation in Scotland (e.g. Planning (Scotland) Bill); soil protection is an implicit rather than explicit outcome.

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2. Project aims and rationale

“Scotland’s soils are one of the Nation’s greatest natural assets and are at the heart of most terrestrial life. However, unlike other key natural assets such as air and water, relatively few policies exist which are specifically targeted at the protection of soil itself. Existing policies (e.g. for environmental protection, agriculture, forestry, recycling of organic materials, planning) may all make a contribution to soil protection, but each focuses on a particular function of the soil, rather than on the soil itself. Because of this fragmented nature, existing policies are limited in their combined effectiveness to protect soils. In addition, they are spread across many policy areas and organisations. They do not constitute a coherent soil protection policy, because they do not cover all soils and all threats to soils” (Scottish Soil Framework, Scottish Government, 2009: 1).

This project aimed to understand the extent of the different legislative and policy mechanisms for the conservation and management of soil in Scotland, and how they relate to key national institutions¹. This research is timely due to the need to update understanding on the existing policies relating to soil in Scotland, assess their effectiveness, and identify any gaps in order to improve adaptation necessary for Climate Ready Scotland: the Scottish Climate Change Adaptation Programme (Scottish Government, 2014). This rationale is underpinned with the view of key stakeholders, who assert that there remains a need to assess policy effectiveness with regard to soil protection. The project seeks to identify the institutions that have a key role in delivering long term sustainable soil management, in particular: (1) steering policy and behaviour; (2) setting and delivering objectives; (3) governance and regulation. In addition, the main policy instruments will be identified and explored, such as the existence of key relationships between different instruments, e.g. common goals, multiple benefits, overlaps that could lead to conflict/delivery risks, and gaps.

The definitions of key terms used in developing this institutional overview, in addition to the methodological approach, are described in Appendix A.

3. Policy analysis results

Update on existing policies relating to soil in Scotland

As recognised in the Scottish Soil Framework (Scottish Government, 2009), soil protection and management is a feature of a range of policy areas, including environmental protection (including habitat, biodiversity, landscape, heritage protection, etc.), water, climate change, pollution, waste, land use (including planning) and land ownership (see also Dobbie et al., 2011). As described, an overview table (Table 1) has been generated to illustrate the range of Scottish policies that influence soil protection/conservation and management in Scotland. It should be noted that many of these documents were published several years ago (i.e. between 1990- 2017). The Scottish Soil Framework, of particular relevance, is now almost a decade old, yet the issues and concerns raised regarding integration of soil policy persist today. This table is presented on the following page, and highlights the multi-level and wide range of legislation that protects different soil functions, often indirectly (see also Prager et al., in press; Scottish Government, 2009).

The policy overview presented in Table 1 is not exhaustive, but includes those that have both a direct and indirect influence on soil protection, where it was indicated on close reading. The policy areas not included relate to: air pollution, marine areas, buildings, transport, food and drink, plant health, the disposal of animals/animal by-products, charities, community governance/engagement, human/equal rights, succession or tax. These were removed from the analysis as a search for soil (and related terms, e.g. land, earth, and ground) did not highlight any relevant aspects.

¹ Please note, this project focussed only on policy analysis at the Scottish national scale. Whilst the relationships between this level of policy, and that at UK and EU level are also relevant, they are beyond the scope of this project.

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| | SG purpose: “To focus on creating a more successful country, with opportunities for all of Scotland to flourish, through sustainable and inclusive economic growth” (Scottish Government, 2018) | | | | | | | | | | | | | | | | |
| | National Performance Framework | | | | | | | | | | | | | | | | |
| Primary legislation relating to soil (Acts and Bills) | Environmental Protection Act (1990) | Environment Act (1995) | Nature Conservation (Scotland) Act (2004) | Environmental Assessment (Scotland) Act (2005) | Wildlife and Natural Environment (Scotland) Act (2011) | Water Environment and Water Services (Scotland) Act (2003) | Flood Risk Management (Scotland) Act (2009) | Climate Change (Scotland) Act (2009) | Radioactive Substances Act (1993) | Planning etc. (Scotland) Act (2006) | Planning (Scotland) Bill (as introduced 4th December 2017) | Land Reform (Scotland) Act (2016) | Forestry and Land Management (Scotland) Act 2018 | Historic Environment (Amendment) (Scotland) Act (2011) | Electricity Act 1989 | | |
| Secondary legislation relating to soil (Regulations and Amendments) | Conservation (Natural Habitats, &c.) Regulations (1994) | Environmental Liability Regulations (Scotland) (2009) | Conservation of Habitats and Species Regulations 2010 | Water Environment (Controlled Activities) (Scotland) Regulations (2011) | Water Environment (Miscellaneous) (Scotland) Regulations (2017) | Pollution Prevention and Control (Scotland) Regulations 2012 | Radioactive Contaminated Land (Scotland) Regulations (2007) | Contaminated Land (Scotland) Regulations (2005) and Statutory Guidance SE/2006/44 | Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008) | Sludge (Use in Agriculture) Regulations (1989 and later amendments) | Landfill (Scotland) Regulations (2003) (and later amendments) | Waste Management Licensing (Scotland) Regulations (2011) | Rural Development Contracts (Rural Priorities) (Scotland) Regulations 2008 | Rural Development Contracts (Land Managers Options) (Scotland) Regulations 2008 | The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 | | |
| SG National Plans, Policies and Strategies (relating to soil) | Scotland's Economic Strategy | | | | | | | | | | | | | | | | |
| | Scottish Soil Framework (2009) | Land Rights and Responsibilities Statement (2017) | National Planning Framework 3 (2014) and Scottish Planning Policy (2014) | Scottish Climate Change Plan: Third Report on Proposals and Policies 2018-2032 (RPP3) And Scottish Climate Change Adaptation Programme | 2020 Routemap for Renewable Energy in Scotland | Common Agricultural Policy in Scotland (2015); - Cross Compliance (2017) and Greening Guidance (2018); Scotland Rural Development Programme 2014 - 2020 | The Future of Scottish Agriculture (2006) | Land Use Strategy (2016 - 2021) | Rural Diffuse Pollution Plan for Scotland (2015-2021) | Scotland's National Food and Drink Policy (2009) | Scottish Forestry Strategy (2006) | Scotland's National Peatland Plan (2015) | Carbon Calculator (2011) | Scottish Biodiversity Strategy: 2020 Challenge for Scotland's Biodiversity (2013) | Historic Environment Scotland Policy Statement (2016) | Flood Risk Management Strategies and Local Flood Risk Management Plans | The river basin management plan for the Scotland river basin district: 2015–2027 |
| Guidance documents/codes of practice (relating to soil) | Valuing Your Soils (2016) | Farming for a Better Climate (2011) | Prevention of Environmental Pollution from Agricultural Activity (2005) | Management of Carbon-Rich Soils (2010) | Strategic Environmental Assessment Guidance (2013) | Farming and Water Scotland (website; updated 2018) | Guidance on Suitable Organic Material Applications for Land Restoration and Improvement (2015) | The Muirburn Code (2017) | | | | | | | | | |

Table A Soil conservation and management in Scotland – policy overview

Responsible institutions

The policy review sought to identify the range of Scottish institutions that have a key role in soil conservation/management (including research²), as well as their responsibilities within the range of soil-related policies. These responsibilities include steering behaviour and policy (e.g. Scottish Ministers), setting objectives (i.e. as a statutory consultee); as well as governance and regulation (i.e. the main enforcing authority). The following table (Table 2) lists the range of institutions and the primary legislation for which they are responsible, i.e. in terms of implementation, enforcement, monitoring, or to provide secondary guidance. It should be noted that the table describes the institutions as they are included in the primary legislation, which is publicly available. It is recognised that the legislative legal responsibilities lie with the Scottish Ministers (and their administration) in many instances, but it is not possible to include the delegated responsibilities from Scottish Ministers to institutions such as SEPA or SGRPID, and others, where they are not clear in the primary legislation or explanatory notes.

Table B Institutions responsible for associated primary legislation (i.e. implementation, enforcement, monitoring, or providing secondary guidance)

| Responsible Institution | Scottish legislation |
|---|--|
| Scottish Ministers (as legally accountable) | Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008) Climate Change (Scotland) Act (2009) Environmental Assessment (Scotland) Act (2005) Electricity Act (1989) Flood Risk Management (Scotland) Act (2009) Forestry and Land Management Bill (as introduced 10 th May 2017) Historic Environment (Amendment) (Scotland) Act (2011) Land Reform (Scotland) Act (2016) The Environmental Liability Regulations (Scotland) (2009) Planning etc. (Scotland) Act (2006) Planning (Scotland) Bill (as introduced 4 th December 2017) Water Environment and Water Services (Scotland) Act (2003) The Pollution Prevention and Control (Scotland) Regulations 2012 The Water Environment (Controlled Activities) (Scotland) Regulations (2011) The Water Environment (Miscellaneous) (Scotland) Regulations (2017) Waste Management Licensing (Scotland) Regulations (2011) |

² Please refer to Appendix E: 'Mapping Science to Policy'.

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| <p>SEPA (Scottish Environment Protection Agency)</p> | <p>Conservation (Natural Habitats, &c.) Regulations (1994) Environmental Assessment (Scotland) Act (2005) [statutory consultee] Environmental Protection Act (1990) Environment Act (1995) Flood Risk Management (Scotland) Act (2009) Landfill (Scotland) Regulations (2003) (and later amendments) Planning etc. (Scotland) Act (2006) The Contaminated Land (Scotland) Regulations (2005) & Statutory Guidance SE/2006/44 The Water Environment (Controlled Activities) (Scotland) Regulations (2011) The Water Environment (Miscellaneous) (Scotland) Regulations (2017) The Environmental Liability Regulations (Scotland) (2009) The Pollution Prevention and Control (Scotland) Regulations 2012 Radioactive Contaminated Land (Scotland) Regulations 2007 Radioactive Substances Act (1993) Sludge (Use in Agriculture) Regulations (1989 and later amendments) Waste Management Licensing (Scotland) Regulations (2011) Water Environment and Water Services (Scotland) Act (2003) Wildlife and Natural Environment (Scotland) Act (2011)</p> |
| <p>Local (Planning) Authorities</p> | <p>Climate Change (Scotland) Act (2009) Environmental Protection Act (1990) Flood Risk Management (Scotland) Act (2009) Forestry and Land Management Bill (as introduced 10th May 2017) (as consultees) Land Reform (Scotland) Act (2016) Planning etc. (Scotland) Act (2006) Planning (Scotland) Bill (as introduced 4th December 2017) Radioactive Contaminated Land (Scotland) Regulations 2007 Radioactive Substances Act (1993) The Conservation of Habitats and Species Regulations 2010</p> |
| <p>Scottish Natural Heritage (SNH)</p> | <p>Environment Act (1995) Environmental Assessment (Scotland) Act (2005) Land Reform (Scotland) Act (2016) Nature Conservation Scotland (Act) (2004) The Conservation of Habitats and Species Regulations 2010 Wildlife and Natural Environment (Scotland) Act (2011)</p> |

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|---|--|
| Scottish Water | Climate Change (Scotland) Act (2009) Waste Management Licensing (Scotland) Regulations (2011) Water Environment and Water Services (Scotland) Act (2003) |
| National Park authorities | Planning etc. (Scotland) Act (2006) The Conservation of Habitats and Species Regulations 2010 |
| All public bodies | Climate Change (Scotland) Act (2009) |
| Scottish Land Court/ Lands tribunal | Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008) Land Reform (Scotland) Act (2016) |
| Secretary of State/Minister of Agriculture, Fisheries and Food/ appropriate Minister [UK Parliament]/ appointed chief inspector | Radioactive Substances Act (1993) Sludge (Use in Agriculture) Regulations (1989 and later amendments) |
| Crown Estate Commissioners | Forestry and Land Management Bill (as introduced 10 th May 2017) |

As Table 2 illustrates, SEPA has a key role to play in contributing to soil policy success in Scotland, which in turn may be considered conducive to policy integration. The Scottish Ministers are also responsible for multiple pieces of soil-related legislation; it is likely that the monitoring and regulation tasks associated with the responsibilities held by the Scottish Ministers are delegated to other nominated institutions. It is important to differentiate between monitoring required for regulation versus wider environmental monitoring, and the range of institutions involved in monitoring for both purposes; this information is provided in the Soil Monitoring Action Plan (Black et al., 2012).

With regard to other levels of policy as included in Table 2, the key institutions also play a role in ensuring soil policy implementation. As detailed in the following Table 3, the institutions listed are required to ensure the success of sectoral policies and plans.

Table 3 Institutions responsible for the success of sectoral policies and plans

| Scottish Sectoral Plans and Policies | Responsible institution(s) |
|--|--|
| Scottish Soil Framework (SFF) (2009) | The SFF brings together key delivery partners, including Scottish Environment Protection Agency, Scottish Natural Heritage, Forestry Commission Scotland and Historic Scotland, as well as land managers, research organisations and other stakeholders working towards the soil outcomes (Scottish Soil Framework, 2009: 13). The actions and |

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| | <p>responsibilities of these organisations are detailed in the Soil Monitoring Action Plan (Black et al., 2012).</p> <p>As explained in the SFF, advice on policy review and development, as well as liaison amongst key delivery partners and stakeholders was undertaken by the Soil Focus Group (with close links to the Soils Research Consultative Group). This group no longer exists, although it is partly replaced by the Soils Engagement Group, however with a different remit. A progress review of the actions in the SFF was published in 2013.</p> |
| Land Rights and Responsibilities Statement | <p>Scottish Land Commission</p> <p>Scottish Ministers</p> |
| National Planning Framework 3 (2014) | <p>Scottish Government</p> <p>Planning Authorities</p> <p>National Park Authorities</p> |
| Scottish Planning Policy (2014) | <p>Planning Authorities</p> |
| Common Agricultural Policy in Scotland (2015); - Cross Compliance (2017) and Greening Guidance (2018) | <p>Scottish Government Rural Payments and Inspections Directorate (SGRPID).</p> |
| Land Use Strategy (2016 - 2021) | <p>Scottish Government</p> <p>All public bodies have statutory duty to implement principles for sustainable land management.</p> |
| Rural Diffuse Pollution Plan for Scotland (2015-2021) | <p>Diffuse Pollution Management Advisory Group (DPMAG).</p> <p>SEPA (land manager advice)</p> <p>Forestry Commission Scotland</p> <p>SGRPID</p> <p>NFUS & SLE</p> <p>Responsibilities are detailed for SRUC, SNH, ConFor, etc.</p> |
| Scottish Forestry Strategy (2006) | <p>Forestry Commission Scotland</p> |
| Scotland's National Peatland Plan (2015) | <p>SNH provides advice through Peatland Action and chair the National Peatland Group.</p> <p>The public sector is required to respond to the 'Biodiversity Duty'.</p> |

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| | <p>Scotland’s National Peatland Plan is developed by a collaborative effort among: Scottish Natural Heritage, Scottish Government, Scottish Environment Protection Agency.</p> <p>Forestry Commission Scotland, Historic Scotland, Scottish Crofting Federation, Scottish Land & Estates, South Lanarkshire Council, Scotland’s Moorland Forum, James Hutton Institute, COSLA, RSPB, Scottish Wildlife Trust, the IUCN UK Peatland Programme, the Scotch Whisky Association and Scottish Renewables.</p> |
| Scottish Biodiversity Strategy: 2020 Challenge for Scotland’s Biodiversity | The public sector is required to respond to the ‘Biodiversity Duty’. |
| Historic Environment Scotland Policy Statement (2016) | Historic Environment Scotland |
| Flood Risk Management Strategies and Local Flood Risk Management Plans | SEPA Local Authorities |

Policy effectiveness

This research project was also tasked to integrate an evaluation of policy effectiveness with regard to soil protection and management, where available. On reviewing the range of policy, there are multiple indicators that may be considered to evaluate policy effectiveness of the primary policy goal, however they don’t necessarily reflect the effectiveness for soil protection where this may be an indirect impact.

Currently there is limited soil monitoring in Scotland and the monitoring undertaken isn’t necessarily fit for the purposes of monitoring policy effectiveness as it wasn’t designed for that purpose. This has been reported previously (Dobbie et al., 2011; Black et al., 2012) and more recently echoed by Prager et al (in press) who state that: “*most monitoring appears to be of the state of the environment and not the effects of a given policy instrument*”. Nonetheless, three policies/strategies are identified as including outcomes that relate to soil health and that include potential indicators of policy effectiveness. These policies and the relevant indicators are presented in Box 1. The suggested indicators of policy effectiveness are in red font.

Box 1: Soil monitoring as indicators of policy effectiveness (see also Dobbie et al., 2011; Annex 1)

[Scottish Soil Framework](#) (Scottish Government, 2009)

The Framework identifies 13 soil outcomes for sustainable soil management, against which progress can be assessed. As described in the Scottish Soil Framework:

“The Scottish Government has made increasing sustainable economic growth its overarching purpose. To achieve this purpose, the Government has identified 15 National Outcomes, including: ‘We value and enjoy our built and natural environment and protect it and enhance it for future generations’. Protecting Scotland’s soils aligns with and supports the Government purpose of increasing sustainable economic growth and the National Outcome identified above. The

Government has also identified 5 Strategic Objectives, which play a key role in focusing the activity of Government and its delivery partners. Sustainable soil use contributes in particular to the Greener objective. Because of its wide-ranging functions, sustainable soil use also contributes towards other Government Strategic Objectives, including the Wealthier & Fairer, Healthier and Safer & Stronger objectives. In particular, healthy and functioning soils are essential for wealth creation in forestry and agriculture” (Scottish Soil Framework, 2009).

“A common thread in the assessment of the pressures on soils is the lack of systematic baseline data in some cases and a lack of trend data for nearly all cases. Long term baseline data from field sites and/or national datasets are clearly essential to detect change and trends in Scottish soils with a view to assess the effectiveness of policies in place to protect soils” (Scottish Soil Framework, 2009; see also: State of the Environment: Soil Quality Report (SEPA, 2001), and Towers et al 2006).

[Scotland’s National Peatland Plan](#) (2015)

SNH is responsible for assessment under Habitats Directive: “The condition of features on Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC) is assessed by SNH on a cyclical basis. Reporting in 2013 on the blanket bog Natura habitat under Article 17 of the Habitats Directive, we have described its Conservation Status as ‘Unfavourable declining’ – in a poor state. However, currently 63% of blanket bog, 60% of raised bog, and 72% of fen, marsh and swamp features on designated sites are in ‘favourable condition’” (Plan document, 2015: 11; see also Dobbie et al., 2011 and Black et al., 2012³).

[Scottish Biodiversity Strategy: 2020 Challenge for Scotland’s Biodiversity](#)

“We know from the UKNEA (2011) that ecosystems across Scotland are not meeting their full potential. It is not that they are close to collapse; rather the evidence suggests degradation across wide areas and so reducing their value. Examples of these extensive issues relate to diffuse pollution (mainly by nitrogen oxides); poor soil quality (compaction, loss of soil biodiversity and reduced soil carbon); reduced water retention on land; siltation and scouring in rivers; fragmentation of habitats; the spread of invasive species, such as rhododendron in woodland or signal crayfish in rivers; and rapid change in land use. We want to reverse these trends, pursuing the Aichi target of restoring 15% of degraded ecosystems” (Challenge document, 2013, page 18).

Policy instruments and relationships

The project aimed to identify and explore the main policy instruments that relate to soil protection and management in Scotland. The following table presents a summary of the policy instruments/mechanisms included in Scottish legislation (Table 4; see also Appendix B) and within policies, plans, and strategies (Appendix C).

³ ‘There is a limitation in that the Common Standards Monitoring under SNH is only for designated sites, whereas Scotland’s National Peatland Plan is intended to deliver across the entire peatland resource. There is no agreed baseline of the condition of the Scottish peatlands in non-designated areas (the majority of the land area)’ (Artz, personal communication, 17.5.18).

Table C Description of policy instruments/mechanisms for soil protection/management in Scottish legislation (see also Appendix B)

| Instrument/ mechanism | Scottish legislation | Summary of policy instrument/mechanism(s) |
|--|---|---|
| SECTOR: Natural environmental protection | | |
| Licensing/authorisation | Environmental Protection Act (1990) | Authorisations granted (and revoked) by enforcing body to ensure best techniques used to prevent release of substances (including controlled waste) into the environment without 'rendering harmless'. |
| Compulsory land purchase Licensing/authorisation | Environment Act (1995) | SEPA can purchase land compulsorily, to fulfil its functions as detailed in the Act (section 26). SEPA can also obtain information about land (section 27) (e.g. ownership, tenancy arrangements). SEPA can grant licenses for authorised environmental activity (e.g. abstraction), with charging prescribed for environmental licensing (Section 41). |
| Controlled management of site | The Environmental Liability Regulations (Scotland) (2009) | An application of the 'polluter pays principle', requiring preventative measures to be taken by operators to remove the threat of/remediate any environmental damage, i.e. removing, controlling, containing or diminishing potential land contaminants, as well as risk-assessment procedures taking into account the characteristic and function of the soil, the type and concentration of the harmful substances, preparations, organisms or micro-organisms, their risk and the possibility of their dispersion. |
| SECTOR: Species protection | | |
| Licensing; restricted seasons; controlled management of designated site. | Wildlife and Natural Environment (Scotland) Act (2011) | There is no mention of soil, but the Act includes requirements regarding muirburn (i.e. season length and licensing), and the management of Sites of Special Scientific Interest (i.e. including geology and geomorphology, which could include soil features). |
| Creation of byelaws for conservation purposes | The Conservation of Habitats and Species Regulations 2010 | The appropriate nature conservation body may make byelaws for the protection of a European site that can prohibit/restrict any activity that will 'interfere with the soil'. |
| Restrictions on land management activities | Nature Conservation Scotland (Act) (2004) | The legislation makes "further provision in relation to the conservation and enhancement of Scotland's natural features" (Act, page 1); the 'natural features' of land are any flora, fauna, geological, or geomorphological features, i.e. that could include soil. |
| Creation of byelaws for conservation purposes | Conservation (Natural Habitats, &c.) Regulations (1994) | As in later Conservation of Habitats and Species Regulations 2010 , byelaws can be made to prohibit/restrict any activity that will 'interfere with the soil'. |

| SECTOR: Water environmental protection | | |
|---|---|--|
| Requirement for management plans; control of regulated activities | Water Environment and Water Services (Scotland) Act (2003) | Part 1 aims to protect the water environment, including reducing/preventing pollution of groundwater (i.e. water in direct contact with subsoil). This includes the requirement for responsible institutions to produce River Basin Management Plans (SEPA) and to enforce control of regulated activities (Scottish Ministers) (e.g. activities that might result in water pollution, the impounding of water, and water abstraction). |
| Control of regulated activities | The Water Environment (Controlled Activities) (Scotland) Regulations (2011) | The General Binding Rules include those regarding the area of exposed soil from which water drains into a surface water drainage system (and time period of drainage), the storage of fertiliser on land with a minimum soil depth, and the application of organic/inorganic fertilisers according to soil depth, as well as those relating to livestock, and land cultivation. |
| Control of regulated activities | The Water Environment (Miscellaneous) (Scotland) Regulations (2017) | The amendment to the General Binding Rules within these regulations include the types of materials that cannot be disposed of into a surface water drainage system (e.g. oil, paint, paint thinners, pesticides, disinfectants, or other pollutants), the maximum period for exposed soil to be authorised for surface water run-off, that no fertiliser can be stored on land (e.g. in a mobile tank or bowser) on land without a minimum soil depth and specific underlying geology; plus rules regarding fertiliser application to regain agronomic status, the run-off from land where livestock gather; plus location of trees to prevent exposed soil run-off into a river or ditch, and the revegetation of exposed soil to minimise soil erosion. Run-off must be intercepted to prevent soil (or other sediment) entering a water course. |
| SECTOR: Land/water pollution | | |
| Restrictions on land management activities | Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008) | Regulations have direct measures for reducing water pollution (and therefore indirectly with regard to soil protection and land), to be undertaken by landowners/managers in designated 'Nitrate Vulnerable Zones'. These measures include restrictions on the amount of manure spread on land, time of spreading, and location, to avoid run-off and water-course [and soil] pollution. |
| Identification and remediation activities | Radioactive Contaminated Land (Scotland) Regulations 2007 | No specific mention of soil, instead sets out a regime for the identification and remediation of contaminated land (e.g. with regard to pollution of the water environment and radioactive substances). |
| Identification and remediation activities | The Contaminated Land (Scotland) Regulations (2005) & Statutory | The Regulations do not mention soil specifically, but amends the Environmental Protection Act 1990 with regard to contaminated land in Scotland, requiring local authorities to: "identify and secure the remediation of contaminated land in their area" (Regulations pg. 6). |

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|--|--|---|
| | Guidance SE/2006/44 | |
| Required location and prevention activities | Landfill (Scotland) Regulations (2003) (and later amendments) | Soil protection is a specified measure of these regulations, as stated in Schedule 3, General Requirements for all Landfills: “3.—(1) The landfill must be situated and designed so as to – (a) provide the conditions for prevention of pollution of the soil, groundwater or surface water... (2) Soil, groundwater and surface water is to be protected by the use of a geological barrier” (Regulations, pg. 13). |
| Authorisations and risk assessments required | The Pollution Prevention and Control (Scotland) Regulations 2012 | These Regulations directly seek to protect soil and groundwater from pollution. SEPA can authorise activities (e.g. installation or operation of a mobile plant) according to the following conditions: that where necessary, the appropriate soil and groundwater protection, as well as appropriate waste management, is implemented. An authorisation also requires specific environmental monitoring (including baseline survey) to ensure surveillance of measures taken to prevent emissions to soil and groundwater. A risk assessment is necessary to ensure all risks of pollution have been mitigated for, and to: “remove, control, contain or reduce any relevant hazardous substance in soil or groundwater so that the site, taking into account the current or approved future use, ceases to pose a significant risk to human health or the environment” (Regulations, pg. 27). |
| Licensing and remediation activities if any harm | Waste Management Licensing (Scotland) Regulations (2011) | In these regulations, soil is included as a type of waste in certain circumstances. Organic waste (including soil) can be applied to land in order to provide agricultural and ecological benefits, and where it does not cause environmental harm (e.g. soil contamination). As explained: “In the application of waste to land, it is necessary to demonstrate that this will result in ‘ecological benefit’ or ‘agricultural benefit’ and not adversely affect the soil or waterbodies. In the keeping or treating of waste and for old closed landfills, SEPA will not accept surrender of a site licence if the condition of land is such that it is likely to cause pollution or harm to the environment; this includes soil contamination. If harm is caused, the operator must carry out remediation” (from SEPA’s position statement on land protection , page 6). |
| Control of regulated activities | Radioactive Substances Act (1993) | The Act does not specifically mention soil. Nonetheless, “SEPA is the enforcing authority under the Radioactive Substances Act, 1993, and, as such, regulates the accumulation and disposal of radioactive waste and the keeping and use of radioactive material. There are limits which apply to the doses received by humans from these radioactive substances activities; SEPA also has to ensure that any doses are kept as low as reasonably achievable. This includes assessing if proposed permitted activities would lead to pollution of the land environment” (from SEPA’s position statement on land protection , page 7). |
| | Sludge (Use in Agriculture) | “It seeks to control the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects |

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| | Regulations (1989 and later amendments) | on soil, vegetation, animals, and humans” (from SEPA’s position statement on land protection , page 6). Soil protection and maintaining soil quality is a key goal of these Regulations. |
| SECTOR: Land use planning | | |
| Land protection measures | Flood Risk Management (Scotland) Act (2009) | The Flood Risk Management (Scotland) Act 2009 does not specifically mention soil, but “recognises the role of land management and restoration in reducing overall flood risk... This provides an opportunity for indirect land protection due to the relationship between land quality deterioration and increased flooding” (from: SEPA’s position statement on land protection , pg. 9). |
| Requirements for land protection within applications for consent | Planning etc. (Scotland) Act (2006) | The legislation does not explicitly mention soil, but details the requirements for a National Planning Framework, Strategic Development Plans (and Action Programmes), and Local Development Plans, including spatial strategies for the development and use of land. There are implications therefore for soil protection and management. For example, planning obligations appear to be a means to influence soil protection through the Act; similarly, Good Neighbour Agreements could be used for the purposes of soil protection. Furthermore, the Act details provisions for the identification and designation of National Scenic Areas, where the area is of environmental importance. The question arises whether soil could be considered of environmental importance. |
| Required assessment | Environmental Assessment (Scotland) Act (2005) | The legislation “ensures that all public plans, programmes, and strategies that are likely to have significant environmental effects, if implemented, are subject to environmental assessment...The likely impacts on soils are a consideration” (from: SEPA’s position statement on land protection , pg. 10). |
| | The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 | Environmental impact assessment (including the ‘ Carbon Calculator ’) must be used to identify, describe and assess the direct and indirect significant effects of the proposed development on land, soil, water, air and climate, amongst other factors. |
| Sustainable development and transparency requirements Tenancy responsibilities for land management | Land Reform (Scotland) Act (2016) | The legislation does not explicitly mention soil. However, the Act requires the publication of a Land Rights and Responsibilities Statement, which must have regard for “furthering the achievement of sustainable development in relation to land” (Part 1(3)g, Act, page 2). The Act also requires Scottish Ministers to provide a complete database of controlling interests in land; knowing who owns and manages land is important in ensuring soil protection measures are undertaken/successful. Part 5 gives rights to community bodies to acquire land where it is: “the transfer of land is likely to further the achievement of sustainable development in relation to the land, [and] the transfer of land is in the public interest” (Part 56 (2)a, Act, page 38). It may be that soil protection could be considered necessary for the sustainable development of land and in the public interest [NB. Different |

| | | |
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| | | <p>provisions with regard to mineral rights – how does this untangle from soil?].</p> <p>Part 10 of the Act details the new ‘modern limited duration tenancies’ and explains that the landlord may end the tenancy after 5 years if the tenant is “(a) is not using the land in accordance with the rules of good husbandry, or (b) is otherwise failing to comply with any other provision of the lease” (Section 8D(6), Act, page 68). Good husbandry is defined in the Agriculture (Scotland) Act 1948 and may be related to soil management (as could be detailed in the lease).</p> |
| Applications for consent | Historic Environment (Amendment) (Scotland) Act (2011) | The Act does not mention soil, but refers to historically important areas of land and locations of monuments, for example. Provides protection through applications for consent to make changes to land, and can lead to acquisition and guardianship of land in the vicinity of an ancient monument (see Act page 14). |
| Requirements in Land Use Strategy; variation of muirburn season length | Climate Change (Scotland) Act (2009) | The Act does not specifically mention soil, but it requires Scottish Ministers to produce a Land Use Strategy (and Action Plan), and to review the Strategy every 5 years (Section 57, pg. 30). Also includes provisions to vary permitted times for muirburn (Section 58, pg. 30). |
| Land use and management restrictions/requirements | Planning (Scotland) Bill (as introduced 4 th December 2017) | The Bill does not mention soil, but makes provisions about how land is ‘developed and used’, therefore has direct implications for soil management/protection. This includes the requirement to provide information about environmental characteristics of an area in preparing the National Planning Framework. Planning obligations appear again as a means to influence soil protection through the Bill proposals |
| Sustainable development requirements Land use and management restrictions/requirements | Forestry and Land Management (Scotland) Act (2018) | <p>The Act does not mention soil, but makes provisions “in relation to the management of forested land and other land”. Part 2 requires Scottish Ministers to “promote sustainable forest management” and produce a forestry strategy, which must include “priorities and policies with respect to—</p> <ul style="list-style-type: none"> (a) the creation of woodland, (b) economic development of forestry, (c) targets for planting of trees, (d) the conservation and enhancement of the environment by means of sustainable forest management” <p>The Act also requires Scottish Ministers to “... manage land ...for the purpose of furthering the achievement of sustainable development”.</p> |

Close reading of the original legislation and policy documents (see Table 4 and Appendix B (i) and (ii)) indicate key relationships between different instruments, and the interlinkages between policy documents. As presented in Appendix C and D, the multiple pieces of legislation and policy interweave between scales of governance. As stated in the Scottish Soil Framework (Scottish Government, 2009), and remains the case today, there is no one policy designed specifically for the

protection of soil. Nonetheless, there are common goals and purposes shared by the range of legislation and policies that influence soil protection, and overlaps that could provide multiple benefits.

The policy instruments (both within the legislation or policy/strategy documents) can be categorised into three broad areas: (i) environmental protection and regulation; (ii) framing principles and standards; and (iii) shaping and encouraging the direction of travel (thus: ‘regulatory, framing, or enabling’⁴). Within the first policy instrument theme, that of environmental protection and regulation, soil protection and management is considered either directly (albeit infrequently) or indirectly. Indeed, in many pieces of primary legislation and policy documents, soil is not mentioned at all, but the instruments and implications of the legislation/policy impact indirectly on (and at times require) soil management/protection. Furthermore, direct soil protection and management may not be only for soil health outcomes; instead a feature of several policy instruments is the requirement of soil conservation/management to, for example, reduce or remove the threat of water pollution, to prevent flooding, or to mitigate for the impacts of contaminated land (e.g. with regard to radioactive substances). The functions of soil is often the focus rather than the soil (and soil health) itself. This categorisation is presented in Table 5 (not exhaustive), and multiple specific legislative and policy documents could be assigned to each column.

⁴ Govan, S., 2018; personal communication.

Table D Categorisation of how soil conservation and management features in Scottish legislation and policy

| Direct soil management for the protection of other environmental features/ functions | Policy measures for soil conservation and protection | Indirect soil protection for other environmental /social outcomes |
|--|--|---|
| <ul style="list-style-type: none"> • Soil management to prevent erosion, diffuse pollution, and run-off into watercourses (e.g. stabilising riverbanks). • Soil management in nitrate vulnerable zones. • Soil as waste and conduit for water pollution (e.g. landfill, sewage sludge) • Soil conditions important for preserving archaeological artefacts and other heritage. | <ul style="list-style-type: none"> • The sustainable management and protection of soils consistent with the economic, social, and environmental needs of Scotland. • Soil pollution from waste (e.g. landfill, sewage sludge, etc.). • Environmental assessment including soils. • Soil as a natural feature/habitat for biodiversity. • Soil management for sustainable development. • Reducing the impact on carbon rich soils, protecting soils from erosion, compaction, or disturbing soils and releasing CO2 (e.g. by renewable energy infrastructure development; muirburn, retaining minimum soil cover/crop cover, restoration measures, etc.). | <ul style="list-style-type: none"> • Soil health, quality, conservation, and biodiversity, as integrated with other policy goals (e.g. land and freshwater biodiversity conservation). • Soil management for the remediation of contaminated land. • Land management (including soil) to prevent flooding. • Development and land use planning for sustainable development • Limiting soil erosion and maintain soil organic matter to maintain good agricultural environmental conditions/ productive land capability. • Improving soil fertility in order to reduce greenhouse gas emissions associated with agriculture. |

This policy analysis does not highlight any overlaps in policy objectives that could lead to conflict or delivery risks. This conclusion is reinforced by the findings of Prager et al. (in press), who similarly identify policy alignment, yet believe that this is largely due to the high-level goals of such policy instruments (in particular so-called ‘parent’ policy, i.e. primary legislation, policies, strategies, and plans). Therefore, whilst there is high level correspondence of policy goals that allows flexibility, there

may be conflict at lower levels of governance, i.e. individual land manager interpretation, or farmer guidance, etc⁵.

Furthermore, gaps arise with regard to the interpretation of soil in policies specifically focussed on land (or referring to 'ground') for example, the Land Rights and Responsibilities Statement, or planning policy and legislation in Scotland (e.g. Planning (Scotland) Bill). It seems that there are missed opportunities within these land-focussed policies where soil protection and management is implicit, but could benefit from explicit consideration⁶. Such links and clarity of definition around 'land' and 'soil' could contribute to effective policy integration, and the optimisation of outcomes for soil protection. Similarly, clarification is necessary regarding the definition of soil as a 'natural habitat', and therefore eligibility for protection measures required in the various environmental and biodiversity-focussed policies/legislation, few of which clearly detail measures directly related to soil.

It is clear that understanding of soil policy is held within the knowledge and experience of the responsible institutions (as outlined earlier), and the associated civil servants, in conjunction with those who undertake monitoring. However, this valuable understanding is not well documented within the publicly available policy documentation. There is a risk that gaps in delivery may arise where such documents are not regularly reviewed and updated (e.g. progress made with regard to the Scottish Soil Framework, post-2013).

4. Discussion and conclusions

The policy analysis presented through the variety of tables in this report illustrates the challenge and complexity of soil governance in Scotland, due to the lack of coherent soil policy and lack of soil monitoring data to inform policy evaluation. Nonetheless, three main groups of policies (including legislation, strategies and plans; see Appendix A) are identified, thus: (i) environmental protection and regulation (i.e. licensing and rules); (ii) framing principles and standards (i.e. for good practice in soil protection and management); and (iii) shaping and encouraging the direction of travel. A positive direction of travel is illustrated in the profusion of policies that relate to soil protection (although indirectly), largely included within the umbrella policy, the 'Scottish Soil Framework' (Scottish Government, 2009; see also Black et al., 2012). There are calls for greater policy integration in order to progress soil protection and conservation outcomes, for example from Dobbie et al (2011) and Prager, et al. (in press), and supported by the findings of this report. It is also noted that the Scottish Soil Framework is almost 10 years old, yet progress towards policy integration is limited. The potential exists to amend and revise existing mechanisms to focus on policy integration and the optimal outcomes for soil (and climate change adaptation) rather than seeking to generate and implement new policies.

Furthermore, there is potential to align definitions across policy areas to assist integration, where policy integration is understood as greater alignment and coordination (i.e. rather than the legal requirement for a single instrument/legislation). For example, there is a need to raise awareness of soil protection and management measures that feature indirectly within policies (e.g. measures for 'land' vs. the soil⁷). Furthermore, the opportunity arises for greater integration between policies that focus on different functions of soil quality/health for the wider environment. Prager et al (in press) also

⁶ One interpretation for this disconnect is the largely technical and natural scientific focus on soil (e.g. properties, chemistry, quality), which is in contrast with the tendency for 'land' to be considered in more socio-economic terms, for example, regarding property rights.

⁷ It should be noted that in Norway only one word exists for both 'soil' and 'land' (and as used in policy) – 'jord' (literally, 'earth'). For example, see: <https://www.regjeringen.no/no/dokumenter/jordlova/id269774/> (accessed 3.4.18; last updated: 12.5.1995).

found “*little active consideration of integration between policy instruments*”. The benefits to soil health should be identified within those policies that impact on/require soil management and protection. This is not to suggest that the original policy goal should be re-focussed on soil health, but that this becomes a parallel outcome, with appropriate, fit-for-purpose indicators (and monitoring) to evaluate policy effectiveness. In this regard, a broadening of policy goals in order to include potential interlinkages with soil protection may contribute further to the adaptation necessary for Climate Ready Scotland: the Scottish Climate Change Adaptation Programme (Scottish Government, 2014)⁸. An exercise of ‘soil proofing’⁹ could be beneficial in supporting policy coherence, soil health outcomes, and climate change adaptation. Future discussions should focus on where responsibility lies within and between institutions regarding soil policy integration, and therefore how to implement a ‘soil proofing’ approach to policy development.

Summary conclusion and recommendations:

- Legislation and policy interweave between scales of governance, comprising key relationships between different instruments, and interlinkages between policy documents. Whilst there is no evidence of conflict between policy goals, it is suggested that this is due to the high-level nature of such policy goals, and there may be conflict at lower levels of governance.
- Policy instruments can be categorised into three broad areas: (i) environmental protection and regulation; (ii) framing principles and standards; and (iii) shaping and encouraging the direction of travel.
- As stated by Scottish Soil Framework (2009) - and remains the case today - there is **no one policy designed specifically for the protection of soil**.
- Gaps arise in policies specifically focussed on land (or referring to ‘ground’) for example, the Land Rights and Responsibilities Statement, or planning policy and legislation in Scotland (e.g. Planning (Scotland) Bill); **soil protection is an implicit rather than explicit outcome**.
- There is a need for **greater policy integration** to progress soil protection and conservation outcomes (see: Dobbie et al (2011) and Prager, et al. (in press)), for example by (i) **amending and revising existing mechanisms** to focus on policy integration and the optimal outcomes for soil, and (ii) **raising awareness of soil protection measures** that feature indirectly within policies.
- It is suggested that an exercise of ‘**soil proofing**’ may be necessary to support policy coherence, soil health outcomes, and climate change adaptation. Future discussions should focus on where responsibility lies within and between institutions regarding soil policy integration, and therefore how to implement a ‘soil proofing’ approach to policy development.

⁸ Whilst beyond the scope of this project, the likely success of policy implementation integration is considered by Prager et al (in press).

⁹ Lessons can be learned from the experience of ‘island proofing’ and ‘rural proofing’ in the Scottish context, i.e. in terms of ensuring mainstream, cross-sectoral policy design and delivery considers the impact on soil, and underpinning soil protection (e.g. see Rowe, 2011)

5. References¹⁰

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¹⁰ Please note, all policy documents within this report are hyperlinked in the main text, and footnotes include full references.

6. Appendices

Appendix A: Definitions and methodology

Definitions

This draft report presents working definitions of key terms used in developing an institutional map; these are presented in Table A.

Table A – Definitions of key terms

| Key term | Definition used in this report |
|----------------------------|---|
| Primary legislation | 'Level one' primary legislation, both legislation applicable to Scotland for pre-1999 UK-wide instruments, and post devolution Scottish legislation, including Acts, Bills, Regulations and Amendments. |
| Policy | 'Level one' policy can include (statutory and non-statutory) strategies, statements, plans and frameworks ¹¹ . |
| Policy instrument | 'Level two' policy instruments including regulations, secondary legislation, incentive schemes that are used to implement level one policy ¹² . |
| Guidance | A type of policy instrument that can also include codes of practice, programmes and projects, and funding support. |
| Institution | The range of organisations with an oversight, influence, and/or responsibility for soil management in Scotland. |
| Effectiveness | As presented in the monitoring and assessment programmes associated with the policy, and through research. |

Methods

In order to fulfil the project aims, an in-depth review of all Scottish policy (including primary legislation, policies and guidance) related to soil was undertaken. This review involved close reading of the policy documents, in order to identify measures that influenced soil protection and conservation, in particular, where soil was not explicitly mentioned. The main institutions involved in soil management and conservation were identified, in addition to the main policy instruments, and where possible, indicators of effectiveness were noted. The policy review generated a series of tables (presented throughout the main report and appendices), and provide the basis for an institutional overview.

Appendix B (i) – Full table of Scottish legislation and soil-related provisions

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| Scottish legislation | Policy instrument/ mechanism |
| Environmental Protection Act (1990) | - Authorisations granted by enforcing body (i.e. LA or SEPA), including conditions of authorisation, such as limits on substances produced/utilised, and advance notice |

¹¹ As defined by Mickwitz et al (2009) and adopted by Prager et al (In Press).

¹² As defined by Mickwitz et al (2009) and adopted by Prager et al (In Press).

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>requirements, in addition to: “ensuring that, in carrying on a prescribed process, the best available techniques not entailing excessive cost will be used—</p> <p>(i) for preventing the release of substances prescribed for any environmental medium into that medium or, where that is not practicable by such means, for reducing the release of such substances to a minimum and for rendering harmless any such substances which are so released; and</p> <p>(ii) for rendering harmless any other substances which might cause harm if released into any environmental medium” (Section 7 (2) (a)). Authorisations may be revoked (and a prohibition notice served) if prescribed charges are not paid by the holder of the authorisation, or if the prescribed process has not been carried on for not for 12 months, or if the person carrying on a prescribed process under an authorisation is contravening any condition of the authorisation or is likely to contravene any such condition (Sections 13 and 14). Contraventions and mis-information are an offence, and may result in a conviction, fine and/or imprisonment (Section 23).</p> <p>- Subject to Section 54 (Scotland specific), a person shall not:</p> <p>“ (a) deposit controlled waste [or extractive waste], or knowingly cause or knowingly permit controlled waste [or extractive waste] to be deposited in or on any land unless [an environmental permit] authorising the deposit is in force and the deposit is in accordance with the licence;</p> <p>(b) submit controlled waste, or knowingly cause or knowingly permit controlled waste to be submitted, to any listed operation (other than an operation within subsection (1)(a)) that— (i) is carried out in or on any land, or by means of any mobile plant, and (ii) is not carried out under and in accordance with an environmental permit.]</p> <p>(c) treat, keep or dispose of controlled waste [or extractive waste] in a manner likely to cause pollution of the environment or harm to human health” (Section 33; see also prohibitions on unauthorised or harmful deposit, treatment or disposal of waste; plus limitations e.g. household and vehicular waste, batteries, etc). A person who contravenes any condition of a waste management license commits and offence and may be convicted, resulting in a fine (including fixed penalty notice, or forfeiture of vehicle involved) and/or imprisonment (Section 33; Section 35).</p> |
| <p>Environment Act (1995)</p> | <p>SEPA can purchase land compulsorily (as if it were a local authority), to fulfil its functions as detailed in the Act (section 26). SEPA can also obtain information about land (section 27) (e.g. ownership, tenancy arrangements) and if this is not forthcoming the responsible person may be found guilty of an</p> |

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| <p>Scottish legislation</p> | <p>Policy instrument/ mechanism</p> |
| | <p>offence (and can be fined). SEPA can grant licenses for authorised environmental activity (e.g. abstraction), with charging prescribed for environmental licensing (Section 41).</p> |
| <p>Wildlife and Natural Environment (Scotland) Act (2011)</p> | <p>No specific mention of soil, but Act includes requirements regarding muirburn (i.e. season length and licensing), and the management of Sites of Special Scientific Interest (i.e. including geology and geomorphology, which could include soil features).</p> |
| <p>Water Environment and Water Services (Scotland) Act (2003)</p> | <p>Part 1 of this legislation aims to protect the water environment, including “ensuring the progressive reduction of pollution of groundwater and preventing further pollution of it” (Act, pg. 2), where groundwater is defined as: “water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil” (Act, pg. 3). Part 1 includes the requirement for the responsible institutions to produce River Basin Management Plans (SEPA) and to enforce control of regulated activities (Scottish Ministers) (e.g. activities that might result in water pollution, the impounding of water, and water abstraction). It is an offence to fail to provide information requested by the Scottish Ministers regarding the water environment for SEPA (Section 18), as well as where there are breaches within the controlled activities regulations (see Schedule 2, section 11(1), pg. 36).</p> |
| <p>The Water Environment (Controlled Activities) (Scotland) Regulations (2011)</p> | <p>“The Scottish Ministers make the following Regulations in exercise of the powers conferred by sections 20, 36(2) and (3) of, and schedule 2 to, the Water Environment and Water Services (Scotland) Act 2003(a) (“the Act”) and section 2(2) of the European Communities Act 1972(b) and of all other powers enabling them to do so” (Regs., pg. 4).</p> <p>Specific regulations regarding soil:</p> <p>Schedule 3 – General Binding Rules (Regulations 6 and 21(2) Part 1: Rules:</p> <p>“on construction sites any area of exposed soil from which water drains into a surface water drainage system, and the period of time during which such water drains, must be the minimum reasonably necessary to facilitate the construction works being undertaken at that site” (pg.38).</p> <p>“(a) No fertiliser may be stored on land that – (iv) has an average soil depth of less than 30 centimetres and overlies gravel or fissured rock, except if the fertiliser is stored in an impermeable container;”</p> <p>“(c) no organic fertiliser may be applied to land that –</p> |

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| <p>Scottish legislation</p> | <p>Policy instrument/ mechanism</p> |
| | <p>(iv) has an average soil depth of less than 30 centimetres and overlies gravel or fissured rock, except where the application is for forestry operations;” (pg. 44). [Same rule for inorganic fertiliser application.]</p> <p>[See list of offences in Part VII, from page 22.]</p> <p>“The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR), place controls on activities from rural land use posing a risk to the water environment from diffuse pollution and as such offer indirect protection to land” (from: SEPA’s position statement on land protection, pg. 9).</p> |
| <p>The Water Environment (Miscellaneous) (Scotland) Regulations (2017)</p> | <p>Regulations related to soil management/protection:</p> <p>Part II: Amendment to General Binding Rules</p> <p>11. (a) “Oil, paint, paint thinners, pesticides, detergents, disinfectants or other pollutants must not be disposed of into a surface water drainage system or onto any surface that drains into a surface water drainage system;...</p> <p>(d) on construction sites, any area of exposed soil from which the discharge of water run-off to the water environment is authorised under activity 10, and the period of time during which such soil is exposed, must be the minimum required to facilitate the construction works being undertaken at that site.” (pg. 6).</p> <p>18. (a) No fertiliser may be stored, including temporarily in a mobile tank or bowser, on land that:</p> <p>(iv) has an average soil depth of less than 40 centimetres and overlies gravel or fissured rock, unless the fertiliser is stored in an impermeable container” (pg. 9).</p> <p>18 (i) “fertilisers must not be applied to land: ... (ii) in excess of the amount required to maintain the soil phosphorus status at acceptable agronomic levels” (pg. 11).</p> <p>19. (d) “run-off from land on which livestock congregate to access watering points or feeders must be intercepted (by means of a sufficient buffer zone or otherwise) such that any faeces, urine or soil in the run-off are prevented from entering any spring, well, borehole, surface water or wetland.” (pg. 13).</p> <p>25. (g)” all reasonable steps must be taken whilst placing the trees or parts of trees to:—</p> <p>(i) prevent any exposed soil or other sediments from entering the river, burn or ditch” (pg. 19).</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>(h) “once the trees or parts of trees have been placed, any areas of bare earth on the banks resulting from the works must be revegetated to minimise the risk of soil erosion, either by covering with grass turfs or lining with a biodegradable geotextile and seeding” (pg. 20).</p> <p>“These Regulations amend the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (“the Principal Regulations”)...</p> <p>The following changes are made to the existing general binding rules listed above-</p> <p>Activity 11 – rule (d) is revised to provide that in carrying out activity 10 the area of, and the period of time for which, soil is exposed must be minimised.</p> <p>Activity 19 – rules (a) and (c) are revised to clarify how distances from surface waters are to be measured; rule (d) is new and provides that run-off must be intercepted (by a buffer zone or otherwise) to prevent faeces, urine or soil from entering any spring, well, borehole, surface water or wetland.” (pg. 28)</p> <p>“General binding rule 25 is new and provides for the activity of the placement of trees or parts of trees in a river, burn or ditch to protect eroding banks. The rules to which this activity are to be subject are designed to ensure that the trees used are properly secured in place; the protection does not increase erosion of the bed or banks; the risk of soils and other sediments entering the river as a result of the works are minimised; and the risk to freshwater pearl mussel are taken into consideration” (Pg. 29).</p> |
| <p>The Conservation of Habitats and Species Regulations 2010</p> | <p>“30.—(1) The appropriate nature conservation body may make byelaws for the protection of a</p> <p>European site under section 20 of the 1949 Act(a) (byelaws for protection of nature reserves).</p> <p>(2) Such byelaws may, in particular, make the kinds of provision mentioned in this regulation, subject to regulation 31(1).</p> <p>(3) Byelaws may— ...</p> <p>(b) prohibit or restrict the killing, taking, molesting or disturbance of living creatures of any</p> <p>description in the site, the taking, destruction or disturbance of eggs of any such creature,</p> <p>the taking of, or interference with, vegetation of any description in the site, or the doing</p> |

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| <p>Scottish legislation</p> | <p>Policy instrument/ mechanism</p> |
| | <p>of anything in the site which will interfere with the soil or damage any object in the site” (pg. 27; Regs).</p> |
| <p>The Environmental Liability Regulations (Scotland) (2009)</p> | <p>“The Environmental Liability Regulations (Scotland) 2009 can be seen as an application of the ‘polluter pays principle’. The legislation places an obligation on operators of certain activities to take preventative measures where there is an imminent threat of environmental damage and remediate any environmental damage caused by their activities. This legislation relates to certain categories of environmental damage caused in the present. This is in contrast to the contaminated land regime which deals with historic contamination” (SEPA’s position statement on land protection, pg. 7).</p> <p>“36. The necessary measures shall be taken to ensure, as a minimum, that the relevant contaminants are removed, controlled, contained or diminished so that the contaminated land, taking account of its current use or approved future use at the time of the damage, no longer poses any significant risk of adversely affecting human health.</p> <p>37. The presence of such risks shall be assessed through risk-assessment procedures taking into account the characteristic and function of the soil, the type and concentration of the harmful substances, preparations, organisms or micro-organisms, their risk and the possibility of their dispersion” (Regs, pg. 20).</p> |
| <p>Climate Change (Scotland) Act (2009)</p> | <p>Act does not specifically mention soil, but it requires Scottish Ministers to produce a Land Use Strategy (and Action Plan), and to review the Strategy every 5 years (Section 57, pg. 30).</p> <p>The Act also includes provisions to vary permitted times for muirburn (Section 58, pg. 30).</p> |
| <p>Flood Risk Management (Scotland) Act (2009)</p> | <p>The Flood Risk Management (Scotland) Act 2009 does not specifically mention soil, but “recognises the role of land management and restoration in reducing overall flood risk... This provides an opportunity for indirect land protection due to the relationship between land quality deterioration and increased flooding. Improvements in land and soil quality will be central to the development of a sustainable approach to flood risk management” (from: SEPA’s position statement on land protection, pg. 9).</p> |
| <p>Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008)</p> | <p>Regulations have direct measures for the protection of water and indirectly with regard to land), to be undertaken by landowners/managers. These measures include restrictions on the amount of manure spread on land, time of spreading,</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>and location, to avoid run-off and water-course [and soil] pollution. As summarised in the Regulations:</p> <p>Regulation 4 requires the occupier of a farm in a nitrate vulnerable zone to ensure that the provisions in regulations 5 to 24 are implemented in relation to such a farm. Regulation 5 requires a fertiliser and manure management plan to be prepared each year.</p> <p>Regulations 6 to 11 provide for storage of manure on the farm. Regulations 12 to 16 set limits and conditions for applying nitrogen fertiliser on the farm. Regulations 17 and 18 set conditions for applying chemical fertiliser and organic manure.</p> <p>Regulations 19 to 22 set closed periods during which specified fertiliser or manure must not be applied on the farm. Regulation 23 provides for a minimum period between application of livestock manure. Regulation 24 restricts one method of application of slurry, from 1 July 2009.</p> <p>Regulations 25 and 26 provide for records to be kept and retained. Regulation 27 provides for inspections by the Scottish Ministers for the purpose of monitoring implementation.</p> <p>Regulation 28 provides for serving of notices by the Scottish Ministers and regulation 29 for a procedure to appeal against such notices” (pg. 36, Explanatory Note, Regulations).</p> |
| <p>Radioactive Contaminated Land (Scotland) Regulations 2007</p> | <p>No specific mention of soil. Instead Regulations explain that: “Part IIA of the Environmental Protection Act 1990 (“the 1990 Act”; “Part IIA”) sets out a regime for the identification and remediation of contaminated land. Section 78YC of the 1990 Act provides that regulations may give effect to Part IIA with modifications for the purpose of dealing with harm, or pollution of the water environment which is attributable to radioactivity possessed by any substances. These Regulations, which apply to Scotland only, apply Part IIA of the 1990 Act in relation to such harm or pollution. These Regulations also make provision for Part IIA to have effect with modifications for the purpose of the identification and remediation of radioactive contaminated land” (pg. 7, Regulations Explanatory Note).</p> |
| <p>Planning etc. (Scotland) Act (2006)</p> | <p>Legislation does not explicitly mention soil. Act details the requirements for a National Planning Framework, Strategic Development Plans (and Action Programmes), and Local Development Plans, including spatial strategies for the development and use of land. There are implications therefore for soil protection and management.</p> <p>Planning obligations appear to be a means to influence soil protection through the Act. As detailed:</p> |

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| <p>Scottish legislation</p> | <p>Policy instrument/ mechanism</p> |
| | <p>“23 Planning obligations (1) For section 75 of the principal Act substitute— “75 Planning obligations (1) A person may, in respect of land in the district of a planning authority— (a) by agreement with that authority, or (b) unilaterally, enter into an obligation (referred to in this section and in sections 75A to 75C as a “planning obligation”) restricting or regulating the development or use of the land, either permanently or during such period as may be specified in the instrument by which the obligation is entered into (referred to in this section and in those sections as the “relevant instrument”). (2) Without prejudice to the generality of subsection (1), the reference in that subsection to restricting or regulating the development or use of land includes— (a) requiring operations or activities specified in the relevant instrument to be carried out in, on, under or over the land, or (b) requiring the land to be used in a way so specified” (Act, pg. 54-55). Similarly, Good Neighbour agreements could be used for the purposes of soil protection: ““75D Good neighbour agreements (1) A person may, by agreement with a community body, enter into an obligation governing operations or activities relating to the development or use of land, either permanently or during such period as may be specified in the agreement” (Act, pg. 59). -> Both of these planning measures are recorded in the Register of Sasines (Land Registry) and require landowner compliance (if not then planning authority can enforce). Furthermore, the Act details provisions for the identification and designation of National Scenic Areas: “where any area is for the time being designated as a National Scenic Area, special attention is to be paid to the desirability of safeguarding or enhancing its character or appearance in the exercise, with respect to any land in that area, of any powers under this Act”, and that “In deciding whether to designate an area as a National Scenic Area, the Scottish Ministers are to take account of—</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>(a) whether the area is of outstanding natural beauty, (b) the amenity of the area, including— (i) whether it is of historical, cultural or environmental importance; and (ii) the nature of any buildings or other structures within it, and (c) any flora, fauna or physiographical features of the area, whether or not to any extent the product of human intervention in the landscape” (Act Part 10 (50), page 84). The question arises whether soil could be considered of environmental importance?</p> |
| <p>The Contaminated Land (Scotland) Regulations (2005) & Statutory Guidance SE/2006/44</p> | <p>The Regulations do not mention soil specifically, but seek to amend the Environmental Protection Act 1990 with regard to contaminated land in Scotland, requiring local authorities to: “identify and secure the remediation of contaminate land in their area” (Regulations pg. 6). As explained: “In so far as contaminated land is a source of pollution of controlled waters, it is necessary to amend the relevant provisions of Part IIA of the 1990 Act and the 2000 Regulations to align the contaminated land regime provided for thereunder with the requirements of the 2003 Act” (Regulations pg. 6).</p> |
| <p>Environmental Assessment (Scotland) Act (2005)</p> | <p>“The Environmental Assessment (Scotland) Act 2005 ensures that all public plans, programmes, and strategies that are likely to have significant environmental effects, if implemented, are subject to environmental assessment...The likely impacts on soils are a consideration” (from: SEPA’s position statement on land protection, pg. 10).</p> <p>Schedule 3—Information for environmental reports:</p> <p>“1 An outline of the contents and main objectives of the plan or programme, and of its relationship (if any) with other qualifying plans and programmes.</p> <p>2 The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.</p> <p>3 The environmental characteristics of areas likely to be significantly affected.</p> <p>4 Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Council Directive 79/409/EEC on the</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>conservation of wild birds and Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna (as last amended by Council Directive 97/62/EC).</p> <p>5 The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation.</p> <p>6 The likely significant effects on the environment, including—</p> <p>(a) on issues such as—</p> <p>(i) biodiversity;</p> <p>(ii) population;</p> <p>(iii) human health;</p> <p>(iv) fauna;</p> <p>(v) flora;</p> <p>(vi) soil;</p> <p>(vii) water;</p> <p>(viii) air;</p> <p>(ix) climatic factors;</p> <p>(x) material assets;</p> <p>(xi) cultural heritage, including architectural and archaeological heritage;</p> <p>(xii) landscape; and</p> <p>(xiii) the inter-relationship between the issues referred to in heads (i) to (xii);</p> <p>(b) short, medium and long-term effects;</p> <p>(c) permanent and temporary effects;</p> <p>(d) positive and negative effects; and</p> <p>(e) secondary, cumulative and synergistic effects” (Act, page 22).</p> |
| <p>Nature Conservation Scotland (Act) (2004)</p> | <p>“to make further provision in relation to the conservation and enhancement of Scotland’s natural features” (Act, page 1).</p> <p>“References in this Act to a “natural feature” of land are references to any of its flora or fauna or geological or geomorphological features” (Act, page 2) – i.e. that could include soil.</p> |

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| <p>Landfill (Scotland) Regulations (2003) (and later amendments)</p> | <p>The Landfill (Scotland) Regulations 2003 implement the Landfill Directive in Scotland. Soil protection is a specified measure of these regulations, as stated in Schedule 3, General Requirements for all Landfills: “3.—(1) The landfill must be situated and designed so as to –</p> <p>(a) provide the conditions for prevention of pollution of the soil, groundwater or surface water; and</p> <p>(b) ensure efficient collection of leachate as and when required by paragraph 2.</p> <p>(2) Soil, groundwater and surface water is to be protected by the use of a geological barrier” (Regulations, pg. 13).</p> <p>“These Regulations stipulate certain conditions to be included in landfill permits. Schedule 3 of the Regulations includes the general condition that applies to all landfills that it must be situated and designed so as to ‘provide the conditions for prevention of pollution of the soil, groundwater, or surface water”’ (SEPA’s position paper on land protection, page 6).</p> |
| <p>The Pollution Prevention and Control (Scotland) Regulations 2012</p> | <p>“There are...provisions in the PPC Regulations requiring SEPA to accept an application for a surrender only where the operator can show that it has taken steps to avoid any pollution risks from the operation of the installation and that it has taken steps to return the site to a satisfactory state” (SEPA’s position paper on land protection, page 6). As described in the Regulations: “A permit authorising the operation of a Part A installation or Part A mobile plant shall also include conditions– ...</p> <p>“(b) ensuring, where necessary, appropriate protection of the soil and groundwater including requirements for the regular maintenance and surveillance of measures taken to prevent emissions to soil and groundwater....</p> <p>(f) setting out suitable emission monitoring requirements specifying measurement methodology, frequency, and evaluation procedure, including in particular—</p> <p>(i) appropriate requirements in respect of the surveillance of measures taken to prevent emissions to soil and groundwater,</p> <p>(ii) appropriate requirements in respect of the periodic monitoring of soil and groundwater in relation to relevant hazardous substances likely to be found on the site, having regard for that purpose to the possibility of soil and groundwater contamination at the site”</p> <p>“(3) For the purposes of paragraph (2)(f)— ...</p> |

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| | <p>(b) periodic monitoring of—</p> <p>(i) groundwater must be carried out at least every 5 years, and</p> <p>(ii) soil must be carried out at least every 10 years, unless such monitoring is based on a systematic appraisal of the risks of contamination of groundwater and soil”.</p> <p>Permits: surrender of a Part A permit</p> <p>48.—(1) “The operator of a Part A installation may apply to SEPA to surrender all or part of a permit for the installation.</p> <p>(d) a description of the steps that have been taken to avoid pollution risks from the site, including any steps that have been taken to—</p> <p>(i) return the site to a satisfactory state, and</p> <p>(ii) remove, control, contain or reduce any relevant hazardous substance in soil and groundwater...</p> <p>(8) SEPA must approve an application if it is satisfied that all appropriate measures have been taken to—</p> <p>(a) avoid pollution risk resulting from the operation of the installation,</p> <p>(b) return the site to a satisfactory state, taking into account the technical feasibility of the measures,</p> <p>(c) remove, control, contain or reduce any relevant hazardous substance in soil or groundwater so that the site, taking into account its the current or approved future use, ceases to pose a significant risk to human health or the environment”.</p> <p>(3) “A baseline report must provide soil and groundwater measurements for the site—</p> <p>(a) based on previously existing information if using that information provides an accurate description of the state of the site at the time of the report, or</p> <p>(b) based on new information,</p> <p>having regard for that purpose to the possibility of soil and groundwater contamination by any hazardous substance to be used, produced or released by the installation concerned” .</p> |
| <p>Waste Management Licensing (Scotland) Regulations (2011)</p> | <p>“In the application of waste to land, it is necessary to demonstrate that this will result in ‘ecological benefit’ or ‘agricultural benefit’ and not adversely affect the soil or waterbodies. In the keeping or treating of waste and for old closed landfills, SEPA will not accept surrender of a site licence if the condition of land is such that it is likely to cause pollution or harm to the environment; this includes soil contamination. If harm is caused, the operator must carry out</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>remediation” (from SEPA’s position paper on land protection, page 6).</p> <p>Soil is included as a type of waste in Schedule 1 (Activities Exempt from Waste Management Licensing) of the Regulations, where: “7.—(1) The treatment with any of the wastes listed in Table 2 [including soil (including excavated soil from contaminated sites), stones and dredging spoil; and soil from the washing of beets, soil from soil/groundwater remediation activities, gardens and parks] of land used for agriculture [and later non-agricultural land] where such treatment results in benefit to agriculture or ecological improvement” (Regulations, page. 23).</p> <p>-> See page 27 with regard to increasing concentration of certain elements in soil (as detailed in accompanying table) as a result of treatment of sludge on land.</p> <p>-> See page 46 regarding the burning of waste, thus: “(6) The treatment of land for the benefit of agriculture or ecological improvement by incorporation into soil of ash from waste which is burned on that land in reliance upon the exemption conferred by sub paragraph (1) or (3)” (Regulations, page 46).</p> <p>-> See page 61 regarding the incineration of pig and poultry carcasses, thus: “50.—(1) The mixing of ash from the incineration of pig or poultry carcasses at its place of production with manure for the treatment of land as specified in sub-paragraph (2).</p> <p>(2) The treatment of land used for agriculture with agricultural waste resulting in benefit to agriculture or ecological improvement, if—</p> <p>(a) the waste consists of ash from the incineration of pig or poultry carcasses, or such ash mixed with manure in reliance on the exemption in sub-paragraph (1);</p> <p>(b) the land is at the place of production of the ash;</p> <p>(c) the land is at least—</p> <p>(i) 10 metres from any inland or coastal waters;</p> <p>(ii) 50 metres from any well, borehole or similar work sunk into underground strata for the purpose of any water supply other than a domestic water supply; and</p> <p>(iii) 250 metres from any well, borehole or similar work sunk into underground strata for the purpose of any domestic water supply;</p> <p>(d) at the start of and throughout the treatment—</p> <p>(i) the land has not been frozen for 12 or more hours during the preceding 24 hours; and</p> |

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| | <p>(ii) the land is not waterlogged, flooded or snow-covered;</p> <p>(e) the activity is carried out in accordance with any requirement imposed by or under the Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008(a);</p> <p>(f) where the waste consists only of ash from the incineration of pig or poultry carcasses, it is incorporated into the soil as soon as possible; and</p> <p>(g) the total quantity of ash incorporated into the soil does not exceed 150 kilograms per hectare in any period of 12 months” (Regulations, page 61).</p> <p>A key section with regard to soil quality/protection is Schedule 2 – Assessment of Benefit to Agriculture or Ecological Improvement, as detailed:</p> <p>“1. In assessing benefit to agriculture or ecological improvement for the purposes of paragraphs 7, 8, 9, 25, 42 and 50 of Schedule 1 to these Regulations, regard shall be had to the following paragraphs.</p> <p>2. In assessing benefit to agriculture, regard shall be had to whether the use of the waste on the land will result in an improvement of the soil for the purpose of growing crops or grazing, and the following criteria shall apply for the purposes of such assessment—</p> <p>(a) the addition of nitrogen, phosphorus and other plant nutrients in the waste material should take account of the soil nutrient status and other sources of nutrient supply and be matched to the needs of the planned crop rotation;</p> <p>(b) the addition of total nitrogen attributable to the use of the waste on the land in any 12 month period must not exceed 250 kilograms per hectare, except in the case of the following wastes as listed in the European Waste Catalogue—</p> <p>(i) soil from cleaning and washing beet (02 04 01);</p> <p>(ii) soil (including excavated soil from contaminated sites), stones and dredging spoil consisting of soil and stones other than those containing dangerous substances (17 05 04);</p> <p>(iii) dredging spoil other than those containing dangerous substances (17 05 06); and</p> <p>(iv) garden and park wastes (including cemetery wastes) consisting of soil and stones (20 02 02);</p> |

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| | <p>(c) the addition of organic matter which improves the capacity of the soil to hold water, or its porosity, stability, tilth and workability is a benefit;</p> <p>(d) the addition of materials containing lime should take account of the neutralising value of the material, the pH of the soil and the target soil pH for the crop rotation;</p> <p>(e) the spreading or injection of watery wastes may be a benefit where the moisture of the soil is insufficient to support the growth of crops at the time of application, or where they contain nutrients which are applied at an appropriate rate;</p> <p>(f) the spreading of waste soil may be a benefit where it is done in order to level uneven land and thereby facilitate the use of the land for agriculture, but not where it is done solely in order to raise the level of the land.</p> <p>3. In assessing ecological improvement, regard shall be had to the extent to which wildlife habitats which might otherwise deteriorate are maintained or supported. The creation of a new habitat, or the restoration of an old habitat, is regarded as an improvement” (Regulations, page 63).</p> <p>-> Soil analysis is required for waste registration in certain circumstances (see Regulations, page 68).</p> |
| <p>Conservation (Natural Habitats, &c.) Regulations (1994)</p> | <p>As in later Conservation of Habitats and Species Regulations 2010, byelaws can be made to prohibit/restrict any activity that will ‘interfere with the soil’.</p> |
| <p>Radioactive Substances Act (1993)</p> | <p>Act does not specifically mention soil. Nonetheless, “SEPA is the enforcing authority under the Radioactive Substances Act, 1993, and, as such, regulates the accumulation and disposal of radioactive waste and the keeping and use of radioactive material. There are limits which apply to the doses received by humans from these radioactive substances activities; SEPA also has to ensure that any doses are kept as low as reasonably achievable. This includes assessing if proposed permitted activities would lead to pollution of the land environment” (from SEPA’s position paper on land protection, page 7).</p> <p>Failure to comply with any provisions of the Act is an offence.</p> |
| <p>Sludge (Use in Agriculture) Regulations (1989 and later amendments)</p> | <p>“It seeks to control the use of sewage sludge in agriculture and to regulate its use in such a way as to prevent harmful effects on soil, vegetation, animals, and humans” (from SEPA’s position paper on land protection, page 6).</p> <p>Soil protection is a key goal for these Regulations, as explained: Section 3.—(1) “No person shall cause or</p> |

| Scottish legislation | Policy instrument/ mechanism |
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| | <p>knowingly permit sludge to be used on agricultural land unless the following requirements are fulfilled... (7) The sludge shall be used in such a way that account is taken of the nutrient needs of the plants and that the quality of the soil and of the surface and ground water is not impaired” (Regulations, page 2).</p> <p>“EXPLANATORY NOTE...These Regulations implement Council Directive No.86/278/EEC (OJ No. L181/6) on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture.</p> <p>Regulation 3 prohibits sludge from sewage plants from being used in agriculture unless specified requirements are fulfilled. They include the testing of the sludge and the soil (Schedules 1 and 2).</p> <p>Regulation 4 specifies precautions which must be taken after sludge from sewage plants or septic tanks is used on agricultural land.</p> <p>Regulation 5 requires the occupier of land on which sludge has been used to provide the sludge producer with information about the land and the sludge used.</p> <p>Regulations 6 and 7 require every sludge producer to maintain a register of the quantities of sludge produced and supplied for use in agriculture, including details of the amount of sludge used on each agricultural unit and the results of analysis of the sludge and the soil. The register is to be available to the Secretary of State for inspection, together with such information or facilities as he may reasonably require, including facilities for analysing the sludge or soil. The sludge producer is required to provide persons he supplies with the results of analysis of the sludge.</p> <p>Regulation 8 makes special provision for dedicated sites, which on 17th June 1986 (the date of notification of the Directive) were dedicated to the disposal of sludge but on which commercial food crops were being grown exclusively for animal consumption.</p> <p>Regulation 9 provides an offence of contravening the Regulations, which carries a maximum fine on summary conviction of level 5 on the standard scale” (Regulations page 8).</p> |
| <p>Land Reform (Scotland) Act (2016)</p> | <p>Legislation does not explicitly mention soil. However, the Act requires the publication of a Land Rights and Responsibilities Statement, which must have regard for “furthering the achievement of sustainable development in relation to land” (Part 1(3)g, Act, page 2). In addition, with regard to the role of</p> |

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| | <p>the Commissioners, it is explained that: “a “matter relating to land in Scotland” includes—</p> <ul style="list-style-type: none"> (a) ownership and other rights in land, (b) management of land, (c) use of land, (d) the land use strategy prepared under section 57 of the Climate Change (Scotland) Act 2009” (Part 22(5), Act pg. 12). <p>-> The use of land and the Land Use Strategy have an influence on soil protection. Land tenure change may have an impact on soil protection, as shorter length tenancies become more prevalent, soil conservation may be undermined; see also Section 89, part 18A ‘irritancy of lease and good husbandry: modern limited duration tenancies’, which mentions conservation activities.</p> <p>The Act also requires Scottish Ministers to provide a complete database of controlling interests in land. Thus: “39 Information about persons with controlling interests in owners and tenants of land</p> <p>(1) The Scottish Ministers must by regulations make provision—</p> <ul style="list-style-type: none"> (a) requiring information to be provided about persons who have controlling interests in owners and tenants of land” (Part 39(1)a, Act page 20). Again, knowing who owns and manages land is important in ensuring soil protection measures are undertaken/successful. <p>-> ‘Land’ is defined in Part 5 of the Act ‘Right to buy land to further sustainable development’ (Part 45, page 26).</p> <p>Part 5 also gives rights to community bodies to acquire land where it is: “the transfer of land is likely to further the achievement of sustainable development in relation to the land, [and] the transfer of land is in the public interest” (Part 56 (2)a, Act, page 38). It is possible that soil protection could be considered necessary for the sustainable development of land and in the public interest.</p> <p>Part 8 of the Act makes provisions with regard to deer management, and SNH can require deer management to be under taken by land owners/occupiers where deer are causing “damage to woodland, to agricultural production, including any crops or foodstuffs, to the welfare of deer or, whether directly or indirectly, to the natural heritage generally, [and] damage to public interests of a social, economic or environmental nature “(Section 6A (2) (ii), Act, page. 60).</p> <p>Part 10 of the Act details the new ‘modern limited duration tenancies’ and explains that the landlord may end the tenancy</p> |

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| | <p>after 5 years if the tenant is “(a) is not using the land in accordance with the rules of good husbandry, or</p> <p>(b) is otherwise failing to comply with any other provision of the lease” (Section 8D(6), Act, page 68). Good husbandry is defined in the Agriculture (Scotland) Act 1948 and may be related to soil management (as could be detailed in the lease).</p> |
| <p>Historic Environment (Amendment) (Scotland) Act (2011)</p> | <p>No mention of soil – but refers to historically important areas of land and locations of monuments, for example. Provides protection through applications for consent to make changes to land, and can lead to acquisition and guardianship of land in vicinity of an ancient monument (see Act page 14).</p> |
| <p>Planning (Scotland) Bill (as introduced 4th December 2017)</p> | <p>Bill does not mention soil, but makes provisions about how land is ‘developed and used’, therefore has direct implications for soil management/protection. This includes the requirement to provide information about environmental characteristics of an area in preparing the National Planning Framework (Part 1, Section 1 (6) (2) (a), Bill, page 2).</p> <p>Planning obligations appear again as a means to influence soil protection through the Bill proposals, thus: “a planning obligation is an obligation which...(a) restricts or regulates the development or use of land” (Section 19 (2) (b), Act, page 32).</p> |
| <p>Forestry and Land Management Bill (as introduced 10th May 2017)</p> | <p>Bill does not mention soil, but makes provisions “in relation to the management of forestry land and other land” (Bill page 1). Therefore, the Scottish Ministers must ‘promote sustainable forest management’ (Part 2, Bill page 1) and produce a forestry strategy, which must include “the Scottish Ministers’ objectives, priorities and policies with respect to—</p> <p>(a) the economic development of forestry,</p> <p>(b) the conservation and enhancement of the environment by means of sustainable forest management” (Part 2(2), Bill, page 2). The latter aim has implications for soil protection and management. Similarly: “The Scottish Ministers must manage land ...for the purpose of furthering the achievement of sustainable development” (Part 13 (1), Bill, page 4); in order to fulfil this purpose they have powers to acquire land through compulsory purchase (or they can delegate powers to a community body).</p> <p>It can be assumed that soil samples might be taken under Part 54 ‘Powers of entry and step-in power: further provision’ ((2) (c), Bill, page 19).</p> |
| <p>Electricity Act (1989) Section 36, in conjunction with: The Electricity Works (Environmental Impact</p> | <p>Environmental impact assessment (including the ‘Carbon Calculator’) must be used to identify, describe and assess the direct and indirect significant effects of the proposed</p> |

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| Assessment) (Scotland) Regulations 2017 | development on land, soil, water, air and climate, amongst other factors (Regulations, 2017, pg. 7). |

Appendix B (ii) – Full table of Scottish plans/policies and soil-related provisions

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
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| Scottish Soil Framework (2009) | <p>“The Scottish Government’s Scottish Soil Framework pulls together policy drivers for soil, including the EU Soil Thematic Strategy (COM (2006) 231) and a proposal for a Soil Framework Directive which set out common principles for protecting soils across the EU. The main aim of the Scottish Soil Framework is to promote the sustainable management and protection of soils consistent with the economic, social and environmental needs of Scotland. (SEPA’s position paper on land protection, page 5).</p> |
| Land Rights and Responsibilities Statement | <p>The LRRS aims to: “Firstly, to inform the development of Government policy and action in relation to land, whether that be in planning, housing provision, urban regeneration, farming, caring for the environment or any other Government activities that relate to land. The Statement interrelates with many existing strategies and policies, and it will help inform future iterations of Scotland’s Economic Strategy, the Land Use Strategy, and the National Planning Framework. Secondly, to encourage and support others with significant responsibilities over land, such as local authorities and large private land owners, to consider how their decision-making powers could contribute to realising the vision in the Statement. Many of those who own and manage land in Scotland are already delivering significant benefits and working successfully with local communities but good practice is not yet universal” (LRRS, 2017:6).</p> <p>“Meaning of the term “land”: The Land Reform (Scotland) Act 2016 does not define the meaning of “land” for the purposes of the Scottish Land Rights and Responsibilities Statement. Schedule 1 of the Interpretation and Legislative Reform (Scotland) Act 2010 applies: this provides that ““land” includes buildings and other structures, land covered with water, and any right or interest in or over land” (LRRS, 2017, pg. 7).</p> <p>Within the LRRS Advisory Notes the existing measures around soil protection within GAEC are highlighted: “The Good Agricultural Environmental Conditions contain a range of standards under cross-compliance developed to limit soil erosion, maintain soil organic matter levels, ensure a minimum level of maintenance, retain landscape features and protect and manage water” (LRRS, 2017: 11).</p> <p>“Those who own, manage or use land are responsible for the good stewardship of that land, and ensuring that, in line with sustainable development, Scotland’s land and associated buildings and infrastructure are well looked after and, where possible, improved “(LRRS, 2017, 25).</p> |
| National Planning Framework 3 (2014) | <p>One aspect of the vision of the NPF3 is that Scotland is a “natural, resilient place. Natural and cultural assets are respected, they are improving in condition and represent a sustainable economic,</p> |

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
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| | <p>environmental and social resource for the nation. Our environment and infrastructure have become more resilient to the impacts of climate change” (NPF 3, 2014: 1).</p> <p>“We will respect, enhance and make responsible use of our natural and cultural assets” (NPF 3, 2014, pg 42);</p> <p>“Our principal physical asset is our land. Our most productive soils extend along the east coast and across the Central Belt into Ayrshire. Peatlands are an important habitat for wildlife and a very significant carbon store, containing 1,600 million tonnes of the 3,000 million tonnes in all Scottish soils” (NPF 3, 2014, pg 42).</p> |
| <p>Scottish Planning Policy (2014)</p> | <p>“The SPP is a statement of Scottish Government policy on how nationally important land use planning matters should be addressed across the country. It is non-statutory. However, Section 3D of the Town and Country Planning (Scotland) 1997 Act requires that functions relating to the preparation of the National Planning Framework by Scottish Ministers and development plans by planning authorities must be exercised with the objective of contributing to sustainable development” (SPP, 2014: 2).</p> <p>With regard to soils, the SPP makes provisions for reducing the impact on carbon rich soils through energy infrastructure developments (e.g. windfarm developments (SPP Section 169, pg. 40). The SPP also states that the planning system should: “seek to protect soils from damage such as erosion or compaction” (SPP Section 169, pg. 45).</p> <p>Furthermore: “Where peat and other carbon rich soils are present, applicants should assess the likely effects of development on carbon dioxide (CO₂) emissions. Where peatland is drained or otherwise disturbed, there is liable to be a release of CO₂ to the atmosphere. Developments should aim to minimise this release” (SPP 2014 Section 205; pg. 47).</p> |
| <p>Scottish Climate Change Adaptation Programme and Climate Change Plan: Third Report on Proposals and Policies 2018-2032 (RPP3)</p> | <p>The RPP3 includes an update on the work of the adaptation sub-committee, including the development of an action plan to deliver the Scottish Government’s Scottish Soil Framework. As explained: “Work is proposed in areas such as soil pH, soil carbon content, the use of legumes in rotation, promotion and dissemination of information on such things as the use of</p> <p>cover crops, how to minimise and alleviate soil compaction, the importance of soil health and condition and the use of zero or minimum tillage where practical” (RPP3, 2017).</p> |
| <p>Common Agricultural Policy in Scotland (2015); - Cross Compliance (2017) and Greening Guidance (2018)</p> | <p>All land managers must fulfil the requirements of Cross Compliance in order to receive Direct Payments (e.g. Basic Payment, Greening, etc) and SRDP schemes. Cross Compliance comprises two main elements: (1) Statutory Management Requirements (SMR) and (2) Good Agricultural and Environmental Conditions (GAEC).</p> |

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
|---|---|
| | <p>Within (1) SMRs 2018, SMR 1 (Nitrate Vulnerable Zones) aims to “reduce the pollution of waters caused by nitrates from agricultural sources and to prevent such pollution occurring in the future” (SMRs, 2018, pg. 2). Those who farm land within a Nitrate Vulnerable Zone must comply with the conditions of the NVZ action programme [see guidance], which includes a Fertiliser and Manure Management Plan, and adequate records for each year, including information on soil type in each field within the NVZ. It is forbidden to apply any kind of nitrogen fertilizer to frozen soil (see SMR 1, 2018, pg. 2).</p> <p>GAEC 4 (Minimum soil cover) aims to protect soil against erosion after harvest until the end of winter, through requiring retaining stubble or sowing grass/another crop (see GAEC 4, 2018, pg. 10). GAEC 5 (Minimum land management reflecting site specific conditions to limit erosion) aims to reduce soil erosion (see GAEC 5, 2018, pg. 11). GAEC 6 (Maintenance of soil organic matter) requires compliance with the Muirburn Code (see GAEC 5, 2018, pg. 12).</p> <p>With regard to Greening Guidance: “Under reform of the Common Agricultural Policy, it is mandatory for applicants to the Basic Payment</p> <p>Scheme to comply with Greening requirements, where relevant on their land. In return for this, an additional Greening payment will be made. The Greening requirements cover:</p> <ul style="list-style-type: none"> • permanent grassland • crop diversification • Ecological Focus Areas (EFAs)” (Greening Guidance, 2018, pg. 4). <p>Soil protection features throughout the Greening Guidance, including requirements for crop diversification (pg. 11), Ecological Focus Areas (see pg. 25, catch crops), nitrogen fixing crops, hedges and agro-forestry systems (which reduced run-off and soil erosion) (pg. 28 and 32).</p> |
| <p>Scotland Rural Development Programme 2014 - 2020 – Rural Development Contracts; LEADER</p> | <p>One of the key needs identified by the SRDP is “4.2.7 Enhance the quality of Scotland’s soils and peatlands” (SRDP, 2014:): 79). Preventing soil erosion and improving soil management features as an element of the need to integrate training and skills across land-based sectors, plus improving the co-ordination and integration of advisory services. A further key need is “4.2.21. To improve the condition of designated sites affected by land management activities (NATURA, SSSIs and SAMs)” (SRDP; pg. 89). The SRDP includes many measures for ‘preventing soil erosion and improving soil management’ (SRDP, 2014: 106); the goal of soil health features throughout the programme document (interlinked with GAEC).</p> |
| <p>Land Use Strategy (2016 - 2021)</p> | <p>The LUS recognises soil as a key aspect of natural capital and that soil provides ecosystem services. It states that: “Through 2016 we will work with industry, science and environmental stakeholders to create new policies to reduce both the total greenhouse gas emissions associated with agriculture, and the intensity of emissions</p> |

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
|---|--|
| | from livestock. We will focus on improving soil fertility, tackling livestock disease and increasing efficiency in fertiliser and fuel use” (LUS 2016). |
| Rural Diffuse Pollution Plan for Scotland (2015-2021) | Plan aims to reduce diffuse pollution from rural sources working alongside the river basin management planning cycles. No specific mention of soil, but soil management is integrated with measures required to reduce diffuse pollution (e.g. reducing run-off, soil erosion, etc). |
| Scotland’s National Food and Drink Policy (2009) | Soil protection/conservation does not feature in this policy, with the exception of noting the expertise of the main research providers, thus: “These research organisations are helping to provide the evidence base to tackle global challenges such as climate change and food security” (Policy, 2009, pg. 36). |
| Scottish Forestry Strategy (2006) | <p>Objective 3 of the Scottish Forestry Strategy (2006) is ‘High quality, robust and adaptable environment’, including to: “Contribute positively to soil, water and air quality</p> <ul style="list-style-type: none"> • endorse sustainable soil management • help to improve the quality of surface and ground water bodies • integrate forestry planning and practice in River Basin Management Plans • encourage the restoration of forest wetlands • use woodlands to help improve urban air quality and reduce noise pollution • support woodland expansion for the restoration of degraded landscapes • use ‘green’ technology to minimise emissions from forestry operations • encourage effective waste management in forestry” (Strategy document, 2006, pg. 19). <p>Furthermore, the Strategy recognises that: “Well planned, well managed woodlands can protect and enhance water quality by reducing the potential for watercourse acidification and soil erosion, and by stabilising riverbanks and reducing pollution in run-off. Appropriately managed woodlands can also have a positive role in Nitrate Vulnerable Zones” (Strategy document, 2006, pg. 43). This leads to the following actions:</p> <p>“Protecting water, soil and air resources ->Ensure implementation of the relevant Forest Guidelines to avoid point source and diffuse pollution.</p> <ul style="list-style-type: none"> • Continue to aid the recovery of acidified rivers and lochs. • Support the development of River Basin Management Plans, including examination of the potential for forestry in sustainable flood |

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
|---|---|
| | <p>management and reducing nitrate losses into the aquatic environment in Nitrate Vulnerable Zones.</p> <ul style="list-style-type: none"> • Develop the evidence base for the potential of ‘protection forestry’ in Scottish conditions. • Promote sustainable management of soils in the forestry sector, in line with the EU Thematic Soil Strategy. • Promote the use of low impact management systems in areas with highly fragile soils. • Promote the role of forestry and street trees in ameliorating air pollution in priority urban areas. • Increase the use of green technology in forestry and encourage the continued improvement in emission standards in the processing sector. • Encourage the forestry sector to take part in the Scottish Executive’s National Waste Plan” (Strategy document, 2006, pg. 44). |
| <p>Scotland’s National Peatland Plan (2015)</p> | <p>“Scotland’s peatlands embrace a wide range of soil types and habitats, notably blanket bogs, raised bogs and some fens” (Plan document, 2015: 7).</p> |
| <p>Scottish Biodiversity Strategy: 2020 Challenge for Scotland’s Biodiversity</p> | <p>The ‘2020 Challenge for Scotland’s Biodiversity’ (published 2013) builds on the Scottish Biodiversity Strategy (2004). Soil health, quality, conservation and biodiversity features significantly in the ‘2020 Challenge’ and it is integrated within other policy goals. For example, Chapter 5 specifically addresses a more integrated approach to land and freshwater use and management, including building on river basin management plans as a “means of integrating public policy objectives in order to tackle issues such as diffuse pollution, flood risk, soil protection, peatland restoration and an expansion of woodland cover” (Challenge document, 2013, page 9).</p> |
| <p>Historic Environment Scotland Policy Statement (2016) / The Historic Environment Strategy for Scotland</p> | <p>Soil protection is not a key feature of this policy statement. Under the heading: ‘Protection and Management of the Historic Environment’, the aim of Historic Environment Scotland to support “the protection and management of Scotland’s rich and diverse historic environment in a sustainable way so that current and future generations can understand, appreciate and benefit from it”, therefore “understanding the development of our environment through time helps inform decision-making about its management. It offers a longer term perspective on important topics such as the nature and impact of past climate change and past management of the land, soil degradation, loss of woodland, building decay processes and the results of past economic and industrial development. Good stewardship of the historic environment can make a contribution towards addressing wider issues like energy conservation (maintaining and using existing resources and embodied energy) and reuse of buildings and building materials (including recycling).</p> |

| Sectoral Plans and Policies | Description of policy instrument/mechanism |
|---|---|
| | <p>The use of local resources, traditional materials and skills can help reduce the impact of transportation” (Policy statement, 2016: pg. 11).</p> <p>Soil conditions are also noted as important for preserving artefacts and archaeological features.</p> |
| <p>Flood Risk Management Strategies and Local Flood Risk Management Plans</p> | <p>No mention of soil, but does refer to the likelihood of flooding from groundwater, which has implications for soil protection and management.</p> <p>“The FRM Act requires the production of Flood Risk Management Plans covering each Local Plan District. There will be two sets of complementary plans, Flood Risk Management Strategies produced by SEPA and Local Flood Risk Management Plans produced by lead local authorities.</p> <p>The Flood Risk Management Strategies will identify the main flood hazards and impacts, setting out objectives for reducing risk and the best combination of actions to achieve this, such as the appropriateness of an alleviation scheme or improving flood warning arrangements. The Local</p> <p>Flood Risk Management Plan takes these objectives and explains what actions will be taken by whom and at what time to deliver them within a six-year planning cycle. The first cycle will run from 2015 to 2021” (SEPA, guidance document, 2011: 4).</p> |

Appendix C – Soil-related Scottish legislation and links with other soil-related policies

| Scottish legislation | Links with other soil-related policies ¹³ |
|--|--|
| Environmental Protection Act (1990) | Control of Pollution Act 1974; Water Resources Act 1991; Environment Act 1995; Water Environment and Water Services (Scotland) Act 2003 Regulatory Reform (Scotland) Act 2014 ¹⁴ |
| Environment Act (1995) | “In this section, “pollution control powers” and “pollution control functions” in relation to SEPA, mean respectively its powers or its functions under or by virtue of— (a)the M22Alkali, &c. Works Regulation Act 1906; (b)Part III of the 1951 Act, the M23Rivers (Prevention of Pollution) (Scotland) Act 1965 and Parts I, IA and II of the M24Control of Pollution Act 1974; (c)Part I of the M25Health and Safety at Work etc. Act 1974; (d)the M26Control of Pollution (Amendment) Act 1989; (e)Parts I, II and IIA of the 1990 Act; (f)section 19 of the M27Clean Air Act 1993; (g)the M28Radioactive Substances Act 1993; [F4(ga)regulations under section 2 of the Pollution Prevention and Control Act 1999;] and (h)regulations made by virtue of section 2(2) of the M29European Communities Act 1972, to the extent that the regulations relate to pollution” (see Section 33(5)). |
| Wildlife and Natural Environment (Scotland) Act (2011) | Muirburn Code; Guidance for owners/land managers of SSSI designated sites: Sites of Special Scientific Interest |

¹³ Policies/legislation were not included in this table where related to air, marine areas, buildings, transport, food and drink, plant health, the disposal of animals/animal by-products, charities/community governance/, community engagement, human/equal rights; succession or tax.

¹⁴ As explained in the Economic Strategy: “The Regulatory Reform (Scotland) Act 2014 provides a proportionate and risk-based approach to regulation, and environmental protection in particular. The Act enables the creation of an integrated authorisation framework, reducing the unnecessarily complex landscape of individual pieces of environmental legislation and allows businesses to benefit from clearer guidance, simpler processes and reduced administration” (Scotland’s Economic Strategy, 2015: 43).

| Scottish legislation | Links with other soil-related policies ¹³ |
|--|--|
| | <p>booklet for owners and occupiers of SSSIs; Farming, SSSIs and Natura sites leaflet;</p> <p>Scottish Rural Development Programme (land management measures to support SSSI management); Nature Conservation (Scotland) Act 2004; Natura 2000 Sites Regulations</p> |
| <p>Water Environment and Water Services (Scotland) Act (2003)</p> | <p>Groundwater Directive 2006/118/EC</p> <p>Priority Substances Directive 2008/105/EC</p> <p>River Basin Management Plans</p> <p>Sewerage (Scotland) Act 1968</p> <p>Environment Act 1995</p> <p>Water (Scotland) Act 1980</p> <p>Water Industry (Scotland) Act 2002</p> <p>Environmental Protection Act 1990</p> |
| <p>The Water Environment (Controlled Activities) (Scotland) Regulations (2011)</p> | <p>Water Environment and Water Services (Scotland) Act 2003</p> <p>Environmental Impact Assessment Directive 85/337/EEC</p> <p>Groundwater Directive 1980 80/68/EEC</p> <p>Groundwater Directive 2006 2006/118/EC</p> <p>Priority Substances Directive 2008/105/EC</p> <p>The Water Environment (Water Framework Directive) (Northumbria River Basin District) Regulations 2003(a)</p> <p>The Water Environment (Water Framework Directive) (Solway Tweed River Basin District) Regulations 2004(b)</p> <p>Part 2 of the Nature Conservation (Scotland) Act 2004(c)</p> <p>The Conservation (Natural Habitats &c) Regulations 1994(d)</p> <p>The Urban Waste Water Treatment (Scotland) Regulations 1994(e)</p> <p>The Surface Waters (Shellfish) (Classification) (Scotland) Regulations 1997(f)</p> <p>The Surface Waters (Fishlife) (Classification) (Scotland) Regulations 1997(g)</p> <p>The Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2002(h)</p> |

| Scottish legislation | Links with other soil-related policies ¹³ |
|--|---|
| | <p>The Designation of Nitrate Vulnerable Zones (Scotland) (No. 2) Regulations 2002(i)</p> <p>The Control of Pollution (Silage Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003(j)</p> <p>SEPA's Land Protection objectives, with regard to the Land Use Strategy, in particular: “make links between soil management and water protection measures to ensure maximum benefit for both soil/land and water quality” (SEPA, date unknown);</p> <p>Environmental Protection Act (1990; Environment Act (1995); Pollution Prevention and Control (PPC) Act 1999; Rural Diffuse Pollution Plan for Scotland</p> |
| <p>The Water Environment (Miscellaneous) (Scotland) Regulations (2017)</p> | <p>Water Environment and Water Services (Scotland) Act 2003</p> <p>Water Environment (Controlled Activities) (Scotland) Regulations 2011 (these regulations amend the 2011 regulations)</p> <p>Environmental Protection Act 1990</p> <p>Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Scotland) Regulations 2003</p> <p>Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013</p> |
| <p>The Conservation of Habitats and Species Regulations 2010</p> | <p>Habitats Directive 92/43/EEC</p> <p>Planning Act 2008</p> <p>Town and Country Planning (Scotland) Act 1997</p> <p>Pipe-lines Act 1962</p> <p>Natura 2000</p> <p>Land Compensation Act 1961, 1973</p> <p>Electricity Act 1989</p> <p>Land Drainage Act 1991</p> <p>Transport and Works Act 1992</p> <p>Conservation (Natural Habitats, &c.) (Amendment) (No. 2) Regulations 2009</p> <p>Nitrate Pollution Prevention (Amendment) Regulations 2009</p> <p>Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007</p> <p>(Not including policies related to marine areas.)</p> |

| Scottish legislation | Links with other soil-related policies¹³ |
|---|--|
| The Environmental Liability Regulations (Scotland) (2009) | Environmental Liability Directive 2004/35/CE |
| Climate Change (Scotland) Act (2009) | Climate Change Delivery Plan; Land Use Strategy (2016-2021) Hill Farming Act 1946 Nature Conservation (Scotland) Act 2004 Town and Country Planning (Scotland) Act 1997 Water Industry (Scotland) Act 2002 Environmental Protection Act 1990 Climate Change Act 2008 |
| Flood Risk Management (Scotland) Act (2009) | EU Floods Directive (2007/60/EC) Flood Prevention (Scotland) Act 1961 Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 Land Drainage (Scotland) Act 1958 Water Environment and Water Services (Scotland) Act 2003 Conservation (Natural Habitats, &c.) Regulations 1994 Nature Conservation (Scotland) Act 2004 Civil Contingencies Act 2004 Town and Country Planning (Scotland) Act 1997 Acquisition of Land (Authorisation Procedure) (Scotland) Act 1947 Environment Act 1995 Flood Risk Management Plans |
| Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations (2008) | Nitrates Directive 91/676/EEC Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2002 Agricultural Holdings (Scotland) Act 2003 Water Environment and Water Services (Scotland) Act 2003 Pollution Prevention and Control (Scotland) Regulations 2012 Waste Management Licensing Regulations 1994 |

| Scottish legislation | Links with other soil-related policies¹³ |
|---|--|
| Radioactive Contaminated Land (Scotland) Regulations 2007 | Environmental Protection Act 1990 Environment Act 1995 Contaminated Land (Scotland) Regulations 2000 |
| Planning etc. (Scotland) Act (2006) | National Planning Framework Environmental Assessment (Scotland) Act 2005 Local Government, Planning and Land Act 1980 Land Compensation (Scotland) Act 1963 National Parks (Scotland) Act 2000 Conservation (Natural Habitats &, c.) Regulations 1994 Town and Country Planning (Scotland) Act 1997 Planning (Hazardous Substances) (Scotland) Act 1997 Water Environment and Water Services (Scotland) Act 2003 |
| The Contaminated Land (Scotland) Regulations (2005) & Statutory Guidance SE/2006/44 | Water Environment and Water Services (Scotland) Act 2003 Water Environment (Controlled Activities) (Scotland) Regulations 2005 Part IIA Environmental Protection Act (1990) Contaminated Land (Scotland) Regulations 2000 Water (Scotland) Act 1980 Control of Pollution Act 1974 |
| Environmental Assessment (Scotland) Act (2005) | The Strategic Environmental Assessment Directive 2001/42/EC |
| Nature Conservation Scotland (Act) (2004) | Scottish Biodiversity Strategy (2013); Wildlife and Natural Environment (Scotland) Act (2011) Forestry Act 1967 Wildlife and Countryside Act 1981 Environmental Protection Act 1990 Natural Heritage (Scotland) Act 1991 Environment Act 1995 Town and Country Planning (Scotland) Act 1997 Water Industry (Scotland) Act 2002 |

| Scottish legislation | Links with other soil-related policies ¹³ |
|--|--|
| | Conservation (Natural Habitats, &c.) Regulations 1994 |
| Landfill (Scotland) Regulations (2003) (and later amendments) | Landfill Directive (99/31/EC) Mercury Directive 2011/97/EU Pollution Prevention and Control Act 1999 Environmental Protection Act 1990 Waste Management Licensing Regulations 1994 Town and Country Planning (Scotland) Act 1997 Wildlife and Countryside Act 1981 Conservation (Natural Habitats, &c.) Regulations 1994 Environment Act 1995 Environmental Protection (Duty of Care) Regulations 1991 |
| The Pollution Prevention and Control (Scotland) Regulations 2012 | Integrated Pollution Prevention and Control Directive 96/61/EC Waste Directive 75/442/EEC Pollution Prevention and Control (PPC) Act 1999 Town and Country Planning (Scotland) Act 1997 Environment Act 1995 Environmental Protection Act 1990 Conservation (Natural Habitats, &c.) Regulations 1994 Acquisition of Land (Authorisation Procedure) (Scotland) Act 1947 Land Compensation (Scotland) Act 1963 Control of Pollution Act 1974 The Environmental Protection (Prescribed Processes and Substances) Regulations 1991 The Special Waste Regulations 1996 The Landfill Tax Regulations 1996 The Specified Risk Material Regulations 1997 The Groundwater Regulations 1998 Contaminated Land (Scotland) Regulations 2000 |
| Waste Management Licensing (Scotland) Regulations (2011) | Waste Framework Directive 2008/98/EC Environmental Protection Act 1990 |

| Scottish legislation | Links with other soil-related policies ¹³ |
|----------------------|---|
| | <p>Pollution Prevention and Control Act 1999</p> <p>Environmental Protection (Prescribed Processes and Substances) Regulations 1991</p> <p>Environment Act 1995</p> <p>Pollution Prevention and Control (Scotland) Regulations 2012</p> <p>Control of Pollution Act 1974</p> <p>Water Environment and Water Services (Scotland) Act 2003</p> <p>Landfill (Scotland) Regulations 2003</p> <p>Water Environment (Controlled Activities) (Scotland) Regulations 2005</p> <p>Water Environment (Controlled Activities) (Scotland) Regulations 2011</p> <p>Agriculture (Scotland) Act 1948</p> <p>Town and Country Planning (Scotland) Act 1997</p> <p>Radioactive Substances Act 1993</p> <p>Special Waste Regulations 1996</p> <p>Groundwater Directive 2006/118/EC</p> <p>Water Framework Directive 2000/60/EC</p> <p>Common Agricultural Policy</p> <p>Sludge (Use in Agriculture) Regulations 1989</p> <p>Land Drainage (Scotland) Act 1958</p> <p>Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008</p> <p>National Waste Management Plan for Scotland Regulations 2007</p> <p>Climate Change (Scotland) Act 2009</p> <p>Sewerage (Scotland) Act 1968</p> <p>Controlled Waste Regulations 1992</p> <p>Waste Management (Miscellaneous Provisions) Regulations 1997</p> <p>Waste Incineration (Scotland) Regulations 2003</p> <p>Water Environment (Water Framework Directive) (Solway Tweed River Basin District) Regulations 2004</p> <p>Rural Development Contracts (Rural Priorities) (Scotland) Regulations 2008</p> |

| Scottish legislation | Links with other soil-related policies¹³ |
|---|---|
| | Rural Development Contracts (Land Managers Options) (Scotland) Regulations 2008 |
| Conservation (Natural Habitats, &c.) Regulations (1994) | Habitats Directive (92/43/EC); SEPA Nature Conservation Procedure for Environmental Licensing; Controlled Activity Regulations (CAR), Waste Management Licensing Regulations and Pollution Prevention and Control Regulations; Natura 2000 Sites Regulations |
| Radioactive Substances Act (1993) | Environmental Protection Act 1990 Rivers (Prevention of Pollution) (Scotland) 1951 Salmon Act 1986 Sewerage (Scotland) Act 1968 Town and Country Planning (Scotland) Act 1972 Control of Pollution Act 1974 Water (Scotland) Act 1980 Water Resources Act 1991 |
| Sludge (Use in Agriculture) Regulations (1989 and later amendments) | Sewage Sludge Directive (86.278/EEC) Control of Pollution Act 1974 Code of Practice for Agricultural Use of Sewage Sludge (1996) |
| Land Reform (Scotland) Act (2016) | Land Rights and Responsibilities Statement Climate Change (Scotland) Act 2009 Land Use Strategy Agricultural Holdings (Scotland) Act 1991 Conveyancing and Feudal Reform (Scotland) Act 1970 Deer (Scotland) Act 1996 Town and Country Planning (Scotland) Act 1997 Agriculture (Scotland) Act 1948 Agricultural Holdings (Scotland) Act 2003 Land Reform (Scotland) Act 2003 Crofters (Scotland) Act 1993 Agricultural Holdings (Amendment) (Scotland) Act 2012 |
| Historic Environment (Amendment) (Scotland) Act (2011) | Ancient Monuments and Archaeological Areas Act 1979 |

| Scottish legislation | Links with other soil-related policies¹³ |
|---|---|
| | <p>Land Registration (Scotland) Act 1979</p> <p>Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997</p> <p>Historic Buildings and Ancient Monuments Act 1953</p> <p>Ancient Monuments and Archaeological Areas Act 1979</p> |
| <p>Planning (Scotland) Bill (as introduced 4th December 2017)</p> | <p>National Planning Framework and local development plans</p> <p>Town and Country Planning (Scotland) Act 1997</p> <p>Planning etc. (Scotland) Act 2006</p> |
| <p>Forestry and Land Management Bill (as introduced 10th May 2017)</p> | <p>Land Use Strategy</p> <p>Climate Change (Scotland) Act 2009</p> <p>Land Rights and Responsibilities Statement</p> <p>Land Reform (Scotland) Act 2016</p> <p>Town and Country Planning (Scotland) Act 1997</p> <p>Acquisition of Land (Authorisation Procedure) (Scotland) Act 1947</p> <p>Countryside (Scotland) Act 1967</p> <p>Countryside Act 1968</p> <p>Agriculture (Miscellaneous Provisions) Act 1972</p> <p>Forestry Act 1979</p> <p>Wildlife and Countryside Act 1981</p> |

Appendix D – Soil-related Scottish plans/policies and links with other soil-related policies

| Sectoral Plans and Policies | Links with other soil-related policies |
|---|---|
| <p>Scottish Soil Framework (2009)</p> | <p>See SEPA's position statement on planning and soils (pg. 2) for further description of the Scottish Soil Framework and Land Use Strategy (although not listed in policy context in LUS 2016 (pg. 15)).</p> <p>Flood Risk Management (Scotland) Act (2009);</p> <p>Common Agricultural Policy (GAEC).</p> <p>Thematic Strategy for Soil Protection (European Commission, 2006); Framework Directive for the Protection of European Soil</p> <p>The Prevention of Environmental Pollution from Agricultural Activity (PEPFAA) Code; the 4 Point Plan and Farm Soils Plan.</p> <p>UK Forestry Standard and Scottish Forestry Strategy (2006)</p> <p>Sewage Sludge Directive (86/278/EEC); Sludge (Use in Agriculture) Regulations 1989 (as amended, 1990); Code of Practice for Agricultural Use of Sewage Sludge 1996.</p> <p>Water Framework Directive (2001/60/EEC); Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR); General Binding Rules; Water Environmental (Diffuse Pollution) (Scotland) Regulations (2008).</p> <p>Flood Risk Management (Scotland) Act 2009</p> <p>Scottish Biodiversity Strategy (2004)</p> <p>Contaminated Land Regime (Part IIA of Environmental Protection Act 1990); Pollution Prevention and Control (PPC); Waste Management Licensing.</p> <p>Scottish Historic Environment Policy</p> <p>Scottish Planning Policy</p> <p>Environmental Assessment (Scotland) Act 2005</p> <p>Strategic Environmental Assessment (SEA)</p> <p>Scotland's Climate Change Programme Changing Our Ways [now out-dated]</p> <p>Climate Change (Scotland) Act 2009</p> <p>Scotland's Climate Change Adaptation Framework</p> <p>Forestry Commission Scotland Climate Change Action Plan 2008-2010</p> |
| <p>Land Rights and Responsibilities Statement</p> | <p>See page 42 (Annex B): The Scottish Land Rights and Responsibilities Statement Policy Context</p> <p>United Nations Sustainable Development Goals</p> <p>Land Reform (Scotland) Act 2016</p> <p>Scotland's Economic Strategy</p> |

| Sectoral Plans and Policies | Links with other soil-related policies |
|---|--|
| | <p>2020 Challenge for Scotland’s Biodiversity</p> <p>Low Carbon Economic Strategy</p> <p>National Planning Framework 3 (NPF3)</p> <p>SRDP 2014-2020</p> <p>Scottish Forestry Strategy</p> <p>Land Use Strategy</p> <p>“Small Farms Grant Scheme and the Crofting Agricultural Grant Scheme provide grants to smaller agricultural businesses. Another important grant is the New Entrants Capital Grant. For further information please see the Young Farmers and New Entrants Start-Up Grant Schemes Guidance” (LRRS, pg. 18).</p> <p>LEADER</p> <p>Community Empowerment (Scotland) Act 2015</p> <p>Tenant Farming Commissioner Codes of Practice</p> <p>The Land Use Strategy for Scotland 2016-2021</p> <p>Scotland’s National Food & Drink Policy – Becoming a Good Food Nation</p> <p>National Planning Framework 3</p> <p>The Future of Scottish Agriculture</p> <p>Peatland Action (2013; SNH)</p> <p>Low Carbon Scotland</p> <p>Place Standards</p> |
| <p>National Planning Framework 3 (2014)</p> | <p>Scottish Planning Policy</p> <p>Zero Waste Plan</p> <p>Land Use Strategy</p> <p>2020 Challenge for Scotland’s Biodiversity</p> <p>Central Scotland Green Network</p> <p>Scotland’s National Peatland Plan</p> <p>National Park Partnership Plans</p> |
| <p>Scottish Planning Policy (2014)</p> | <p>National Planning Framework</p> <p>Town and Country Planning (Scotland) 1997 Act</p> <p>Single Outcome Agreements</p> <p>Community Planning Partnerships</p> <p>Climate Change (Scotland) Act 2009</p> <p>Scottish Government Economic Strategy (2011)</p> <p>Planning Reform: Next Steps</p> |

| Sectoral Plans and Policies | Links with other soil-related policies |
|--|---|
| | <p>Land Use Strategy</p> <p>UK's Shared Framework for Sustainable Development</p> <p>The 2020 Challenge for Scotland's Biodiversity</p> <p>European Landscape Convention</p> <p>Nature Conservation (Scotland) Act 2004</p> <p>The Conservation (Natural Habitats etc) Regulations</p> <p>The Wildlife and Countryside Act 1981</p> <p>EU Habitats Directive – 92/43/EEC</p> <p>Ramsar Convention on Wetlands of International Importance</p> <p>National Parks (Scotland) Act 2000</p> <p>River Basin Management Plans</p> <p>Nature Conservation (Scotland) Act 2004</p> <p>Water Environment and Water Services (Scotland) Act 2003</p> <p>Flood Risk Management (Scotland) Act 2009</p> <p>Updated Planning Advice Note on Flooding</p> <p>Delivering Sustainable Flood Risk Management (Scottish Government, 2011).</p> <p>Surface Water Management Planning Guidance (Scottish Government, 2013).</p> |
| <p>Scottish Climate Change Adaptation Programme and Climate Change Plan: Third Report on Proposals and Policies 2018-2032 (RPP3)</p> | <p>Climate Change (Scotland) Act 2009</p> <p>A Nation with Ambition: The Government's Programme for Scotland 2017-2018</p> <p>Scotland's Economic Strategy (2015)</p> <p>Planning (Scotland) Bill (plus Scottish Planning Policy and National Planning Framework 3)</p> <p>Zero Waste Plan</p> <p>Making Things Last: A Circular Economy Strategy for Scotland</p> <p>UK Forestry Standard</p> <p>Forestry and Land Management (Scotland) Bill</p> <p>Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017</p> <p>Scottish Forestry Strategy</p> <p>Scottish Rural Development Programme (SRDP): 2014-2020</p> <p>Control of Woodland Removal Policy</p> <p>Land Use Strategy (2016-2021)</p> <p>Scottish Biodiversity Strategy</p> |

| Sectoral Plans and Policies | Links with other soil-related policies |
|--|--|
| | Peatland Action Initiative/ Scotland’s National Peatland Plan Farming for a Better Climate Initiative Common Agricultural Policy (CAP) Woodland Carbon Code and the Peatland Code |
| Common Agricultural Policy in Scotland (2015) ; - Cross Compliance (2017) and Greening Guidance (2018) | Muirburn Code Waste Management Licensing (Scotland) Regulations Environmental Impact Assessment (Agriculture)(Scotland) Regulations 2006 |
| Scotland Rural Development Programme 2014 - 2020 –Rural Development Contracts; LEADER | The 7th EU Environment Action Programme EU Biodiversity Strategy Scottish Government’s National Performance Framework; The 2020 Challenge for Scotland's Biodiversity Natura Prioritised Action Framework Nature Conservation (Scotland) Act 2004 Conservation (Natural Habitats &c.) Regulation 1994 (as amended) The Habitats and Birds Directive. [Plus as contained within individual measures, too extensive to list.] |
| Land Use Strategy (2016 - 2021) | Climate Change (Scotland) Act 2009 Land Reform (Scotland) Act 2016; and 2003 Act Community Empowerment (Scotland) Act 2015 Scotland’s Economic Strategy (2015) A Stronger Scotland, The Government’s Programme for Scotland 2015-16 The Future of Scottish Agriculture – A Discussion Document Scottish Forestry Strategy CAP/SRD (Environmental Co-operation Action Fund; Agri-Environment Climate Scheme) Applying an Ecosystems Approach to Land Use (LUS guidance document, 2011) Land Rights and Responsibilities Statement National Planning Framework 3 Scottish Planning Policy Low Carbon Scotland, the Report on Policies and Proposals 2 [and RPP3] Natural Capital Asset Index SEA |

| Sectoral Plans and Policies | Links with other soil-related policies |
|--|--|
| | <p>Scottish Biodiversity Strategy Climate Change Adaptation Programme River Basin Management Plans Becoming a Good Food Nation Farming for a Better Climate Future Proofing Scotland’s Farming Third Report on Policies and Proposals (RPP3) Scottish Biodiversity Strategy Environmental Impact Assessment Regulations, forestry assessment procedures, Nitrate Vulnerable Zones Scotland’s National Peatland Plan</p> |
| <p>Rural Diffuse Pollution Plan for Scotland (2015-2021)</p> | <p>River Basin Management Plans ‘Farming and Water Scotland’ SRDP/Scottish Water measures</p> |
| <p>Scotland’s National Food and Drink Policy (2009)</p> | <p>[None stated in policy document.]</p> |
| <p>Scottish Forestry Strategy (2006)</p> | <p>EU Thematic Soil Strategy. UK Forestry Standard UK Woodland Assurance Standard European Union (EU) Forestry Strategy The Nature Conservation (Scotland) Act 2004 Scottish Biodiversity Strategy Forestry Act 1967 (as amended) Environmental Impact Assessment (Forestry) (Scotland) Regulations 1999. Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 and the Environmental Assessment (Scotland) Act 2005. Town & Country Planning (Scotland) Act 1997 National Planning Policy Guideline 14 (Natural Heritage) [Now SPP] Wildlife and Countryside (Amendment) Act 1985 The Nature Conservation (Scotland) Act 2004 Water Environment and Water Services (Scotland) Act 2003. SRPD (Land Managers Contracts; LEADER) Changing our Ways: Scotland’s Climate Change Programme</p> |

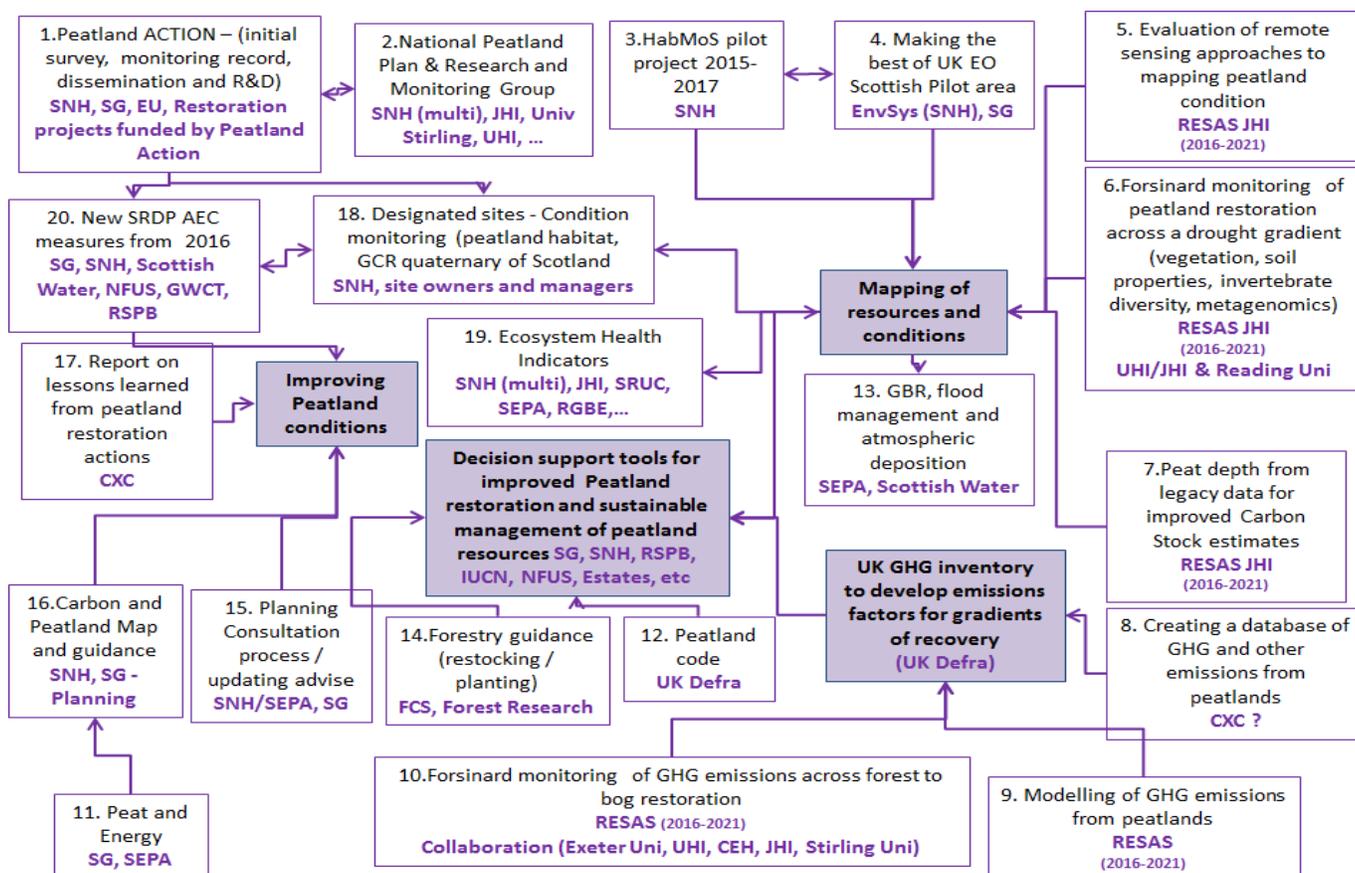
| Sectoral Plans and Policies | Links with other soil-related policies |
|--|--|
| Scotland's National Peatland Plan (2015) | SRDP (in particular the Agri-Environment Climate Scheme and Environmental Co-operation Action Fund/Programme) Scottish Biodiversity Strategy Route Map The UK Peatland Code Habitats Directive Birds Directive 2020 Challenge for Scotland's Biodiversity Scottish Planning Policy UK Forestry Standard (2011) IUCN Peatland Programme WISE Peatland Choices (JHI research) SNH's Climate Change Action Plan Land Use Strategy and Action Plan Climate Change (Scotland) Act 2009 SNH's Review of Sustainable Moorland Management National Planning Framework 3 Scottish Planning Policy Peatland Action (SNH programme) Scottish Forestry Strategy Implementation Plan (2013–16) Muirburn Code Local Biodiversity Action Plan Partnerships |
| Scottish Biodiversity Strategy: 2020 Challenge for Scotland's Biodiversity | Land Use Strategy SRDP Nature Conservation (Scotland) Act 2004 National Planning Framework (2009) Scottish Planning Policy (2010) The Biodiversity Duty (2004) Climate Change Act (2008) Farming for a Better Climate (2011) Low Carbon Economic Strategy (2010) The Deer Code (2012) Scottish Forestry Strategy (2006) |
| Historic Environment Scotland Policy Statement (2016) / The Historic | Historic Environment Scotland Act 2014 |

| Sectoral Plans and Policies | Links with other soil-related policies |
|--|---|
| Environment Strategy for Scotland | |
| Flood Risk Management Strategies and Local Flood Risk Management Plans | [None stated in policy document.] |

Appendix E – Mapping Science to Policy

How policy making, tools for decision making and practical advice are underpinned by novel scientific research in Scotland (Baggaley et al., 2017) ¹⁵.

Peatlands



¹⁵ Network diagram provided by Nikki Baggaley (personal communication, 17.5.18), with additional information and web links to individual pieces of work as numbered in the diagram. Other topics such as forestry, national and regional scale soil assessments, grasslands, and arable agriculture are being considered in the same way as peatlands and erosion as part of the work going on in the SoilMAP . Version 1 © Soil Monitoring Action Plan 2017 (see diagram available online: http://soils.environment.gov.scot/media/1117/peatland_forseweb2.pdf).

References:

- [1] Peatland ACTION: <http://www.snh.gov.uk/climate-change/taking-action/carbon-management/peatland-action/information-for-applicants/>
- [2] Scotland's National Peatland Plan: <http://www.snh.gov.uk/climate-change/taking-action/carbon-management/peatland-action/national-peatland-plan/>
- [3] Trial mapping of upland EUNIS habitats using stereo colour near-infrared aerial imagery: <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=2454>
- [4] Assessment of the use of UK Earth Observation data for habitat mapping <http://jncc.defra.gov.uk/page-5563>
- [4, 5, 6, 7, 9, 10] Current projects funded by the Scottish Government's Rural and Environmental Science and Analytical Services Division Strategic Research Programme 2016-2021: <http://www.gov.scot/Resource/0050/00504329.pdf> & <http://www.gov.scot/Resource/0050/00504327.pdf>
- [11] Draft Peatland and Energy Policy Statement: <http://www.gov.scot/Topics/Business-Industry/Energy/Energy-sources/19185>
- [12] Peatland Code: <http://www.iucn-uk-peatlandprogramme.org/peatland-code>
- [13] SEPA flooding research and development: <http://www.sepa.org.uk/environment/water/flooding/developing-our-knowledge/>
- [14] Forestry guidance Peatland habitats (Scotland) advice: <http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/soil-and-water-management/peatland-habitats>
- [16] Carbon and peatland map: <http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/soils-and-development/cpp/>
- [17] S.J Chapman, R.R.EArtz, A. Moss, [2015] Set of CXC adaptation indicators for peatlands. **NB 11** Extent of key habitats: deep peat; **NB13** Condition of key habitats: area of modified deep peat soils; **NB18** annual greenhouse gas (GHG) emissions from degraded peatlands; **NB22a** Peatland restoration area: http://www.climatexchange.org.uk/files/4114/7738/6041/CXC_Adaptation_indicators_full_list.pdf
- [18] SNH Designated sites conditions monitoring: <http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/site-condition-monitoring/>
- [19]-Ecosystems Health Indicators Scottish biodiversity strategy <http://www.biodiversityscotland.gov.uk/doing/scottish-biodiversity-governance/science-and-technical-group/>
- [20]- Guidance and best practices for restorations: <http://www.snh.gov.uk/climate-change/taking-action/carbon-management/peatland-action/peatland-action-videos>

[4, 7, 8, 9, 10, 11, 12, 13] Current projects funded by the Scottish Government's Rural and Environmental Science and Analytical Services Division Strategic Research Programme 2016-2021 <http://www.gov.scot/Resource/0050/00504329.pdf>

[5] Scotland's Environment Web Soil Erosion Citizen Science Portal <https://envscot-csportal.org.uk/soilerosion/>

[6] James Hutton Institute, SEPA, Scottish Rural College collaboration

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<https://cereals.ahdb.org.uk/publications/2016/may/25/reducing-the-risks-associated-with-autumn-wheeling-of-combinable-crops-to-mitigate-runoff-and-diffuse-pollution-a-field-and-catchment-scale-evaluation.aspx>

[15] Macaulay Development Trust funded project