

**STRATEGIC ENVIRONMENTAL ASSESSMENT
OF THE
SCOTTISH SOIL FRAMEWORK
(CONSULTATION DRAFT)**

Non Technical Summary

July 2008



Introduction

This document presents a Non-Technical Summary (NTS) of the Environmental Report (ER), produced as part of the Strategic Environmental Assessment of the Scottish Government, Environmental Quality Directorate's Scottish Soil Framework (SSF), which was recently published as a consultation draft. A full version of the ER is available from the Scottish Government SEA Gateway:

SEA.Gateway@scotland.gsi.gov.uk

What is Strategic Environmental Assessment?

Strategic Environmental Assessment (SEA) is a statutory assessment process applied under the Environmental Assessment (Scotland) Act 2005, which requires a formal environmental assessment of new plans, programmes, policies and strategies that are deemed likely to have significant effects on the environment.

The SSF falls within the scope of Section 5(4) of the Act and therefore requires a formal Strategic Environmental Assessment.

What is the Scottish Soil Framework?

The Scottish Soil Framework is a strategic document aimed at relevant policy leads within Scottish Government and its delivery partners, environmental and business NGOs, research organisations and other key stakeholders.

The SSF aims to provide a strategic framework for soil protection to ensure that Scottish Government and agencies work in a coordinated manner. It sets out the key pressures on soils and the current policies in place to combat those threats. The SSF also acknowledges upcoming policy measures and the importance of integrating soil considerations throughout policy development.

The SSF recognises the current quality of Scottish soil resources and the range of effective guidance already in use; however, the SSF also recognises that a more streamlined approach to future policy development and related guidance will be of benefit throughout the range of land management, land use and planning disciplines.

The Framework is not intended to set out new policy measures that would impact on land management, and it does not contain detailed practical guidance for practitioners. The SSF aims to foster a process of on-going policy review and it highlights the benefits of making information on soils more widely accessible to stakeholders, providing them with better knowledge on the character and state of their local environment.

The SSF recognises that more appropriate data, and effective monitoring, is required to inform future policy development and it promotes the development of a Scottish Soils Monitoring Network in conjunction with wider research providers and the work of the UK Soil Indicators Consortium.

The SEA Process

The SEA process involves five standard stages, as described below:

Table 1: The five stages of SEA

SEA stages	
A	Setting the context and objectives, establishing the baseline and deciding on the scope.
B	Developing and refining alternatives and assessing effects.
C	Preparing the Environmental Report.
D	Consulting on the SSF Activities and the Environmental Report.
E	Monitoring the significant effects of implementing the plan on the environment.

Stage A (Scoping) was completed in February 2008, and this NTS and the ER form part of the statutory requirements for Stages C and D. A more detailed overview of SEA processes, and the assessment methodologies applied, is provided in Sections 2 and 4 of the Environmental Report.

SEA and the Scottish Soil Framework

The SSF Consultation document presents the Vision and Aim for the Framework, a series of desired outcomes and a range of proposed activities, which are to be delivered over four key work areas, as discussed in Sections 4 and 5 of the Environmental Report and Chapter 7 of the Consultation document.

The SEA assessed each of these key features against a range of environmental topics, as required by Schedule 2 of the Environmental Assessment (Scotland) Act 2005.

The SEA assessed four alternative strategic options for the direction/ focus of the Framework, which included a 'business-as-usual' option for comparison. Appendices to the ER provide evidence of assessments undertaken on a wide range of early stakeholder suggestions that were discussed and considered for inclusion in the SSF.

SEA Consultation

Public involvement through consultation is a key element of SEA. The Environmental Assessment (Scotland) Act 2005 sets specific requirements for consultation with the Statutory Consultation Bodies, as well as the public, stakeholders and other interested parties.

One round of consultation took place during the SEA scoping phase, which included:

- Scottish Environment Protection Agency
- Scottish Natural Heritage
- Historic Scotland
- Forestry Commission Scotland

The SEA Environmental Report and the SSF Consultation document form this round of wider consultation, which runs from the 30th of June 2008 until the 22nd of September 2008.

All comments on the Environmental Report, received during the consultation period, will be reviewed and taken into account during the preparation of the SEA Post Adoption Statement.

What does the SEA Report contain?

A key product of the SEA process is the Environmental Report, which contains:

- An outline of the main objectives of the SSF and its relationship with the environmental objectives of other relevant plans, programmes and strategies (the PPS review);
- A discussion of baseline characteristics and relevant pressures on Scottish soils;
- High level appraisal of strategic options, SSF activity proposals and the desired outcomes;

- Assessments of the likely significant effects on the environment including biodiversity, fauna, flora, population, human health, soil, water, air, climatic factors, material assets, cultural heritage, landscape and the inter-relationships between these factors, as required by Schedule 2 of the 2005 Scottish Act;
- Recommendations on means to maximise environmental gain through the SSF, as the range of measures envisaged to improve soil considerations are not, in themselves, expected to present significant negative impacts; and
- A preliminary range of indicators/ potential monitoring measures for the SSF as it is implemented.

Identification of Key Issues

There are a range of, sometimes conflicting, demands on Scotland's soil resources, including rising demand for locally produced Scottish food; land requirements for domestic and business infrastructure development as well as increasing forestry cover, biomass and renewable energy production.

As part of the SEA policy review, Table 2 provides a summary of high-level national policy objectives that could be affected by, or impact upon, the implementation of the Scottish Soil Framework.

One of the key aims of the Framework will be to improve the consideration and management of organic (ie. carbon rich) soils in the context of climate change. The SSF document outlines how Scottish soils can contribute to climate change, through greenhouse gas emissions, as well as the need to conserve resources and capitalise on any new opportunities under a changing climate (adaptation).

As part of the SEA baseline assessment, a review of relevant SEPA reports and recent research into the current state of, and threats to, Scottish Soils conducted by the Macaulay Institute and the University of Stirling resulted in an overview of the key soil issues and their inter-relationships for SEA purposes. This is provided for reference in Table 3.

Better access to information from a range of sources, at appropriate scales, could assist in changing behaviours, increasing awareness, and contributing towards a more holistic and sustainable approach to the management of the Scottish soils resource.

Table 2: Summary of PPS Review (taken from Table 3.3 of the Environmental Report)

PPP/PPS Summary of National Environmental Objectives by SEA Topic	
Land Use and Land Management (Soils)	Material Assets
<p>Agriculture</p> <ul style="list-style-type: none"> • Good Agricultural and Environmental Conditions (GAEC) & Statutory Management Requirements (SMR) integral to Single Farm Payments under CAP (Cross Compliance) • Research on sectoral responses to adapt to and capitalise (business and crop-type) on climate change effects • Develop biomass potential of Scottish farming • Research on meeting environmental regulatory and legislative demands at reasonable cost • Prevent/minimise diffuse pollution from agricultural activity • Prevent/minimise soil degradation from agricultural activity • Promote whole farm reviews, develop nutrient budgeting • Continue to identify and promote best practice in land management • Prevent loss of high quality agricultural land • Develop landscape/ catchment scale approach to land management <p>SRDP</p> <ul style="list-style-type: none"> • Land Management Options (LMO) and Rural Development Contracts (RDC) for Tiered Payments based on activities undertaken to achieve improved public goods • Promote and develop uptake of environmental best practice measures through LMO/ RDC measures • Reward land managers for undertaking activities to provide public goods/ benefits • Regional priorities and projects cascade from national policy steer <p>Forestry</p> <ul style="list-style-type: none"> • Increase wooded land cover to 25% (currently around 17%) • Further develop sustainable woodland management for biomass potential • Prevent/ minimise diffuse pollution from forestry activity • Prevent/ minimise soil degradation from forestry activity • Adopt planting of appropriate species on appropriate land to maximise carbon sequestration from trees and soils 	<p>Planning & Infrastructure</p> <ul style="list-style-type: none"> • Direct development to sites outwith identified flood plains • Brownfield sites preferred to greenfield • Remediate contaminated land to 'suitable for use' condition • Mixed use developments to minimise the need to travel • Eco-Towns/ Sustainable Land Development • Sustainable Urban Drainage Systems (SUDS) • Improve the consideration of soils as a resource <p>Waste</p> <ul style="list-style-type: none"> • National policy objectives to: <ul style="list-style-type: none"> ◦ Reduce waste to landfill ◦ Increase recycling and re-use ◦ Maximise energy recovery from waste ◦ Maximise composting opportunities • Potential use of sewage sludge for applications to land
	<p>Water</p> <ul style="list-style-type: none"> • Meet Water Framework Directive (WFD) targets • Protect and enhance water quality – coastal, transitional, riverine, inland water bodies, groundwater • Minimise diffuse pollution impacts • Minimise/ sustainably manage flood risk • Integrate SUDS in all new developments • Ensure abstractions are sustainable (do not impact aquatic biodiversity)
	<p>Population & Human Health</p> <ul style="list-style-type: none"> • Deliver quality and affordable housing to meet continued demand in appropriate mixed use developments • Increase recreation levels, reduce obesity, improve diet • Recognise potential value of soils as biodiversity and pharmacological resource
	<p>Biodiversity, Flora & Fauna</p> <ul style="list-style-type: none"> • Maintain and enhance protected sites • Increase species abundance – halt biodiversity loss • Provide appropriate biodiversity breaks/ green corridors to maximise migration potential/ Climate Change adaptation • Prevent spread of alien invasive species • Research to enhance appreciation, understanding and protection of soil biodiversity • Soils as basis of terrestrial ecosystems – significant benefits in protecting all soils
<p>Air and Climatic Factors</p> <p>Air</p> <ul style="list-style-type: none"> • Protect and enhance air quality to minimise human health impacts (priority is urban air quality) <p>Climate Change and Energy</p> <ul style="list-style-type: none"> • Reduce Scottish greenhouse gas (GHG) emissions by 80% by 2050 (upcoming commitment of Scottish Climate Change Bill) • Increase share of renewables energy production to 50% by 2040 • Implement the Biomass Action Plan • Develop micro-renewables and maximise energy recovery from waste • Maximise Scotland's potential to adapt to climatic change • Maximise carbon sequestrations from forestry, biomass activities and soils • Maximise potential to mitigate flood risks and minimise cost of flood events • Protect Scottish high carbon soils to mitigate/ prevent potential GHG release – landslide, erosion, loss of organic matter 	<p>Historic Environment & Landscape</p> <p>Historic Environment</p> <ul style="list-style-type: none"> • Where possible, protect and enhance the historic environment • Improve appreciation of cultural or heritage soils value • Soils not explicit in historic policy or protection • Seen as medium to hold and protect historic features <p>Landscape</p> <ul style="list-style-type: none"> • Landscapes as key contributor to tourism revenues, outdoor recreation and cultural heritage/ identity • Protect valued and distinctive landscapes through various national, regional and local designations • Promote soil as basis for physical environmental and human interactions that form landscapes

Table 3: Key Soil Issues by SEA Topic (taken from Table 3.2 of the Environmental Report)

Summary of Key Soil Issues by SEA Topic	
Soil	Material Assets
<p>Loss of soil organic matter</p> <ul style="list-style-type: none"> Loss of carbon store and other soil functions Diminished water retention, increasing flooding risks Indirect GHG releases <p>Soil stability</p> <ul style="list-style-type: none"> Potential for increased erosion and landslides Indirect GHG releases <p>Fertiliser/ manure use</p> <ul style="list-style-type: none"> Diffuse pollution, nitrates, ammonia, nitrous oxide and methane release all possible <p>GHG emissions from Scottish soils</p> <ul style="list-style-type: none"> Potential for high carbon soils to become net GHG emitter rather than carbon sink Intricately linked to climate change esp. temperature and precipitation effects on soil moisture and water retention <p>Carbon sequestrations from land use</p> <ul style="list-style-type: none"> Increasing forestry cover Need to maintain and improve sequestration in current high carbon soils Biomass/ energy crop potential 	<p>Energy</p> <ul style="list-style-type: none"> On-shore renewables growth – potential for negative impacts esp. water table change, landslide risks and GHG emissions Conventional fossil fuel production emissions – potential for negative impacts on soils through atmospheric deposition Sustainable timber production and management – potential for localised impacts on soils through machinery use and felling practice employed, potential to increase carbon sequestration Land use change required for biomass growth – potential for soil GHG emissions, soil carbon losses and changes to water regime through increased irrigation requirements <p>Waste management</p> <ul style="list-style-type: none"> Improved reduction and recycling of extracted soils as aggregates or growing medium on development sites Recycling of organic matter – potential for application of sewage sludges and other organic waste Composting – potential to improve organic matter recycling through increasing composting options Landfill – reduction in landfill volumes likely, extending lifespan, however new sites will be required <p>Development & Infrastructure (incl. Transport)</p> <ul style="list-style-type: none"> Continued demand on soil resources for development and growth (sealing) and raw materials (forestry, aggregates and mineral extraction) Raw material extraction can damage soil resources Most sustainable to conserve soils without disturbance Infrastructure development (eg. roads, airports) Alternative fuels – domestic biofuel developments
<p>Air and Climatic Factors</p> <ul style="list-style-type: none"> Atmospheric deposition of sulphur and nitrogen can lead to acidification/ eutrophication of soils and water environments Heavy metal contamination is also an issue Changing climate has potential to affect soil conditions through temperature and precipitation interactions GHG emission rates from high carbon soils could dramatically increase 	<p>Water</p> <p>Precipitation change</p> <ul style="list-style-type: none"> Increasing summer droughts could desiccate soils Increased risk of flooding could lead to further damage to soils, especially after prolonged dry periods <p>Sea level rise</p> <ul style="list-style-type: none"> Increased risk of coastal erosion in Scotland Stronger storm surges, higher waves also increase coastal flood risk <p>Water Quality</p> <ul style="list-style-type: none"> Inputs to, and erosion of, soils impact water quality through diffuse pollution mechanisms Changing land use and land management practice may affect soil and water interactions <p>Urban Flood Risk</p> <ul style="list-style-type: none"> Increasing expense of urban flood events driving upstream/ rural flood management proposals
<p>Population & Human Health</p> <p>Demographic Change</p> <ul style="list-style-type: none"> Increasing demand for land for urban fringe development <p>Transport</p> <ul style="list-style-type: none"> Associated demand for land for road developments <p>Food Security & Health</p> <ul style="list-style-type: none"> Soils are basis for agricultural production and Scottish quality produce relies on quality soils Potential pharmaceutical resources within soils Contaminated soils can pose risks to biodiversity and human health <p>Energy Demand & GHG Emissions Reduction</p> <ul style="list-style-type: none"> Driving on-shore renewables and biomass developments Potential to negatively affect soil resources 	<p>Historic Environment & Landscape</p> <p>Potential loss of cultural/ historic assets</p> <ul style="list-style-type: none"> Soils provide a medium for the protection of cultural/ historic assets - climatic change, erosion, acidification and drainage interactions all potentially negative for historic soils/ assets Land use and land management change potential to affect landscapes and historic land use patterns Soils & geodiversity interactions with water and biodiversity form the basis of landscapes Tourism pressures can lead to footpath erosion and scars on the landscape
<p>Biodiversity, Flora & Fauna</p> <p>Adaptation to climate change</p> <ul style="list-style-type: none"> Loss of Biodiversity Action Plan (BAP) & Priority Habitats and Species Species and habitat migration and adaptation <p>Awareness of Soil Biodiversity and Geodiversity</p> <ul style="list-style-type: none"> Soil is a living medium supporting many other environmental and ecological functions Geodiversity and soil biodiversity should be considered on a par with above ground biodiversity considerations 	

SEA Assessment Summary

The Scottish Soil Framework presents a range of broad activities over four priority work areas; however, the nature of such a high level strategy/framework is that it is not possible to predict and identify the exact nature, location or extent of environmental impacts.

The range of activities and key work areas are intended to guide the future direction of SSF implementation, in order to achieve the desired SSF outcomes. Key work areas and activity options were reviewed to identify potential impacts, both positive and negative, and to recommend possible means of mitigation or enhancement. Activities were assessed against a range of SEA topics and objectives, and a 'Best-for-the-Environment' option was developed. With respect to the SSF activities, key impacts identified include:

- Due to the overarching intention to improve consideration of soil issues across national and local policy development, and the integral role of soils in environmental quality, the SSF is expected to present environmental benefits over the long term.
- Increasing focus on soil management and protection measures that help improve and protect soils from erosion or degradation will likely have a range of secondary benefits across water, biodiversity and climate objectives.
- Long-term positive effects associated with the activity on climate change, once the SSF moves from quantifying GHG emissions and sequestrations to identifying means to reduce emissions from the land use sectors. This will be driven by on-going climate research (on emissions, sequestrations and adaptation) in the agricultural and sustainable forestry sectors.
- Similarly, activities on peat protection/restoration will likely lead to improved management of Scotland's high carbon soil resources, and potentially reduced risk of significant GHG emissions from these soils. Effective coordination between SNH, SEPA and other key stakeholders will help ascertain the most sustainable management options/ trade-offs in the context of potentially active habitat and water resource management to minimise risk of emissions/ carbon losses.
- Increased heavy rainfall events are predicted as a result of climate change, which is likely to increase flood risks. Positive effects are expected through the improved recognition of the role of soils in sustainable flood management, as an important element of climate change adaptation and in maintaining/improving soil conditions to maximise natural attenuation rates.
- Strengthening the values placed on soil resources will likely help further limit development within identified flood risk areas. Significant benefits are likely in the protection of material assets, population and human health as a result of improved consideration of the benefits and protection of soils in the attenuation of likely increasing rainfall events, and sustainable flood management.
- Positive effects are to be expected with activities related to improving land management guidance and on the application of organic materials (through possible reviews of the PEPFAA Code and the SRDP, and the introduction of an effective nutrient supply advisory system), especially when considered in the context of existing work and guidance on diffuse pollution and on developing a landscape scale or catchment management approach for land use activities and river basin planning.
- Long-term benefits likely if the decision support system helps land managers adopt improved nutrient budgeting, thereby limiting unnecessary applications. Could also improve control of applications across the country, thereby helping reduce the waste burden and diffuse pollution impacts of eutrophication and sedimentation. Similarly, reducing inputs to soils may help limit/reduce GHG emissions from land use.
- Future climatic change may lead to increased agricultural/ biomass/ forestry production in Scotland and improving information on nutrient supplies will help maximise yields whilst minimising emission risks.

- Appropriate application of sludges, following the most up to date scientific advice may have positive impacts by reducing the national waste burden, improving soil structure and organic matter content, limiting soil degradation and reducing the need for inorganic fertiliser applications. Research to address concerns over metals and pathogens in sludge application to land should help improve consumer confidence (population effects) and maintain/ minimise human health risks.
- Inclusion of specific measures to quantify losses of agricultural land and to review land capabilities for agriculture should help protect soil resources and land values, leading to long-term benefits in line with the current emphasis on recognising the public benefits of land management for environmental stewardship.
- Removal of robust protection of prime quality agricultural land has indirectly resulted in increased development on some highly versatile agricultural soils, particularly around urban centres. The activity on considering re-introduction of such protection has the potential to result in highly beneficial effects as, under future climate conditions, soil resources for agriculture may become more important on the international stage. Limiting further degradation of these soil resources will also have benefits for local biodiversity, landscapes and flood risk.
- Similarly, the majority of agricultural soils occur in river basins, which may be more susceptible to flooding under future climate conditions, so protecting these soils will likely benefit future populations, human health and material assets. The aim to make informed choices on which land/ soils are best suited for change closely reflects the aims of the 'Best-for-the-Environment' option to develop an agreed hierarchy of soil value criteria to help direct development to the least valuable/ most sustainable (in terms of the precautionary principle) soil sites.
- Activities that include reference to Strategic Environmental Assessment will be informed by new guidance, produced by SNIFFER, on how to assess air, water and soils as part of the SEA process. Therefore indirect, and potentially significant, positive effects can be attributed through improving the statutory consideration of soils at the policy or plan development stage.
- Activities supporting SEPA on the production of a State of Contaminated Land report in 2008 and on a State of Scotland's Soils report in 2011 will likely present benefits by maintaining the focus on updating soils data and monitoring requirements. These reports will provide an important snapshot of Scotland's soils and help inform negotiations with Europe on the progress of the EU Soil Framework Directive and, potentially, future CAP reviews. It is likely that these reports will continue to inform/ refine the development of indicators and monitoring, aiding trend analysis in future SSF reviews.
- Activities on international negotiations (Common Agricultural Policy, Soil Framework Directive and Atmospheric Emissions and Eutrophication) are all likely to be beneficial, by ensuring that Scotland's national conditions and priorities are effectively represented.
- Continued support for SEPA training on soils is likely to provide benefits across a range of environmental media through continued standards of enforcement, analysis and education. The work of Forest Research will be of similar value in continuing the development of best practice within the forestry sector.
- Similarly, the included activity on historic environment guidance will likely result in beneficial effects across appropriate locations, and could help promote the wider consideration of soils as public goods, leading to long-term sustainability benefits for future generations with respect to landscapes and material/ historic/ cultural assets.
- Developing appropriate communications and advice systems for effective knowledge exchange is expected to produce indirect positive effects if they provide easily accessible information with regularly updated and evidence based advice. Added benefits include the potential to reduce emissions from transport if land managers are happy with the information provided and do not require to travel, or to bring in advisers, for face-to-face advice.

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- The introduction of a Scottish Soils Monitoring Network, that feeds into such an information system, and is both accessible and applicable to a range of users, at different scales, will also result in indirect benefits as, for example, planners, developers and land managers become more aware of the pressures on soils at the scales most important/ relevant to their sphere of influence.

Cumulative Effects

Section 5.6 of the Environmental Report contains a summary of potential environmental effects by SEA topic, including an assessment of cumulative effects. A summary of which is provided below.

Soils & Geodiversity	<p>An adopted Soil Framework is highly likely to be beneficial for the conservation of soil resources and, by proxy, for geodiversity.</p> <p>Due to the key environmental interactions between soils, water, air, climate and biodiversity, long-term effective coordination of policies based on a hierarchy that maximises climate adaptation potential and minimises emissions from land use change and development, will both help conserve soil resources and help deliver on a wide range of environmental policy objectives.</p> <p>Better protected and managed soils, are likely to present positive effects for (amongst others):</p> <ul style="list-style-type: none"> • Water (reduced diffuse pollution and maximised natural potential to alleviate flooding); • Climate and energy (potential to limit emissions, maximise sequestration, introduce biomass crops and direct energy development to least damaging sites); • Population and human health (potential to maximise and adapt sustainable agricultural production); • Landscape and heritage (limiting loss of landscape quality and cultural/ historic evidence).
Air & Climatic Factors	<p>Scottish soil resources are likely to become much more critical in development and adaptation decisions under changing climate, in terms of absolute quantity for productive use, structural quality for rainfall attenuation and the location of developments and carbon storage conditions, in terms of limiting emissions.</p> <p>Soils are recognised for the key part they play in regulating/ contributing to climate change and, as the evidence base and scientific knowledge improves, the SSF could provide an overarching framework for coordinating land use policy and responses, and is therefore likely to present long-term benefits for both emissions reduction and adaptation to changing climate.</p> <p>Recognising the risk to the overall Scottish GHG emissions burden, and developing coordinated responses to minimise the risk and limit emissions as widely as possible, will have national and international benefits.</p>

Water	<p>Significant benefits likely for the protection of material assets, population and human health as a result of improving considerations of the benefits and protection of soils, especially in the attenuation of likely increasing rainfall events, and sustainable flood management.</p> <p>Improved guidance on soil and land management under changing climate conditions, and the availability of appropriate funding, will help maximise the uptake of measures that help limit diffuse pollution, thereby having a positive effect for aquatic biodiversity, energy inputs and costs (reduced treatment) as well as groundwater and bathing water improvements.</p>
Material Assets	<p>Long-term improvements in the consideration of soils as material assets and a move towards more sustainable use will likely present benefits for soil resources and wider benefits across waste, biodiversity, landscape and population issues.</p> <p>Government face tough decisions on renewable energy and biomass developments, and developed, scientific assessment/ guidance frameworks will help both identify and justify the selection of the most appropriate sites.</p> <p>Action under the SSF priorities could help redress the sustainability balance between environmental and economic justifications for development and energy site selection.</p>
Human Health & Population	<p>The greatest threats to Scottish soils are the impacts and effects of climate change and the continued loss of valuable soils to sealing, through development pressure, which are both indirect impacts of population/economic growth.</p> <p>Long-term sustainability in Scotland means breaking the link between economic growth and GHG emissions, but also breaking the link between economic growth and the permanent loss of useful soil resources to development.</p> <p>In the long-term, if the SSF works to raise awareness and results in development decisions that do direct the change of use from high value to least valuable soils, the SSF will be central in driving improved environmental sustainability in Scotland.</p>
Biodiversity, Flora & Fauna	<p>Healthy soils are the foundation for terrestrial ecosystems and, as such, any work to maintain both soil quantities and quality is likely to present benefits for above and below ground biodiversity.</p> <p>Long-term declines in biodiversity due to intensified agriculture and habitat fragmentation are likely to remain significant pressures, and SSF activities that limit these impacts or help direct land use change and development to the least important soil sites will likely benefit local biodiversity.</p>
Cultural Heritage & Landscape (including Historic Environment)	<p>The permanent sealing of soils can lead to an effective loss of any buried historic features and potentially a gradual decline in historic landscape patterns.</p> <p>The SSF recognises these effects and successful action to raise awareness through improved guidance could present long-term benefits in preserving cultural/ historic evidence in situ or by helping minimise development that encroaches upon landscape quality.</p> <p>These benefits would be strengthened by the development of soil value criteria that included an assessment of landscape and historic value.</p>

Mitigation and Enhancement

No direct negative impacts were identified; however, many of the current pressures on Scottish soils and inter-related environmental media will persist, and further research is required on understanding the detailed mechanisms of carbon storage/ loss and soil biodiversity under climatic change. The SEA assessment suggests that SSF activities that effectively promote and lead to improved protection and consideration of soils, throughout policy development, will ultimately help improve environmental sustainability and present positive environmental effects.

The SEA assessments recognise the positive aspirations of the Scottish Soil Framework and, when considered in combination with current and upcoming policies (as discussed in the SSF Consultation document Annex B – Policies in Place for Soil Protection and in the SEA Environmental Report Appendix C – PPS/PPP Review), the Scottish Soil Framework presents great opportunities for developing collaborative approaches that will be likely to assist in the delivery of the desired outcomes.

With respect to diffuse pollution and sustainable flood management, collaboration between land managers, regulators, research and training organisations will likely help deliver real improvement and drive the growth of landscape-scale approaches and cooperation.

Collaborative processes are vital for ensuring success when considering improved and coordinated action at a landscape scale; as this will involve action across farm boundaries and river catchments. Implementation measures should be supported by evidence based advice and effective assessments of impacts at the local level. This should be augmented by current Government proposals to improve farm audits through the newly introduced SEARS (Scotland's Environmental and Rural Services) collaborative partnership.

With respect to GHG emissions from soils, the active protection of peat habitats (high carbon soils) and associated biodiversity will require cooperation between government, regulators and land managers to identify and manage both the GHG emission

risks, and other risks to these fragile and important environments.

Other SEA recommendations include:

- The development of a well-advised and agreed hierarchy of soil value criteria, based on the precautionary principle, could help direct necessary development to the most sustainable soil sites and could help redress the sustainability balance, putting the consideration of the soil resources before economic and social considerations. This could lead to more rural development/ development outwith the urban fringe and development on the least valuable/ least important soils (least important in terms of the most relevant sustainability criteria, agreed at the appropriate development planning levels/ tiers). Built development for economic/ housing growth should consider cumulative environmental impacts and not limit Scotland's potential to adapt to future climate change.
- The included activity on National Planning Guidance and associated SEA and EIA assessments was attributed a positive effect; however, it was felt that this positive could be improved further by ensuring that improved consideration of soils was explicitly considered in the current review of the National Planning Framework and Guidance, or by the introduction of a dedicated policy on soils.
- The SSF acknowledges there will be different priorities across sectors and regions and the SEA recommends that national priorities on identified soil pressures are disseminated through appropriate training and awareness raising activities for key actors in, for example, local authority planning departments.
- The SEA recognises that further assessments will be required at lower levels, especially when considering renewable energy and biomass projects and any works that may impact upon the integrity of protected sites or features. Lower level SEA, EIA, appropriate assessment and carbon balances or life cycle assessments will likely be required in more cases as environmental legislation is strengthened over the coming years.

Indicators and Monitoring

The direction of the Scottish Soil Framework is not finalised at the consultation stage and, as the SSF represents a high-level steer for key stakeholders and policy-makers, the actual 'on-the-ground' effects may not be realised for some time.

However, statutory SEA requires that a monitoring framework is put in place, in order to identify at an early stage any unforeseen adverse effects and to be able to undertake appropriate remedial action.

One of the priority work areas outlined for the SSF is the development of a Scottish Soil Monitoring Network, intended to improve the collation, and accessibility of soils data. Work on appropriate soil indicators is currently being progressed through the UK Soil Indicators Consortium (UKSIC) and Scottish Government funded research. At this consultation stage, it is therefore too early to commit to a dedicated monitoring framework for the SSF.

One of the proposed activities states that the SSF will be reviewed after 5 years and that regular updates will be produced. There is therefore an opportunity to build SEA requirements for monitoring and reporting into these reviews and updates.

Section 7 of the ER presents a range of existing/potential indicators that could be used for monitoring effects on SSF identified soil pressures and wider environmental receptors. The key is to develop a monitoring framework that effectively aids reporting on the desired SSF outcomes and the results of activities undertaken. The ideal situation is to develop a suite of indicators that together attribute change effectively to the SSF.

The SEA recommends that, as the SSF progresses, indicators are identified that are most applicable to each activity, such that the development of an effective monitoring framework becomes an organic process, with indicators and review periods identified for each action before implementation.

The SSF is intended to stimulate wider policy reviews to raise awareness and ultimately mainstream the consideration given to soils across all levels of government in Scotland. To ensure successful implementation, effective mechanisms must be identified that:

- Record which policies have been reviewed and what changes have been made;
- Assess what the intended/ expected benefits are likely to be;
- Require appropriate monitoring of the actual effects over time to determine whether changes are successful; and
- Effectively resource the implementation, review and appropriate monitoring and reporting.

An effective record of implementation activity, with associated indicators, will help identify trends for future baseline studies and assessment for future reviews of the Scottish Soil Framework. This is a requirement that will require further discussion between the Scottish Government and the Statutory Consultees, post-consultation, to inform the development of a finalised monitoring framework for inclusion in the SEA Post-Adoption Statement.

Comments on appropriate indicators and monitoring options are especially welcomed.

Commenting on the Environmental Report

The Environmental Report has been produced to accompany the SSF Consultation document and both documents are available to the wider public, through the Scottish Government SEA Gateway. The consultation period for the SSF and the SEA Environmental Report will run until the 22nd of September 2008.

All comments on the ER, received before the end of the consultation period, will be reviewed and taken into account during the preparation of the SEA Post Adoption Statement, which will be published once the finalised Scottish Soil Framework is adopted by Scottish Government Ministers.

Comments and any other queries relating to the Scottish Soil Framework Environmental Report and this consultation, should be sent through the Scottish Government SEA Gateway at:

**Scottish Soil Framework
SEA Responses
SEA Gateway
Area 2-H (South)
Victoria Quay
Edinburgh EH6 6QQ**

E-mail - SEA.Gateway@scotland.gsi.gov.uk