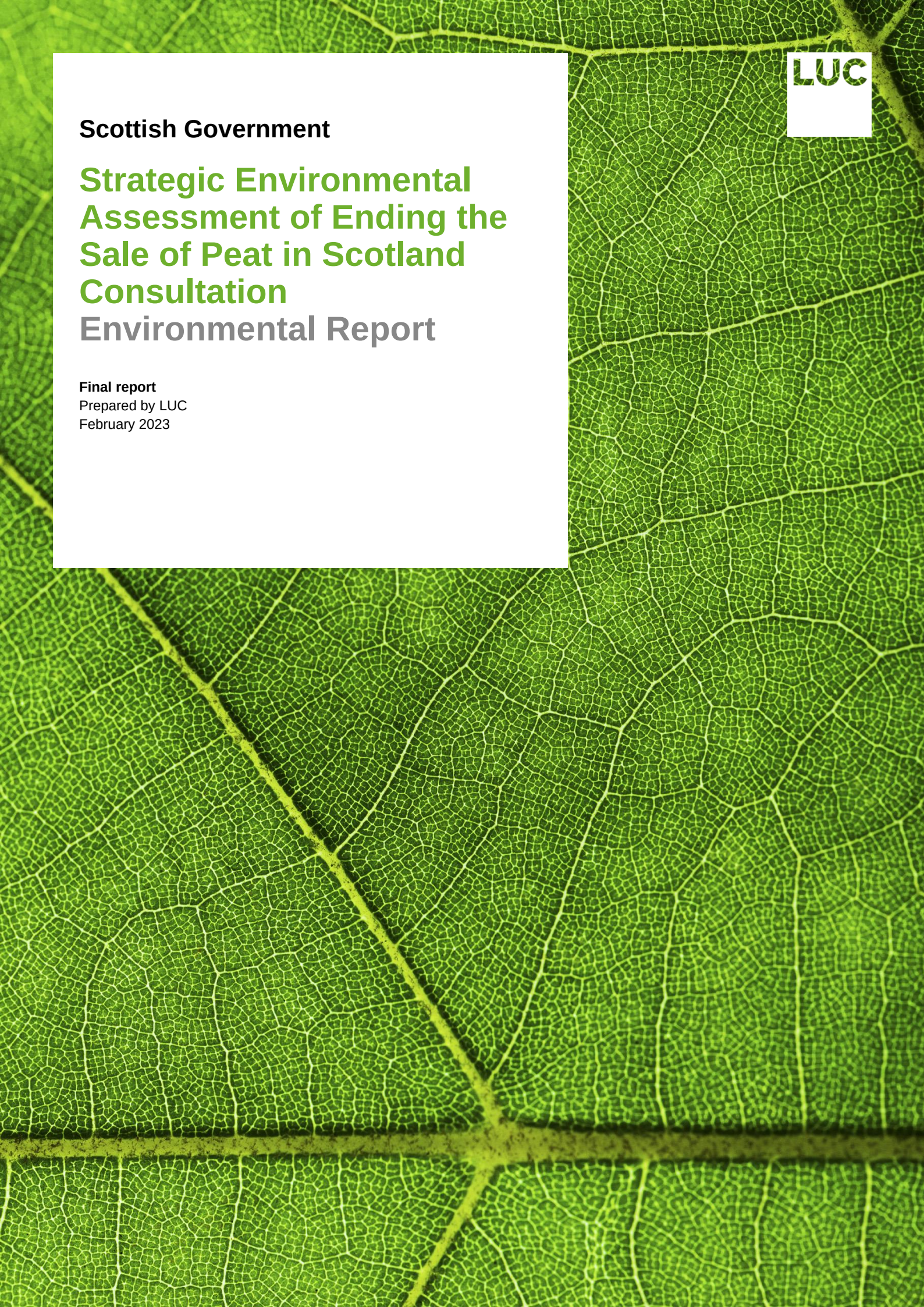


Scottish Government

Strategic Environmental Assessment of Ending the Sale of Peat in Scotland Consultation

Environmental Report

Final report
Prepared by LUC
February 2023

Scottish Government

Strategic Environmental Assessment of Ending the Sale of Peat in Scotland Consultation
Environmental Report

Version	Status	Prepared	Checked	Approved	Date
1.	Draft	H Ennis E Hynes	N James	N James	04.11.2022
2.	Final	E Hynes	N James	N James	20.02.2023

Bristol
Cardiff
Edinburgh
Glasgow
London
Manchester

landuse.co.uk

Land Use Consultants Ltd
Registered in England
Registered number 2549296
Registered office:
250 Waterloo Road
London SE1 8RD

100% recycled paper

Landscape Design
Strategic Planning & Assessment
Development Planning
Urban Design & Masterplanning
Environmental Impact Assessment
Landscape Planning & Assessment
Landscape Management
Ecology
Historic Environment
GIS & Visualisation

Contents

Contents

Table of Tables

Table of Figures

Chapter 1
Non-Technical Summary

Introduction to the Proposed Ban on Sales of Peat for all Horticultural Use

1.1 The Scottish Government is currently preparing a consultation on the proposed ban on sales of peat for all horticultural use.

1.2 In the 2021-2022 Programme for Government[1], the Scottish Government pledged to take forward work to develop and consult on a ban on the sale of peat related gardening products, as part of Scotland's wider commitment to phase out the sale and use of peat in horticulture (including imported peat). The aim is to ensure that all gardening products will become peat-free. The ban will therefore help protect peat resources from becoming further degraded, reduce carbon emissions, and provide further opportunities for the restoration of carbon sequestration functions and address biodiversity loss in these degraded habitats.

What is Strategic Environmental Assessment?

1.3 Strategic Environmental Assessment (SEA) is a way of considering the environment when preparing public plans, programmes and strategies. It identifies potential significant environmental effects and where necessary, describes how these effects can be avoided or reduced. Through consultation, SEA also provides an opportunity for the public to express their views on proposed policies and their potential environmental impacts.

1.4 SEA should begin at an early stage in a plan's preparation, as it is important that the future consultation on the plan and the Environmental Report takes place when ideas are forming, and policy options are still being actively considered.

1.5 In this case, SEA is being used to assess the likely environmental effects of the proposed ban on sales of peat for all horticultural use.

How was the Strategic Environmental Assessment undertaken?

1.6 This SEA is an assessment of the likely significant environmental effects of the proposed ban on the sale of peat for all horticultural use and the alternatives to it. The Environmental Report considers the environmental effects of

[1] Scottish Government (2021) A Fairer, Greener Scotland: Programme for Government 2021-2022 [online] Available at: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/

the proposed ban on sales of peat for horticultural use as it would influence activities across Scotland and further afield.

1.7 The proposed ban on sales of peat for all horticultural use will likely result in greater demand for alternative growing media to replace peat. The environmental effects of alternative growing media have also been assessed within the SEA. The following alternative growing media was considered:

- Wood
- Bark
- Coir
- Compost
- Anaerobic digestate
- Cultivated Sphagnum Moss
- Bracken
- Loam
- Other Mineral Compounds

1.8 The assessment identifies positive and negative environmental effects and the significance of these. It also distinguishes between effects arising directly from the proposed ban on sales of peat for horticultural use and any 'secondary' and cumulative effects which would impact on the environment.

Which reasonable alternatives have been considered?

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

1.10 Given the high-level nature of the proposed ban on sales of peat for all horticultural use, the alternatives to be considered are at the strategic level. The reasonable alternatives reflect differences in the scope of the peat ban and timing of banning different aspects of peat use.

1.11 Overall, five key scenarios have been identified as reasonable alternatives. These are detailed below:

1. Ban on sale of peat for amateur horticultural use
2. Ban on sale of peat for professional horticultural use
3. Ban on sale of peat for all horticultural use
4. Ban on sale of all peat (maximum scenario - includes exceptions for domestic peat cutting for heating purposes)
5. Ban on sale of all peat excluding peat for whisky production (slightly lesser scenario - includes exceptions for domestic peat cutting for heating purposes)

1.12 Scenarios 4 and 5 are considered as reasonable alternatives. Scenarios 1, 2 and 3 form the main basis of the assessment and represent three different temporal or phased scenarios, with the ban on sale for amateur horticulture expected to be introduced first (phase 1 - scenario 1), and then expanded to include the professional sector (phase 2 - scenario 2) so that peat sales are banned across the entire horticultural sector (phase 2 - scenario 3).

1.13 The reasonable alternatives do not include consideration of a *do nothing* scenario relating to the business as usual approach, as the commitment to ban peat use to some degree has been set out in the most recent Programme for Government.

What are the key environmental challenges relevant to the ban on sales of peat for all horticultural use?

1.14 In 2020, Scotland's total emissions of the seven GHG were estimated to be 40 MtCO2e, a decrease in source emissions of 12.0% from 2019. The main reason for the decrease is due to a reduction in transport derived emissions due to the impact of COVID-19. A 51.0% reduction in estimated GHG emissions between 1990 and 2020 was also reported. Land use, land use change and forestry (LULUCF) play a crucial role in removing CO2 from the atmosphere by serving as a carbon stock in a form of forestland, cropland, grassland, wetlands, settlements and harvested wood products and rewetting soils and gaining soils organic matter. Scotland's soils and peatlands are the biggest terrestrial store of carbon. Peatlands alone hold around 3,000 megatonnes of carbon; 60 times more than carbon stored by trees and other vegetation. In 2020, LULUCF sequestrated 3.7 MtCO2e. However, LULUCF can also emit carbon emissions, with 4.2 MtCO2e released in 2020. Overall, in 2020 the LULUCF sector resulted in a net release of 0.5 MtCO2e.

1.15 In terms of soil and geology, it is estimated that Scotland's soils contain over 3 billion tonnes of historic carbon, with peatlands making up over 53% of the Scotland's soil carbon. Degraded soil can act as a net carbon emitter, soils in good condition protect the carbon store and depending on the vegetation cover can continue to sequester carbon. Land use change and management practices can impact significantly on soil carbon stores and sequestration. Peatlands are of particular importance for mitigating climate change by acting as carbon 'sinks'. Blanket bog is the most extensive semi-natural habitat in Scotland, covering around 23% of the land area . Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west in areas with gentle slopes and poor drainage . Approximately 1.7 billion tonnes of carbon is stored within Scottish peatlands. If peatlands are in good condition they have the ability to deposit and continually sequester new carbon in peat-forming vegetation. However, if they are in poor

condition they can act as a source of carbon emissions. It is estimated that over 80% of Scotland's peatlands are degraded.

1.16 In terms of biodiversity, flora and fauna, Scotland's protected areas include 243 SACs, 162 SPAs, 51 Ramsar sites and 2 Biosphere reserves, amongst other internationally designated sites. There are further national level designations such as 1,422 SSSIs, 231 Marine Protected Areas for nature conservation, one Demonstration and Research MPA, 8 Historic MPAs and 2 National Parks. There are also over 900 Geological Conservation Review (GCR) sites in Scotland which contain geological and geomorphological features of national and international importance. The UK Biodiversity Action Plan identified 39 priority habitats and 197 priority species in Scotland. By March 2022, the proportion of natural features reported as being in a "favourable" condition decreased by 0.4 from 78.3% in 2021 to 77.9%.

1.17 In terms of population and human health, the estimated population of Scotland in 2021 was 5.48 million. Projections forecast that the population will continue to rise and will peak at around 5.5 million in 2028. Approximately 91% of Scotland's people live in urban areas, which accounts for just 2% of Scotland's land surface. Around 11.2% of the population live in small towns of less than 10,000 people; of these, around 77% are located within a 30-minute drive of large urban settlements. Key findings from the 2020 Scottish Index of Multiple Deprivation show that 14 areas have been consistently among the 5% most deprived in Scotland since the 2004 Index.

1.18 Significant improvements to water quality have been observed alongside significant reductions in pollution. Most of Scotland's seas, coasts, and estuaries are in good or excellent condition. Around 80% of Scotland's groundwater is in good condition. Agriculture and the legacy of industrial activity are the main causes of regional-scale groundwater problems. Flooding can have significant and long-lasting impacts on people, communities, and businesses. Flood Risk Management Strategies co-ordinate action to tackle flooding in Scotland. Scotland's peatlands play an important role in natural flood management by slowing the flow of water over a rough vegetated surface, and by water retention by sphagnum moss which has a water holding capacity of more than 20 times its dry weight. Therefore, peatland has the ability to soak up and store vast quantities of water, particularly in pools, hollows and depressions, thereby slowing flow of water through a catchment. This can prevent flooding downstream within catchments, particularly if large areas of peatland are present upstream.

1.19 Air pollution can result in adverse impacts on human health and can significantly affect many aspects of quality of life. The quality of the air around us is affected by the pollutants released into the atmosphere through human activities. Sulphur dioxide, oxides of nitrogen, particulates, and low-level ozone are generally considered to be of most importance in relation to human health and the environment.

1.20 Scotland's many and varied historical sites are unique and irreplaceable. While these assets are distributed widely throughout Scotland there are clusters of sites in and around settlements and around the coastline. As of 2016, it is estimated that around 5-10% of the historic environment is designated. However, whilst most of the historic environment is undesignated (90-95%), these known but undesignated assets provide important contextual information which helps understanding of designated sites. The waterlogged, acidic and anaerobic conditions that characterise peatlands are ideal environments for the long-term preservation of organic and some inorganic archaeological remains, and historical and paleo climatic and environmental evidence. Many of the geological SSSI and Geological Conservation Review (GCR) sites are protected for their 'Quaternary of Scotland' feature category. Peatlands are of particular importance for cultural heritage as they not only help preserve heritage assets, but they also can form an important component to the setting of heritage assets. Their alteration (e.g., through extraction) could adversely affect the setting of heritage assets.

1.21 Scotland's distinctive landscapes are a significant part of the country's natural and cultural heritage and make a significant contribution to both the country's economic performance and the well-being of its people. There are currently two National Parks (Loch Lomond and the Trossachs, and the Cairngorms) and 40 National Scenic Areas in Scotland. Over 13% of Scotland's land area has been classified as a National Scenic Area. Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west. Peatlands cover around 23% of the land area, and as such are an important component for the landscape character of an area and if damage could be detrimental to the landscape character of the area.

1.22 Scotland's natural resources are also material assets. Mineral resources and aggregates are used for purposes such as fuel, construction and other purposes such as horticulture (e.g. peat, minerals, clay and loam).

Which existing environmental protection objectives are relevant?

1.23 Environmental protection objectives which form the context for the assessment include international and national level policies and strategies that aim to reduce greenhouse emissions. Climatic objectives focus on achieving Scotland's GHG emissions to net zero by 2045. Objectives for biodiversity, fauna and flora are largely aimed at protecting habitats and species from damage and disturbance.

Objectives for population and human health focus on setting out requirements for air quality, legislation against noise and vibration nuisance. Soil objectives seek to protect peatlands. Objectives for water aim to protect rivers, lochs, transitional waters, coastal waters and groundwater resources. Objectives for air aim to reduce pollution, and to reverse the effects of past emissions. Cultural heritage objectives are primarily focused on valued sites and features, including townscapes, buildings, archaeological sites, battlefields, wrecks and landscapes that have been recognised at the international, national and local levels. Landscape objectives reflect the importance of all landscapes and the need to help to improve those that have become degraded. Objectives for material assets seek to reduce the overall GHG emissions and make the best use of Scotland's natural resources.

Strategic Environmental Assessment Findings

1.24 Banning the sale of peat for horticultural use is expected to have broadly positive effects on the environment. However, increased use of alternative growing media may result in some adverse effects.

1.25 Each of the SEA objectives can be categorised into one of the following themes: climatic factors; biodiversity; population and human health; soil; water; air; cultural heritage; landscape; and material assets.

Climatic Factors

1.26 Overall, minor positive effects are identified in relation to climatic factors. The ban on sales will likely result in less need for peat extraction in Scotland and other countries which export peat to Scotland, and subsequently reduce the amount of peat-derived carbon released into the atmosphere. Protecting these peat resources from exploitation, will reduce damage to peat resources, and may help maximise their rates of carbon sequestration.

1.27 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined minor negative effect in relation to climatic factors. The use of alternative growing media therefore will dampen the positive effects previously identified due to the release of greenhouse gas emissions associated with their processing and transportation.

1.28 Overall, a minor positive effect is identified in relation to climatic factors.

Biodiversity, Flora and Fauna

1.29 The ban on sales of peat will likely result in less need for peat extraction in Scotland and countries which export peat to Scotland. As peatlands support a variety of different species, any reduced extraction may have positive effects for biodiversity, as well as helping maintain a more favourable condition of the peatland.

1.30 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined minor positive effect in relation to biodiversity. The use of alternative growing media therefore will further enhance the positive effects previously identified, as the use of these alternatives could have positive effects on biodiversity by regulating soil temperatures and moisture content.

1.31 Overall, a minor positive effect is identified in relation to biodiversity.

Population and Human Health

1.32 The ban on sales of peat will likely reduce transport-related air pollution of peat products, which would have subsequent benefits for population and human health. These positive effects are enhanced as protecting peatland would provide more ecosystem services (e.g. water regulation and natural flood protection) which also have positive effects for population and human health.

1.33 The ban on sale of peat will encourage the increased use of alternative growing media, which are identified as having a combined minor negative effect in relation to population and human health due to implications of reductions in air quality arising from the extraction, processing and transportation of growing media. The use of alternative growing media therefore will dampen the positive effects previously identified from the reduced use of peat, resulting in mixed effects overall.

1.34 Overall, a mixed (minor positive and minor negative) effect is identified in relation to population and human health.

Soil

1.35 The ban on sales of peat will likely reduce the need for peat extraction, having significant positive effects for soil resources in Scotland and countries which export peat to Scotland. The ban will therefore help protect these important soil resources.

1.36 The ban on sale of peat will encourage the increased use of alternative growing media which are identified as having a combined minor positive effect in relation to soil due to their ability to improve the physical, chemical and biological properties of soil. The use of alternative growing media therefore will further enhance the positive effects previously identified.

1.37 Overall, a significant positive effect is identified in relation to soil.

Water

1.38 The ban on sales of peat will likely reduce the need for peat extraction, and subsequently protect and maintain the ecosystem services peatland provided, notably in relation to water. Protection of peatlands will therefore help clean and store water, protect water quality and better regulate runoff by absorbing excess water.

1.39 The ban on sale of peat will encourage the increased use of alternative growing media which are identified as having a combined minor negative effect in relation to water due to their required water usage during processing, potential for contamination of watercourses (e.g., sediment from loam excavation, and leachate pollution). Some positive effects are also identified due to reduced need for chemical fertilisers, however when all alternatives are considered the overall effect is minor negative. The use of alternative growing media therefore will dampen the positive effects previously identified from the reduced use of peat, resulting in mixed effects overall.

1.40 Overall, a mixed (minor positive and minor negative) effect is identified in relation to water.

Air

1.41 The ban on sales of peat will likely reduce the need for peat extraction, and subsequent transportation of peat. Reductions in emissions released from peat itself and from reduced need for transportation of peat products is therefore expected to have minor positive effect in relation to air quality.

1.42 The ban on sale of peat will encourage the increased use of alternative growing media which is identified as having a combined minor negative effect in relation to air, primarily due to emissions and pollution released during the energy-intensive processing and transportation of alternative growing media.

1.43 Overall, a mixed (minor positive and minor negative) effect is identified in relation to air.

Cultural Heritage

1.44 The ban on sales of peat will likely reduce the need for peat extraction, having minor positive effects on cultural heritage. This is because peatlands are culturally significant and may be important to the setting of heritage assets, particularly in the lowlands as well as containing unknown heritage assets in the uplands.

1.45 The ban on sale of peat will encourage the increased use of alternative growing media which are identified as having a combined negligible effect in relation to cultural heritage. This is because most alternatives are a waste or by-product of another industry (e.g., forestry management, coconut industry, sawmills etc.) with limited chance of adversely affecting the historic environment. The use of alternative growing media is unlikely to affect the previously identified effects arising from the reduced sale of peat.

1.46 Overall, a minor positive effect is identified in relation to cultural heritage.

Landscape and Geodiversity

1.47 The ban on sales of peat will likely reduce the need for peat extraction, having minor positive effects on landscape by helping to maintain the 'wilderness' and preventing further areas of peatland from becoming degraded.

1.48 The ban on sale of peat will encourage the increased use of alternative growing media which are identified as having a combined negligible effect in relation to landscape. This is because most alternatives are a waste or by-product of another industry (e.g., forestry management, coconut industry, sawmills etc.). However, the use of minerals and clays may adversely affect landscape because of extraction on the landscape along with construction of composting and anaerobic digestion facilities. Overall, the use of alternative growing media is unlikely to affect the previously identified effects arising from the reduced sale of peat.

1.49 Overall, a minor positive effect is identified in relation to landscape and geodiversity.

Material Assets

1.50 The ban on sales of peat will likely maintain and enhance the ecosystem services that peatlands provide, having positive effects on material assets by reducing water treatment costs etc. However, banning the sale of peat products in the horticultural sector could have adverse effects on the horticultural industry due to loss of income from peat-derived product sales. Furthermore, banning peat sales for this industry may cause peat extractors to extract for other uses allowed under the scope of the ban.

1.51 The ban on sale of peat will encourage the increased use of alternative growing media which are identified as having a combined mixed (minor positive and minor negative) effect in relation to material assets. Minor positive effects are identified as many of the alternative growing media are the by-product of other industries, and therefore their use is promoting a circular economy and preventing waste going to landfill. However, these are mixed with minor negative effects as the alternative growing media could result in conflicts over land use and may also require the use of other substances (e.g., nitrogen fertiliser) to be effective. Furthermore, some alternatives, such as minerals, clay and loam are non-renewable resources.

1.52 Overall, a mixed (minor positive and minor negative) effect is identified in relation to material assets.

Cumulative Effects

1.53 Cumulative effects arising from a reduction in the sale of peat for horticultural purposes is expected to result in greater positive effects across all SEA topics. This is due to less peatland being disturbed and extracted, which thereby maximises the ecosystem services peatlands provide. Furthermore, there would be reduced need for transportation of peat products, having positive effects on air quality and subsequently population and human health.

1.54 However, the cumulative effects from the increased use of alternative growing media are expected to be greater due to the potentially combined effects from producing, processing and using a wide range of alternative growing media.

1.55 Whilst there is data on the current market share of alternative growing media, it is uncertain how this balance will change in the future, especially as new technologies and growing media become more viable. Therefore, there is uncertainty associated with the effects arising from use of alternative growing media as little is known about the future use and balance of growing media, including the consideration that some will be used in combination together to make different products.

1.56 The cumulative effects identified below focus on the combined environmental effects arising from increased use of alternative growing media to displace the use of peat products.

Climatic Factors

1.57 The use of alternative growing media such as compost and anaerobic digestate are expected to enhance the positive effects due to reducing the amount of organic waste going to landfill, therefore reducing methane emissions. Increased use of anaerobic digestate will further enhance these effects due to the potential to utilise the biogas produced as a form of renewable energy. Likewise, the use of cultivated sphagnum moss will help reduce emissions from the reduced disturbance of peat resources.

1.58 Other alternative growing media are expected to have negative effects on climatic factors as a result of energy requirements during extraction, processing and transportation of the product. Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat, overall, the positive effects would continue to outweigh the negatives associated with transportation and processing of alternative growing media.

Biodiversity, Flora and Fauna

1.59 The use of various alternative growing media (e.g., wood based, coir, bark, cultivated sphagnum moss, and bracken) will have varying benefits for soil substrate by improving the physical, chemical and biological properties of soils which will have subsequent benefits for flora growing within the soil and also fauna living within or dependent on it. The increased use of these growing media therefore will result in greater combined positive effects on biodiversity.

1.60 However, the increased use of growing media such as compost, anaerobic digestate and minerals, clays and loam, is expected to have negative effects on biodiversity due to development of processing facilities and extraction activities. Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat, and use of other growing media, overall, the positive effects would continue to outweigh the negatives.

Population and Human Health

1.61 The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have primarily negative effects on population due to increased processing and transport-related pollution which may lead to greater occurrences of nuisance and respiratory illnesses amongst the population. The increased use of these growing media in varying quantities, therefore, will result in greater combined negative effects on population. The use of other growing media for which negative effects were identified, would not outweigh the positives associated with reductions in use of peat.

Soil

1.62 The increased use of alternative growing media to displace the use of horticultural products containing peat will have mainly positive effects on soils by improving their physical, chemical and biological properties. The increased use of these growing media therefore will result in greater combined positive effects on soils.

1.63 However, the use of alternative growing media such as bark, coir, and loam may also have minor negative effects as loss of trees from forests (for bark) and extraction of minerals, clays and loam may result in increased soil erosion and loss of soil resources. Likewise, positive effects associated with coir are mixed with negative due to the removal of natural nutrients from soil when coconut husks are processed and transported elsewhere. However, the greater use of these alternative growing media, in varying quantities, is expected to result in greater combined negative effects on soil. Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat and use of other alternatives, overall, the positive effects would continue to outweigh the negatives associated with soil erosion.

Water

1.64 Some growing media (e.g., wood-based, coir, cultivated sphagnum moss, bracken and loam) are expected to have minor negative effects on water due to their water intensive processing and potential to result in decreased water quality from pollution (minerals, clays and loam, compost and anaerobic digestate). In the case of bracken, this growing medium has poor water retention capabilities so may result in increased use of water. The use of other alternative growing media (bark, compost and anaerobic digestate) may have positive effects in relation to water due to their water retention properties and their displacement of use of chemical fertilisers. Overall, the greater use of these alternative growing media is expected to result in greater combined positive and negative effects on water, depending on the type of growing media used and how much is being produced.

Air

1.65 The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to mainly have negative effects on air quality due to emissions and pollution released during their processing and transportation. The increased use of these growing media therefore will result in greater combined negative effects on air quality.

1.66 The greater use of these alternative growing media, in varying quantities, is expected to result in greater combined negative effects on air, especially if the alternatives require extensive processing and transportation. These combined negative effects would lessen the positive effects identified from banning the sale of peat, and overall, the positive effects would be mixed with the negatives associated with transportation and processing of alternative growing media.

Cultural Heritage

1.67 The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mainly negligible effects on cultural heritage due to being by-products of other industries. Some alternative growing media, notably compost, anaerobic digestate and minerals, clay and loam are identified as having potential negative effects on cultural heritage assets due to siting of processing development or in the case of mineral resources, the potential to affect buried and underwater archaeology. The increased use of these alternative growing media will likely result in greater cumulative negative effects on cultural heritage, especially if compositing and AD facilities are located in proximity to one another and near heritage assets.

Landscape and Geodiversity

1.68 The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mixed effects on landscape. Growing media derived from by-products of other industries are expected to have negligible effects. However, some alternative growing media, notably compost, anaerobic digestate and minerals, clay and loam are identified as having potential negative effects on landscape due to the siting of processing development or in the case of loam, the potential to affect landscape character through removal of vegetation. The increased use of these alternative growing media will likely result in greater cumulative negative effects on landscape, especially if compositing and AD facilities are located in proximity to one another and loam is extracted at large scales.

Material Assets

1.69 The increased use of alternative growing media to displace the use of horticultural products containing peat is also expected to have mixed effects on material assets. This is due to several growing media being produced primarily from by- or waste-products of other sectors which prevents this material being wasted or sent to landfill, having positive effects in relation to material assets due to improved resource efficiency. Positive effects are also identified due to the production of biogas from the anaerobic digestion process which can be used as a renewable energy source, improved water efficiency through their use, and natural flood management that their use can provide. These positive effects are mixed as often there is competition for by- or waste-products. Some negative effects may also arise due to the greater use of non-renewable resources such as minerals, clays and loam.

What measures could be put in place to avoid, reduce or manage the environmental effects of the ban on sale of peat for all horticultural use?

1.70 There are some mitigation opportunities that could address the adverse effects identified in the assessment. These include:

- Ensuring timber-based alternatives based on waste- or by-products are sourced from productive forests and not semi-natural and/or ancient woodland.
- Prioritising transportation of growing media in their less voluminous forms to minimise transportation and transport-related emissions.
- Promoting use of alternative growing media near their point of origin/source.
- Avoid and minimise adverse effects arising from development of growing media processing facilities through regulation via the planning and consenting system.

- Identify the water requirements of producing alternative growing media and commission research into reducing water use in the production process.
- Manage potential adverse effects on water quality from composting, anaerobic digestion and loam production through the planning system or environmental consenting system.
- Avoid development in locally or nationally designated landscapes.
- Avoid development in heritage designations or in proximity to heritage assets.

1.71 Areas for enhancement relate primarily to research and innovation to address knowledge gaps, and measures which could be incorporated into development for alternative growing media to improve the environment.

Next Steps

1.72 The consultation on the proposed ban on sales of peat for all horticultural use will run for a twelve-week period from mid-December 2022. Comments on the proposed ban on sales of peat for all horticultural use and the Environmental Report can be submitted via the Scottish Government Citizen Space website address https://consult.gov.scot/. Requests for hard copies of the Environmental Report can be made to horticultural.peat@gov.scot.

Chapter 2
Introduction

Purpose of this Report

2.1 The Scottish Government is currently preparing a consultation on the proposed ban on sales of peat for all horticultural use.

2.2 LUC was appointed by the Scottish Government in June 2022 to undertake a Strategic Environmental Assessment (SEA) of the proposed ban on sales of peat for all horticultural use. The SEA of the proposed ban presents an important opportunity in which environmental considerations are brought to the forefront of the decision-making process and influence the outcome of the ban.

2.3 The purpose of this Environmental Report is to present the findings of the SEA process.

Scope of peat for horticultural use

2.4 The scope of the proposed ban covers sales of peat (except peat which is extracted incidentally to development or peat cut by crofters for their own use) with a focus on horticultural peat. The proposed ban will have a phased approach, targeting the amateur market before extending this to the professional market. Scope will be refined and phase-out dates determined following the consultation.

2.5 Peat for horticultural use within the scope of the SEA includes the following categories of use:

- Peat related gardening products, including growing media and potted plants for the retail (amateur) horticulture sector.
- Professional horticulture sector, including growing media and potted plants (includes edible and ornamental – mushroom growing, commercial nurseries producing container grown plants, tree nurseries, raising of young plants for vegetable and salad plants and soft fruit growing).

2.6 In addition to the above, non-horticultural uses of peat include:

- Scientific use of peat
- Use of peat for spirits, including whisky
- Use of peat for heat (peat cutting), both domestically (e.g. through turbary rights) and commercially for sale as

peat briquettes or peat logs for use in homes or other commercial units.

2.7 Furthermore, peat is also extracted during the development process in some locations, for example during wind farm construction. These uses are outside of the scope of the proposed ban and will not be considered as part of the SEA.

2.8 For reference the following definitions are provided for terms used within this Environmental Report.

- **Peat -** a brown deposit resembling soil, formed by the partial decomposition of organic matter in the wet acidic conditions of bogs and fens. Peat is a natural resource that takes millennium to form.
- **Growing media –** a substance used for rooting and growing of plants.
- **Soil improver -** substrates that improve soil structure and soil fertility by increasing the soil organic matter level.
- **Peatland soils / peat soils -** soils with an organic layer at the surface containing more than 60 % organic matter which is more than 50 cm deep.
- **Gardening products –** tools and materials used to assist in caring for and growing plants. Gardening products used as growing media can be sold as bulk material, as pre-formed material (like peat plugs or peat pellets) and as support for flowering plant, vegetable, mushroom, tree and other plants in a container, pot or plug.
- **Retail horticulture (non-professional) sector use –** sale and use of growing media to the general public for gardening activities.
- **Professional horticulture sector use –** sale and use of growing media to commercial growers (e.g. mushroom growing, commercial nurseries producing container grown plants, tree nurseries, raising of young plants for vegetable and salad plants and soft fruit growing).

Context for the ban on sales of peat for horticultural use

2.9 In the 2021-2022 Programme for Government[2], the Scottish Government pledged to take forward work to develop and consult on a ban on the sale of peat related gardening products, as part of Scotland's wider commitment to phase out the sale and use of peat in horticulture (including imported peat). Overall, there has been a decline in the use of peat in the retail sector over the past decade: from 58% of growing media used by the UK public in 2011 to 29% in 2021. The decline has been slower in the professional sector, with peat still accounting for over half of growing media used.

2.10 The aim is to ensure that all gardening products will become peat-free. The ban will therefore help protect peat resources from becoming further degraded, reduce carbon emissions, and provide further opportunities for the restoration of carbon sequestration functions and address biodiversity loss in these degraded habitats.

2.11 Peatlands are wetland habitats that occupy 3% of the global land surface and 12% of UK land area[3]. Peatlands cover over 2.5 million hectares (or one third) of Scotland and are of national and global significance. 75% of peatlands are degraded through drainage, extraction, overgrazing, burning, afforestation and development. Degraded peatlands offer fewer benefits and now account for around 15% of Scotland's total net emissions. Peatlands are a globally important habitat as in pristine condition they are a significant carbon sink, reduce flood risk, improve water quality and support unique and rare biodiversity. Peatlands currently store vast quantities of carbon – an estimated 3.2 billion tonnes in the UK alone. The amount of carbon stored in Scotland's peatlands is equivalent to 140 years' worth of Scotland's GHG[4]. However, they are currently considered to be a net source of emissions due to the way they have been managed now and in the past. The natural formation of peat is also very slow, typically with less than 1mm per year in the UK. Therefore, any human induced changes to peatland can create significant lasting impacts.

2.12 Peat accumulates very slowly, with an average of 1m of peat accumulated every thousand years. Therefore, commercial peat extraction is capable of removing thousands of years of peat growth in a single operation[3]. Peatland extraction is normally focused on the rare and declining lowland raised bog habitat as it is deeper, closer to the market

[2] Scottish Government (2021) A Fairer, Greener Scotland: Programme for Government 2021-2022 [online] Available at: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/

[3] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf

[4] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf

and easier to process than peat from upland bog. Lowland raised bogs are a priority conservation habitat in Europe, and many sites are protected under current legislation.

2.13 Industrial peat extraction for horticultural use occupies 0.15% of UK peatland, mostly on lowland raised bogs. UK Government report "Mineral extraction in Great Britain" states that 0.5 million cubic metres of peat was extracted in Scotland in 2014, representing 63% of peat extracted from the UK as a whole. Estimated carbon emissions arising from extraction in Scotland are 100,000 t CO2e per year. **Figure 1** maps the locations peat extraction sites in Scotland.

2.14 In 2019 peat extraction from UK sites ranged from a likely minimum of 600,000 cubic metres to a likely maximum of 800,000 cubic metres, and has likely fallen compared with the 2014 Mineral extraction survey for Great Britain[5]. The volume of peat used in growing media supplied to the UK from Scotland in 2021 was 266,803m^3. This suggests a declining trend in the contribution of UK peat to UK growing media, alongside an overall decline in peat as a proportion of the total volume of growing media[6]. However, 2020 saw a 9% increase in the use of peat in growing media compared to 2019. This is due to the increased demand for gardening during the COVID-19 lockdown[7,8] and use of other growing media also rose. However, peat use as a proportion of all growing media still declined.

2.15 The UK consumed around 2.2 million cubic metres (m3) of peat in 2020. 39% of the peat sold in the UK was extracted in the UK, 51% imported from the Republic of Ireland with the remaining 10% coming from mainland Europe[9].

2.16 Of the 5.44 million cubic metres of growing media used in 2020, 79% was used by amateur gardeners, mainly through multipurpose compost and grow bags. Recent RHS research suggests that 33% of multipurpose compost may be dug into gardens, which is not an ideal use of peat[3].

2.17 Peat is also imported as growing media in container grown ornamental plants. The total number of plants imported into the UK in 2009 was estimated at over 211 million along with 122,580 m3 of growing media of which 101,873 m3 was estimated to be peat. Most of the plant material was sold either directly or indirectly onto retail businesses (garden centres, DIY outlets, supermarket retailers etc), but some (especially the young plant material) went to production nurseries for growing on[10].

2.18 The Wildlife Trusts estimate that 31 million tonnes of CO_2 may have been released into the atmosphere since 1990 as a direct result of the use of peat in gardening[3].

2.19 To minimise the use of peat in horticulture, the 2019-20 Programme for Government[11] included a commitment to *"seek to phase out the use of horticultural peat by increasing uptake of alternative growing media substrate"* (page 57). This commitment implied phasing out the use of horticultural peat in both the professional and amateur sectors. The 2021-22 Programme for Government[12] sets a full commitment to phase out the use of peat in horticulture: *"we will take forward work to develop and consult on a ban on the sale of peat related gardening products as part of our commitment to phase out the use of peat in horticulture."* Whilst this commitment is in relation to the amateur sector only, it may be viewed as a first step to delivering the older commitment to phase out its use across all Scottish horticulture, both in the amateur and professional sectors.

[5]Growing Media Association, Department for Environment, Food and Rural Affairs, AHDB, HTA (2020) Growing media monitor Trends in the composition of UK growing media supplied 2011 to 2020. [online] Available at: https://hta.org.uk/resources/get?mediaId=6380

[6] Growing Media Association, Department for Environment, Food and Rural Affairs, AHDB, HTA (2021) Growing media monitor report Trends in the composition of growing media supplied 2011 to 2021

[7] Growing Media Association, Department for Environment, Food and Rural Affairs, AHDB, HTA (2020) Growing media monitor Trends in the composition of UK growing media supplied 2011 to 2020. [online] Available at: https://hta.org.uk/resources/get?mediaId=6380

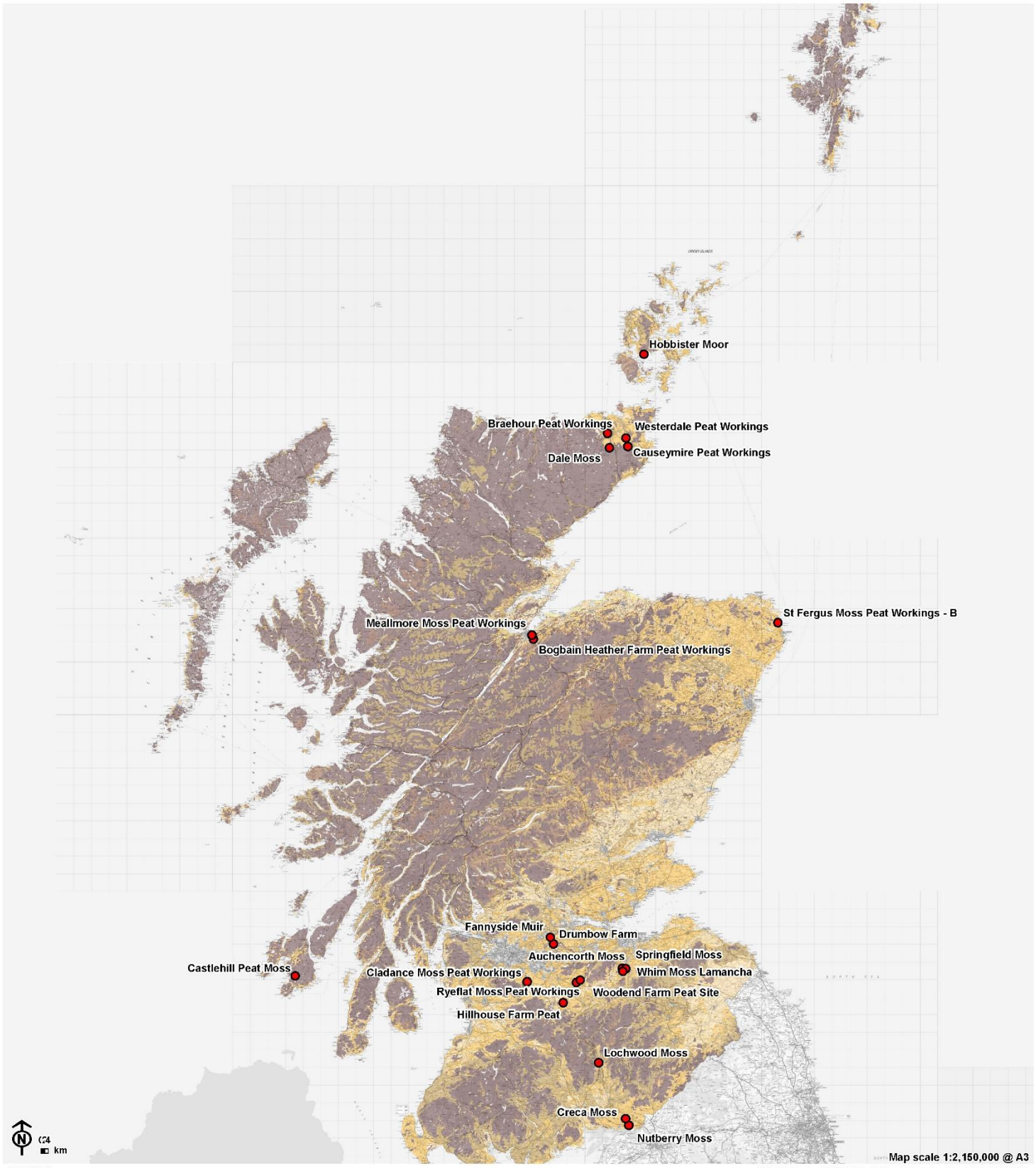
[8] BGS (2021) United Kingdom Minerals Yearbook 2021. [online] Available at: https://www2.bgs.ac.uk/mineralsuk/download/ukmy/UKMY2021.pdf?_ga=2.58939373.195137139.1667233383-204128122.1667233383

[9] Holmes, S. & Bain, C. (2021) 'Peat-free Horticulture – Demonstrating Success', IUCN UK Peatland Programme, Edinburgh

[10] https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf

[11] Scottish Government (2019) Protecting Scotland's Future: the Government's Programme for Scotland 2019-2020 [online] Available at: https://www.gov.scot/publications/protecting-scotlands-future-governments-programme-scotland-2019-20/documents/ (accessed 15/08/2022)

[12] Scottish Government (2021) A Fairer, Greener Scotland: Programme for Government 2021-22 [online] Available at: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/ (accessed 15/08/2022)



CB:LT EB:Tembo_L LUC FIG1_12122_r2_Extraction_Sites_A3P 10/11/2022
Source:OS, Topsoil organic carbon concentration 250K - Copyright James Hutton Insitute.

Figure1 : Peat extraction in Scotland

- Peat extraction sites

Top soil organic carbon concentration

- Low (less than 1.5%)
- Moderate (between 1.5 and 3%)
- High (more than 3 to 5%)
- Humose (more than 5 to 12%)
- Organo-mineral (more than 12 to 35%)
- Organic (greater than 35%)

Peat Alternatives

2.20 A range of alternative, peat free growing media are now available, based on materials including bark, wood fibre, coir, anaerobic digestate, bracken, waste sheep's wool, composted green waste and other mineral compounds such as vermiculate, perlite, bentonite and other expanded clay minerals. No single material is going to replace peat and it is likely that there will need to be a wide range of alternatives to cover the demand from the amateur gardening industry. Many of these alternatives will be used in combination to create suitable growing media. For example, by combining composted green waste with wood fibre or other mineral compounds. However, the poor quality of some early peat alternatives may affect attitudes among retailers and consumers.

2.21 Some materials (e.g. coir) are of variable quality and require significant processing and transportation over long distances. Others, such as wood fibre, are under increased demand from other sectors, including as feedstock for energy generation, raising questions about the ability to meet the growing demand created by a ban on peat products. Novel materials, including purpose grown sphagnum moss are also being explored as alternative media, though the costs are likely to be relatively high and growing conditions carefully regulated.

Coir – Coir is a widely used substitute and is the main constituent in grow bags for UK soft fruit production. It is a waste product from the coconut industry, and therefore makes use of a secondary product that would otherwise be classified as waste. However, as it is a waste product, the quality of the product can sometimes be inconsistent. It requires a large amount of transportation to reach the UK and requires a lot of secondary processes to make it usable – raising carbon emissions and cost.

Wood fibre – wood fibre can be any material that is made up from primary and waste woods. To ensure that the wood is suitable as a growing medium it has to be subjected to secondary processing methods. Wood fibre is mostly used as a supplement to current growing media as it helps balance the nutrient dynamics. There is competition with forestry by-products for energy generation.

Composted organic wastes – there is political pressure for this type of growing medium. However, there are problems with consistency and supply and it has not been widely adopted in the industry.

Cultivated Sphagnum moss (peat moss) – Sphagnum mosses are found naturally in wet habitats, such as peat bogs. Multiple trials are being undertaken currently to assess whether Sphagnum moss can be cultivated for wide scale use in horticulture. This practice is known as paludiculture whereby water loving crops such as sphagnum moss are grown under wetland conditions. Early trials indicate that Sphagnum growing media can perform just as well as peat based alternatives. Set up costs for Sphagnum cultivation are high and it is currently viewed as high risk. A recent study suggests that Sphagnum grown on degraded peatland can have a carbon flux of between -0.6 and 2.2 t CO2 ha/y. This study also notes that growing Sphagnum requires elaborate water level management. Another study suggests that establishing production strips of Sphagnum on degraded former peat bog grassland in Germany has the potential to sequester 5-9 t ha/y CO2e.

Other Mineral Compounds – Mineral compounds such as vermiculate, perlite, bentonite and other expanded clay minerals offer water retention properties and structural enhancement which can be added to substrate to improve its properties.

Climate Change in Scotland

2.22 The UK Met Office's most recent climate projections (UKCP18) suggest that under a high emissions scenario, by the 2070s, average temperatures in Central Scotland could be up to 4.8°C warmer in summer and 4.5°C warmer in winter. The expected increase in temperature is greatest in the south and east. There is greater uncertainty about precipitation, with projections suggesting that by 2070, summers could range from 40% drier to 8% wetter, whilst winters could range from 3% drier to 12% wetter. Scotland was 4% wetter in the most recent decade (2008-2017) compared to the 1981-2010 average. These trends vary across Scotland but increases in rainfall are likely to be most pronounced in the north and west.

2.23 The overall pattern of warming is expected to continue and is likely to be accompanied by changes in rainfall patterns and more frequent episodes of extreme weather including storms, flooding, drought and unseasonably hot or cold weather.

2.24 Land use and forestry is a key sector with great potential to slow climate change, due to the potential for carbon sequestration. Reports suggest carbon sequestration totalled approximately 5.4MtCO2e in 2017, compared to 0.3MtCO2e in 1990. This is primarily a result of increased woodland and forestry cover, and restoration of peatland. Between 2019-

2020, circa 6,000ha of peatland were restored, with around 5,000ha to be restored in 2020-2021[13].

Scottish Government's Ban on sales of peat for all horticultural use

2.25 The Scottish Government has committed to developing a Ban on sales of peat for all horticultural use. The Ban on sales of peat for all horticultural use will support a push towards the ban of peat within horticultural products to reduce extraction of peat and help restore peatland that acts as an important carbon store.

2.26 The proposed ban on sales of peat for all horticultural use considers alternative growing media to replace peat which include:

- Wood
- Bark
- Coir
- Compost
- Anaerobic digestate
- Cultivated Sphagnum Moss
- Bracken
- Loam
- Other Mineral Compounds

Strategic Environmental Assessment

2.27 The Environmental Assessment (Scotland) Act 2005 ('the 2005 Act')[14], is a means to judge the likely impact of the plan, programme or strategy on the environment and to seek ways to minimise adverse effects, if likely to be significant.

The SEA process comprises a number of stages:

- Pre-screening.
- Screening (preparation of a Screening Report).
- Scoping (preparation of a Scoping Report).
- Environmental Assessment (preparation of an Environmental Report).
- Main consultation on the Environmental Report.
- Preparation of a Post-adoption SEA Statement.
- Monitoring the significant environmental effects of implementing the proposed ban on sales of peat for horticultural use.

2.28 A Scoping report was prepared and submitted to the SEA Gateway in June 2022.

The UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021[15]

2.29 Section 15 of the Continuity Act places a duty on responsible authorities to have due regard to the guiding principles on the environment when preparing a plan, programme or strategy requiring a SEA under the Environmental assessment (Scotland) Act 2005. Whilst not yet in force, nonetheless the guiding principles are set out below and will be taken into account in the preparation of the Environmental Report: The guiding principles as set out in Section 13 (1) of the Act are:

a. the principle that protecting the environment should be integrated into the making of policies,

b. the precautionary principle as it relates to the environment,

c. the principle that preventative action should be taken to avert environmental damage,

d. the principle that environmental damage should as a priority be rectified at source,

e. the principle that the polluter should pay.

2.30 The SEA process comprises a number of stages:

- Pre-screening.
- Screening (preparation of a Screening Report).
- Scoping (preparation of a Scoping Report).
- Environmental Assessment (preparation of an Environmental Report).
- Main consultation on the Environmental Report and proposed Ban on sales of peat for all horticultural use.
- Preparation of a Post-adoption SEA Statement.
- Monitoring the significant environmental effects of implementing the proposed Ban on sales of peat for all horticultural use.

2.31 The proposed ban on sale of peat falls within section 5 (3) of the Environmental Assessment (Scotland) Act 2005.

[13] Supporting documents - Climate Change Plan: monitoring reports - 2021 compendium - gov.scot (www.gov.scot)

[14] The Environmental Assessment (Scotland) Act 2005

[15] UK Withdrawal from the European Union (Continuity) (Scotland) Act 2021. Available at: https://www.legislation.gov.uk/asp/2021/4/enacted

Structure of the Environmental Report

2.32 This chapter has described the background to the proposed Ban on sales of peat for all horticultural use and the requirement to undertake SEA. The report is structured into the following chapters, and bold highlights illustrate where these meet the requirements of the 2005 Act.

- Chapter 2 (this chapter): Outlines the **contents and main objectives** of the proposed ban on sales of peat for all horticultural use and its relationship with other qualifying plans and programmes.
- Chapter 3: Describes the approach to the assessment including the **difficulties encountered.**
- Chapter 4: Describes **environmental policy context.**
- Chapter 5: Describes the **significant environmental effects** expected from the proposed Ban on sales of peat for all horticultural use, including for the **reasonable alternatives** and alternative peat-free growing media.
- Chapter 6: Describes the **mitigation and enhancement** measures proposed against the SEA findings.
- Chapter 7: Describes the approach to **monitoring** the SEA.
- Chapter 8: Describes the **next steps** for the proposed ban on sale of peat for horticultural use.

2.33 The main body of the report is supported by **Appendix A** which presents the consultation comments received during consultation of the SEA Scoping Report. **Appendix B** which presents the review of plans, programmes and environmental protection objectives of relevance to the proposed ban on sales of peat for all horticultural use. **Appendix C** presents the baseline information that supports the proposed ban on sales of peat for all horticultural use.

Chapter 3
Approach to the Assessment

Requirement under the 2005 Act

3.1 The proposed ban on sales of peat for all horticultural use is considered to fall under Section 5(3) of the 2005 Act and as such, a SEA is required.

3.2 Schedule 3(6) of the 2005 Act requires the Environmental Report to consider "The likely significant effects on the environment, including (a) on issues such as – (i) biodiversity; (ii) population; (iii) human health; (iv) fauna; (v) flora; (vi) soil; (vii) water; (viii) air; (ix) climatic factors; (x) material assets; (xi) cultural heritage including architectural and archaeological heritage; (xii) landscape; and (xiii) the inter-relationship between the issues referred to in heads (i)–(xii); (b) short, medium and long-term effects; (c) permanent and temporary effects; (d) positive and negative effects; and (e) secondary, cumulative and synergistic effects".

Scoping of SEA Topics

3.3 In accordance with Schedule 2 of the 2005 Act, consideration has been given as to whether the environmental effects (both positive and negative) of the proposed ban on sales of peat for all horticultural use are likely to be significant.

3.4 Given the anticipated environmental effects of the proposed ban on sale of peat for horticultural use, it is considered that all SEA topics required to be considered by the 2005 Act should be scoped into the SEA process. These are set out in **Table 2.1.**

Table 3.1: Proposed scoping in/out of SEA topics

SEA Topic	Scoped in
Biodiversity, flora and fauna	✓
Population and human health	✓
Soil	✓
Water	✓
Air	✓

SEA Topic	Scoped in
Climatic factors	✓
Cultural heritage and the historic environment	✓
Landscape and geodiversity	✓
Material assets	✓

Approach to the Assessment

3.5 This is a strategic level assessment of a high-level ban on sales of peat for all horticultural use and reflects the national perspective the ban on sales of peat for all horticultural use will take. Specifically, the SEA takes the form of a baseline-led assessment which compares the potential impacts of the ban on sales of peat for all horticultural use against the current environmental baseline and understanding of the environmental effects of alternative peat-free growing media in order to assess the significance of any environmental effects that could arise for each SEA topic.

3.6 The proposed ban on sale of peat for horticultural use, along with alternative peat-free growing media have been appraised against the SEA topics, with scores being attributed to indicate the likely effects on each objective.

3.7 The assessment used matrices for the ban on sale of peat and each alternative growing media. The matrices use a colour coded symbol showing the score for each action and target against each of the SEA objectives and include a concise justification for the score given. The SEA matrices are presented in **Appendix D**.

3.8 The use of colour coding in the matrices allows for likely significant effects (both positive and negative) to be easily identified, as shown in **Table 2.2** below.

Table 3.2: SEA Framework Symbol and Colour Coding

Symbol and Colour Code	Description
++	Significant positive effect likely
++/-	Mixed significant positive and minor negative effects likely
+	Minor positive effect likely
+/-	Mixed minor positive and minor negative effects likely
-	Minor negative effect likely
--/+	Mixed significant negative and minor positive effects likely
--	Significant negative effect likely
0	Negligible effect likely
?	Uncertain effect
N/A	Not applicable or relevant

3.9 Where a potential positive or negative effect is uncertain, a question mark has been added to the relevant score (e.g. +? Or -?) and the score colour coded as per the potential positive, negligible or negative effect.

Consideration of Potential Alternatives

3.10 Part 14(2) of the 2005 Act requires that:

"The report shall identify, describe and evaluate the likely significant effects on the environment of implementing (a) the plan or programme; and (b) reasonable alternatives to the plan or programme, taking into account the objectives and the geographical scope of the Plan or Programme".

3.11 Therefore, the SEA must appraise not only the Plan or Programme's objectives and actions, but "reasonable alternatives" to these. This implies that alternatives that are not reasonable do not need to be subject to appraisal. It is important to note that when considering the scope of alternatives, the 2005 Act does not specify whether this means considering an alternative plan, programme, or strategy, or different alternatives within the plan, programme, or strategy itself that should be assessed. Part (b) of Regulation 14(2) above notes that reasonable alternatives will take into account the objectives of the plan, as well as its geographical scope. Therefore, alternatives that do not meet the objectives of national policy are unlikely to be reasonable.

Potential alternatives

3.12 The 2005 Act requires that the potential for significant environmental effects of reasonable alternatives of a plan, programme or strategy be assessed as part of the SEA process.

3.13 Given the high-level nature of the proposed ban on sales of peat for all horticultural use, the alternatives to be considered are at the strategic level. The reasonable alternatives reflect differences in the scope of the peat ban and timing of banning different aspects of peat use.

3.14 Overall, five key scenarios have been identified as reasonable alternatives. These are detailed below:

1. Ban on sale of peat for amateur horticultural use
2. Ban on sale of peat for professional horticultural use
3. Ban on sale of peat for all horticultural use
4. Ban on sale of all peat (maximum scenario - includes exceptions for domestic peat cutting for heating purposes)
5. Ban on sale of all peat excluding peat for whisky production (slightly lesser scenario - includes exceptions for domestic peat cutting for heating purposes)

3.15 The reasonable alternatives do not include consideration of a *do nothing* scenario relating to the business as usual approach, as the commitment to ban peat use to some degree has been set out in the most recent Programme for Government.

3.16 The SEA considered the effects of banning the sale of peat for all horticultural use along with the environmental effects of using alternative growing media instead of peat. The alternative growing media considered in the assessment include:

- Wood-based
- Bark
- Coir
- Compost
- Anaerobic Digestate
- Cultivated Sphagnum Moss
- Bracken
- Loam
- Other mineral compounds including vermiculate, perlite, bentonite and other expanded clay minerals

Defining the scope of the SEA of the Ban on sales of peat for all horticultural use

3.17 Due to the nature of the proposed ban on sales of peat for all horticultural use and the hierarchy in which it sits, the assessment will be undertaken at a strategic and national level. This approach to the assessment will reflect the national status of the ban on sales of peat for all horticultural use and the high-level nature of assessment it requires.

3.18 The proposed ban on sales of peat for all horticultural use is to build upon a variety of other plans, programmes and strategies. These plans, programmes and strategies have themselves undergone SEA, which can be used to inform the assessment for the proposed ban on sales of peat for all horticultural use.

Likely significance of effects

3.19 Schedule 2 of the 2005 Act identifies criteria for determining the likely significance of effects on the environment (see **Table 2.3**) which will be reflected in the approach to assessment.

Table 3.3: Criteria for assessing the likely significant effects

SEA Assessment Criteria	Breakdown and Description
a) the probability, duration, frequency and reversibility of the effects	<u>Probability</u> Low – Not likely to have an effect Medium High – Highly likely to have an effect <u>Duration</u> Short-term – 0-5 years Medium-term – 5- 10 years (up to the end of action plan period) Long-term – 10+ years (beyond the end of the action plan period) <u>Frequency</u>

SEA Assessment Criteria	Breakdown and Description
	Continual; defined by number of occurrences; or intermittent Reversibility Whether the effect can be reversed (i.e., can the receptor return to baseline condition) without significant intervention
b) the cumulative nature of the effects	Where several options each have insignificant effects but together have a significant or combined effect. This includes synergistic effects, which is when effects interact to produce a total effect greater than the sum of the individual effects.
c) the transboundary nature of the effects	Effects beyond Scotland's boundary.
d) the risks to human health or the environment	Whether the impact of the effect would present a risk for people and the environment.
e) the magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected)	Magnitude High – High proportion of the receptor affected Medium Low – Low proportion of the receptor affected Spatial extent National/Transboundary – Effects on Scotland or England International – Effects extending to the UK or beyond
f) the value and vulnerability of the area likely to be affected due to: – special natural characteristics or cultural heritage – exceeded environmental quality standards or limit values g) intensive land-use	Impact of the effect on the value or condition of the existing area.
h) g) the effects on areas or landscapes which have a recognised national, Community or international protection status	Impacts on areas with national, community or international protection

Assessment of SEA topics

3.20 The appraisal is based around the SEA topic areas and takes a strategic view of environmental effects on each topic, reflecting the nature of the proposed ban on the sale of peat for horticultural use. **Table 2.4** sets out the considerations in relation to each SEA topic. These have been used to inform the approach to the narrative assessment.

Table 3.4: SEA assessment scope for the proposed ban on sales of peat for all horticultural use

SEA Topic Area	SEA assessment scope
Climatic Factors	Climate change mitigation and adaptation. In particular the assessment for 'climatic factors' will reflect both the impacts for GHG emissions and carbon sequestration of peat and alternative production, and GHG emissions associated with transport of peat and alternatives.
Biodiversity, flora and fauna	Terrestrial and aquatic habitats and species and geodiversity of international, national, regional or local importance, loss of peatland, and habitat fragmentation.
Population and human health	Health, quality of life and living environment.
Soil	Loss of or preservation or restoration of peatland soil resources
Water	Quality and quantity of watercourses and waterbodies associated with peatland soils.
Air	Air pollution associated with transportation of peat and emissions from landfill and other waste disposal routes.
Cultural heritage and the historic environment	Terrestrial and freshwater designated and undesignated heritage assets associated with lowland and upland peatland sites.
Landscape and geodiversity	Designated and undesignated landscape and geodiversity.
Material assets	Use of existing resources and development of a circular economy.

3.21 The findings from the SEA of the proposed ban on sales of peat for all horticultural use are presented as a narrative for each component of the proposed ban on sales of peat for all horticultural use in the main body of the Environmental Report.

3.22 The narrative reflects the significance of the effect. In order to determine significance the text considers the following factors (see **Table 2.2**):

- The **magnitude** of the proposed ban on sale of peat effects, including the degree to which the ban sets a framework for projects and proposals, the degree to which it influences other plans and environmental problems relevant to the proposed ban on sale of peat.
- The **sensitivity** of the receiving environment, including the value and vulnerability of the area, exceeded environmental quality standards, and effects on designated areas or landscapes.
- The **effect characteristics**, including probability, duration, frequency, reversibility, cumulative effects, transboundary effects, risks to human health or the environment, and the magnitude and spatial extent of the effects.

3.23 The likely effects of the objectives scoped into the assessment need to be determined and their significance assessed, which inevitably requires a series of judgments to be made.

Developing a SEA Framework

3.24 The relevant environmental objectives identified by the review of plans and programmes together with the key environmental issues identified by the collection and review of baseline information, helped to inform the development of a set of environmental objectives (the 'SEA Framework') against which the effects of the proposed ban on sales of peat for horticultural use have been assessed.

3.25 Development of the SEA Framework is not a requirement of the 2005 Act, but it is a recognised way in which the likely environmental effects of the proposed ban can be

transparently and consistently described, analysed and compared.

3.26 The SEA Framework that has been used throughout the SEA process is presented in **Table 2.5** overleaf.

Table 3.5: SEA Framework

SEA Topic	SEA Headline Objective	Environmental Sub Objective(s)
Climatic Factors	Reduce Scotland's contribution and vulnerability to climate change.	Reduce Scotland's contribution to climate change by reducing greenhouse gas emissions released from peat carbon stores.
		Support climate adaptation.
Biodiversity, Flora and Fauna	Protect, maintain, and where possible enhance, biodiversity and geodiversity.	Protect and enhance habitats of international, national, regional or local importance.
		Protect international, national, regional or locally important species.
		Protect geological sites of national, regional or local importance.
		Maintain wildlife corridors and minimise fragmentation of ecological areas.
Population and Human Health	Improve the health of the people of Scotland.	Avoid adverse effects on health and quality of life.
		Improve the health of people and communities by reducing greenhouse gas emissions.
Air	Improve Scotland's air quality.	Improve air quality through reduced need to transport peat over longer distances.
Soil	Protect soil quality and resources in particular high carbon soils.	Safeguard soil quality and quantity.
Water	Protect the quality and quantity of watercourses and waterbodies.	Protect the quality and quantity of watercourses and surface water and groundwater waterbodies, including those associated with peatland soils.
	Protect the natural flood defences that peatlands provide.	Protect peatlands to maximise their role in providing natural flood management.
Cultural Heritage	Protect the character and setting of Scotland's historic environment and cultural heritage assets.	Protect cultural heritage sites associated within lowland and upland peatland sites, including terrestrial and freshwater cultural heritage.
Landscape	Protect landscape character and the quality of Scotland's landscapes.	Protect landscape character and the quality of Scotland's landscapes, particularly in designated or sensitive landscapes, and historic landscapes.
Material Assets	Use natural resources more efficiently.	Encourage the prudent use of natural resources, particularly scarce resources.
		Promote a circular economy.

Mitigation and monitoring proposals and opportunities for enhancement

3.27 A key part of the SEA process is the identification of mitigation for adverse effects and opportunities to enhance benefits, in addition to the development of proposals for monitoring post adoption. Where possible, existing data sources, environmental indicators and monitoring programmes will be identified in the SEA.

3.28 Any recommendations for monitoring made in the SEA process are likely to focus on areas where the assessment identifies the potential for significant environmental effects, and the need to address data gaps. These are likely to be linked to the implementation of mitigation or enhancement measures where appropriate.

Difficulties encountered

3.29 Difficulties encountered during the SEA process included a general lack of data on peat in Scotland. There is a lack of data on current peat extraction in Scotland, the end use of peat extracted in Scotland (including how much peat is exported), and lack of data on peat imports. In addition, there is lack of detail on the locations where peat is extracted.

3.30 There is also uncertainty about the environmental impacts of alternative peat-free growing media, which meant it was more challenging to determine whether effects were minor or significant. In addition, although it is reasonable to assume the market share of peat-free alternative growing media will significantly increase post-ban, the future uptake is highly speculative.

3.31 Furthermore, there is uncertainty regarding the potential for peat extractors to continue selling peat for non-horticultural purposes, particularly whilst the ban is being phased in. For example, extractors and the professional horticultural sector could continue selling peat for professional horticultural purposes whilst the ban prohibits sales for amateur horticulture.

3.32 No other specific data limitations or difficulties were encountered during the SEA process.

Chapter 4
Context for the proposed ban on sales of peat for all horticultural use

Relationship with other Plans, Programmes and Strategic and Environmental Objectives

Introduction

4.1 The proposed ban on sales of peat for all horticultural use is not being prepared in isolation and is greatly influenced by other plans, programmes and strategies (PPS), and by broader environmental objectives. The proposed ban on sales of peat for horticultural use needs to be consistent with international and national guidance and strategic planning policies and should contribute to the goals of a wide range of other programmes and plans. It must also conform to environmental protection legislation and the environmental objectives established at the international, national and local level.

4.2 Schedule 3 of the 2005 Act requires:

- *(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.*
- *(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"*.

4.3 Chapter 2 has outlined the contents and main objectives of the Scottish Government's proposed ban on sales of peat for all horticultural use.

4.4 In order to establish a clear scope for the SEA it is necessary to review and develop an understanding of the environmental objectives contained within international and national plans and programmes that are of relevance to the ban on sales of peat for all horticultural use. The review is not, and cannot be, exhaustive. **Appendix B** identifies the relationship that the PPS's have with the development of the proposed ban on sales of peat for all horticultural use, and also shows how the environmental objectives have been taken into account during the preparation of the SEA Framework. The following sections of this chapter provide an overview by SEA topic area of the overarching objectives considered most

relevant in the context of the preparation of the proposed ban on sales of peat for all horticultural use.

Climatic Factors

4.5 Scotland's ambition on tackling climate change is set out in the *Climate Change (Scotland) Act 2009* ("the 2009 Act")[16]. Through this legislation, Scotland contributes to international (UN) efforts on climate change mitigation and adaptation. The 2009 Act creates the statutory framework for greenhouse gas (GHG) emissions reduction in Scotland and set targets for reduction in emissions of the seven Kyoto Protocol GHG by 80% by 2050, with an interim 2020 target of 42%, compared to the 1990/1995 baseline level.

4.6 *The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019*[17], amends the *Climate Change (Scotland) Act 2009*, sets targets to reduce Scotland's emissions of all greenhouse gases to net-zero by 2045 at the latest, with interim targets for reductions of at least 56% by 2020, 75% by 2030, 90% by 2040.

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

4.8 *The Climate Change Plan*[18] set out a vision that by 2032 Scotland will have reduced its emissions by 66% relative to 1990 baseline. Specifically, land use, land use change and forestry should sequester 6.7 $MtC0_2e$ by 2032. The Climate Change Plan outlined that by 2020, 50,000ha of peatland should have been restored, with a further 200,000ha over by 2030. However, following the introduction of the 2019 Act and the net-zero GHG emissions target for 2045, the Scottish Government has updated the *Climate Change Plan (CCPu)*[19].

4.9 The *update to the Climate Change Plan*[20] commits the Scottish government to providing a £250 million ten-year funding package to support the restoration of 250,000ha of degraded peatland by 2030.

4.10 The *Scottish Climate Change Adaptation Programme* (the Adaptation Programme)[21] addresses the impacts identified for Scotland in the *UK Climate Change Risk Assessment* (CCRA)[22], which has now been superseded by the UK Climate Risk Assessment 2022[23]. The Adaptation Programme sets out Scottish Ministers' objectives in relation to adaptation to climate change, their proposals and policies for meeting these objectives, and the period within which these proposals and policies will be introduced. The Programme also sets out the arrangements for wider engagement in meeting these objectives.

4.11 At the Paris Climate Conference (COP 21) in December 2015, 195 countries adopted the first ever universal, legally binding global climate deal. The *Paris Agreement* is a bridge between today's policies and climate-neutrality before the end of the century. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2ºC[24]. The deal also states that countries should aim for the even more ambitious target of 1.5ºC[25]. A number of other agreements were reached on key issues such as mitigation through reducing emissions, adaptation and loss and damage[26]. The Agreement entered into force on 4th November 2016[27].

4.12 A fairer, greener Scotland: Programme for Government 2021-22[28] sets out Scottish Government's plans to lead

[16] The Scottish Government (2009) Climate Change (Scotland) Act 2009 [online] Available at: http://www.legislation.gov.uk/asp/2009/12/contents (accessed 04/08/2022)

[17] Scottish Government (2019) The Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 [online] Available at: http://www.legislation.gov.uk/asp/2019/15/enacted (accessed 04/08/2022)

[18] Scottish Government (2018) Climate Change Plan [online] Available at: https://www.gov.scot/publications/scottish-governments-climate-change-plan-third-report-proposals-policies-2018-9781788516488/ (accessed 04/08/2022)

[19] Scottish Government (2020) Securing a green recovery on a path to net zero: climate change plan 2018-2032 – update [Online] Available at: https://www.gov.scot/publications/securing-green-recovery-path-net-zero-update-climate-change-plan-20182032/ (accessed 04/08/2022)

[20] Ibid.

[21] Scottish Government (2019) Climate Ready Scotland Scottish Climate Change Adaptation Programme 2019-2024 [online] Available at: https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/ (accessed 04/08/2022)

[22] UK Government (2017) UK Climate Change Risk Assessment [online] Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017 (accessed 04/08/2022)

[23] UK Government (2022) UK Climate Change Risk Assessment 2022. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf (accessed 10/08/2022)

[24] UNFCC (2016) The Paris Agreement [online] Available at: http://unfccc.int/paris_agreement/items/9485.php (accessed 04/08/2022)

[25] Ibid.

[26] Ibid.

[27] Ibid.

[28] Scottish Government (2021) A fairer, greener Scotland: Programme for Government 2021-22 [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/09/fairer-greener-scotland-programme-government-2021-22/documents/fairer-greener-scotland-programme-government-2021-22/fairer-greener-scotland-programme-government-2021-22/govscot:document/fairer-greener-scotland-programme-government-2021-22.pdf https://www.gov.scot/binaries/content/documents/govscot/publications

Scotland out of the pandemic whilst being steered by the longer-term vision in the National Performance Framework which sets out a vision for a country that is characterised by fairness and equality; that values and protects the environment; that has communities that are inclusive, empowered, resilient and safe; and where human rights are respected, protected and fulfilled.

4.13 Within the context of the global climate emergency, the Programme sets out that action will be required across to ensure that Scotland no longer contributes to global climate change by 2045 at the latest. One of the commitments outlined is to provide £22 million for the restoration of degraded peatlands in 2021-22 as part of the Government's £250 million commitment to restore 250,000 hectares by 2030.

4.14 Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme 2019-2024[29], sets out policies and proposals to prepare Scotland for the challenges that will be faced as the climate changes, as required by the Climate Change (Scotland) Act 2009. The Programme sets out to address the risks identified for Scotland in the UK Climate Change Risk Assessment 2017[30], which has now been superseded by the UK Climate Risk Assessment 2022[31].

Biodiversity, Flora and Fauna

4.15 Environmental protection objectives for biodiversity, flora and fauna are largely aimed at protecting habitats and species from damage and disturbance; principally through the identification and conservation of areas of particular value. The policies define a hierarchy of protection and include a range of international conventions, including the development of the *Aichi Targets for 2020*[32] and the *Convention on Biological Diversity*[33].

4.16 Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), were developed under the European Commission 'Habitats Directive' (Directive 92/43/EEC)[34] and the 'Birds Directive' (Directive 79/409/EEC)[35]. SACs are strictly protected sites designated under the Directive 92/43/EEC (the 'Habitats Directive') and form a European network of important, high quality conservation sites. The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 amended the Conservation (Natural Habitats, &c.) Regulations 1994 to ensure these designations continue to operate effectively following the UK's withdrawal from the EU. (The 1994 Regulations as amended therefore maintains the statutory protection these areas and species are provided). The majority of SPAs and SACs are also underpinned by SSSI legislation[36].

4.17 The designation of European protected species and identification of species and habitats as being the most threatened and requiring conservation action in the UK also demonstrates the prioritisation of conservation ambitions at European and national levels. *UK Biodiversity Action Plan,*[37] succeeded by the *UK Post 2010 Biodiversity Framework*[38] is a response to Article 6 of the Biodiversity Convention. It is a national strategy for the conservation of biological diversity, the sustainable use of biological resources and to contribute to the conservation of global biodiversity through all appropriate mechanisms.

4.18 The *2020 Challenge for Scotland's Biodiversity*[39] is Scotland's response to the 20 Aichi Targets set by the United

/strategy-plan/2021/09/fairer-greener-scotland-programme-government-2021-22/documents/fairer-greener-scotland-programme-government-2021-22/fairer-greener-scotland-programme-government-2021-22/govscot%3Adocument/fairer-greener-scotland-programme-government-2021-22.pdf (accessed 04/08/2022)

[29] Scottish Government (2019) Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme 2019-2024. Available at: https://www.gov.scot/publications/climate-ready-scotland-second-scottish-climate-change-adaptation-programme-2019-2024/ (accessed 04/08/2022)

[30] Committee on Climate Change (2016) UK Climate Change Risk Assessment 2017 Evidence Report. Available at: https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/ (accessed 04/08/2022)

[31] UK Government (2022) UK Climate Change Risk Assessment 2022. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf (accessed 10/08/2022)

[32] Convention on Biological Diversity (2011) Aichi Biodiversity Targets [online] Available at: https://www.cbd.int/sp/targets/default.shtml (accessed 04/08/2022)

[33] Convention on Biological Diversity (1993) Text of the CBD [online] Available at: https://www.cbd.int/convention/text/ (accessed 04/08/2022)

[34] European Commission, The Habitats Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm (accessed 04/08/2022)

[35] European Commission, The Birds Directive [online] Available at: http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm (accessed 04/08/2022)

[36] Scottish Government (undated) Natura 2000 [online] Available at: https://www.gov.scot/policies/biodiversity/natura-2000/ (accessed 04/08/2022)

[37] UK Government (1994) Biodiversity: The UK Action Plan [online] Available at: http://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf (accessed 04/08/2022)

[38] JNCC and Defra on behalf of the Four Countries' Biodiversity Group (2012) UK Post-2010 Biodiversity Framework [online] Available at: https://hub.jncc.gov.uk/assets/587024ff-864f-4d1d-a669-f38cb448abdc#UK-Post2010-Biodiversity-Framework-2012.pdf (accessed 04/08/2022)

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

Nations Convention on Biological Diversity, and the *European Union's Biodiversity Strategy for 2020*[40]. The 2020 Challenge supplements the 2004 *Scottish Biodiversity Strategy*[41] and focuses on the importance of healthy ecosystems and an outcome that *"Scotland's ecosystems are restored to good ecological health so that they provide robust ecosystem services and build on our natural capital".*

4.19 The *Scottish biodiversity strategy post-2020: statement of intent*[42] provides a commitment to protect at least 30% of the Scottish land area by 2030, in line with the 30x30 pledge. Likewise, the forthcoming Biodiversity Strategy (consultation draft released in 2022[43]) sets out a draft vision to substantially restore and regenerate biodiversity across Scottish land, water and seas.

4.20 The 2021 Programme for Government[44] committed to the deployment of Nature Networks. This commitment along with the commitments set out in the statement of intent will be key components in increasing ecological connectivity and restoration of nature more widely, helping to deliver the Scottish Biodiversity Strategy.

4.21 Beyond site and species designations there are also longer-term aspirations for enhancing biodiversity and geodiversity, improving landscape-scale ecological networks and addressing the impacts of climate change on the natural environment. *Scotland's Geodiversity Charter*[45] encourages the promotion and management of Scotland's geodiversity and better integration of geodiversity into policy and guidance,

Population and Human Health

4.22 Many existing environmental protection objectives are relevant to population and human health, either directly or indirectly. For example, the *Air Quality Standards (Scotland) Regulations 2010*[46], the *Air Quality (Scotland) Regulations 2000*[47], the *Air Quality (Scotland) Amendment Regulations 2002*[48] and the *Air Quality (Scotland) Amendment Regulations 2016*[49] help set out current objectives and requirements for air quality with clear relevance for human health.

Soil and Geology

4.23 The importance of soil as a resource is recognised internationally through the *European Commission's Thematic Strategy for Soil Protection*[50]. Nationally, the protection of prime quality agricultural land and peatlands is set out in the *Scottish Soil Framework*[51], *Scotland's National Peatland Plan*[52] and the *Scottish Government's Draft Peatland and Energy Policy Statement*[53].

4.24 The Scottish Soil Framework 2009[54] acknowledges the multiple functions of soils. The Framework includes a vision that soils be recognised as a vital part of our economy,

biodiversity-strategy-conservation-enhancement-biodiversity-scotland/ (accessed 04/08/2022)

[40]European Commission (2011) Our life insurance, our natural capital: an EU biodiversity strategy to 2020 [online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0244&from=EN (accessed 04/08/2022)

[41] Scottish Government (2004) Scottish Biodiversity Strategy – It's in your hands [online] Available at: https://www.gov.scot/publications/scotlands-biodiversity---its-in-your-hands/ (accessed 04/08/2022)

[42] Scottish Government (2020) Scottish biodiversity strategy post-2020: statement of intent [online] Available at: Summary and Purpose - Scottish biodiversity strategy post-2020: statement of intent - gov.scot (www.gov.scot) (accessed 03/11/2022)

[43] Scottish Government (2022) Scotland's Biodiversity Strategy: A Consultation [online] Available at: https://consult.gov.scot/environment-forestry/scottish-biodiversity-strategy-2022/ (accessed 03/11/2022)

[44] Scottish Government (2021) A Fairer, Greener Scotland: Programme for Government 2021-2022 [online] Available at: https://www.gov.scot/publications/fairer-greener-scotland-programme-government-2021-22/

[45] Scottish Geodiversity Forum, BGS, NatureScot (2018) Scotland's Geodiversity Charter 2018-2023 [online] Available at: https://scottishgeodiversityforum.files.wordpress.com/2019/06/scotlands-geodiversity-charter2018-2023.pdf (accessed 04/11/2022)

[46] The Air Quality Standards (Scotland) Regulations 2010 [online] Available at: http://www.legislation.gov.uk/ssi/2010/204/contents/made (accessed 04/08/2022)

[47] Scottish Government (2000) The Air Quality (Scotland) Regulations 2000 [online] Available at: http://www.legislation.gov.uk/ssi/2000/97/made (accessed 04/08/2022)

[48] Scottish Government (2002) The Air Quality (Scotland) Amendment Regulations 2002 [online] Available at: http://www.legislation.gov.uk/ssi/2002/297/introduction/made (accessed 04/08/2022)

[49] The Air Quality (Scotland) Amendment Regulations 2016 [online] Available at: http://www.legislation.gov.uk/sdsi/2016/9780111030837/contents (accessed 04/08/2022)

[50] European Commission (2015) Soil, The Soil Thematic Strategy [online] Available at: http://ec.europa.eu/environment/soil/three_en.htm (accessed 04/08/2022)

[51] The Scottish Government (2009) The Scottish Soil Framework [online] Available at: https://www.gov.scot/publications/scottish-soil-framework/ (accessed 04/08/2022)

[52] NatureScot (2015) Scotland's National Peatland Plan, Working for our Future [online] Available at: https://www.nature.scot/scotlands-national-peatland-plan-working-our-future (accessed 04/08/2022)

[53] The Scottish Government (2017) Draft Peatland and Energy Policy Statement [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2018/11/peatland-and-energy-draft-policy-statement/documents/draft-peatland-and-energy-policy-statement/draft-peatland-and-energy-policy-statement/govscot%3Adocument/Draft%2Bpeatland%2Band%2Benergy%2Bpolicy%2Bstatement.pdf (accessed 04/08/2022)

[54] Scottish Government (2009) The Scottish Soil Framework. Available at: https://www.gov.scot/publications/scottish-soil-framework/pages/10/ (accessed 04/08/2022)

environment and heritage, and be safeguarded for existing and future generations. It highlights that the most significant pressures are climate change and the loss of organic soil matter, and identifies 13 key soil outcomes, including reducing greenhouse gas emissions from soil.

4.25 Scotland's National Peatland Plan[55] sets out a vision to protect, manage and restore Scotland's peatlands to maintain their natural functions, biodiversity and other benefits.

4.26 Many lowland bogs used as extraction sites are designated for their 'Quaternary of Scotland' features under Geological Conservation Review (GCR) and/or Sites of Special Scientific Interest (SSSI) designations Geological sites receive protection through the designation of geological Sites of Special Scientific Interest (SSSIs) at the national level and at the international recognition through establishment of a network of Geoparks[56].

4.27 National Planning Policy (NPF3[57]) seeks to make responsible use of Scotland's natural assets, including soils. This is likely to be reflected in the forthcoming NPF4, with the draft version[58] specifically setting out aims to protect carbon rich soils and preserve and restore peat. The need for sustainable use of natural resources is also reflected in the policies of Local Development Plans.

Water

4.28 The condition of all Scottish water bodies is implemented by the Water Environment and Water Services (Scotland) Act 2003 as amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019 and reflecting the original Water Framework Directive requirements, as part of retained EU Law. The legislation governs objectives for rivers, lochs, transitional waters, coastal waters and groundwater resources. The Water Framework Directive requires assessment of both chemical and ecological status, alongside the requirement to consider the status of biodiversity as an indicator in determining water quality. The Water Environment (Controlled Activities) (Scotland) Regulations 2011, The Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013, and The Pollution Prevention and Control (Scotland) Regulations 2012 were all amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019 to ensure they retained effect post the UKs exist from the EU. These regulations collectively aim to improve the overall condition of water bodies.

Air

4.29 Scotland's air quality environmental protection objectives are largely derived from the *EC Air Quality Directive* (2008/50/EC)[59] and the *4th Air Quality Daughter Directive* (2004/107/EC)[60], via the *Air Quality Standards (Scotland) Regulations 2010*[61] which transpose these Directives into the Scottish context. The Scottish Government will ensure that EU standards and principles relating to emissions of air pollutants will continue to apply in Scotland now the UK has left the EU.

4.30 The Air Quality (Amendment etc.) (EU Exit) (No. 1) Regulations 2018 contain amendments to directly applicable EU legislation. The Air Quality (Amendments) (EU Exit) (No. 2) Regulations 2018 contain amendments to EU-derived domestic legislation.

4.31 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland[62] sets out long term air quality objectives and policy options to further improve air quality in the UK. The strategy focuses on tackling the key air pollutants to air in the

[55] Scottish Natural Heritage (2015) Scotland's National Peatland Plan: Working for our future. Available at: https://www.nature.scot/scotlands-national-peatland-plan-working-our-future (accessed 04/08/2022)

[56] NatureScot (undated) Geoparks [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/geopark (accessed 04/08/2022)

[57] Scottish Government (2014) Scotland's Third National Planning Framework [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/06/national-planning-framework-3/documents/00453683-pdf/00453683-pdf/govscot%3Adocument/00453683.pdf

[58] https://www.gov.scot/binaries/content/documents/govscot/publications/consultation-paper/2021/11/scotland-2045-fourth-national-planning-framework-draft/documents/scotland-2045-fourth-national-planning-framework/scotland-2045-fourth-national-planning-framework/govscot%3Adocument/scotland-2045-fourth-national-planning-framework.pdf

[59] The European Parliament and the Council of the European Union (2008) Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe [online] Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008L0050&from=en (accessed 04/08/2022)

[60] The European Parliament and the Council of European Union (2004) Directive 2004/107/EC of the European Parliament and of the Council relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air [online] Available at: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2005:023:0003:0016:EN:PDF (accessed 04/08/2022)

[61] The Air Quality Standards (Scotland) Regulations 2010 [online] Available at: http://www.legislation.gov.uk/ssi/2010/204/pdfs/ssi_20100204_en.pdf (accessed 04/08/2022)

[62] DEFRA, Scottish Executive, Welsh Assembly Government and DENI (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69336/pb12654-air-quality-strategy-vol1-070712.pdf (accessed 04/08/2022)

UK which include Particulate Matter (PM-PM10 and PM2.5), oxides of nitrogen (NOx), Ozone, sulphur dioxide, polycyclic aromatics hydrocarbons (PAHs), benzene, 1,3 – butadiene, carbon monoxide, lead and ammonia. It sets out specific national objectives that consider European Directive limits and target values for protecting human health.

Cultural Heritage and the Historic Environment

4.32 Existing cultural heritage objectives are set out in legislation including the Historic Environment (Amendment) Scotland Act 2011[63], Ancient Monuments and Archaeological Areas Act 1979 (as amended) [64] and Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997[65]. These objectives are focused primarily on the protection of valued sites and features, including townscapes (i.e. places, buildings and open spaces), buildings, archaeological sites, battlefields, wrecks and landscapes that have been recognised at the international, national and local levels through a hierarchy of designations.

4.33 Policies such as National Planning Framework (NPF3)[66] and Scottish Planning Policy (SPP)[67] aim to improve the quality of our settlements and built environment with a national level focus. These are complemented by the Historic Environment Strategy for Scotland (2014)[68] and the Historic Environment Policy for Scotland[69] which provide an overarching framework for historic environment policy in Scotland. Together, they emphasise the importance of preserving recognised sites, avoiding negative impacts on them and their wider setting, and contributing to their enhancement where appropriate. These key objectives also extend to taking into accounting of, and avoiding damage to or loss of, currently unknown archaeology.

Landscape and Geodiversity

4.34 Environmental protection objectives reflect the importance of all landscapes and also the need to help to improve those that have become degraded. The *European Landscape Convention*[70] lays the foundation for these objectives[71].

4.35 The establishment of key national programmes including the National Scenic Areas Programme[72] demonstrate a continuing commitment to protect the special qualities of nationally important landscapes and seascapes. The protection and enhancement of Scotland's landscapes are set out at the national level in SPP and are also referenced in relation to several national developments and under a natural, resilient place in NPF3.

4.36 NatureScot Natural Heritage Futures[73] sets out guidelines for sustainable management and use of Scotland's nature and landscaped until 2025. It aims to ensure utilisation of an integrated approach to work with Scotland's nature and land. It also provides basis for stakeholders' engagement. It consists of 21 documents that cover the whole of Scotland, as each of the areas has its own identity and distinct issues.

4.37 NatureScot Landscape Policy Framework[74] sets out to safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes to ensure that in the future they will contribute to the quality of life. The principles of approach are based on four propositions - Scotland's landscapes are a shared responsibility; all of

[63] The Historic Environment (Amendment) Scotland Act 2011 [online] Available at: http://www.legislation.gov.uk/asp/2011/3/contents/enacted (accessed 04/08/2022)

[64] Ancient Monuments and Archaeological Areas Act 1979 (as amended) [online] Available at: http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf (accessed 04/08/2022)

[65] Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 [online] Available at: http://www.legislation.gov.uk/ukpga/1997/9/contents (accessed 04/08/2022)

[66] The Scottish Government (2014) National Planning Framework 3 [online] Available at: http://www.gov.scot/Publications/2014/06/3539/0 (accessed 04/08/2022)

[67] The Scottish Government (2014) Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/5823 (accessed 04/08/2022)

[68] Historic Environment Scotland (2014) Our Place in Time: The Historic Environment Strategy for Scotland [online] Available at: http://www.gov.scot/Resource/0044/00445046.pdf (accessed 04/08/2022)

[69] Historic Environment Scotland (2019) Historic Environment Policy for Scotland [online] Available at: https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps// (accessed 31/10/2022)

[70] Council of Europe (2015) European Landscape Convention, ETS No. 176 [online] Available at: http://www.coe.int/en/web/conventions/full-list/-/conventions/treaty/176 (accessed 04/08/2022)

[71] EU exit has no direct impact on the European Landscape Convention, https://www.nature.scot/professional-advice/landscape/framework-landscape-policy/european-landscape-convention

[72] NatureScot (undated) National Scenic Areas [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/national-scenic-areas (accessed 04/08/2022)

[73] Scottish Natural Heritage (2002) Natural Heritage Futures: An Overview [online] Available at: https://www.nls.uk/e-monographs/2020/216666894.23.pdf (accessed 04/08/2022)

[74] NatureScot (2017) SNH's Landscape Policy Framework [online] Available at: https://www.nature.scot/professional-advice/landscape/framework-landscape-policy/naturescot-landscape-policy-framework (accessed 04/08/2022)

Scotland's landscapes deserve attention; Scotland's landscapes will continue to change; and Scotland's landscapes deserve greater care.

4.38 NatureScot has undertaken research on areas which are viewed as wildland[75]. This is based on four attributes: perceived naturalness of land cover; ruggedness of the terrain; remoteness from public roads or ferries; and lack of buildings, roads, pylons and modern artefacts. Areas with stronger wildland characteristics are more commonly found in the north and west, particularly areas of higher ground, although additional areas of wildland are present in other areas of Scotland[76].

Material Assets

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

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

4.41 The National Planning Framework 3 (NPF3)[77] is a long-term strategy for Scotland that identifies national developments and other strategically important development opportunities in Scotland. It sets out a vision for Scotland to be a successful and sustainable, low carbon, natural and resilient and a connected place. *Scottish Planning Policy (SPP)*[78] sets out national planning policies. It promotes the consistency in application of policies across Scotland and it relates to the preparation of development plans, the design of development, and the determination of planning applications and appeals. Scotland's fourth National Planning Framework is currently in preparation.

4.42 Getting the Best from Our Land: Scotland's Third Land Use Strategy 2021-2026[79] builds on the framework set out in Scotland's first and second Land Use Strategy from 2011 and 2016, respectively. The overall aim of this strategy is to continue use Scotland's land with long term objectives in mind and in a well-integrated and sustainable manner. In addition, this strategy focuses on the five-year period (2021-2026) and represents a programme of action supported by a suite of policies and proposals.

4.43 Making Things Last: A Circular Economy Strategy for Scotland[80] sets out priorities for moving towards a more circular economy with a long-term ambition. It articulates Scotland's aspirations and proposes a number of actions to take over the short to medium term and creates conditions for long term change. This strategy builds on the Zero Waste Plan (2010)[81] and the Safeguarding Scotland's Resources (2013)[82].

4.44 The Scottish Rural Development Programme (SRDP) 2021-2024[83] and forthcoming Agricultural Bill for Scotland (consultation draft[84]) will shape the way the way rural and agricultural land is managed. This is likely to cut across several themes include biodiversity, climate, soil and water, and landscape. In terms of peat, the SRDP sets out priorities for enhancing the quality of Scotland's soils and peatlands. Likewise, the draft Agricultural Bill sets out proposals for peatland restoration.

[75] NatureScot (undated) Landscape Policy: Mountains [online] Available at: https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-policy-wild-land (accessed 04/08/2022)
[76] Ibid
[77] Scottish Government (2014) National Planning Framework 3 [online] Available at: http://www.gov.scot/Publications/2014/06/3539/0 (accessed 04/08/2022)
[78] Scottish Government (2016) Scottish Planning Policy [online] Available at: http://www.gov.scot/Publications/2014/06/5823 (accessed 04/08/2022)
[79] Scottish Government (2021) Getting The Best From Our Land: Scotland's Third Land Use Strategy 2021-2026 [online] Available at: https://www.gov.scot/publications/scotlands-third-land-use-strategy-2021-2026-getting-best-land/documents/ (accessed 04/08/2022)
[80] Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: http://www.gov.scot/Resource/0049/00494471.pdf (accessed 04/08/2022)
[81] Scottish Government (2010) Zero Waste Plan [online] Available at: https://www.gov.scot/publications/scotlands-zero-waste-plan/ (accessed 04/08/2022)
[82] Scottish Government (2013) Safeguarding Scotland's Resources: blueprint for a more resource efficient and circular economy [online] Available at: https://www.gov.scot/publications/safeguarding-scotlands-resources-blueprint-more-resource-efficient-circular-economy/ (accessed 04/08/2022)
[83] Scottish Government (2021) Scottish Rural Development Programme (SRDP) 2021-2024 [online] Available at: https://www.gov.scot/publications/scottish-rural-development-programme---domestic-programme-2021/ (accessed 03/11/2022)
[84] Scottish Government (2022) Delivering our vision for Scottish agriculture – proposals for a new Agricultural Bill: consultation [online] Available at: https://www.gov.scot/publications/delivering-vision-scottish-agriculture-proposals-new-agriculture-bill/ (accessed 03/11/2022)

Chapter 5
Strategic Environmental Assessment findings

Introduction

5.1 This chapter of the Environmental Report sets out the assessment findings and the significant environmental effects of the proposed ban on sales of peat for horticultural use. The SEA considered the effects of banning the sale of peat for all horticultural use along with the environmental effects of using alternative growing media instead of peat. The alternative growing media considered in the assessment include:

- Wood-based
- Bark
- Coir
- Compost
- Anaerobic Digestate
- Cultivated Sphagnum Moss
- Bracken
- Loam
- Other mineral compounds including vermiculate, perlite, bentonite and other expanded clay minerals

5.2 Other alternative growing media are also available, however they tend to be used in small amounts, occupying small proportions of the retail and professional market share. An example is the use of shredded paper and cardboard which is now nearly complete phased out in all Local Authority collection sites due to contamination, imbalances in the carbon and nitrogen ratios and competition for recycled materials for other uses. Such alternatives have not been considered in the assessment.

Reasonable Alternatives

5.3 Part 14(2) of the 2005 Act requires that:

"The report shall identify, describe and evaluate the likely significant effects on the environment of implementing (a) the plan or programme; and (b) reasonable alternatives to the plan or programme, taking into account the objectives and the geographical scope of the Plan or Programme".

5.4 Therefore, the SEA must appraise not only the objectives and actions, but *"reasonable alternatives"* to these.

5.5 As outlined in the approach to the assessment, the reasonable alternatives explore five different scenarios of a ban on sale of peat. These are detailed below:

1. Ban on sale of peat for amateur horticultural use
2. Ban on sale of peat for professional horticultural use
3. Ban on sale of peat for all horticultural use
4. Ban on sale of all peat (maximum scenario - (does not include domestic, own use (not sold), peat cutting for heating purposes)
5. Ban on sale of all peat excluding peat for whisky production (slightly lesser scenario - includes exceptions for domestic peat cutting for heating purposes)

5.6 Scenarios 4 and 5 are considered as reasonable alternatives. Scenarios 1, 2 and 3 form the main basis of the assessment and represent three different temporal or phased scenarios, with the ban on sale for amateur horticulture expected to be introduced first (phase 1 - scenario 1), and then expanded to include the professional sector (phase 2 - scenario 2) so that peat sales are banned across the entire horticultural sector (phase 2 - scenario 3).

Assessment Findings

5.7 The following paragraphs provide a brief summary of the main assessment findings of the proposed ban on sales of peat for horticulture by SEA topic and includes the findings of the reasonable alternatives. A summary of the environmental effects for each of the proposed peat ban scenarios, and the effects of alternative growing media are set out in **Table 5.1** and **Table 5.2**, respectively. The full assessment tables for the ban on sales of peat for horticultural purposes, along with the assessment tables for alternative growing media and the reasonable alternatives are provided in **Appendix D.**

Summary of Effects by SEA topic

Climatic Factors

Amateur Sector

5.8 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to climatic factors.

5.9 It is noted that peat extracted in Scotland for amateur horticulture accounts for 58% of all peat extracted for horticulture (the remaining 42% is for professional horticulture).

5.10 The ban on sales will likely result in less need for peat extraction in Scotland and other countries which export peat to Scotland, and subsequently reduce the amount of peat-derived carbon released into the atmosphere. Protecting these peat resources from exploitation, will reduce damage to peat resources, and may help maximise their rates of carbon sequestration. The ban will also reduce emissions associated with the transportation of peat for amateur horticultural use, notably imported and exported peat.

5.11 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[85] minor negative effect in relation to climatic factors. The use of alternative growing media therefore will dampen the positive effects previously identified due to the release of greenhouse gas emissions associated with their processing and transportation. This is expected in the short term.

5.12 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales. Furthermore, the use of other minerals and clays is expected to increase slightly. Therefore, an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular, with other minerals and clays also becoming increasingly more popular. The increased use of cultivated sphagnum moss and bracken (instead of wood, bark and coir which are most common currently) is expected to further minimise the negative effects on climatic factors associated with processing and transportation of alternative growing media. However, the greater use of minerals and clays may increase the adverse effects associated with transportation and processing. Overall, the use of these growing media in the future is expected to have negligible effects on climatic factors, and when considered alongside the positive effects from a ban on sale of peat, will result in minor positive effects overall.

5.13 Despite the dampening of effects due to the minor negative effects associated with current use of growing media (bark, wood and coir), overall, a **minor positive** effect is identified in relation to climatic factors. This minor positive effect will be enhanced in the medium- and longer-term as other alternative growing media become more readily available. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

[85] Based on current usage weighting

Professional Sector

5.14 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.15 As with the amateur sector, the use of alternative growing media is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. In addition, it is anticipated that there will be a slight increase in the use of minerals and clays as growing media. Overall, this will help minimise negative effects associated with the processing and transportation of other alternative growing media, however some negative effects may arise from the extraction, processing and transportation of minerals and clays.

5.16 Overall, a **minor positive** effect is identified in relation to climatic factors. This minor positive effect will be enhanced in the medium- and longer-term as other alternative growing media become more readily available. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.17 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in significant positive effects on climatic factors. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, noting that 94% of peat extracted in Scotland is for horticultural purposes.

5.18 However, the increased use of alternative growing media, particularly in the shorter-term (up to 2025 after which there is expected to be better availability of alternatives) will dampen these positive effects. This is due to the energy intensive processing and transportation required for the alternatives (notably wood, bark and coir). Considering the effects of alternative growing media, a minor positive effect is identified overall in the short-term.

5.19 In the medium and longer term, as alternatives such as compost, anaerobic digestate, cultivated sphagnum moss and bracken become more viable, these negative effects will reduce, and the overall effects of the ban (and use of alternatives) will be significantly positive. The ban on sale of all peat would have marginally greater positive effects compared to the maximum case scenario.

Reasonable Alternatives

5.20 Two other reasonable alternative scenarios were considered for the ban on sales of peat:

- A ban on sale of all peat (maximum case scenario)
- The ban on sale of peat for all sectors excluding the domestic whisky industry (slightly lesser case compared to the maximum case)

5.21 Both reasonable alternative scenarios also allow for domestic peat cutting to continue under the assumption that the peat is not sold on.

5.22 Significant positive effects are identified in relation to climatic factors as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. Therefore, there will be a reduction in the release of peat-derived carbon into the atmosphere, and associated transportation emissions. Furthermore, their protection may help enhance carbon sequestration rates, having significant positive effects on climatic factors overall. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky. Therefore, there is potential for continued negative effects in relation to climatic factors, depending on peat sales for domestic whisky production.

5.23 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Biodiversity, Flora and Fauna

Amateur Sector

5.24 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to biodiversity.

5.25 The ban on sales of peat (for the amateur horticultural sector) will likely result in less need for peat extraction in Scotland and countries which export peat to Scotland. As peatlands support a variety of different species, any reduced extraction may have positive effects for biodiversity, as well as helping maintain a more favourable condition of the peatland.

5.26 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural

sector, which are identified as having a combined[86] minor positive effect in relation to biodiversity. The use of alternative growing media therefore will further enhance the positive effects previously identified, as the use of these alternatives could have positive effects on biodiversity by regulating soil temperatures and moisture content. This is expected in the short term.

5.27 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales. Furthermore, the use of other minerals and clays is expected to increase slightly. Therefore, an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular, with other minerals and clays also becoming increasingly more popular albeit to a lesser extent. The increased use of compost, anaerobic digestate and minerals and clays is expected to have increased negative effects on biodiversity due to the loss of habitats, or disturbance from extraction, emissions or noise. Overall, the use of these growing media in the future (medium-term) is expected to have negligible effects on biodiversity when considered alongside other alternatives. When considered alongside the positive effects from a ban on sale of peat, this will result in minor positive effects on biodiversity overall.

5.28 In the longer term (2028 onwards), cultivated sphagnum moss and bracken are expected to further enhance the positive effects on biodiversity as both these alternatives will help protect biodiversity by sustainably managing and protecting habitats. These effects are mixed with minor negative effects for bracken as the management and clearing of bracken may have adverse effects on biodiversity which rely on bracken for survival. Furthermore, the extraction of minerals and clays may also have adverse effects by damaging habitats. Overall, positive effects are expected from the use of these alternatives and will result in minor positive effects on biodiversity when considered alongside the ban on sale of peat.

5.29 Overall, a **minor positive** effect is identified in relation to biodiversity. This minor positive effect will be enhanced in the longer-term as other alternative growing media become more readily available. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.30 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.31 As with the amateur sector, the use of alternative growing media is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. In addition, it is anticipated that there will be a slight increase in the use of minerals and clays as growing media. Overall, this will help maximise positive effects on biodiversity, particularly in the longer-term. However, some negative effects may arise from the extraction, processing and transportation of minerals and clays.

5.32 Overall, a **minor positive** effect is identified in relation to biodiversity. This minor positive effect will be enhanced in the longer-term as other alternative growing media become more readily available. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.33 Extending the ban in the future to include the ban on sales of peat for both amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced positive effects on biodiversity. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat. This will help protect peatland and keep it in favourable condition.

5.34 Furthermore, the increased use of alternative growing media, particularly in the shorter-term (up to 2025) and longer-term (2028 onwards) will enhance these positive effects. This is by improving soil quality through their use and managing habitats (bracken) and protecting habitats (cultivated sphagnum moss) throughout the landscape. Considering the effects of alternative growing media across different timescales, minor positive effects are identified overall. These will be particularly enhanced in the short and long-term.

Reasonable Alternatives

5.35 Significant positive effects are identified in relation to biodiversity as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. This will likely result in significant positive effects on biodiversity by protecting peatlands, which are an important habitat for many species, and could also result in the reintroduction of

[86] Based on current usage weighting

important species which had been lost through peatland degradation. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky as there is potential for continued negative effects in relation to biodiversity, depending on the amount of peat sales for domestic whisky production.

5.36 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Population and Human Health

Amateur Sector

5.37 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to population and human health.

5.38 The ban on sales of peat (for the amateur horticultural sector) will likely reduce transport-related air pollution of peat products, which would have subsequent benefits for population and human health. These positive effects are enhanced as protecting peatland would provide more ecosystem services (e.g. water regulation and natural flood protection) which also have positive effects for population and human health.

5.39 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[87] minor negative effect in relation to population and human health due to implications of reductions in air quality arising from the extraction, processing and transportation of growing media, and in the case of harvesting bracken, the potential health implications of being around a plant which is toxic and carcinogenic. Some positive effects are mixed with these negative effects for certain alternatives. For example, the biogas produced during anaerobic digestion can be used as renewable energy which may help improve security of energy supply and reduce fuel poverty. Likewise, controlling bracken can improve recreational access in the landscape. In the event that alternative growing media performs worse than expected, adverse effects on population may arise due to reduced participation in gardening as a hobby and recreational activity. The use of alternative growing media therefore will dampen the positive effects previously identified from the reduced use of peat, resulting in mixed effects overall. This is expected in the short-term where the most popular alternatives (wood-based and coir) may require extensive processing and transportation.

5.40 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales. Furthermore, the use of other minerals and clays is expected to increase slightly, therefore an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular, with other minerals and clays also becoming increasingly more popular albeit to a lesser extent. The increased use of compost and anaerobic digestate is expected to have mixed effects, and minerals and clays minor negative effects. Overall, the use of these growing media in the future (medium-term) is expected to have negligible effects on population when considered alongside other alternatives and will result in reduced transport related emissions and pollution due to be being locally produced. When considered alongside the minor positive effects from a ban on sale of peat, this will result in minor positive effects on population overall.

5.41 In the longer term (2028 onwards), increased use of cultivated sphagnum moss and bracken is expected to dampen the positive effects on population. This is because bracken is toxic and carcinogenic. However, the positives of these alternatives outweigh the negatives and overall, minor positive effects are expected from the use of these alternatives and will result in enhanced minor positive effects on population and human health when considered alongside the ban on sale of peat.

5.42 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to population and human health in both the short and medium-term. In the long term, alternatives are expected to have more of a positive effect, and result in enhanced positive effects overall. However, all the effects have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.43 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.44 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer

[87] Based on current usage weighting

term. Use of minerals and clays is expected to increase slightly over this period too. In the event that alternative growing media performs worse than expected, adverse effects on population may arise due to reduced sale of growing media, and associated implications for businesses.

5.45 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to population and human health in both the short and medium-term. In the long term, alternatives are expected to have more of a positive effect, and result in enhanced positive effects overall. However, the mixed effects have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.46 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced the minor positive effects on population. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will likely reduce transport-related air pollution and associated respiratory illnesses, and increase ecosystem services, which would have subsequent benefits for population and human health.

5.47 However, a substantial increase in use of alternative growing media across the entire horticultural sector will dampen these effects, resulting in the overall effect being mixed (minor positive and minor negative). This is due to the release of air pollution during extraction, processing and transportation, along with the fact that bracken can be toxic and carcinogenic.

Reasonable Alternatives

5.48 Mixed (minor positive and minor negative) effects are identified in relation to population and human health as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. Therefore, there will be a reduction in the release of peat-derived carbon emissions and associated transportation emissions which could improve respiratory health. Furthermore, their protection may help enhance the ecosystem services peatlands provide such as water regulation which could have further benefits for population. However, these effects are mixed with negative as the ban may adversely impact certain people working in certain industries such as horticulture and whisky production (for the ban on sale of all peat). It would also result in the reduced use of peat sold commercially for heating purposes, resulting in potential increases in fuel poverty.

5.49 The mixed effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector only.

Soil

Amateur Sector

5.50 The ban on sale of peat for the amateur horticultural sector is expected to have significant positive effects in relation to soil.

5.51 The ban on sales of peat (for the amateur horticultural sector) will likely reduce the need for peat extraction, having significant positive effects for soil resources in Scotland and countries which export peat to Scotland. The ban will therefore help protect these important soil resources.

5.52 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[88] minor positive effect in relation to soil due to their ability to improve the physical, chemical and biological properties of soil. The use of alternative growing media therefore will further enhance the positive effects previously identified. This is expected across the short-, medium- and long-term.

5.53 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. Over this time period, use of minerals and clays in combination with other materials for growing media is also expected to increase, albeit to a lesser extent. The increased use of compost and anaerobic digestate is expected to have increased positive effects due to displacing the use of harmful chemical fertilisers and improving soil condition. However, the extraction of minerals and clays would have adverse effects on soil quality. Overall, the use of these growing media in the future (medium-term) is expected to have minor positive effects on soil when considered alongside other alternatives. When considered alongside the significant positive effects from a ban on sale of peat, this will result in a further enhanced significant positive effect on soil overall.

5.54 In the longer term (2028 onwards), cultivated sphagnum moss and bracken is expected to further enhance the positive

[88] Based on current usage weighting

effects on soil. Bracken helps provide protective cover on steep slopes susceptible to soil erosion, and cultivated sphagnum moss helps minimise disturbance to soil due to its ability to be farmed at a smaller scale. Overall, positive effects are expected from the use of these alternatives and will result in significant positive effects on soil when considered alongside the ban on sale of peat.

5.55 Overall, a **significant positive** effect is identified in relation to soil. This significant positive effect will be enhanced in the short-, medium and long-term with the increased use of other alternative growing media. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.56 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.57 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. This will help maximise positive effects on soil in the short to long term. Some adverse effects may arise from the slight predicted increase in use of minerals and clays in the medium to long term.

5.58 Overall, a **significant positive** effect is identified in relation to soil. This significant positive effect will be enhanced in the short-, medium and long-term with the increased use of other alternative growing media. However, the positive effects will have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.59 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced significant positive effects on soil. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will help protect peatland as an important soil resource.

5.60 Furthermore, a substantial increase in use of alternative growing media across the entire horticultural sector will further enhance these effects, throughout the short- to long-term.

Reasonable Alternatives

5.61 Significant positive effects are identified in relation to soil as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. Therefore, more areas of peatland will remain intact and undisturbed, helping to provide a carbon store and sufficient nutrients to support peatland vegetation. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky, as sale and extraction for these purposes could continue to have adverse effects on soil resources. However, this is dependent on peat sales for domestic whisky production.

5.62 The significant positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector, due to the greater level of peatland protection. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Water

Amateur Sector

5.63 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to water.

5.64 The ban on sales of peat (for the amateur horticultural sector) will likely reduce the need for peat extraction, and subsequently enhance the ecosystem services peatland provided, notably in relation to water. Protection of peatlands will therefore help clean and store water, protect water quality and better regulate runoff by absorbing excess water.

5.65 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[89] minor negative effect in relation to water due to their required water usage during processing, potential for contamination of watercourses (e.g., sediment from loam excavation, and leachate pollution). Some positive effects are also identified due to reduced need for chemical fertilisers, however when all alternatives are considered the overall effect is minor negative. The use of alternative growing media therefore will dampen the positive effects previously identified from the reduced use of peat, resulting in mixed effects overall. This is expected in the short-term where the most popular

[89] Based on current usage weighting

alternatives (wood-based and coir) will require extensive water use during processing.

5.66 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. Use of minerals and clays are also expected to increase over this period, albeit to a lesser extent. The increased use of compost and anaerobic digestate is expected to have mixed effects due to reducing use of chemical fertilisers but recognising that poor management of leachate may have adverse effects on water quality. Pollution of watercourses from extraction of minerals may also occur. Overall, the use of these growing media in the future (medium-term) is expected to have negligible effects on water when considered alongside other alternatives. When considered alongside the minor positive effects from a ban on sale of peat, this will result in minor positive effects on water overall.

5.67 In the longer term (2028 onwards), increased use of cultivated sphagnum moss, bracken and clays and minerals is expected to dampen the positive effects on water. This is because cultivating sphagnum moss is water intensive, and bracken has low water retention levels. Extraction of minerals may also result in pollution of watercourses. Overall, minor negative effects are expected from the use of these alternatives and will result in a mixed (minor positive and minor negative) effect on water when considered alongside the ban on sale of peat.

5.68 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to water. This mixed effect will have greater negative effects in the short- and long-term and will have greater positive effects in the medium term. However, the mixed effects have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.69 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.70 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. Slight increases in use of minerals and clays are also predicted over this period. These mixed effects identified will have greater negative effects in the short- and long-term and will have greater positive effects in the medium term.

5.71 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to water. However, the mixed effects have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.72 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced minor positive effects on water. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will help protect peatland and help clean and store water, protect water quality and better regulate runoff by absorbing excess water.

5.73 However, a substantial increase in use of alternative growing media across the entire horticultural sector will dampen these effects, resulting in the overall effect being mixed (minor positive and minor negative). This is due to the extensive water use required during processing (e.g. wood fibre and coir), and potential pollution of watercourses which could occur (e.g., leachate from composting, or sediment from mineral, clay and loam extraction).

Reasonable Alternatives

5.74 Minor positive effects are identified in relation to water as both scenarios will result in a reduction in the sale of peat, and likely reduction in peat extraction. This therefore will help maintain and enhance the ecosystem services that peatlands provide, particularly in relation to improving water quality, regulating runoff and absorbing excess water. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky. Therefore, there is potential for continued negative effects in relation to water arising from continued peat sales and extraction, but this is dependent on the location of peat extraction and the volume of peat sales for domestic whisky production.

5.75 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Air

Amateur Sector

5.76 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to air.

5.77 The ban on sales of peat (for the amateur horticultural sector) will likely reduce the need for peat extraction, and subsequent transportation of peat. Reductions in emissions released from peat itself and from reduced need for transportation of peat products is therefore expected to have minor positive effect in relation to air quality.

5.78 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which is identified as having a combined[90] minor negative effect in relation to air, primarily due to emissions and pollution released during the energy-intensive processing and transportation of alternative growing media. This is particularly important for bark and coir, which tend to be transported from further afield (bark from Europe and coir from tropical regions). The use of alternative growing media therefore will dampen the positive effects previously identified from the reduced use of peat, resulting in minor negative effects overall. This is expected in the short-term where the most popular alternatives (including wood fibre, bark and coir) will require extensive processing and transportation.

5.79 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. Slight increases in use of minerals and clays are also predicted over this period. The increased use of compost is expected to have a negligible effect on air quality, as although processing could result in the release of dust, bacteria and fungi into the air, this is expected to be managed through the permitting system. Due to anaerobic digestions requirements to operate 24 hours a day, transportation of feedstock and dust produced on site may have adverse effects on air quality. Further adverse effects may arise from mining activities for minerals and clays. Overall, the use of these growing media in the future (medium-term) is expected to have negligible effects on air when considered alongside other alternatives. When considered alongside the minor positive effects from a ban on sale of peat, this will result in minor positive effects on air overall.

5.80 In the longer term (2028 onwards), increased use of cultivated sphagnum moss and bracken is expected to have mixed effects on air. Whilst cultivating sphagnum moss will result in improvements to air quality by preventing the release of emissions from peatland, the harvesting of bracken is energy intensive and will result in transport-related pollution. Overall, when considered alongside other alternatives, negligible effects are expected from the use of alternative growing media and will result in a minor positive effect on air when considered alongside the ban on sale of peat.

5.81 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to air. This mixed effect will have greater negative effects in the short-term, but as other alternative growing media becomes more viable in the medium and long-term, negative effects would reduce and an overall minor positive effect is identified. However, these effects have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.82 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.83 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. Use of minerals and clay is also expected to increase slightly over this period. These mixed effects identified will have greater negative effects in the short- and long-term and will have greater positive effects in the medium term.

5.84 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to air. This mixed effect will have greater negative effects in the short-term, but as other alternative growing media becomes more viable in the medium and long-term, negative effects would reduce and an overall minor positive effect is identified. However, the mixed effects have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.85 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced mixed (minor positive and minor negative) effects on air. The positive effects associated with the ban on sale of

[90] Based on current usage weighting

peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, and associated transport of peat products.

5.86 However, a substantial increase in use of alternative growing media across the entire horticultural sector will dampen these effects, resulting in the overall effect being mixed (minor positive and minor negative). This is primarily due to emissions and pollution released during the energy-intensive processing and transportation of alternative growing media.

Reasonable Alternatives

5.87 Minor positive effects are identified in relation to air quality as both scenarios will result in a reduction in the sale of peat and will likely reduce transport-related emissions and pollution associated with transport of peat-products. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky as there is potential for continued negative effects in relation to air quality, due to continued sale and transportation of peat for domestic whisky production.

5.88 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Cultural Heritage and the Historic Environment

Amateur Sector

5.89 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to cultural heritage and the historic environment.

5.90 The ban on sales of peat (for the amateur horticultural sector) will likely reduce the need for peat extraction, having minor positive effects on cultural heritage. This is because peatlands are culturally significant and may be important to the setting of heritage assets, particularly in the lowlands.

5.91 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[91] negligible effect in relation to cultural heritage. This is because most alternatives are a waste or by-product of another industry (e.g., forestry management, coconut industry, sawmills etc.) with limited chance of adversely affecting the historic environment. The use of alternative growing media is unlikely to affect the previously identified effects arising from the reduced sale of peat. This is expected in the short-term, when bark, coir and wood-based alternatives which are predominantly waste products are expected to be most popular.

5.92 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. A slight increase it the use of minerals and clays is also expected over this period. The increased use of compost, anaerobic digestate and minerals and clays is expected to have minor negative effects on cultural heritage due to inappropriate siting and/or design of composting and anaerobic digester facilities, and potential for disturbance to heritage assets during mineral extraction. Overall, the use of these growing media in the future (medium-term) is expected to have minor negative effects on cultural heritage when considered alongside all other alternative growing media. When considered alongside the minor positive effects from a ban on sale of peat, this will result in mixed minor effects on cultural heritage overall.

5.93 In the longer term (2028 onwards), cultivated sphagnum moss and bracken is expected to have negligible effects on the historic environment. Some adverse effects may arise due to extraction of minerals. Overall, negligible effects are identified, and therefore will not influence the positive effects on cultural heritage as identified with the reduction in sale (and associated extraction) of peat.

5.94 Overall, a **minor positive** effect is identified in relation to cultural heritage. However, the positive effects across all timescales will have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes, and effects on the historic environment will depend largely on the location and scale of extraction.

Professional Sector

5.95 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.96 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer

[91] Based on current usage weighting

term. A slight increase it the use of minerals and clays is also expected over this period. Most alternative growing media will have negligible effects on cultural heritage, however the increased use of compost and anaerobic digestate, and minerals may have adverse effects on heritage assets.

5.97 Overall, a **minor positive** effect is identified in relation to cultural heritage. However, the positive effects across all timescales will have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes, and effects on the cultural heritage will depend largely on the location and scale of extraction.

All Horticulture

5.98 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced minor positive effects on cultural heritage. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will help protect culturally important peatlands from becoming degraded, and help prevent adverse effects on heritage assets where peatland is important to its setting.

5.99 An increase in use of alternative growing media across the entire horticultural sector is not expected to affect cultural heritage assets, particularly in the short and long-term. There is potential for adverse effects to arise in the medium-term due to the development of commercial scale composting and AD facilities which could have adverse effects on the setting of heritage assets. Likewise, the extraction of minerals and clay may also adversely affect heritage assets.

Reasonable Alternatives

5.100 Minor positive effects are identified in relation to cultural heritage as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. Reduced extraction, particularly in lowland bogs will help avoid negative effects on the historic environment, noting that peatlands are culturally significant and can be important to the setting of some heritage assets. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky. This is because there is potential for continued negative effects in relation to cultural heritage, depending on the volume of peat sales (and extraction) for domestic whisky production.

5.101 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Landscape and Geodiversity

Amateur Sector

5.102 The ban on sale of peat for the amateur horticultural sector is expected to have minor positive effects in relation to landscape.

5.103 The ban on sales of peat (for the amateur horticultural sector) will likely reduce the need for peat extraction, having minor positive effects on landscape by helping to maintain the 'wilderness' and preventing further areas of peatland from becoming degraded.

5.104 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[92] negligible effect in relation to landscape. This is because most alternatives are a waste or by-product of another industry (e.g., forestry management, coconut industry, sawmills etc.). However, the use of minerals and clays may adversely affect landscape because of the potential impacts of extraction on the landscape. Overall, the use of alternative growing media is unlikely to affect the previously identified effects arising from the reduced sale of peat. This is expected in the short-term, when bark, coir and wood-based alternatives are expected to be most popular.

5.105 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. Over the medium-long term, a slight increase in the use of clays and minerals is expected. The increased use of compost and anaerobic digestate is expected to have negative effects on the landscape character due to inappropriate siting and/or design of composting and anaerobic digester facilities. Likewise, mining and extractive operations may have negative effects on the landscape. Overall, the use of these growing media in the future (medium-term) is expected to have negligible effects on landscape when considered alongside all other alternative growing media. When considered alongside the minor positive effects from a ban on sale of peat, this will result in minor positive effects on landscape overall.

[92] Based on current usage weighting

5.106 In the longer term (2028 onwards), cultivated sphagnum moss and bracken is expected to further enhance the positive effects on landscape. This is because the management and control of bracken will prevent its spread across the landscape, and cultivating sphagnum moss will help maintain and protect sphagnum mosses in peatlands from extraction. However, mining and extractive operations may have negative effects on the landscape. Overall, positive effects are expected from the use of these alternatives and will result in enhanced positive effects on landscape when considered alongside the ban on sale of peat.

5.107 Overall, a **minor positive** effect is identified in relation to landscape. This will be further enhanced in the long-term with the increased use of bracken and cultivated sphagnum moss as an alternative growing media. However, the positive effects across all timescales will have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes, and effects on the landscape will depend largely on the location and scale of extraction.

Professional Sector

5.108 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.109 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. This will help enhance positive effects on landscape, particularly in the long term. Use of clays and minerals will increase slightly over this period, having potential negative effects due to extraction of material.

5.110 Overall, a **minor positive** effect is identified in relation to landscape. This will be further enhanced in the long-term with the increased use of bracken and cultivated sphagnum moss as an alternative growing media. However, the positive effects across all timescales will have **uncertainty** attached to them as a ban on sales of peat for professional horticulture would still allow the sale of peat for other purposes, and effects on the landscape will depend largely on the location and scale of extraction.

All Horticulture

5.111 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in enhanced minor positive effects on landscape. The positive effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will help protect peatland from becoming degraded and by helping to maintain the sense of 'wilderness' across these landscapes.

5.112 Furthermore, a substantial increase in use of alternative growing media across the entire horticultural sector will further enhance these effects. Alternative growing media is expected to have negligible effects in the short-term. In the medium-term, effects of alternatives are more likely to be negative due to the landscape and visual impact of commercial composting and AD facilities, and mineral extraction. In the longer term, positive effects are more likely for alternative growing media (cultivated sphagnum moss and bracken) due to their role in helping to protect the landscape through sustainable management.

Reasonable Alternatives

5.113 Minor positive effects are identified in relation to landscape as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction. Reduced extraction will help protect areas of peatland from becoming degraded and therefore will have positive effects on landscape character by maintaining the sense of wilderness. Uncertainty is attached to the second scenario which excludes peat sales for domestic whisky. This is because there is potential for continued negative effects in relation landscape, depending on the volume of peat sales (and extraction) for domestic whisky production.

5.114 The positive effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector. The maximum case scenario would have marginally greater effects than those for the scenario excluding peat for whisky.

Material Assets

Amateur Sector

5.115 The ban on sale of peat for the amateur horticultural sector is expected to have mixed (minor positive and minor negative) effects in relation to material assets.

5.116 The ban on sales of peat (for the amateur horticultural sector) will likely maintain and enhance the ecosystem services that peatlands provide, having positive effects on material assets by reducing water treatment costs etc. However, banning the sale of peat products in the amateur horticultural sector could have adverse effects on the amateur horticultural industry due to loss of income from peat-derived product sales. Furthermore, banning peat sales for this

industry may cause peat extractors to extract for other uses allowed under the scope of the ban.

5.117 The ban on sale of peat will encourage the increased use of alternative growing media across the amateur horticultural sector, which are identified as having a combined[93] mixed (minor positive and minor negative) effect in relation to material assets. Minor positive effects are identified as many of the alternative growing media are the by-product of other industries, and therefore their use is promoting a circular economy and preventing waste going to landfill. However, these are mixed with minor negative effects as the alternative growing media could result in conflicts over land use and may also require the use of other substances (e.g., nitrogen fertiliser) to be effective. Furthermore, some alternatives, such as minerals, clay and loam are non-renewable resources.

5.118 The use of alternative growing media therefore will further intensify the mixed effects previously identified from the reduced use of peat, resulting in mixed effects overall. This is expected in the short-term where the most popular alternatives are by-products but are also in demand for other industries and have variable quality, but help improve water efficiency through their use.

5.119 In the medium term (2024-2028), compost and anaerobic digestate is expected to become more viable at larger scales, and an increase in the use of these growing media is expected. Likewise, in the longer term (2028 onwards), cultivated sphagnum moss and bracken as growing media are expected to become more popular. The increased use of compost and anaerobic digestate is expected to have mixed effects due to promoting a circular economy, but also may result in conflicts in resource management and the high start-up costs associated with it. Negative effects are exacerbated by the use of natural resources when extracting clay and minerals. Overall, the use of these growing media in the future (medium-term) is expected to have mixed minor effects on material assets when considered alongside other alternatives. When considered alongside the mixed minor effects from a ban on sale of peat, this will result in mixed effects on material assets overall.

5.120 In the longer term (2028 onwards), increased use of cultivated sphagnum moss and bracken is expected to have negligible effects on material assets overall. This is because cultivating sphagnum moss can be done at a variety of scale and helps improve water efficiency by retaining water well. Bracken has mixed (significant negative and minor positive) effects due to being challenging and expensive to harvest, but also being found extensively throughout the landscape in the UK which would limit transportation distances. Although the slight increase in use of clay and minerals is likely to have negative effects in relation to material assets, overall, negligible effects are expected from the use of these alternatives. However they will result in slightly increasing the scale of the positive and negative effects on material assets when considered alongside the ban on sale of peat.

5.121 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to material assets across the short, medium and long term. However, all the effects have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

Professional Sector

5.122 Independently, the ban on sale of peat for professional horticultural purposes will have the same effects identified in relation to the ban on sales for the amateur horticultural sector. This is in terms of the reduction in peat use, and increased use of alternative growing media.

5.123 As with the amateur sector, the use of alternative growing media in the professional sector is expected to switch more towards compost and anaerobic digestate in the medium term, and cultivated sphagnum moss and bracken in the longer term. Use of minerals and clays is also expected to increase slightly.

5.124 Overall, a **mixed (minor positive and minor negative)** effect is identified in relation to material assets across the short, medium and long term. However, all the effects have **uncertainty** attached to them as a ban on sales of peat for amateur horticulture would still allow the sale of peat for other purposes.

All Horticulture

5.125 Extending ban in the future to include the ban on sales of peat for amateur and professional horticultural purposes (i.e., banning sale of peat for *all* horticulture), will result in further increase the scale of the positive and negative effects on material assets. The positive and negative effects associated with the ban on sale of peat for amateur horticulture will be further enhanced by extending the ban to the professional sector too. This is due to the vast reduction in sale (and likely extraction) of peat, which will likely help enhance ecosystem services provided by peatland. However, the ban on sale of peat in horticulture could have adverse effects on the horticultural industry due to lack of income.

5.126 A substantial increase in use of alternative growing media across the entire horticultural sector will further increase the scale of these positive and negative effects,

[93] Based on current usage weighting

resulting in the overall effect being mixed (minor positive and minor negative), albeit with stronger effects.

Reasonable Alternatives

5.127 Mixed (minor positive and minor negative) effects are identified in relation to material assets as both scenarios will result in a large reduction in the sale of peat, and likely reduction in peat extraction, which could have positive effects in terms of the ecosystem services these peatlands could continue to provide. However, banning the sale of all peat may have adverse effects on industries which currently utilise peat, including the horticultural sector, whisky industry etc. In the second lesser scenario which excludes peat for domestic whisky from the ban, negative effects are still expected on the horticultural sector.

5.128 The mixed positive and negative effects of both reasonable alternative scenarios would be greater than those of the scenarios which see a ban on the sale of peat for the amateur, professional and entire horticultural sector only. The ban on sale of all peat would have marginally greater positive effects compared to the maximum case scenario due to the protection of more peatland, however would also likely have greater adverse effects due to negative effects on the whisky production sector.

5.129 Table 5.1 and **Table 5.2** below provide an overview of the environmental effects identified in relation to each of the proposed peat ban scenarios and the alternative growing media considered in this assessment, respectively. The full assessment tables are provided in **Appendix D.**

Table 5.1: Summary of likely effects of peat ban scenarios

	Climatic Factors	Population and Human Health	Air	Soil	Water	Biodiversity	Cultural Heritage	Landscape	Material Assets
Ban on sale of all peat (maximum case scenario)	++	+/-	+	++	+	++	+	+	+/-
Ban on sale of all peat excluding peat for whisky production (includes exceptions for domestic peat cutting for heating purposes)	++?	+?	+?	++?	+?	++?	+?	+?	+/-
Ban on sale of peat for amateur horticultural use	+?	+?	+?	++?	+?	+?	+?	+?	+/-?
Ban on sale of peat for professional horticultural use	+?	+?	+?	++?	+?	+?	+?	+?	+/-?
Ban on sale of peat for all horticultural use	++?	+?	+?	++?	+?	+?	+?	+?	+/-?

Table 5.2: Summary of likely effects of alternative growing media

	Climatic Factors	Population and Human Health	Air	Soil	Water	Biodiversity	Cultural Heritage	Landscape	Material Assets
Wood based	-	-	-	+	-?	+?	0?	0?	+/-
Bark	-	-	-	+/-	+	+?	0?	0?	+/-
Coir	--	-	-	+/-	-	+?	0?	0?	+/-
Compost	+	0?	0?	+	+/-?	-	-?	-?	+/-
Anaerobic Digestate	+/-	+/-?	-	+	+/-?	-	-?	-?	+/-
Cultivated Sphagnum Moss	+	?	+	+	-	+	0	+	+
Bracken	-	+/-	-	+	-	++/-	0	+	--/+
Loam	-?	-?	-	-	-	-	-?	-?	+/-
Vermiculite, Perlite and other expanded clay minerals	-	-	-	-	-	-	-	-	-
Bentonite	-	+/-	-	0	-	-	0	0	-

Cumulative, secondary and synergistic effects

5.130 The following paragraphs set out the potential cumulative and in-combination effects likely to arise from the proposed ban on the sale of peat for horticultural purposes alongside increased use of alternative growing media.

Climatic Factors

5.131 The proposed ban on the sale of peat for horticultural purposes is identified as having significant positive effects in relation to climatic factors, as the reduced sale (and use) of peat for horticulture (both amateur and professional) will prevent carbon being emitted from peat resources. However, the increased use of alternative growing media to displace the use of horticultural products containing peat may have both positive and negative effects on climatic factors. The use of alternative growing media such as compost and anaerobic digestate are expected to enhance the positive effects due to reducing the amount of organic waste going to landfill, therefore reducing methane emissions. Increased use of anaerobic digestate will further enhance these effects due to the potential to utilise the biogas produced as a form of renewable energy. Likewise, the use of cultivated sphagnum moss will help reduce emissions from the reduced disturbance of peat resources.

5.132 Other alternative growing media are expected to have negative effects on climatic factors as a result of energy requirements during extraction, processing and transportation of the product. This includes wood-based products, bark, coir, bracken and minerals, clays and loam. Coir in particular requires lengthy transportation across the world with more significant adverse effects identified. The greater use of these alternative growing media, in varying quantities, is expected to result in greater combined greenhouse gas emissions, especially if they require more transportation.

5.133 Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat, overall, the positive effects would continue to outweigh the negatives associated with transportation and processing of alternative growing media.

Biodiversity, Flora and Fauna

5.134 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to biodiversity, flora and fauna. The reduced sale (and use) of peat for horticulture will help conserve remaining peatland which supports a variety of species and habitats. The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mainly positive effects on biodiversity, enhancing those identified in relation to banning the sale of peat. The use of various alternative growing media (e.g. wood based, coir, bark, cultivated sphagnum moss, and bracken) will have varying benefits for soil substrate by improving the physical, chemical and biological properties of soils which will have subsequent benefits for flora growing within the soil and also fauna living within or dependent on it. The increased use of these growing media therefore will result in greater combined positive effects on biodiversity.

5.135 However, the increased use of growing media such as compost, anaerobic digestate and minerals, clays and loam is expected to have negative effects on biodiversity due to development of processing facilities and extraction activities. The increased development of composting or AD facilities will result in increased land take which could have adverse effects on biodiversity due to loss of habitat. Likewise, habitat may be destroyed during loam extraction. The greater use of these alternative growing media, in varying quantities, is expected to result in greater combined adverse effects on biodiversity.

5.136 Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat, and use of other growing media, overall, the positive effects would continue to outweigh the negatives associated with compost, AD and loam.

Population and Human Health

5.137 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to population and human health. The reduced sale (and use) of peat for horticulture will help maintain ecosystem services provided by peatlands, reduce carbon emissions and transport related air pollution. The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have primarily negative effects on population due to increased processing and transport-related pollution which may lead to greater occurrences of nuisance and respiratory illnesses amongst the population. The increased use of these growing media in varying quantities, therefore, will result in greater combined negative effects on population.

5.138 However, the increased use of growing media such including anaerobic digestate and bracken may also result in greater combined positive effects. This is due to the delivery of renewable energy as part of the anaerobic digestion process which may help alleviate fuel poverty and improve security of energy supply. Furthermore, the removal of bracken from the landscape may encourage healthier more active lifestyles by improving access to the landscape. Its removal also reduces the chance of illness derived from its carcinogenic properties and provide benefits to land managers. The greater use of these alternative growing media, in varying quantities, is

expected to result in greater combined positive effects on the population. These combined positive effects would further enhance the positive effects identified from banning the sale of peat. The use of other growing media for which negative effects were identified, would not outweigh the positives associated with reductions in use of peat.

Soil

5.139 The proposed ban on the sale of peat for horticultural purposes is identified as having significant positive effects in relation to soil, as the reduced sale (and use) of peat for horticulture will reduced the extraction of peat soil resources. The increased use of alternative growing media to displace the use of horticultural products containing peat will have mainly positive effects on soils by improving their physical, chemical and biological properties. The increased use of these growing media therefore will result in greater combined positive effects on soils.

5.140 However, the use of alternative growing media such as bark, coir, and loam may also have minor negative effects as loss of trees from forests (for bark) and extraction of minerals, clays and loam may result in increased soil erosion and loss of soil resources. Likewise, positive effects associated with coir are mixed with negative due to the removal of natural nutrients from soil when coconut husks are processed and transported elsewhere. However, the greater use of these alternative growing media, in varying quantities, is expected to result in greater combined negative effects on soil. Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat and use of other alternatives, overall, the positive effects would continue to outweigh the negatives associated with soil erosion.

Water

5.141 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to water. The reduced sale (and use) of peat for horticulture will reduce the need for extraction of peat which will help preserve peatland and retain and enhance the ecosystem services it provides in terms of water regulation, cleaning, and natural flood management. The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mixed effects on water.

5.142 Some growing media (e.g. wood-based, coir, cultivated sphagnum moss, bracken and loam) are expected to have minor negative effects on water due to their water intensive processing and potential to result in decreased water quality from pollution (minerals, clays and loam, compost and anaerobic digestate). In the case of bracken, this growing medium has poor water retention capabilities so may result in increased use of water. The use of other alternative growing media (bark, compost and anaerobic digestate) may have positive effects in relation to water due to their water retention properties and their displacement of use of chemical fertilisers. Overall, the greater use of these alternative growing media is expected to result in greater combined positive and negative effects on water, depending on the type of growing media used and how much is being produced.

Air

5.143 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to air, as the reduced sale (and use) of peat for horticulture will prevent carbon being emitted from peat resources and pollution from transportation of peat. However, the increased use of alternative growing media to displace the use of horticultural products containing peat is expected to mainly have negative effects on air quality due to emissions and pollution released during their processing and transportation. The increased use of these growing media therefore will result in greater combined negative effects on air quality.

5.144 The increased use of cultivated sphagnum moss will have minor positive effects by further protecting areas of peatland and maintain them as a carbon store, which when combined with the ban on sale of peat will have greater positive effects in relation to air. The greater use of these alternative growing media, in varying quantities, is expected to result in greater combined negative effects on air, especially if the alternatives require extensive processing and transportation. These combined negative effects would lessen the positive effects identified from banning the sale of peat, overall, the positive effects would be mixed with the negatives associated with transportation and processing of alternative growing media.

Cultural Heritage and the Historic Environment

5.145 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to cultural heritage. The reduced sale (and use) of peat for horticulture will reduce the need for extraction of peat which may result in the avoidance of negative effects on cultural heritage assets which are within peat or influenced by peat in terms of their setting. The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mainly negligible effects on cultural heritage due to being by-products of other industries. Some alternative growing media, notably compost, anaerobic digestate and minerals, clay and loam are identified as having potential negative effects on cultural heritage assets due to siting of processing development or in the case of mineral resources, the potential to affect buried and

underwater archaeology. The increased use of these alternative growing media will likely result in greater cumulative negative effects on cultural heritage, especially if compositing and AD facilities are located in proximity to one another and near heritage assets.

5.146 The greater use of these alternative growing media, in varying quantities, is expected to result in greater combined adverse effects on cultural heritage. Whilst these combined negative effects would lessen the positive effects identified from banning the sale of peat, overall, the positive effects would continue to outweigh the negatives associated with compost, AD and loam.

Landscape and Geodiversity

5.147 The proposed ban on the sale of peat for horticultural purposes is identified as having minor positive effects in relation to landscape. The reduced sale (and use) of peat for horticulture will reduce the need for extraction of peat which will help preserve peatland from becoming degraded and maintaining the wildness of the landscape. The increased use of alternative growing media to displace the use of horticultural products containing peat is expected to have mixed effects on landscape. Growing media derived from by-products of other industries are expected to have negligible effects. However, some alternative growing media, notably compost, anaerobic digestate and minerals, clay and loam are identified as having potential negative effects on landscape due to the siting of processing development or in the case of loam, the potential to affect landscape character through removal of vegetation. The increased use of these alternative growing media will likely result in greater cumulative negative effects on landscape, especially if compositing and AD facilities are located in proximity to one another and loam is extracted at large scales.

5.148 The use of cultivated sphagnum moss and bracken however is expected to have minor positive effects due to helping maintain important peatlands areas, and removing bracken from the landscape. The greater use of these alternative growing media is expected to result in greater combined positive effects on landscape.

5.149 Overall, the greater use of these alternative growing media is expected to result in greater combined positive and to a lesser extent negative effects on landscape, depending on the type of growing media used and how much is being produced. Overall, the positive effects are expected to outweigh the negatives associated with compost, AD and loam.

Material Assets

5.150 The proposed ban on the sale of peat for horticultural purposes is identified as having mixed minor positive and minor negative effects in relation to material assets. The reduced sale (and use) of peat for horticulture will decrease the need for extraction of peat which will help preserve peatland and retain and enhance the ecosystem services it provides, having positive effects in relation to material assets. These effects are mixed with negative effects however, as the ban on sale of peat may have adverse implications for the peat extraction and horticultural sectors.

5.151 The increased use of alternative growing media to displace the use of horticultural products containing peat is also expected to have mixed effects on material assets. This is due to several growing media being produced primarily from by- or waste-products of other sectors which prevents this material being wasted or sent to landfill, having positive effects in relation to material assets due to improved resource efficiency. Positive effects are also identified due to the production of biogas from the anaerobic digestion process which can be used as a renewable energy source, improved water efficiency through their use, and natural flood management that their use can provide. These positive effects are mixed as often there is competition for by- or waste-products. Some negative effects may also arise due to the greater use of non-renewable resources such as minerals, clays and loam.

5.152 Overall, the greater use of these alternative growing media is expected to result in greater combined positive and negative effects on material assets, depending on the type of alternative growing media used and how much is being produced.

Chapter 6
Mitigation and enhancement

Introduction

6.1 Schedule 3 of the 2005 Act states that '*the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme'* are outlined within the Environmental Report. These measures are often referred to as mitigation measures. The following text summarises the mitigation measures identified from the assessment.

6.2 This section therefore focuses on ways in which identified adverse effects could be reduced or avoided, or where there is potential to enhance benefits.

6.3 The Scottish Government is proposing a ban on the sale of peat for horticultural use, to help protect peatlands as an important carbon store and to contribute towards the delivery of net zero targets. Mitigation and enhancement measures will inform development and implementation of the proposed ban.

Mitigation

6.4 The following actions are required to address adverse effects or avoid the potential for such effects to occur.

6.5 This ban would be long-term in nature, and it provides strategic level action towards achieving a ban on sale (and likely subsequent extraction) which would encourage the development and production of other peat-free alternative growing media. Therefore, with the encouragement of use of alternative growing media, there is potential that the implication of the ban could lead to tangible developments taking place in the short to long term. There are some mitigation opportunities that could address the adverse effects identified in the assessment. These include:

- Ensuring timber-based alternatives based on waste- or by-products are sourced from productive forests and not semi-natural and/or ancient woodland.
- Prioritise transportation of coir in its less voluminous briquette (dehydrated) form to minimise transportation and transport-related emissions.
- Promote use of alternative growing media near their point of origin/source.

- Avoid and minimise adverse effects arising from development of growing media processing facilities (e.g. in relation to landscape, cultural heritage, pollution etc.) through regulation via the planning and permitting system.
- Identify the water requirements of producing alternative growing media and commission research into reducing water use in the production process.
- Manage potential adverse effects on water quality from composting, anaerobic digestion and loam production through the planning system or environmental permitting system.
- Avoid development in locally or nationally designated landscapes.
- Avoid development in heritage designations or in proximity to heritage assets.

Enhancement

6.6 The identified areas for enhancement relate primarily to research and innovation to address knowledge gaps, and measures which could be incorporated into development for alternative growing media to improve the environment.

- Reinstate the appropriate hydrology in degraded and drained peatlands to increase their resilience to climate change
- Capture and utilise emissions from the anaerobic digestion process to ensure maximum resource efficiency and utilisation of renewable energy.
- Promote peatland restoration throughout Scotland, including areas of previously worked peat and areas extracted for the whisky industry.
- Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.

Chapter 7
Monitoring

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

7.2 The following existing monitoring programmes will be relevant to monitoring potential adverse environmental effects of the proposed ban on sale of peat for horticultural use:

- Scotland's GHG emissions- data collected by the Committee on Climate Change[94] and the Scottish Government[95].
- Peat extraction – data on peat extraction is currently incomplete. Efforts should be made to develop a more comprehensive and up-to-date inventory. Currently, there is partial data available which is collected by local authorities on peat extraction within their jurisdiction.
- Peatland restoration and monitoring – data collected as part of the Peatland ACTION Project[96], including data on restoration sites, peat depth, peatland condition, bare peat, water table depth, water quality and vegetation.
- Biodiversity, flora and fauna – condition monitoring of designated biodiversity sites[97].
- Air quality[98] - national monitoring of air quality.
- Water quality[99] - SEPA undertake water quality condition monitoring.
- Soil – a soil monitoring action plan is underway[100] and land use change can also provide indications of soil quality.

[94] The Committee on Climate Change carbon budgets and targets. Available at: https://www.theccc.org.uk/topic/carbon-budgets/
[95] Scottish Government Scottish Greenhouse Gas Statistics 2020. Available at: https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-2020/pages/1/
[96] NatureScot Peatland ACTION Project – Open Data. Available at: https://www.nature.scot/climate-change/nature-based-solutions/peatland-action/how-apply/peatland-action-open-data
[97] NatureScot Site condition monitoring. Available at: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/site-condition-monitoring/view-monitoring-results
[98] Air quality in Scotland monitoring data. Available at: http://www.scottishairquality.scot/data/
[99] SEPA water quality condition monitoring: Available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/
[100] Scotland's environment Soil Monitoring Action Plan. Available at: https://soils.environment.gov.scot/soils-in-scotland/soil-monitoring/

- Cultural heritage[101] - Historic Environment Scotland monitors changes to designated sites but impacts on setting and cumulative change requires an alternative monitoring mechanism to be established.
- Landscape and geodiversity – NatureScot run the national Scotland's Landscape Monitoring Programme[102].
- Total waste production – SEPA collect key waste statistics[103]. Data on the proportion of energy from waste (biogas) would also be relevant.
- Alternative growing media – the Horticultural Trades Association monitor the trends in the composition of UK Growing Media[104], including peat used in the horticultural sector.

[101] Historic Environment Scotland monitors the condition of Scheduled Monuments. The Buildings at Risk register provides information on buildings at risk.
[102] NatureScot Scotland's Landscape Monitoring Programme https://www.nature.scot/professional-advice/landscape/scotlands-landscape-monitoring-programme
[103]SEPA waste data for Scotland. Available at: https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-data-for-scotland/
[104] HTA. Growing Media Monitoring. Available at: https://hta.org.uk/news-events-current-issues/sustainability/growing-media

Chapter 8
Conclusion and Next steps

8.1 The consultation on the proposed ban on sales of peat for all horticultural use will run for a twelve week period from mid-December 20222. Comments on the proposed ban on sales of peat for all horticultural use and the Environmental Report can be submitted via the Scottish Government Citizen Space website. Requests for hard copies of the Environmental Report can be made to horticultural.peat@gov.scot.

8.2 Consultation questions on the SEA Environmental Report are as follows:

a. Do you have any comments on the environmental baseline information referred to in the Environmental Report?

b. Are you aware of further information that could be used to inform the assessment findings?

c. What are your views on the assessment findings?

d. Are there other environmental effects arising from the proposed ban on sales of peat for all horticultural use?

e. Do you agree with the justification for the approach to the alternatives?

f. What are the most significant environmental effects which should be taken into account as the proposed ban on sales of peat for all horticultural use is finalised?

g. How can the proposed ban on sales of peat for all horticultural use be enhanced to maximise positive environmental effects?

h. What do you think of the proposed approach to mitigation and monitoring?

8.3 Following the consultation period, the consultation responses will be analysed and the Scottish Government will finalise and publish the ban on sales of peat for all horticultural use. After the ban on sales of peat for all horticultural use is adopted a Post Adoption Statement will be produced. This Statement will set out how the SEA and the views received in the consultation processes have been taken into account.

Appendix A

Consultation comments received in relation to SA work completed to date

NatureScot

Table A.1: NatureScot Scoping Report consultation response

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
NatureScot Dated 26th October 2022	**Chapter 1 Purpose of the report and definition of scope** NatureScot will recommend the use of a Glossary to clarify the terminology used in defining the SEA's scope and context. Selective examples, as used in the scoping report to illustrate an issues scope-in or scope-out, are not sufficient. In particular, we will recommend including definitions for the following terms (in the context of the SEA): ■ Peat, ■ Peatland soils, ■ Growing media, ■ Soil improver, ■ Gardening products, ■ Retail horticulture (non-professional) sector, and, ■ Professional horticulture sector The SEA will require a more comprehensive description of the policy scope and improved definitions of the scope of non-horticultural uses and the horticultural uses of peat. Additional information relevant to these definition and policy context are provided in appendix B.	Noted with thanks. A glossary setting out the definitions of key terminology has been provided in Chapter 2.
	Chapter 1 Setting the Context There is limited cogency between the information presented in this Chapter. Please consider providing a short overview of the rational for the ban on sales. NatureScot understands that the rational for developing a ban on sales of peat is anchored on the expected link between a ban on peat sale and both a consequential phasing out of peat extraction/import and an increase production	Noted with thanks. An overview for the rationale of the ban on sales of peat has been provided in Chapter 2, and the text setting out the context has

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	and use of peat substitute products. The consequential impacts on the natural environment will likely lead to a reductions in total GHG emissions and reduced carbon loss from sites previously exploited for peat production (degraded peatland). This, in turn, may provide further opportunities for the restoration of carbon sequestration functions and address biodiversity loss in these degraded habitats. The effects on the environment of an increase of use and production of peat substitutes are more difficult to predict, as this will be in part driven by market demand and technological innovations. Some statements in this Chapter appear out of context and are open to misinterpretation, this will need to be addressed in the SEA environmental report. For example, in paragraph 1.9, the first statement is misleading. Peat accumulates very slowly (average 1 m of peat development per thousand years) hence commercial extraction is capable of removing thousands of years of peat growth in a single operation (Not in years as stated). Many lowland raised-bog sites are protected under current legislation have been sites of exploitation of peat resource in the past. In many of these contexts, there are still active rights for peat and mineral extraction. We recognise that the evidence on the extraction, use, import and export of peat in Scotland are at best patchy and often extrapolated from UK-wide records as shown in paragraph 1.10 to 1.14. This is likely to impact on the provision of robust baseline data for Scotland. The publication of the UK Government's Annual Mineral Extraction Survey Report ceased in 2016 for the whole of GB. More recent data for Scotland are, thereby, collated from industry survey. The overall trend as stated in paragraph 1.11 is towards a reduction of use of peat as growing media since 2014. But 2020 saw an increase compared to 2019. (see BGS United Kingdom Minerals Yearbook 2021, https://www2.bgs.ac.uk/mineralsuk/download/ukmy/UKMY2021.pdf - page 47.) An increase in use is also reported in the Growing Media Association Monitor Report. This will need to be considered when establishing a baseline data for assessing impact of ban of peat sale. The types of peat alternative currently in use by the horticultural industry are not limited to the one mentioned in the SEA scoping report (paragraph 1.17 to 1.19). Other mineral compounds with water rendition properties or structural enhancement like vermiculate, perlite, bentonite and other expanded clay minerals could also be considered. NatureScot does not believe that sphagnum moss is a suitable alternative to peat for general purpose use. Sphagnum moss is the precursor of peatland formation and a key constituent of peat material. Hence strictly speaking the sale of	been updated in light of comments received.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	sphagnum moss is not a peat alternative and should be covered by the ban on sale of peat. We, however, recognise that the production of sphagnum moss for use in peatland restoration projects should be scope-out of the policy.	
	Chapter 2. – Approach to the assessment In table 2.4 (draft SEA framework), we welcome the consideration of geological sites under the biodiversity, flora and fauna SEA topic, but we note some discrepancy on how the issue is presented elsewhere in the report (i.e. scope of assessment and baseline information). The SEA assessment scope (table 2.3) should consider additional issues in the following SEA topics areas: ■ Climatic Factors - *Climate change mitigation and adaptation. In particular the assessment for 'climatic factors' will reflect both the impacts for GHG emissions and carbon sequestration* ***of peat and alternative production****, and GHG emissions associated with transport of peat and alternatives*. ■ Biodiversity, flora and fauna - *Terrestrial and aquatic habitats, species* ***and geodiversity*** *of international, national, regional or local importance, loss of peatland and habitat fragmentation.* ■ Soil – *Loss of or preservation* ***or restoration*** *of peatland soil resources.*	Noted with thanks. The SEA assessment scope has been updated to reflect the additional text requested.
	Chapter 2. – Consideration of reasonable alternatives We believe that the alternative to the 'ban on sale of peat policy' proposed in the scoping report (paragraph 2.21) needs further clarification. We recognise the Government's commitment to the ban on the sale of peat and agree that the business as usual approach is not a scenario consider in the SEA. Reasonable alternatives need to look at plausible options and their environmental impacts. Mitigation measures such as use of alternative products marketed as peat-free growing media are not by themselves reasonable alternatives but maybe incorporated into one. Again, NatureScot does not support the general-purpose sale of sphagnum moss as an alternative peat-free growing media. Exemption for the production and sale of sphagnum moss for specific purpose of peatland restoration activities is however essential.	Noted with thanks. The alternative growing media have not been included as reasonable alternatives, but have been incorporated into the ban itself. Cultivated sphagnum moss has been included as an alternative, noting that it is purpose grown and will not be removed from areas of peatland. A defined list of reasonable alternatives is set out in Chapter 3.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	Reasonable alternative options should avoid offshoring impacts - for example, considering using waste wood product rather than primary extraction, and limiting material transit by encouraging locally-sourced materials.	
	Chapter 3 – Relation with other plans Biodiversity: - Please also consider. the Scottish Biodiversity Strategy Post-2020 statement of intend - https://www.gov.scot/publications/scottish-biodiversity-strategy-post-2020-statement-intent/pages/2/ The consultation on the Scottish Biodiversity Strategy 2022 - https://consult.gov.scot/environment-forestry/scottish-biodiversity-strategy-2022/ The statement of intend mentioned above outlined the commitment to protect at least 30% of our land and sea for nature by 2030 (30x30 Target). The 2021 Programme for Government committed to the deployment of Nature Networks. These two are key components in increasing ecological connectivity and restoration of nature more widely, helping to deliver the Scottish Biodiversity Strategy. As mentioned above, the baseline information does not include geodiversity objectives listed in table 2.3 and 2.4. Soil and Geology Many lowland bogs used as extraction sites are designated for their 'Quaternary of Scotland' features under Geological Conservation Review (GCR) and/or SSSI designations. Local authority development plans and national planning systems also provide a limited policy framework for the protection of peat and soils. Planning Framework 4, currently under development, is likely to come into force before this SEA is complete. Material assets The Scottish Rural Development Programme (SRDP) and the forthcoming Agriculture Bill for Scotland are shaping our agricultural land. More widely future agriculture policy, will have huge implications for the way the land is managed cutting across biodiversity, climate, soil and water, and landscape.	Noted with thanks. These additional sources have been included within Chapter 4.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	Chapter 4: Baseline information Climatic factors 4.5 – 4.6 This section appears to suggest that Land Use, Land Use Change & Forestry is all sequestration. We agree that there is sequestration, but there are also considerable emissions from the land (in the LULUCF chapter even if not considering the Agriculture chapter of the GHG inventory). So both need to be considered in their own right, emissions on the one hand, and sequestration on the other hand, in addition to the balance between the two. This gives a more accurate picture of what is happening and how the proposed ban could affect these. 4.10 – The target for the restoration of 250,000 ha by 2030 is an important objective for setting Scottish peatland on the path of restoration, but this represents less than 10% of total extend of peatland in Scotland. Biodiversity, Flora and Fauna As mentioned above, the baseline information does not include geodiversity objectives, as mentioned in table 2.3 and 2.4. 4.13 to 4.18 The baseline and evolution of SEA topic should consider the implication of the Statement of intent on Biodiversity to protect at least 30% of the land and sea for nature by 2030 (30 x30). In 4.14 – The figure quoted are national data that included all terrestrial, freshwater and marine protected sites not specific to peat and peatland sites. Hence, it may not be relevant to the issues scope. Soil and Geology 4.31 – This paragraph give the impression that peatlands are in good conditions (*As with all soils, peatlands are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to be a significant contributor to Scotland's GHG emissions*). So same point as above, could be raised. The SEA need to consider that an estimated 70% of Scotland's blanket bog and 90% of Scotland's raised bog area[1] have been damaged to some degree[2]. The baseline is how much carbon they hold, but also their condition, and how much they emit (6.6 MtCO2e, GHG Stats 2020). Same comment in 4.58.	Noted with thanks. The baseline in Appendix C has been updated to reflect these comments.

[1] https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf
[2] National Peatland Plan (2015) https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	4.34 – Change to land use or land management practices do not necessarily have negative impacts on the environment. Changes if enacted as part of a restoration or enhancement policy (e.g.to support biodiversity and enhance resilience to climate change) can contribute to reduce pressure on soils and improve soil health. Please referred to State of Scotland soil for detail. https://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/#:~:text=Scotland's%20soils%20contain%20more%20than,our%20annual%20greenhouse%20gas%20emissions. CxC report on vulnerability of soil to climate change - https://www.climatexchange.org.uk/research/projects/measuring-the-vulnerability-of-scottish-soils-to-a-changing-climate/ Water The baseline and its evolution should also reflect change to water quality in degraded peatland habitats. Increase erosion on bare peat may leads to additional loss of carbon and high DOC content in water. This become a problem for both freshwater biodiversity and human consumption (pollution, cost of treatment by industry). Change to drainage and water table level in extractive sites may also impacts on both flux and quality of surface and groundwater. Cultural Heritage 4.52. The conditions that contrive to protect cultural records also ensure the preservation of historical and paleo climatic and environmental evidence. This is the case for many of the geological SSSI and CGR protected for their 'Quaternary of Scotland' feature category. Landscape 4.58 - This is correct but may be more relevant under biodiversity or soil section 4.59 to 4.61 – Land use management and land use changes, as mentioned above, can impact on landscapes. Material assets 4.74 - The restoration of wasted peat (area of peatland where most of the peat has been extracted) requires different consideration for effective restoration compared to damage habitat which have retain some underlying soil and functioning vegetation. (see Peatland Action Programme)	
	Appendix A	Noted with thanks. Reference to the SRDP has been added to Chapter 4.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	Chapter 3/Appendix A – There is a mention of SRDP in Appendix A, but in Chapter 3. See comment above. National Planning Framework 4 (https://www.transformingplanning.scot/national-planning-framework/) and Scottish Biodiversity Strategy 2022 (https://www.nature.scot/scotlands-biodiversity-strategy-2022-2045) currently under development are likely to come in force before this SEA is complete and may need to be included in the assessment.	The status of NPF4 and the forthcoming Scottish Biodiversity Strategy will be monitored and included within the Environmental Report if adopted whilst the SEA process is ongoing.
	Annex to letter – Appendix B NatureScot considers that the policy issues around a ban of sale of peat are much more complex than denoted in the SEA scoping report. The following information outline some of issues that we encounter when assessing the SEA scoping report and are provided for information. We believe that the SEA will require a more comprehensive description of the policy scope and better definitions of the type of non-horticultural uses and the horticultural uses of peat. In addition, defining the type of sales (on-line, commercial premise, direct sale to public) and size of sale operations covered by the ban will be important for the successful implementation of the policy. NatureScot understands that the rational for developing a ban on sales of peat is anchored on the expected link between a ban on peat sale and both a consequential phasing out of peat extraction/import and an increase production and use of peat substitute products. The consequential impacts on the natural environment will likely lead to a reductions in total GHG emissions and reduced carbon loss from sites previously exploited for peat production (degraded peatland). This, in turn, may provide further opportunities for the restoration of carbon sequestration functions and address biodiversity loss in these degraded habitats. The effects on the environment of an increase of use and production of peat substitutes are more difficult to predict, as this will be in part driven by market demand and technological innovations. We recommend the use of clear definition of term use to define issues scope-in or scope-out in the proposed policy. We provide some detail for the following terms (in the context of the SEA): ■ Peat, ■ Growing media, ■ Soil improver,	Noted with thanks. These comments have been incorporated into the Environmental Report where relevant.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	■ Peatland soils / peat soils ■ Gardening products use ■ Retail horticulture non-professional sector, ■ Professional horticulture sector and use <u>Peat</u> Peat, in the context of this policy, maybe understood as material sourced from natural peat soils. Peat is not a product of composting but a natural resources that take millennium to form. Due to its composition, peat has an intrinsic value as a carbon store and can be a potential source of GHG both in-situ or off-site conditions. When in association with natural habitats, peat also contribute to the sequestration of new carbon and support biodiversity and other environmental services. Peatland are exploited for both their 'acrotelm' (the surface peat layer containing living material) and 'catotelm' (the deeper peat layer containing dead and partially decomposed organic material). The former can be sold for its water holding capacity and is labelled as moss or sphagnum moss. Sphagnum moss is the precursor to peat formation and one of the constituent of peat. Therefore, the sale of living or dead sphagnum moss for general purposed use used should also be covered by the ban on sale of peat. The latter will be refer as peat soil. <u>Use of peat – growing media and soil improvers</u> Peat can be sold and used on its own and as a blend with other materials. Peat and peat-blend materials can be used either as a growing media or as a soil improver. Soil improvers are generally used to improve the soil fertility by increasing the soil organic matter level. We understand that there is no need for soil improvers to contain peat, and almost all soil improvers sold in the UK no longer do so. <u>Gardening products and horticultural sectors (professional / gardening)</u>	

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	Gardening products used as growing media can be sold as bulk material, as pre-formed material (like peat plugs or peat pellets) and as support for flowering plant, vegetable, mushroom, tree and other plants in a container, pot or plug. Peat related gardening products can be sold online, in garden centre and other bulk suppliers aims to both the amateur gardener and traders and contractors involved in gardening and landscape activities. The professional horticultural sector as defined in the SEA scoping report appears to refer specifically to horticultural growers. The example provided - *edible and ornamental –mushroom growing, commercial nurseries producing container grown plants, raising of young plants for vegetable and salad plants and soft fruit growing* is not comprehensive. Other activities included- e.g. trees nursery which may use peat for plant sold as cell growth trees (as they can be planted all year round). <u>Use of peat</u> We note the definition of the use of peat for the specific policy context. However, we would recommend a widening of the uses of peat in the policy definition while still protecting legitimate uses. ■ *Use of peat for whisky.* Peat is used in the process of fabrication process of whisky. There is no evidence that it is currently use in the production of other smoky flavour spirit but such developed could be forthcoming. The exemption could be rephrase to apply to the use of peat in the production of all type of spirits. ■ The term *'Use of peat for heat (turf cutting)'* used in the SEA scoping report is pointless. Turf cutting is not an accepted term in relation to peat. Strictly speaking there is no turf on peat. Peat used for heat, harvested for personal use through turbiary rights as defined in the Crofting act is a valid exemption. However, the sale of peat briquette or peat logs for use in home or larger commercial heating units is not a valid exemption. There will be other areas of horticultural and non-horticultural use of peat that may need to be reviewed to include within the scope out of the policy. For example, the propagation and growth of sphagnum species sold and use for the specific purpose of peatland restoration, may require use of peat as substrate for growth. <u>Peat free alternative</u> Peat-free alternatives have gained market share since the 1990s and although it will be reasonable to assume their market shared will significantly increase post-ban, how this should shape out is highly speculative.	

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	We do not support a general-purpose use or sale of sphagnum moss as an alternative 'peat-free' growing media. Sphagnum moss is the precursor of peatland formation and a key constituent of peat material; hence, strictly speaking, the sale of sphagnum moss is not a peat alternative and should be covered by the ban on sale of peat policy. A detail assessment of the alternative to peat in Scotland was recently prepared by ClimateXchange: https://www.climatexchange.org.uk/media/4022/rapid-evidence-assessment-of-the-alternatives-to-horticultural-peat-in-scotland.pdf	

SEPA

Table A.2: SEPA Scoping Report consultation response

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
SEPA Dated 28th October 2022	**Baseline Information** Overall, we are satisfied that the information provided in Ch4 provides a suitable baseline for the SEA, we have a few minor comments below. **Soil and Geology** Section 4.33 "While Scotland's soils are considered to generally be in good health…" although that is a direct quote from the introduction of the James Hutton Institute's publication about soils from 2016, there is still no systematic soil monitoring carried out in Scotland therefore there isn't a robust evidence base to back this up. Scotland's soil framework (2009) states: "Due largely to the sustainable management employed by land managers over a prolonged period, Scotland's soils are generally in good health. However, compared with air or water, for which national, long-term datasets exists, for soils there is a lack of national trend data from which evidence of change or damage to soils might be determined."	Noted with thanks. The environmental baseline presented in Appendix C has been updated to reflect these comments.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	The State of Scotland's soils report (2011) reiterated these points. **Water** Healthy peatlands provide a useful natural flood management function through slowing the flow of water over a rough vegetated surface, and by water retention by sphagnum moss which has a water holding capacity of more than 20 times its dry weight. These points have been omitted from section 4.39. **Material Assets** The description of the deep dug peat extraction process should also be included in section 4.75 as this takes place in Scotland to supply the mushroom production sector and the whisky industry. This method makes the site practically impossible to restore. The process of stripping and draining extensive peat fields for milling and leaving them bare i.e. unvegetated, makes the peat vulnerable to weathering and erosion, leading to the loss of particulate and dissolved organic carbon, as well as emitting carbon at high rates as the drainage lowers the water table enabling oxygen to enter the pore spaces of the peat and resulting in aerobic decomposition which operates at a faster rate than in saturated soils. Section 4.86 – reinstating the appropriate hydrology in degraded and drained peatlands will increase their resilience to climate change. An overall increase in temperature would accelerate the rate of decomposition, but also the rate of photosynthesis and growth to an extent. Changing rainfall patterns pose a threat to peatlands where rainfall is reduced if it results in a lower water table depth; if this occurs with an increase in evaporation due to higher temperatures then the water table depth will lower still further below the surface.	
	Alternatives We agree that a do nothing scenario is not a reasonable alternative as a commitment to ban peat has been set out in the recent Programme for Government. We note that alternatives are still being considered and these will mainly be at a strategic level however the use of alternative peat free growing media will also be considered. As an alternative growing media could shredded used paper and cardboard be used instead of wood fibre as part of the composting mix?	Noted with thanks. Due to very limited use of shredded paper and cardboard as growing media, it has not been included as part of the detailed assessment. A full list of alternative

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
		growing media considered in the assessment is set out in Chapter 3.
	Scoping in / out of environmental topics We agree that in this instance all environmental topics should be scoped into the assessment.	Noted with thanks.
	Methodology for assessing environmental effects We support the use of SEA objectives as assessment tools as they allow a systematic, rigorous and consistent framework with which to assess environmental effects. The baseline information recognises the important role peatlands play in natural flood management. This role should be reflected in the SEA objectives.	Noted with thanks. An additional SEA objective has been added to reflect the role peatlands play in natural flood management.
	Mitigation and enhancement We would encourage you to use the assessment as a way to improve the environmental performance of individual aspects of the final option; hence we support the recognition that a key part of the SEA process is the identification of opportunities to enhance benefits as well as mitigation of negative effects. It is useful to show the link between potential effects and proposed mitigation / enhancement measures in the assessment framework.	Noted with thanks. Mitigation and enhancement measures have been included within assessment and are set out in Chapter 6.
	Monitoring Although not specifically required at this stage, monitoring is a requirement of the Act and early consideration should be given to a monitoring approach particularly in the choice of indicators. It would be helpful if the Environmental Report included a description of the measures envisaged to monitor the significant environmental effects of the plan.	Noted with thanks. Proposed monitoring is set out in Chapter 7 of the Environmental Report.
	Consultation period	Noted with thanks.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	Section 5.3, it is the Scottish Environment Protection Agency rather than Scottish Environmental Protection Agency. We are satisfied with the proposal for a 12 week consultation period for the Environmental Report as stated in section 1.29.	

HES

Table A.3: HES Scoping Report consultation response

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
HES Dated 28th October 2022	**Scope and level of detail** It is our understanding that the Scottish Government is currently preparing a consultation on the proposed ban on sales of peat for all horticultural use, and that the proposal will be subject to environmental assessment. We note that the historic environment has been scoped into the assessment. On the basis of the information provided, we are content with this approach and are satisfied with the scope and level of detail proposed for the assessment, subject to the detailed comments provided below.	Noted with thanks.
	Chapter 2 – Approach to assessment We note that the scope and sub-objective for cultural heritage focuses on cultural heritage sites associated within lowland peatland sites. While this is an important element of the scope, it should not be limited to this. Upland peatland cultural heritage should also be included. More is known about the lowland historic environment because it gets turned up by the plough or planting, or in ditch digging in the 18th to 20th centuries. However, upland	Noted with thanks. The sub-objective for cultural heritage has been updated to include reference to cultural heritage in upland peatlands. The sub-objective has also been amended to consider

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	peatland sites are likely to have also a rich historic environment, and they are likely to have a more ephemeral spread of assets (e.g. flint scatters, trackways, burning horizons etc.) The assessment should consider impacts upon both terrestrial and freshwater cultural heritage. Works to peatlands (including limiting peat harvesting) could impact hydrology of upland and lowland lochs which may contain crannogs etc. The assessment should also consider effects on heritage assets that may be affected by reasonable alternatives, particularly in terms of the alternative materials that may be used to replace peat in horticultural use.	effects on both terrestrial and freshwater cultural heritage.
	Chapter 3 and Appendix A Text refers to the Historic Environment Scotland Policy Statement. This has been superseded by the Historic Environment Policy for Scotland (2019), also known as HEPS. We recommend that you amend all references accordingly and ensure that they reflect the content of HEPS	Noted with thanks. All references to the Historic Environment Scotland Policy Statement have been updated to Historic Environment Policy for Scotland (2019), also known as HEPS.
	Baseline Whilst we agree with the baseline information provided, it would be helpful to have a greater focus on the aspects of the historic environment most likely to be affected by the proposals (including reasonable alternatives that consider alternatives to peat). The baseline information focuses upon known assets, but there should also be a recognition of the potential for unknown assets, and potentially highly significant ones. The nature of blanket bog is that it covers sub-peat landscapes and decreases detection likelihood from all types of archaeological survey. These landscapes (and especially uplands) can be thought of as likely caches of unknown heritage assets, which limiting peat harvesting will help us to protect.	Noted with thanks. The baseline information provided in Appendix C has been updated to highlight the potential for unknown heritage assets and the aspects of the environment most likely to be affected by alternative growing media.
	Consultation period for the Environmental Report	Noted with thanks. There will be a 12 week consultation period on the ER.

Consultation Authority	Consultation Comment	Action (how comment has been addressed in this SEA Report)
	You have not indicated how long the period of consultation on the proposals and environmental report will be. We recommend a minimum six-week period, and longer if possible, to ensure that consultees have adequate time to consider the consultation and respond.	

Appendix A

Consultation comments received in relation to SA work completed to date

Strategic Environmental Assessment of Ending the sale of Peat in Scotland Consultation
February 2023

Appendix B

Review of Plans, Programmes and Strategies

General

Source	Key objectives	Implications/ Comments
International		
Aarhus Convention (1998)	To develop a number of rights of the public with regard to the environment. Local authorities should provide for: ■ The right of everyone to receive environmental information ■ The right to participate from an early stage in environmental decision making ■ The right to challenge in a court of law public decisions that have been made without respecting the two rights above or environmental law in general	Ensure that the public are involved and consulted at all relevant stages of SEA production.
Johannesburg Declaration on Sustainable Development (2002)	Commitment to building a humane, equitable and caring global society aware of the need for human dignity for all. Areas of focus include: ■ Sustainable consumption and production patterns. ■ Accelerate shift towards sustainable consumption and production – 10-year framework of programmed of action. ■ Reverse trend in loss of natural resources. ■ Renewable energy and energy efficiency. ■ Urgently and substantially increase Global share of renewable energy. ■ Significantly reduce the rate of biodiversity loss by 2010.	The SEA should reflect objectives to support reduction in emissions of greenhouse gases.
National (Legislation)		

Source	Key objectives	Implications/ Comments
Town and Country Planning (Scotland) Act 1997 (as amended)	The Town and Country Planning (Scotland) Act governs the use and development of land within Scotland. The 1997 Act forms the basis of the Scottish planning system. It sets out the roles of Scottish Ministers and designates local authorities as 'planning authorities' with a responsibility for producing local development plans and handling most aspects of development management and enforcement. All planning applications in Scotland are required to be determined against the Town and Country Planning (Scotland) Ac 1997.	The SEA should be mindful of the requirements set out in the 1997 Act.
Planning etc. (Scotland) Act 2006	The Planning etc. (Scotland) Act 2006 formed a central part of the reform of the Scottish planning system. One of its key effects was the creation of Strategic Development Planning Authorities, which comprise several local planning authorities and are charged with producing long-term development plans.	The SEA should be mindful of the requirements set out in the Planning etc. (Scotland) Act 2006
Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 (as amended)	Sets out provisions for granting planning permission in accordance with the Town and Country Planning (Scotland) Act 1997.	The SEA should be mindful of the requirements of the Town and Country Planning (Development Management Procedure) Scotland Regulations
Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011	Sets out criteria for determining whether an Environmental Impact Assessment would be required for developments.	The SEA should reflect the objectives **to minimise the potential environmental impacts of development.**
Planning (Scotland) Bill	An Act of the Scottish Parliament to make provision about how land is developed and used. The Bill is part of a wider planning system reform responding to an independent review of planning, which includes changes to secondary legislation made under existing powers as well as non-legislative changes. Some of the key aspects of the Bill are its provisions in relation to the system of development plans; the opportunities for community engagement in planning; the effective performance of planning authorities' functions; and a new way to fund infrastructure development.	The SEA should be mindful of the requirements proposed by the Planning (Scotland) Bill.

Source	Key objectives	Implications/ Comments
National (policies, Plans, Programmes and Strategies)		
National Planning Framework 3 (the Scottish Government, 2014)	The National Planning Framework 3 sets out the Scottish Government's spatial development/investment priorities over the next 20-30 years. It is a long-term strategy to promote environmental sustainability, equality in opportunity, technological progress and human well-being and health. Key outcomes of the framework are as follows: ■ Creating sustainable places ■ Reducing carbon emissions and adapting to climate change ■ Protecting and enhancing Scotland's natural cultural assets as well as facilitating their sustainable use ■ Supporting better transport and digital connectivity	The SEA should reflect the objectives to make Scotland a **successful, sustainable** place; a **low carbon** place; a **natural, resilient** place; and, a **connected** place.
Revised Draft National Planning Framework 4 (the Scottish Government, 2022)	A Revised Draft National Planning Framework 4 (NPF4), laid in the Scottish Parliament on 8 November, sets out the Scottish Government's spatial strategy and principles for the period up to 2045. The Revised Draft NPF4 supports the planning and delivery of: ■ Sustainable places; ■ Liveable places; and, ■ Productive places. The Revised Draft NPF4 makes clear that proposals for new commercial peat extraction, including extensions to existing sites, are not supported except in very limited circumstances: this includes where the extracted peat is supporting the Scottish whisky industry and there is no reasonable substitute, and where other relevant and applicable criteria are met including on site restoration.	The SEA should reflect objectives to make Scotland a **sustainable**, liveable and productive place, and **protects and promotes sustainable use and management of peatlands.**

Source	Key objectives	Implications/ Comments
Scottish Planning Policy (The Scottish Government, 2014)	The purpose of the Scottish Planning Policy is to set out national planning policies on how to address land use matters across the country. It is non-statutory, however, it is in line with the Town and Country Planning (Scotland) ■ Creating sustainable places ■ Reducing carbon emissions and adapting to climate change ■ Protecting and enhancing Scotland's natural cultural assets as well as facilitating their sustainable use ■ Supporting better transport and digital connectivity	The SEA should reflect the objectives to make Scotland a **successful, sustainable** place; a **low carbon** place; a **natural, resilient** place; and, a **connected** place.

Climatic Factors

Source	Key objectives	Implications/ Comments
International		
IPCC's Fifth Assessment Report on Climate Change (2014)	To limit and/or reduce all greenhouse gas emissions which contribute to climate change	The SEA should reflect objectives to **support reduction in emissions of greenhouse gases.**
The Cancun Agreement-UNFCC (2011)	Shared vision to keep global temperature rise to below two degrees Celsius, with objectives to be reviewed as to whether it needs to be strengthened in future on the basis of the best scientific knowledge available.	Include sustainability objectives to support the **reduction in greenhouse gas emissions and mitigation to climate change.**
Paris Agreement (United Nations 2015)	The main aim of the Paris Agreement centres on keeping global temperature rise this century below 2°C above preindustrial levels. Frameworks are to be put in place to help achieve these goals.	The SEA should reflect objectives to **adapt and mitigate climate change.**

Source	Key objectives	Implications/ Comments
The Kyoto Protocol to the UNFCCC (1997)	The Kyoto Protocol to the UNFCCC established the first policy that actively aims to reduce greenhouse gas emissions by industrialised countries.	The SEA Framework should include objectives to **reduce greenhouse gas emissions and promote sustainable development.**
National (Legislation)		
Climate Change (Scotland) Act 2009 Including amendments made by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019	The 2009 Act sets statutory targets for the reduction of greenhouse gas emissions and makes further provision about energy efficiency and about the reduction and recycling of waste. The Act set an interim 42 percent reduction target by 2020 and an 80 percent reduction target for 2050. In 2019, the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 amended these reduction targets to a 56% reduction by 2020, 75% reduction by 2030, 90% reduction by 2040 and achieving net-zero emissions by 2045. Secondary legislation has been made under the Climate Change (Scotland) Act 2009, including: ■ The Climate Change (Annual Targets) (Scotland) Order 2010: sets emission reduction targets for 2010-2022 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2010: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2010-2012 ■ The Carbon Accounting Scheme (Scotland) Regulations 2010: establish a scheme for monitoring compliance with annual reduction targets for 2010-22 (as amended in 2015 and 2016) ■ The Climate Change (International Aviation and Shipping) (Scotland) Order 2010: establish a method by which emissions of greenhouse gases from international aviation and international shipping that are attributable to Scotland are calculated. ■ The Climate Change (Annual Targets) (Scotland) Order 2011: sets emission reduction targets for 2023-2027	The SEA should reflect the objective to **reduce the emission of greenhouse gases and mitigate climate change**

Source	Key objectives	Implications/ Comments
	■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2011: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2023-2027 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2010: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2013-2017 ■ The Climate Change (Duties of Public Bodies: Reporting Requirements) (Scotland) Order 2015: requires bodies to prepare reports on compliance with climate change duties ■ The Climate Change (Additional Greenhouse Gas) (Scotland) Order 2015: adds nitrogen trifluoride as an additional greenhouse gas listed in the Climate Change (Scotland) Act 2009 ■ The Climate Change (Annual Targets) (Scotland) Order 2016: sets annual reduction targets for 2028-2032 ■ The Climate Change (Limit on Carbon Units) (Scotland) Order 2016: places a limit on the amount of carbon units that may be credited to net Scottish Emissions for the period 2018-2022 Part 5 of the Climate Change (Scotland) Act 2009 also includes secondary legislation in relation to the energy performance of buildings and the functions of forestry commissioners.	
National (policies, Plans, Programmes and Strategies)		
Climate Change Plan (The Scottish Government, 2018) Including the Update to the Climate Change Plan (The Scottish Government, 2020)	The Climate Change (Scotland) Act 2009 requires that Ministers publish a report setting out policies and proposals to meet annual targets. With the publication of the Climate Change Plan (2018), the Scottish Government aims to meet its emission reduction targets over the period 2018-2032. The Climate Change Plan sits alongside the Scottish Government's Energy Strategy, and provides the strategic framework for our transition to a low carbon Scotland. Building on previous reports on policies and proposals, the Plan sets out the path	The SEA should reflect objectives to **adapt and mitigate climate change, and support the reduction of greenhouse gas emissions.**

Source	Key objectives	Implications/ Comments
	to a low carbon economy while helping to deliver sustainable economic growth and secure the wider benefits to a greener, fairer and healthier Scotland in 2032. The Climate Change Plan provides policies and proposals to reduce GHG emissions from seven key sectors, including: electricity; buildings; transport; industry; waste and the circular economy; land use, land use change and forestry; and, agriculture. Following the amendments to emissions reduction targets by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019, the Scottish Government committed to updating the climate change plan (2020). The new plan continues to drive progress towards the current emissions reduction target of net-zero b 2045. The plan includes an additional sector, negative emissions technologies.	
Progress in reducing emissions in Scotland, 2021 Report to Parliament (CCC, 2021)	This report documents Scotland's progress towards reducing greenhouse gas emissions. The report sets out strategic policies, objectives and milestones for the coming years, including: ■ Make concrete progress on the roadmap against targets for energy efficiency, funding and the roll-out of low-carbon heating in Scotland's buildings. ■ **Decarbonising transport** by encouraging behavioural change, uptake of active and sustainable means of travel, reducing car-kilometres, removing diesel trains from operation, expanding the EV charge point network and promoting '20 minute' neighbourhoods. ■ **Promote resource efficiency, energy efficiency, innovation and aspects of policy on the embodied carbon content of construction.** ■ **Accelerate afforestation and peat restoration, with a focus on widespread implementation.** ■ Ensuring Energy from Waste (EfW) plants are built or retrofitted with CCS capabilities and delivering on stated ambitions to **improve waste prevention, recycling and resource efficiency.**	The SEA should reflect objectives to **adapt and mitigate climate change, and support the reduction of greenhouse gas emissions.**

Source	Key objectives	Implications/ Comments
Climate Ready Scotland: Second Scottish Climate Change Adaptation Programme (The Scottish Government, 2019)	The Adaptation Programme provides an overarching framework for adaptation to climate change, setting out Scottish Ministers' objectives as required by the 2009 Act. Building on the work of Climate Change Ready Scotland: Scottish Climate Change Adaptation Programme (2014) this second Programme sets out to address the impacts identified for Scotland by the 2017 UK Climate Change Risk Assessment.	The SEA should reflect objectives to **mitigate the effects of climate change.**
Climate Ready Scotland: Scottish Climate Change Adaptation Programme (The Scottish Government, 2014)	Addresses the impacts identified for Scotland in the UK Climate Change Risk Assessment (CCRA) published under section 56 of the UK Climate Change Act 2008. It aims to increase the resilience of Scotland's people, environment and economy to the impacts of a changing climate.	The SEA should reflect objectives to **mitigate the effects of climate change.**
A Low Carbon Economic Strategy for Scotland – Scotland, A Low Carbon Society (The Scottish Government, 2010)	The main purpose of the Low Carbon Economic Strategy is to achieve the targets as set out in the Climate Change (Scotland) Act 2009, as amended. The document provides a comprehensive framework for developing a low carbon economy across Scotland. The strategy sets out measures that could be undertaken by Parties to cut their greenhouse gas emissions. This vision relates to the energy sector, the built environment, Scotland's resources and businesses.	The SEA should reflect objectives to **support the reduction of greenhouse gas emissions**
Scottish Emissions Targets 2028-2032 – The high ambition pathway towards a low-carbon economy (Committee on Climate Change, 2016)	Sets out recommendations by the Committee on Climate Change which involves the following; ■ Significant rollout of low-carbon heat pumps and heat networks ■ Promoting sales of electric cars ■ Stimulating afforestation in Scotland ■ Expanding renewable power and shutdown of coal-fired power	The SEA should reflect objectives to **reduce greenhouse gas emissions.**

Source	Key objectives	Implications/ Comments
Big Climate Conversation	The Big Climate Conversation engaged over 2,500 people in Scotland, over a six-month period up to November 2019, in a discussion about Scotland's response to tackling the global climate emergency. Cross cutting issues which emerged included: ■ A holistic and system-wide approach requiring an integrated plan. ■ Government leadership ensuring that low carbon behaviours become the most convenient or only option. ■ A just transition to ensure that action to address climate change should not exacerbate inequalities and, where possible, should reduce them.	The SEA should reflect objectives to **reduce greenhouse gas emissions**
Scotland's Economic Strategy 2015	The strategy sets out an overarching framework for a more productive, cohesive and fairer Scotland. The Economic Strategy forms the strategic plan for existing and all future Scottish Government policy. In addition to setting goals for sustainable economic growth, the Economic Strategy also sets out our ambitions for investing in Scotland's infrastructure, and prioritises investment to ensure that Scotland protects and nurtures its natural resources and captures the opportunities offered by the transition to a more resource efficient, lower carbon economy.	The SEA should reflect objectives to **adapt and mitigate climate change, and support the reduction of greenhouse gas emissions.**
Protecting Scotland, Renewing Scotland: The Government's Programme for Scotland 2020-2021	The programme sets out Scottish Governments plans to make Scotland a more successful country, with opportunities and increased well-being for all. Within the context of the global climate emergency it sets out that the Scottish Government is committed to achieving net zero by 2045. The importance of adaption to prepare and manage the impacts of climate change is also set out. The programme sets out the next Infrastructure Investment Plan which will reflect Scotland's commitment to achieving net zero.	The SEA should reflect objectives to **reduce greenhouse gas emissions**
A fairer, greener Scotland: Programme for Government 2021-2022.	This programme sets out Scottish Government's plans to lead Scotland out of the pandemic whilst being steered by the longer-term vision in the National Performance Framework. Within the context of the global climate emergency, the Programme sets out that action will be required across to ensure that Scotland no longer contributes to global climate change by 2045 at the latest. One of the commitments outlined is to provide £22 million for the	The SEA should reflect objectives to **reduce greenhouse gas emissions**

Source	Key objectives	Implications/ Comments
	restoration of degraded peatlands in 2021-22 as part of the Government's £250 million commitment to restore 250,000 hectares by 2030	

Biodiversity, Flora and Fauna

Source	Key objectives	Implications/ Comments
International		
Bern Convention (1979)	To ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to regulate the exploitation of those species) listed in Appendix III. To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species.	The SEA should consider **the preservation and protection of the environment**.
Bonn Convention on the Conservation of Migratory Species of Wild Animals (1979)	To ensure that contracting parties work together to conserve terrestrial, marine and avian migratory species and their habitats (on a global scale) by providing strict protection for endangered migratory species. The overarching objectives set for the Parties are: ■ Promote, co-operate in and support research relating to migratory species ■ Endeavour to provide immediate protection for migratory species included in Appendix I ■ Endeavour to conclude Agreements covering the conservation and management of migratory species included in Appendix II	The SEA should reflect the objectives **protecting biodiversity and the natural environment.**
Ramsar Convention (1971)	To promote the wise use of wetlands and their resources. The Convention's mission is "the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".	The SEA should take into account the **conservation of wetlands and their resources**.

Source	Key objectives	Implications/ Comments
The Convention on Biological Diversity (2010)	The Convention on Biological Diversity (CBD) is a multilateral treaty which served three main goals, including: ■ Conservation of biological diversity ■ Sustainable use of its components ■ Fair and equitable sharing of benefits arising from genetic	The SEA should reflect objectives **protecting biodiversity and sustainable use of its components.**
National (Legislation)		
Wildlife and Countryside Act 1981 (as amended)	The Act implements the principles of the Bern Convention and the EU Birds Directive in the UK. Since it came into force, the Act has been amended several times. The act applies to the terrestrial environment and inland waters. According to the Act, Scottish Natural Heritage (SNH) is a regulator of the Wild and Countryside Act and is legally responsible for Sites of Special Scientific Interest (SSSIs) and to enforce law when necessary. It is important to note that specific amendments, which only apply in Scotland due to devolution, have been made to the Act.	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
The Conservation (Natural Habitats, &c.) Regulations 1994	The Act amends the Wildlife and Countryside Act 1981 for Scotland. The Act, together with the Nature Conservation (Scotland) Act 2004, implements the EU Birds and Habitats Directives.	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019	These Regulations amended the Conservation (Natural Habitats, &c.) Regulations 1994 to ensure these designations continue to operate effectively following the UK's withdrawal from the EU. (The 1994 Regulations as amended therefore maintains the statutory protection these areas and species are provided).	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
Nature Conservation (Scotland) Act 2004	The Act amends the Wildlife and Countryside Act 1981 for Scotland, and makes provision for the further conservation of biodiversity. The Act requires the Scottish Government to report on progress in relation to the Scottish Biodiversity Strategy	The SEA should reflect objectives to **protect biodiversity and the natural environment.**

Source	Key objectives	Implications/ Comments
Wildlife and Natural Environment (Scotland) Act 2011 (as amended)	The Act amends the Wildlife and Countryside Act 1981 for Scotland. The Act mainly changed the way land and the environment is managed in Scotland e.g. it made operational changes to how SSSIs are managed.	The SEA should reflect objectives to **protect and enhance designated biodiversity areas.**
The Conservation of Offshore Marine Habitats and Species Regulations 2017	The Regulations form the legal basis for the implementation of the Habitats Directive and the Bird Directive in terrestrial areas and territorial waters.	The SEA should reflect objectives to **value, protect and enhance marine habitats and species**.
National (policies, Plans, Programmes and Strategies)		
UK Post-2010 Biodiversity Framework (JNCC, 2012)	The Framework shows how the work of the four UK countries joins up with work at a UK level to achieve the 'Aichi Biodiversity Targets' and the aims of the EU biodiversity strategy. The Framework identifies the following strategic goals: ■ Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society. ■ Reduce the direct pressures on biodiversity and promote sustainable use. ■ Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity. ■ Enhance the benefits to all from biodiversity and ecosystems. ■ Enhance implementation through participatory planning, knowledge management and capacity building.	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
Scotland's Biodiversity: It's in Your Hands (Scottish Executive, 2004)	Scotland's Biodiversity: It's in Your Hands presents a 25 year strategy (until 2030) for the conservation and enhancement of Scotland's biodiversity. It sets out a number of outcomes in relation to; ■ Species and habitats ■ People	The SEA should reflect objectives to **value, protect and enhance biodiversity.**

Source	Key objectives	Implications/ Comments
	■ Landscapes and Ecosystems ■ Integration and Co-ordination ■ Knowledge	
2020 Challenge for Scotland's Biodiversity – A Strategy for the conservation and enhancement of biodiversity in Scotland (The Scottish Government, 2013)	The aims of the 2020 Challenge are in line with the targets set by the aforementioned United Nations Convention on Biological Diversity (20100 and the European Union's Biodiversity Strategy for 2020, and include: ■ Protect and restore biodiversity on land and in Scotland's Sas ■ Involve and engage people in decisions about the environment ■ Promote sustainable economic growth ■ The 2020 Challenge and the 'Scotland's Biodiversity: It's in Your Hands' together make up the Scottish Biodiversity Strategy.	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
Scotland's Biodiversity: A Route Map to 2020 (The Scottish Government, 2015)	The 'Six Big Steps for Nature' identified in the Route Map are: ■ Ecosystem restoration ■ Investment in natural capital ■ Quality greenspace for health and education benefits ■ Conserving wildlife in Scotland ■ Sustainable management of land and freshwater ■ Sustainable management of marine and coastal ecosystems	The SEA should reflect objectives to **value, protect and enhance biodiversity.**
Scottish Biodiversity Strategy; Report to the Scottish Parliament 2014-2016	Report to the Scottish Parliament which sets out progress with delivery of the Scottish Biodiversity Strategy. It records progress from 2014-2016 and highlights the remaining challenges that must be overcome to meet the aims of the 2020 Challenge for Scotland's Biodiversity	The SEA should reflect objectives to **value, protect and enhance biodiversity.**

Source	Key objectives	Implications/ Comments
Edinburgh Declaration on post-2020 global biodiversity framework	Setting out the aspirations and commitments of the Scottish Government, Edinburgh Process partners, and the wider subnational constituency of the Convention on Biological Diversity, in delivering for nature over the coming decade. In particular the declaration recognises the need for transformative change across terrestrial and marine ecosystems, and across urban development and all productive sector to ensure enhanced food security, human health and sustainable livelihoods whilst avoiding, mitigating or minimising the negative impact on biodiversity.	The SEA should reflect objectives to **value, protect and enhance biodiversity.**

Population and Human Health

Source	Key objectives	Implications/ Comments
International		
International Health Regulations, 2007	The International Health Regulations provide a legal instrument for upholding global public health security by preventing and responding to acute public health risks. The Regulations require countries to report certain disease outbreaks and public health risks to the World Health Organisation.	The SEA should reflect the objective that **acknowledges the potential health hazards** that could be caused by the different development types.
National (Legislation)		
Public Health etc. (Scotland) Act 2008	The Act updates the law on public health, enabling Scottish Ministers to protect public health. It also makes provision for law on statutory nuisances.	The SEA should reflect objectives to **protect public health.**
The Air Quality (Scotland) Regulations 2000 As amended by the Air Quality (Scotland) Amendment Regulations 2002 and the Air	Sets out air quality objectives for several substances in line with the Environment Act 1995. In contrast to EU requirement, Scotland has set stricter levels for specific pollutants including PM_{10} and $PM_{2.5}$.	The SEA should reflect the objective to **protect public health by reducing air pollution.**

Source	Key objectives	Implications/ Comments
Quality (Scotland) Amendment Regulations 2016		
The Air Quality Standards (Scotland) Regulations (2010)	Sets statutory targets for concentrations of pollutants in ambient air in accordance with EU Directives. The Act allows for Air Quality Management Zones to be identified and makes provision for the sharing of this information with the public. The Regulations were amended through The Air Quality Standards (Scotland) Amendment Regulations 2016.	The SEA should reflect the objective to **protect public health by reducing air pollution.**
National (policies, Plans, Programmes and Strategies)		
National Performance Framework (The Scottish Government, 2016)	The main purpose of the National Performance Framework is to promote sustainable economic growth by setting out a measurement set that can be used to determine the extent to which key targets are being fulfilled. It sets seven broad targets in relation to: ■ Growth – stimulating economic growth ■ Productivity – improving productivity ■ Participation – improving economic participation ■ Population – increase population growth ■ Solidarity – reduce income equality ■ Cohesion – reduce inequalities in economic participation ■ Sustainability – reduce greenhouse gas emissions	The SEA should reflect objective to **promote the principles of sustainable economic growth.**
Scotland's Public Health Priorities (Scottish Government, 2018)	Sets out the six public health priorities for Scotland and how they are to be developed. The 6 priorities are: ■ A Scotland where we live in vibrant, healthy and safe places and communities ■ A Scotland where we flourish in our early years	The SEA should reflect objectives which **support Scotland's public health priorities.**

Source	Key objectives	Implications/ Comments
	■ A Scotland where we have good mental wellbeing ■ A Scotland where we reduce the use of and harm from alcohol, tobacco and other drugs ■ A Scotland where we have a sustainable, inclusive economy with equality of outcomes for all ■ A Scotland where we eat well, have a healthy weight and are physically active	

Soil

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

Source	Key objectives	Implications/ Comments
	■ Reduce greenhouse gas emissions from soils ■ Protecting soil biodiversity ■ Ensuring that soils contribute to sustainable flood management ■ Enhancing water quality through sustainable soil management ■ Enhancing soil's productive capacity ■ Reducing soil contamination ■ Reducing pressure on greenfield land and redirect development to brownfield sites where appropriate ■ Protecting soils with significant historical and cultural features ■ Enhancing knowledge base ■ Promoting effective coordination between stakeholders	
Scotland's National Peatland Plan Working for our future (Scottish Natural Heritage, 2015)	This plan sets out proposals for the sustainable use, protection, management and restoration of Scotland's peatlands. It identifies the following outcomes: ■ Protect those areas of peatland currently in good condition and supporting their potential range of ecosystem functions; ■ Enhance ecosystem resilience to climate change through appropriate management; ■ Restore peatland ecosystem functions and biodiversity, evaluating and understanding the benefits to help inform future decisions; ■ Secure greater peatland restoration capabilities and understanding of these amongst land managers, developers, advisers and the public; ■ Ensure peatland values are reflected in the support given to those who manage and restore them; and	The SEA should reflect objectives to **protect and promote sustainable use and management of peatlands.**

Source	Key objectives	Implications/ Comments
	■ Demonstrate and communicate the wider public benefits of healthy peatland landscapes and peatland restoration.	
Scottish Government's Draft Peatland and Energy Policy Statement	The Policy Statement provides a common basis from which the Scottish Government and its agencies act in developing and implementing policies in relation to peatland and energy. The principal aim is to *"to maximise greenhouse gas emissions abatement in the way best designed to deliver multiple benefits."* There are eight core principles to support this aim including several specifically related to peat: ■ Decisions on land use change should seek to support delivery of the Scottish Government's targets for peatland restoration ■ The Peatland Code should be promoted as a significant opportunity for developers and other private sector actors to invest in peatland restoration and support good peatland management ■ Land use practices should seek to avoid peatland disturbance as far as possible.	The SEA should reflect objectives to **protect soil quality and reduce greenhouse gas emissions.**

Water

Source	Key objectives	Implications/ Comments
International		
Convention on the Law of the Sea (1982)	Defines the rights and responsibilities of national in their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of natural resources.	The SEA should reflect objectives to **protect and enhance the water environment**.
National (legislation)		
Bathing Waters (Scotland) Regulations 2008	The Act implements the EU Bathing Water Quality Directive.	The SEA should reflect objectives that relate to **flood management and reduction of risk.**

Source	Key objectives	Implications/ Comments
Flood Risk Management (Scotland) Act 2009	The Act requires local authorities to assess bodies of water to determine potential flood risk and carry out measures if required. The Act implements the EU Floods Directive.	The SEA should reflect objectives that relate to **flood management and reduction of risk.**
Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)	Provides a regulatory framework for controlling activities which could have an adverse effect on Scotland's water environment including abstraction, impoundments, dredging, impoundments, surface water drainage and pollution. The primary objective of the Regulations is to protect and restore Scotland's water environment.	The SEA should reflect objectives to **protect and restore the water environment.**
Water Environment and Water Services (Scotland) Act 2003 as amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019	The Water Environment and Water Services (Scotland) Act 2003, as amended, is the enabling legislation for the Water Framework Directive and makes major changes to the administration of water and sewerage provision in Scotland. It identifies the Scottish Environment Protection Agency (SEPA) as the competent authority. Part 2 sets out the amendments to the 2003 Act.	The SEA should reflect objectives to **protect the water environment.**
The Water Environment (River Basin Management Planning: Further Provision) (Scotland) Regulations 2013 (as amended by the Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019)	These regulations make further provisions for the protection of the water environment under the Water Environment and Water Services (Scotland) Act 2003. Part 2 of the regulations supplements Part 1 of that Act setting out further provisions reflecting the requirements of Directive 2000/60/EC establishing a framework for Community action in the field of water policy. Part 3 sets out further provision to reflect the requirements of Directive 2008/105/EC on environmental quality standards in the field of water policy, and Part 4 sets out further provision to reflect the requirements of Directive 2006/118/EC on the protection of groundwater against pollution	The SEA should reflect objectives to **protect and restore the water environment.**
The Pollution Prevention and Control (Scotland) Regulations 2012 (as amended by the	Implements the requirements of the EU Industrial Emissions Directive in Scotland. The Act states that emissions to air, water and land must be considered together, and permits are considered based on the nature of the activity.	The SEA should reflect objectives to **protect and restore the water environment.**

Source	Key objectives	Implications/ Comments
Environment (EU Exit) (Scotland) (Amendment etc.) Regulations 2019)	The Act has been amended several times since 2012.	
Water Environment (Miscellaneous) (Scotland) Regulations 2017	The Regulations amend existing general binding rules and introduces requirements for particular projects to have a construction license in place before works can commence.	The SEA should reflect sustainability objectives to **protect the natural environment.**
The Flood Risk Management (Flood Protection Schemes, Potentially Vulnerable Areas and Local Plan Districts) (Scotland) Amendment Regulations 2017	Provides a regulatory framework for flood risk management amending the previous regulations made in 2009.	The SEA should reflect sustainability objectives to relate to **flood management and reduction of risk.**
National (Policies, Plans, Programmes and Strategies)		
SEPA Draft River Basin Management Plan for Scotland 2021-2027	Identifies key pressures and environmental impacts on Scottish water bodies, which may be exacerbated by climate change. The plan aims to prevent deterioration and improve the quality of the water environment to at least good condition.	The SEA should reflect objectives that relate to **flood management and reduction of risk.**
Scotland's Bathing Waters: A Strategy For Improvement (Scottish Executive Environment Group, 2002)	The main purpose of this strategic document is to reduce water pollution in bathing waters by implementing changes to agricultural practices, ensuring compliance with controls on industrial discharges and making use of SUDs.	The SEA should reflect the Directive requirements and **protect the quality of bathing waters**.

Air

Source	Key objectives	Implications/ Comments
International		

Source	Key objectives	Implications/ Comments
UNECE Convention on Long Range Transboundary Air Pollution (1979)	The purpose of the UNECE Convention was to address the environmental consequences of air pollution. The main aim of the Convention was to reduce and prevent air pollution in order to improve air quality on the local, regional and national levels. To achieve this, the Convention sets out measures to be taken by parties to cut their emissions of air pollutions. The UNECE Convention has been extended by eight other protocols that identify measures to be undertaken by Parties to cut their emissions of air pollutants. These eight protocols include the following: ■ EMEP Protocol on Long-Term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutions in Europe (1984) ■ Helsinki Protocol on the Reduction of Sulphur Emissions (1985) ■ Nitrogen Oxide Protocol (1988) ■ Volatile Organic Compounds Protocol (1991) ■ Oslo Protocol on Further Reduction of Sulphur Emissions (1994) ■ Protocol on Heavy Metals (1998) ■ Aarhus Protocol on Persistent Organic Pollutants (1998) ■ Gothenburg Protocol on Abate Acidification, Eutrophication and Ground-level Ozone (1999)	The SEA should reflect the objectives to **protect and enhance air quality** from factors such as eutrophication and acidification
National (Legislation)		
The Environment Act 1995	The Act requires the UK government and devolved administrations to produce a national air quality strategy. The most recent version of this national air quality strategy is The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, which defines the roles of the local and central government, as well as the Scottish Environment Protection Agency (SEPA), industry, business, transport, individuals and other groups.	The SEA should reflect the objective for **reducing air pollution**.

Source	Key objectives	Implications/ Comments
	In addition, the Act sets objectives for specific emissions and measures for monitoring. Where limits are not met, the local authority must declare it an Air Quality Management Area (AQMA)	
The Air Quality (Scotland) Regulations 2000 As amended by the Air Quality (Scotland) Amendment Regulations 2002 and the Air Quality (Scotland) Amendment Regulations 2016	Sets out air quality objectives for several substances in line with the Environment Act 1995. In contrast to EU requirement, Scotland has set stricter levels for specific pollutants including PM_{10} and $PM_{2.5}$.	The SEA should reflect the objective for **reducing air pollution.**
The Air Quality Standards (Scotland) Regulations (2010)	Sets statutory targets for concentrations of pollutants in ambient air in accordance with EU Directives. The Act allows for Air Quality Management Zones to be identified and makes provision for the sharing of this information with the public. The Regulations were amended through The Air Quality Standards (Scotland) Amendment Regulations 2016.	The SEA should reflect the objective for **reducing air pollution**.
Pollution Prevention and Control (Scotland) Regulations 2012	Implements the requirements of the EU Industrial Emissions Directive in Scotland. The Act states that emissions to air, water and land must be considered together, and permits are considered based on the nature of the activity. The Act has been amended several times since 2012.	The SEA should reflect the objective for **reducing air pollution.**
National (policies, Plans, Programmes and Strategies)		
The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2011)	The key objective of the strategy is to improve and protect ambient air quality in the UK, with the overall aim of health protection. The strategy sets out key objectives and monitoring recommendations for specific emissions.	The SEA should reflect the objective for **reducing air pollution, particularly in relation to health protection.**

Source	Key objectives	Implications/ Comments
Cleaner Air for Scotland – The Road to a Healthier Future (the Scottish Government, 2015)	Presents a single framework which sets out further proposals for delivering improvements to air quality in Scotland. It summarises six broad types of key actions that could help to reduce air pollution and improve air quality; ■ **Transport** – reducing transport emissions by promoting active travel and/or low and zero emission fuels ■ **Legislation and Policy** – comply with European and Scottish legal requirements ■ **Communication** – inform and engage citizens ■ **Health** – protecting citizens from air pollution ■ **Placemaking** – minimise air pollution through appropriate design ■ **Climate Change** – achieve Scotland's renewable targets	The SEA should reflect the objective for **reducing air pollution and promote more sustainable travel**.

Cultural Heritage and the Environment

Source	Key objectives	Implications/ Comments
International		
European Convention on the Protection of the Archaeological Heritage (Valletta, 1992) Revision of the 1985 Granada Convention	Protection of the archaeological heritage, including any physical evidence of the human past that can be investigated archaeologically both on land and underwater. Creation of archaeological reserves and conservation of excavated sites.	The SEA should reflect objectives to **protect the archaeological heritage**.

Source	Key objectives	Implications/ Comments
UNESCO World Heritage Convention (1972)	The 1972 World Heritage Convention links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. It also sets out the duties of States Parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledged to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage.	The SEA Framework should include objectives relating to **the conservation and enhancement of cultural heritage and natural heritage.**
National (Legislation)		
Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997	Provides main legislation to: ■ list buildings of special architectural or historic interest ■ providing requirements in relation to changes affecting listed buildings and conservation areas ■ setting out a framework for designating and managing Conservation Areas	The SEA should reflect objectives to **conserve cultural heritage, particularly in relation to Listed Buildings, Conservation Areas and buildings of special architectural or historic interest.**
National Parks (Scotland) Act 2000	Sets out for main aims for the National Parks of Scotland: ■ Conserving and enhancing the natural and cultural heritage of the area ■ Promoting sustainable use of the natural resources of the area ■ Promoting understanding and enjoyment of the area by the public ■ Promoting sustainable economic and social development of the area's communities	The SEA should reflect objectives to **conserve cultural heritage in National Parks.**
Historic Environment Scotland Act 2014	The Act established Historic Environment Scotland (HES) as a Non Departmental Public Body (NDPB). Under the Act, HES will be a statutory consultee in relation to listed buildings and conservation area consents, as well as in relation to EIA.	The SEA should reflect objectives to **conserve cultural heritage and the wider historic environment.**

Source	Key objectives	Implications/ Comments
	The Act also amended statutory processes in relation to the historic environment by changing the processes for the designation of sites and buildings (by scheduling and listing) and for consents relating to scheduled monuments, listed buildings and conservation areas.	In addition, the role of Historic Environment Scotland should be taken into account.
The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 The Town and Country Planning (Neighbouring Planning Authorities and Historic Environment) (Scotland) Direction 2015	Both Acts state that Historic Environment Scotland must be consulted on any development affecting a UNESCO World Heritage Site in Scotland.	The SEA should reflect objectives to **conserve cultural heritage and the wider historic environment.**
Ancient Monuments and Archaeological Areas Act 1979 (as amended)	The Act consolidated and amended the law relating to ancient monuments; making provision for the investigation, preservation and recording of matters of archaeological or historical interest and for the regulation of operations or activities affecting these assets.	The SEA should reflect objectives to **conserve cultural heritage, particularly in relation to ancient monuments.**
National (policies, Plans, Programmes and Strategies)		
Our Place in Time – The Historic Environment Strategy for Scotland (The Scottish Government, 2014)	The Strategy provides a high level framework which sets out a 10-year vision for safeguarding the cultural, social, environmental and economic value of Scotland's heritage assets. The Strategy sets out three main aims: ■ Investigating and recording the assets that make up Scotland's historic environment ■ Protecting Scotland's historic environment ■ Sharing information on the significance of Scotland's historic environment ■ Each ambition is underpinned by a number of strategic priorities e.g. application of new technologies.	The SEA should reflect objectives to **conserve the historic environment.**

Source	Key objectives	Implications/ Comments
Historic Environment Policy for Scotland(HEPS) (2019)	This policy supports the protection and enhancement of the historic environment, and sets out six policies for managing the historic environment. HEP3 outlines that *"Plans, programmes, policies and strategies, and the allocation of resources, should be approached in a way that protects and promotes the historic environment… If detrimental impact on the historic environment is unavoidable, it should be minimised. Steps should be taken to demonstrate that alternatives have been explored, and mitigation measures should be put in place."*	The SEA should reflect the principles of the protection and enhancement of the historic environment.

Landscape and Geodiversity

Source	Key objectives	Implications/ Comments
National (Policies, Plans, Programmes and Strategies)		
Getting the best from our land A Land Use Strategy for Scotland 2016-2021	The Strategy supports sustainable land use, and recognises the interactions between different interests and land use. The objectives of the strategy include: ■ Land-based businesses working with nature to contribute more to Scotland's prosperity. ■ Responsible stewardship of Scotland's natural resources delivering more benefits to Scotland's people. ■ Urban and rural communities better connected to the land, with more people enjoying the land and positively influencing land use.	The SEA should reflect the need to support **sustainable land use**.
Natural Heritage Futures 2002	This programme aims to guide the sustainable management and use of Scotland's nature and landscapes up until 2025. The programme's six national prospectuses cover: ■ farmland ■ coasts and seas ■ hills and moors	The SEA should reflect objectives to **conserve and enhance the landscape and natural environment.**

Source	Key objectives	Implications/ Comments
	■ settlements ■ freshwater ■ forests and woodlands And each prospectus describes: ■ what is distinctive to each region in Scotland ■ a vision for the natural heritage for 2025 ■ objectives and actions required to pursue that vision.	
Landscape Policy Framework 2017	The policy aims to 'safeguard and enhance the distinct identity, the diverse character and the special qualities of Scotland's landscapes as a whole, so as to ensure tomorrow's landscapes contribute positively to people's environment and are at least as attractive and valued as they are today'. The principles of approach are based on four propositions: ■ Scotland's landscapes are a shared responsibility. ■ All of Scotland's landscapes deserve attention. ■ Scotland's landscapes will continue to change. ■ Scotland's landscapes deserve greater care.	The SEA should reflect objectives to **conserve and enhance the landscape and natural environment.**

Material Assets

Source	Key objectives	Implications/ Comments
National (Legislation)		
Environmental Protection Act 1990	The Act implements the EU Waste Framework Directive (2008) and includes provisions for improved control of pollution and waste generation arising from certain industrial processes	The SEA should reflect objectives to **reduce pollution**.

Source	Key objectives	Implications/ Comments
	Moreover, the Act places a duty on local authorities, as the primary regulators, to identify and secure the remediation of contaminated land in their respective areas. The Environmental Protection Act comprises the following parts: Part I: Integrated Pollution and Control Part II: Waste Management Licencing Part III: Statutory Nuisances Part IV: Criminal Offences Concerning Litter Part VI: Statutory Notification and Risk Assessment for Genetically Modified Organisms (GMOs) Part VII: Creation of Nature Conservancy Council for England, the Nature Conservancy Council for Scotland and the Countryside Council for Wales.	
The Management of Extractive Waste (Scotland) 2010 Regulations	EU directive 2006/21/EC was transposed in the form of the Management of Extractive Waste (Scotland) 2010 Regulations, also known as 'MEW'. It sets out conditions for granting planning permission for extractive waste areas and waste facilities, along with additional requirements for category A (high risk) waste facilities.	The SEA should reflect objectives to **minimise the environmental impact of waste.**
Waste Management Licencing (Scotland) Regulations 2011 (as amended)	Sets out requirements for the management of waste and related activities with regard to granting site licences and consolidating existing licences.	The SEA should reflect objectives to **minimise the environmental impact of waste.**
Pollution Prevention and Control (Scotland) Regulations 2012 (as amended)	Implements the requirements of the EU Industrial Emissions Directive in Scotland. The Act states that emissions to air, water and land must be considered together, and permits are considered based on the nature of the activity. The Act has been amended several times since 2012.	The SEA should reflect objectives for **reducing air/water/soil pollution.**

Source	Key objectives	Implications/ Comments
Scottish Rural Development Programme (SRDP) 2021-2024	The key purpose of the SRDP 2014 – 2020 is to help achieve sustainable economic growth in Scotland's rural areas and the priorities remains broadly the same as the previous programme: The main priorities are: ■ Enhancing the rural economy ■ Supporting agricultural and forestry businesses ■ Protecting and improving the natural environment ■ Addressing the impact of climate change ■ Supporting rural communities	The SEA should reflect objectives for **protecting the environment.**
National (policies, Plans, Programmes and Strategies)		
Scotland's Zero Waste Plan (2010)	The Zero Waste Plan presents a vision to minimise waste transport to landfills, promote recycling and enhancing collection methods. The key objective of the Plan is to maximise the economic and environmental opportunities of waste reduction and reuse.	The SEA should reflect objectives to **minimise the environmental impact of waste and promote recycling**.
Planning Advice Note 63: energy from waste (2013)	Sets out guidance for planning authorities on proactively planning for waste management	The SEA should reflect objectives to **minimise the environmental impact of waste and promote recycling**.
A strategy for improving waste data in Scotland (2017)	Sets out a strategy to improve the relevance, quality and availability of data on waste from all sources (e.g. households, commerce and industry). The primary objective of the strategy is to improve waste data strategies in order to enhance Scotland's waste and resources sector.	The SEA should reflect objectives to **minimise the environmental impact of waste and promote recycling**.
Getting the Best from Our Land: Scotland's Third Land Use Strategy 2021-2026	The Land Use Strategy sets out the Scottish Government's long-term vision for sustainable land use in Scotland, and outlines their objectives and key policies for delivery. This includes objectives and policies for restoration of peatland.	The SEA should reflect objectives to **minimise the environmental impact from land use change.**

Source	Key objectives	Implications/ Comments
Making Things Last: A Circular Economy Strategy for Scotland	Sets out Scotland's ambitions for changing how waste is seen in our economy. It seeks to reduce waste lost from the economy, and retain the value of materials through repair, reuse, recycling, and remanufacturing via a range of policies and proposals. This is noted as fundamental to helping tackle climate change and to preserve natural capital. Four priorities areas for action are identified in Making Things Last: food and drink and the broader bio-economy, remanufacture, construction and the built environment, and energy infrastructure. Making Things Last builds the progress that has been made to date and integrates key elements of the Zero Waste Plan (2010) and Safeguarding Scotland's Resources (2013), with a view that in due course, the Strategy will supersede both.	The SEA should reflect objectives to **minimise the environmental impact of waste and promote recycling**.
Safeguarding Scotland's Resources (2013)	Sets out a programme to reduce waste and deliver economic and environmental benefits in Scotland, and to position Scotland to respond to major global pressures and opportunities. The overall aim of this programme is to prevent waste, increase resource efficiency and enable a shift towards a more circular economy.	The SEA should reflect objectives to **minimise the environmental impact of waste and promote recycling and a circular economy.**

Appendix C

Environmental baseline

Introduction

C.1 Schedule 3 of the 2005 Act requires information to be provided on:

- (2) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme.
- (3) The environmental characteristics of areas likely to be significantly affected.
- (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 Directives 79/409/EEC on the 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).

C.2 The proposed ban on sales of peat for all horticultural use will be assessed against this baseline to provide an indication of the type and significance of any environmental effects that could arise.

Climatic Factors

Overview of Baseline

C.3 In 2018, the IPCC published a report which predicts that the impacts and costs of global warming 1.5ºC above pre-industrial levels will be far greater than expected. It also highlights that the impacts will be much worse if global warming reaches 2ºC or more. Urgency for action is required as the report predicts such level of global warming can be reached within the next 11 years, and most certainly within 20 years without major reductions in CO_2 emissions. The Scottish government has recognised a climate emergency and is acting accordingly.

C.4 In 2020, Scotland's total emissions of the seven GHG were estimated to be 40 MtCO2e, a decrease in source

emissions of 12.0% from 2019[105]. The main reason for the decrease is due to a reduction in transport derived emissions due to the impact of COVID-19. A 51.0% reduction in estimated GHG emissions between 1990 and 2020 was also reported[106]. Decreases in emissions were from energy supply, land use, land use change and forestry, waste management, business emissions (such as manufacturing) and a reduction in domestic transport emissions. Despite a reduction in domestic transport emissions, this sector remains the largest factor slowing the overall reduction is transport (excluding international), as this sector was the largest contributor in 2020 with 9.5MtCO2e. It has reduced emissions by 29.9% since 1990[107].

C.5 Land use, land use change and forestry (LULUCF) play a crucial role in removing CO_2 from the atmosphere by serving as a carbon stock in a form of forestland, cropland, grassland, wetlands, settlements and harvested wood products and rewetting soils and gaining soils organic matter. In 2020, LULUCF sequestrated 3.7 MtCO2e. However, LULUCF can also emit carbon emissions, with 4.2 MtCO2e released in 2020. Overall, in 2020 the LULUCF sector resulted in a net release of 0.5 MtCO2e.

C.6 Climate change poses significant risks to peatlands, as with the warming climate half of the carbon currently stored in Scottish blanket bogs will be at risk of loss and additional emissions. This may significantly hamper efforts to meet emission reduction targets. LULUCF not only stores carbon but it also has the ability to sequester it by forestry and grassland. Land changes for examples from a grassland to cropland or settlement lead to carbon losses and emissions[108].

C.7 Use of peat for horticultural practices is the largest cause of peat extraction in the UK, and accounts for approximately 0.4 MtCO2e[109].

Evolution of Baseline – Pressure and Trends

C.8 In Scotland, greenhouse gas (GHG) emissions are the key driver for climate change. Land use, land use change and forestry, which has previously been a net sink of carbon emissions, contributed 0.5 MtCO2e in 2018[110], however was a carbon sink for CO_2.

C.9 Almost two thirds (65.8%) of Scotland's GHG emissions in 2020 were in the form of carbon dioxide (CO_2)[111]. During 2020, CO_2 was the main GHG emitted in most sectors, with the exception of agriculture sector. Methane (followed by nitrous oxide and CO_2) was the main gas emitted by the agriculture sector and almost all emissions emitted by the waste management sector were in the form of methane.

C.10 Road transport accounted for 10 $MtCO_2e$ in 2018 (68% of all transport emissions), the largest share of all transport modes. Car emissions were 5.8 $MtCO_2e$, which was a 1.3% decrease from 2017, and 0.5% above the 1990 baseline. Between 2017 and 2018 car kilometres increased by 0.6%. Cars accounted for 39.3% of all transport emissions, the largest contribution of any transport mode, and 57.9% of road transport emissions[112]. Emissions from shipping and aviation were 2.30 $MtCO_2e$ (15.5%) and 2.23 $MtCO_2e$ (15.1%) respectively, rail emissions were 0.16 $MtCO_2e$ (1.1%). Road transport is by far the largest source of emissions, accounting for 65% of all transport emissions[113].

C.11 Scotland's soils and peatlands are the biggest terrestrial store of carbon with peatlands alone holding around 3,000 megatonnes of carbon[114]; 60 times more than carbon stored by trees and other vegetation[115]. The update to the Climate Change Plan commits the Scottish Government to providing a £250 million ten-year funding package to support the restoration of 250,000ha of degraded peatland by 2030, however it is noted that this represents less than 10% of the total extent of peatland in Scotland. This will reduce emissions from peatland over this period.

[105] Scottish Government (2022) Scottish Greenhouse Gas Emissions 2018. [online] Available at: https://www.gov.scot/news/scottish-greenhouse-gas-statistics-2020/#:~:text=A%20measure%20of%20the%20actual,cent%20between%202019%20and%202020 (accessed 08/08/2022)
[106] Ibid.
[107] Ibid.
[108] Committee on Climate Change (2013) Factsheet: Land Use, Land Use Change and Forestry [online] Available at: https://www.theccc.org.uk/wp-content/uploads/2013/03/LULUCF.pdf (accessed 08/08/2022)
[109] Ibid.
[110] Scottish Government (2020) Scottish Greenhouse Gas Emissions 2018. [pdf] Available at: https://www.gov.scot/publications/scottish-greenhouse-gas-statistics-2020/documents/ (accessed 08/08/2022)
[111] Scottish Government (2022) Scottish Greenhouse Gas Emissions 2018. [online] Available at: https://www.gov.scot/news/scottish-greenhouse-gas-statistics-2020/#:~:text=A%20measure%20of%20the%20actual,cent%20between%202019%20and%202020 (accessed 08/08/2022)
[112] Transport Scotland (2020) Carbon Account for Transport No. 12: 2020 Edition [online] Available at: https://www.transport.gov.scot/media/48199/sct07209535161.pdf (accessed 08/08/2022)
[113] Transport Scotland (2020) Carbon Account for Transport No. 12: 2020 Edition [online] Available at: https://www.transport.gov.scot/media/48199/sct07209535161.pdf (accessed 08/08/2022)
[114] NatureScot (2022) Managing nature for carbon capture [online] Available at: https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/managing-nature-carbon-capture (accessed 08/08/2022)
[115] ibid

C.12 The extent of the effects of climate change will vary by location and projections indicate that climate change trends observed over the last century will continue and intensify over the coming decades. Key long-term climate change trends for Scotland are that weather may become more variable, typical summers will be hotter and drier, winter and autumn will be milder and wetter and sea levels will continue to rise[116] and this will have an impact on coastal landscapes. Increases in summer heat waves, extreme temperatures and drought, as well as an increase in the frequency and intensity of extreme precipitation events, are also expected[117].

C.13 Climate change is identified as a primary pressure on many of the SEA topic areas (i.e. soil, water, biodiversity, cultural heritage and the historic environment). These pressures and predicted impacts are discussed further under the individual SEA topics. The complex interaction between air quality and climate change has also been considered under the SEA topic of "Air Quality".

Biodiversity, Flora and Fauna

Overview of Baseline

C.14 Biodiversity is commonly used as a measure of the health of an ecosystem, and helps to provide the ecosystems services that are the basis of life including the regulation of air and water, soil formation, nutrient cycling, flood regulation and pollination, amongst many others[118].

C.15 As of 2022, Scotland's protected areas included 243 SACs,[119] 162 SPAs[120], 51 Ramsar sites[121] and 2 Biosphere reserves[122], amongst other internationally designated sites. There are further national level designations such as 1,422 SSSIs[123], 231 Marine Protected Areas for nature conservation[124], one Demonstration and Research MPA[125], 8 Historic MPAs[126] and 2 National Parks[127]. The MPA network covers approximately 37% of Scottish seas[128]. Four new MPAs in Scottish waters were recently designated in December 2020, alongside 12 Special Protection Areas[129]. Additionally, the Red Rocks and Longay MPA was designated an urgent MPA in March 2021 to protect a flapper skate egg nursery area. These national figures include all terrestrial, freshwater and marine protected sites and not all of these will be designated for, or associated with peatland.

C.16 There are over 900 Geological Conservation Review (GCR) sites in Scotland which contain geological and geomorphological features of national and international importance[130]. Of these most are statutorily protected as SSSIs, however over 200 are unnotified GCR sites with no protective SSSI designation status. These are often treated by local authorities as 'candidate SSSIs' and afforded the same protection as SSSIs. Some are treated as Local Nature Conservation Sites where they are given the slightly less protection of locally important sites.

C.17 The UK Biodiversity Action Plan[131] identified 39 priority habitats and 197 priority species either occurring, or known to have occurred until recently, in Scotland. By March 2022, the proportion of natural features reported as being in a "favourable" condition decreased by 0.4 from 78.3% in 2021 to

[116] Adaptation Scotland (2018) Climate trends and projections [online] Available at: https://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections (accessed 08/08/2022)

[117] ibid

[118] NatureScot (undated) An ecosystem approach [online] Available at: https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/ecosystem-approach#:~:text=The%20Convention%20on%20Biological%20Diversity,management%20that%20may%20affect%2C%20or (accessed 08/08/2022)

[119] NatureScot(undated) Special Areas of Conservation [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/natura-sites/special-areas-conservation-sacs (accessed 08/08/2022)

[120] NatureScot (undated) Special Protection Areas [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/natura-sites/special-protection-areas-spas (accessed 08/08/2022)

[121] NatureScot (undated) Ramsar Sites [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/ramsar-sites (accessed 08/08/2022)

[122] NatureScot (undated) Biosphere Reserves [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/international-designations/biosphere-reserve (accessed 08/08/2022)

[123] NatureScot (undated) Sites of Special Scientific Interest [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/sites-special-scientific-interest (accessed 08/08/2022)

[124] Scottish Government (undated) Marine Environment [online] Available at: https://www.gov.scot/policies/marine-environment/marine-protected-areas/ (accessed 08/08/2022)

[125] Ibid

[126] Ibid

[127] Scottish Government (undated) Landscapes and outdoor access [online] Available at: https://www.gov.scot/policies/landscape-and-outdoor-access/national-parks/ (accessed 08/08/2022)

[128] Ibid

[129] JNCC (2020) New sites designated in Scottish waters. Available at: https://jncc.gov.uk/news/new-scottish-sites-designated/ (accessed 08/08/2022)

[130] NatureScot (2022) Geological Conservation Review sites [online] Available at: https://www.nature.scot/professional-advice/protected-areas-and-species/protected-areas/local-designations/geological-conservation-review-sites (accessed 03/11/2022)

[131] UK Government (1994) Biodiversity: The UK Action Plan [online] Available at: http://data.jncc.gov.uk/data/cb0ef1c9-2325-4d17-9f87-a5c84fe400bd/UKBAP-BiodiversityActionPlan-1994.pdf (accessed 08/08/2022)

77.9%[132]. Despite this decrease, this represents a 1.9% percentage point increase since the current protocols were established in 2007[133].

Evolution of Baseline – Pressure and Trends

C.18 There is a range of pressures with the potential to impact on Scotland's wildlife and biodiversity. Key issues such as land use intensification and modification, climate change and pollution have been noted[134].

C.19 Climate change in particular has the potential to greatly impact on biodiversity on a global scale[135]. The predicted effects of climate change and the potential for associated impacts on biodiversity, flora and fauna are well documented, with evidence already showing the wide-ranging effects that a changing climate can have on flora and fauna species and their habitats[136]. Indirect impacts may also arise through climate change adaptation and the action taken in sectors such as renewable energy (e.g. onshore and offshore wind, solar, hydro-power, hydrogen etc.), agriculture, forestry, planning, water and coastal management in the face of a changing climate[137].

C.20 Habitat change, due mainly to increased and more intensive land management, urban development, pollution, nutrient enrichment, and over exploitation of natural resources such as water are other known pressures. Further information on peatland is provided under the 'soil' topic.

C.21 Pressures on biodiversity may be reduced by the commitment to protect at least 30% of the land and sea for nature by 2030 (30x30 pledge) as set out in the *Scottish biodiversity strategy post-2020: statement of intent*[138].

Population and Human Health

Overview of Baseline

C.22 The estimated population of Scotland in 2021 was 5.48 million, the highest to date, and has increased by 0.25% from 2020 and by 4% over the last decade[139]. Projections forecast that the population will continue to rise to around 5.5 million in 2028, before decreasing by 1.8% to around 5.39 million in 2045[140]. Life expectancy has increased over the past three decades; however, this has slowed in recent years[141].

C.23 Approximately 91% of Scotland's people live in urban areas, which accounts for just 2% of Scotland's land surface[142]. Most of the population and industry is concentrated in highly urbanised areas in the Central Belt and on the East Coast, and primarily in four key city regions (Aberdeen, Dundee, Edinburgh, and Glasgow) and several smaller cities and towns (e.g. Ayr, Inverness, Perth and Stirling). Around 11.2% of the population live in small towns of less than 10,000 people; of these, around 77% are located within a 30-minute drive of urban settlements, with the other 23% located more remotely[143].

C.24 The Scottish Index of Multiple Deprivation ranks small areas (data zones) in Scotland from the most deprived to the least deprived. It analyses data from several indicators across the domains of income, employment, health, education, skills and training, housing, geographic access and crime. Key findings from the 2020 Index show that 14 areas have been consistently among the 5% most deprived in Scotland since the 2004 Index. Of these, nine were in Glasgow City with the remainder located in Inverclyde, Renfrewshire, Highland, North Lanarkshire and North Ayrshire. Six council areas now

---

[132] NatureScot (2022) The Proportion of Scotland's Protected Sites in Favourable Condition 2022: An Official Statistics Publication for Scotland [online] Available at: https://www.nature.scot/doc/proportion-scotlands-protected-sites-favourable-condition-2022 (accessed 08/08/2022)

[133] Ibid

[134] NatureScot (undated) Key pressures on biodiversity [online] Available at: https://www.nature.scot/scotlands-biodiversity/key-pressures-biodiversity (accessed 08/08/2022)

[135] Convention on Biological Diversity (undated) Climate Change and Biodiversity – Introduction [online] Available at: http://www.cbd.int/climate/intro.shtml (accessed 08/08/2022)

[136] NatureScot (undated) Climate change impacts in Scotland [online] Available at: https://www.nature.scot/climate-change/climate-change-impacts-scotland (accessed 08/08/2022)

[137] JNCC (2010) Biodiversity and Climate Change – a summary of impacts in the UK [online] Available at: https://hub.jncc.gov.uk/assets/e2d77481-dcb2-4fb3-8fff-d8b1c0cfc97f (accessed 08/08/2022)

[138] Scottish Government (2020) Scottish biodiversity strategy post-2020: statement of intent [online] Available at: Summary and Purpose - Scottish biodiversity strategy post-2020: statement of intent - gov.scot (www.gov.scot) (accessed 03/11/2022)

[139] National Records for Scotland (2022) Mid-2021 Population Estimates, Scotland [online] Available at: https://www.nrscotland.gov.uk/files//statistics/population-estimates/mid-21/mid-year-pop-est-21-report.pdf (accessed 08/08/2022)

[140] National Records for Scotland (2022) Projected Population of Scotland [online] Available at: https://www.nrscotland.gov.uk/files//statistics/population-projections/2020-based/pop-proj-2020-scot-nat-pub.pdf (accessed 08/08/2022)

[141] Ibid.

[142] National Records of Scotland (2022) 91% of Scotland's population live in 2% of its land area [online] Available at: https://www.nrscotland.gov.uk/news/2022/91-percent-of-scotlands-population-live-in-2-percent-of-its-land-area#:~:text=The%20key%20points%20of%20the,the%20threshold%20of%20500%20people. (accessed 08/08/2022)

[143] Scottish Government (2022) Scottish Government Urban Rural Classification 2020 [online] Available at: https://www.gov.scot/publications/scottish-government-urban-rural-classification-2020/documents/ (accessed 15/08/2022)

have a larger share of the 20% most deprived data zones in Scotland compared to 2016, with the largest increases observed in Aberdeen City, North Lanarkshire, Moray, East Lothian, Highland and North Ayrshire[144].

C.25 Heating and cooling homes and businesses accounts for approximately half of Scotland's GHG emissions. Challenging weather, poor energy efficiency and reduced heating options (especially in rural areas) can make fuel bills unaffordable, resulting in fuel poverty[145]. In 2019, the estimated rate of fuel poverty remained similar to the previous year at approximately 24.6% or around 613,000 fuel poor households, and 12.4% or 311,000 households were living in extreme fuel poverty[146]. This compares to the 25.0% or 619,000 fuel poor households in 2018, with 11.3% or 279,000 households living in extreme fuel poverty[147].

Evolution of Baseline – Pressure and Trends

C.26 Air quality is important for both short and long-term human health. In general, healthy people may not suffer from any serious health effects from exposure to the levels of pollution commonly experienced in urban environments. However, continual exposure can cause harm over the long term, and those with pre-existing health conditions such as heart disease, lung conditions, and asthma can be adversely impacted by exposure to air pollutants[148]. Research has shown that air pollution is one of the largest environmental risks to public health in the UK, reducing average life expectancy of every person in the UK by an average of 7–8 months[149] and often contributing to premature deaths. Activities that generate air pollutants have been considered under the topic of Air Quality.

C.27 Transport is a significant contributor to poor air quality in urban areas[150] and emissions from transport have only declined by only 4% in the last decade up to 2019[151]. In 2020, approximately 68.8% of all journeys in Scotland are reported to have been made by car[152]. Due to several common sources, most notably road traffic in urban areas, there is also a close relationship between air quality and environmental noise[153].

C.28 Flooding can have significant environmental impacts and can also affect people, communities and businesses[154]. When floods occur, they disrupt day-to-day lives and their impacts can be long lasting. Climate change is expected to increase the risk of flooding in coming years, and it also brings additional risks to human health posed by changes to air quality and rising temperatures[155].

C.29 The potential risks and benefits of climate change on population and health will not be evenly spread. For example, pockets of dense urban development will be more at risk of surface water flooding and summer heat stress. In addition, the effects to human health from climate change may have the greatest impact on vulnerable people. Negative health effects are likely to be disproportionately severe in areas of high deprivation because of the reduced ability of individuals and communities in these areas to prepare, respond and recover[156].

Soil and Geology

Overview of Baseline

C.30 Soil is a non-renewable resource and is fundamentally one of Scotland's most important assets[157]. It supports a wide

[144] Scottish Government (2020) Introducing - The Scottish Index of Multiple Deprivation 2020 [online] Available at: https://www.gov.scot/publications/scottish-index-multiple-deprivation-2020/ (accessed 08/08/2022)

[145] Scottish Government (undated) Home energy and fuel poverty [online] Available at: https://www.gov.scot/policies/home-energy-and-fuel-poverty/ (accessed 10/08/2022)

[146] Scottish Government (2020) Scottish house condition survey: 2019 key findings [online] Available at: https://www.gov.scot/publications/scottish-house-condition-survey-2019-key-findings/pages/6/ (accessed 08/08/2022)

[147] ibid

[148] Scotland's Environment (2016) Air quality and health [online] Available at: https://www.environment.gov.scot/our-environment/air/air-quality-and-health/ (accessed 08/08/2022)

[149] DEFRA (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland[online] Available at: http://www.scottishairquality.scot/air-quality/ (accessed 08/08/2022)

[150] Scotland's Environment (2016) Air quality [online] Available at: https://www.environment.gov.scot/our-environment/air/air-quality/ (accessed 08/08/2022)

[151] Climate Change Committee (2021). Progress in reducing emissions in Scotland [online] Available at: https://www.theccc.org.uk/wp-content/uploads/2021/12/Progress-reducing-emissions-in-Scotland-2021-Report-to-Parliament-1.pdf (accessed 10/08/2022)

[152] Transport Scotland (2019) Scottish Transport Statistics [pdf] Available at: https://www.transport.gov.scot/media/47196/scottish-transport-statistics-2019.pdf (accessed 08/08/2022)

[153] Scottish Government (2021) Cleaner Air for Scotland 2 strategy: Towards a Better Place for Everyone Available at: https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/ (accessed 08/08/2022)

[154] UK Government (2022) UK Climate Change Risk Assessment 2022. [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf (accessed 10/08/2022)

[155] Ibid.

[156] The Scottish Parliament (2012) SPICe Briefing: Climate Change and Health in Scotland [online] Available at: https://archive2021.parliament.scot/ResearchBriefingsAndFactsheets/S4/SB_12-26rev.pdf (accessed 08/08/2022)

[157] NatureScot (undated) Scotland's Soils [online] Available at: https://www.nature.scot/landforms-and-geology/scotlands-rocks-landforms-and-soils/scotlands-soils (accessed 08/08/2022)

range of natural processes and underpins much of our natural environment, helping to provide a wide range of environmental, economic and societal benefits. For example, soil provides the basis for food, controls and regulates environmental interactions such as regulating the flow and quality of water and providing a platform for buildings and roads[158]. There is an intrinsic relationship between soil health and other environmental topics; biodiversity, water and air quality in particular. For example, soil erosion is one of the main contributors to diffuse water pollution[159].

C.31 Soils can play two significant roles with regards to carbon. It is estimated that Scotland's soils contain over 3 billion tonnes of historic carbon, 60 times the amount of carbon held in trees and plants[160], with peatlands holding most (over 53%) of Scotland's carbon store[161].

C.32 It is estimated that the loss of just 1% of soil carbon as carbon dioxide would triple Scotland's annual GHG emissions[162]. However, soil has also capacity to continue removing atmospheric carbon dioxide through additional sequestration.

C.33 Degraded soil can act as a net carbon emitter, soils in good condition protect the carbon store and depending on the vegetation cover can continue to sequester carbon. Land use change and management practices, and new development on land can impact significantly on soil carbon stores and sequestration.

C.34 Peatlands are of particular importance for mitigating climate change by acting as carbon 'sinks'. Blanket bog is the most extensive semi-natural habitat in Scotland, covering around 23% of the land area[163]. Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west in areas with gentle slopes and poor drainage[164]. Approximately 1.7 billion tonnes of carbon is stored within Scottish peatlands[165]. If peatlands are in good condition they have the ability to deposit and continually sequester new carbon in peat-forming vegetation. However, if they are in poor condition they can act as a source of carbon emissions.

C.35 As with all soils, peatlands are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to be a significant contributor to Scotland's GHG emissions[166]. It is estimated that 70% of Scotland's blanket bog and 90% of Scotland's raised bog area are damaged to some degree[167]. In 2020, LULUCF (including peatlands) accounted for a net release of 0.5 MtCO2e (based on 3.7 MtCO2e sequestered, and 4.2 MtCO2e released).

C.36 If Scotland lost all of the carbon stored in its peat soils as CO_2, it would be the equivalent of more than 120 times Scotland's annual GHG emissions. It is estimated that over 80% of Scotland's peatlands are degraded[168].

C.37 Further information on peat extraction is provided under 'material assets'.

Evolution of Baseline – Pressure and Trends

C.38 While Scotland's soils are considered to generally be in good health[169], there is no robust evidence base to support this as there is no systematic soil monitoring carried out in Scotland, particularly when compared to air and water which

[158] Scottish Government (2009) The Scottish Soil Framework [online] Available at: https://www.gov.scot/publications/scottish-soil-framework/ (accessed 08/08/2022)

[159] SEPA (undated) Soil [online] Available at: http://www.sepa.org.uk/environment/land/soil/#effect (accessed 08/08/2022)

[160] Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/ (accessed 08/08/2022)

[161] NatureScot (undated) Managing nature for carbon capture [online] Available at: https://www.nature.scot/professional-advice/land-and-sea-management/carbon-management/managing-nature-carbon-capture (accessed 09/08/2022)

[162] Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/ (accessed 08/08/2022)

[163] ibid

[164] NatureScot (2014) Commissioned Report No. 701 - Scotland's peatland – definitions & information resources [online] Available at: https://www.nls.uk/e-monographs/2014/701.pdf (accessed 08/08/2022)

[165] NatureScot (undated) Peatland ACTION case study: What's the connection between peat and carbon storage? [online] Available at: https://www.nature.scot/doc/peatland-action-case-study-whats-connection-between-peat-and-carbon-storage#:~:text=Scottish%20peatlands%20store%201.7%20billion,total%20annual%20greenhouse%20gas%20emissions. (accessed 08/08/2022)

[166] Scottish Government (2009) The Scottish Soil Framework [online] Available at: https://www.gov.scot/publications/scottish-soil-framework/ (accessed 08/08/2022)

[167] NatureScot (2015) Scotland's National Peatland Plan [online] Available at: https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future#:~:text=Scotland%27s%20National%20Peatland%20Plan%20provides,which%20are%20damaged%20or%20degraded. (accessed 03/11/2022

[168] Scotland's Environment (2019) Peatland Restoration [online] Available at: https://soils.environment.gov.scot/resources/peatland-restoration/ (accessed 08/08/2022)

[169] The James Hutton Institute (2016) Soils: Environment, Health and Society [online] Available at: https://www.hutton.ac.uk/sites/default/files/files/publications/Soils%20booklet_reduced%20size_web.pdf (accessed 09/08/2022)

have national, long-term datasets available[170,171]. Furthermore, there are a range of pressures on soils[172]. Climate change[173] and loss of organic matter[174] pose significant threats to Scottish soils, with both likely to affect soil function, including loss of soil carbon. The loss of valued soils in particular has the potential for national impacts which will be difficult to reverse. In the case of climate change, these impacts have the potential to be felt on a global scale[175]. As such, the management and use of these resources can affect the amount of CO_2 that is held or released. Peatlands in good condition remove CO_2 from the atmosphere and store carbon in the soil. Conversely, degraded peatlands may emit more CO_2 than they remove and become a net source of greenhouse gases[176].

C.39 Changes in land use and land management practices can also be a key pressure on soil. Such activities include development and the expansion of agriculture and forestry[177]. However, changes to land use and land management may also have benefits for soil resources and the natural environment in general. For example, if changes are enacted as part of a restoration or enhancement policy[178]

C.40 At present, there is uncertainty and a lack of quantitative information regarding threats to soil functions and ecosystem services, particularly in relation to the extent of soil sealing, changes in soil biodiversity, and compaction of soils[179]. Soil contamination can also arise from many causes, including atmospheric deposition, agriculture and forestry operations, mining and historic land contamination, and can impact on soil function and biodiversity[180].

Water

Overview of Baseline

C.41 Scotland's water provides a wide range of benefits that support our health and prosperity, such as the provision of drinking water and as a resource for use in agriculture and industry and for recreational activities[181]. These water resources also support a rich diversity of habitats and species, attract tourism, promote recreation and provide for the sustainable growth of the economy[182].

C.42 In recent decades, significant improvements to water quality in many rivers, canals, and estuaries have been observed alongside significant reductions in pollution[183]. Most of Scotland's seas, coasts, and estuaries are in good or excellent condition; however, some localised areas of concern remain[184]. Nearly half of rivers in Scotland are now in good condition or better and almost two thirds of lochs surveyed were found to be in good or high condition[185].

C.43 Scotland's groundwater is a valuable asset for many, particularly rural communities where it provides most of the

[170] Scottish Government (2009) The Scottish Soil Framework [online] Available at: https://www.gov.scot/publications/scottish-soil-framework/ (accessed 08/08/2022)

[171] Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/ (accessed 08/08/2022)

[172] The James Hutton Institute (2016) Soils: Environment, Health and Society [online] Available at: https://www.hutton.ac.uk/sites/default/files/files/publications/Soils%20booklet_reduced%20size_web.pdf (accessed 09/08/2022)

[173] NatureScot (undated) Pressures on Soils [online] Available at: https://www.nature.scot/landforms-and-geology/pressures-geodiversity/pressures-soils (accessed 09/08/20222)

[174] Scotland's Soils – part of Scotland's Environment (2017) State of Scotland's soils – State of Scotland's Soil Report 2011 [online] Available at: http://soils.environment.gov.scot/soils-in-scotland/state-of-scotlands-soils/ (accessed 08/08/2022)

[175] ibid

[176] Scotland's Environment (2019) Peatland Restoration [online] Available at: https://soils.environment.gov.scot/resources/peatland-restoration/ (accessed 08/08/2022)

[177] Scotland's Environment (2011) Soils [online] Available at: https://www.environment.gov.scot/media/1213/land-soils.pdf (accessed 08/08/2022)

[178] Scottish Government (2011) The State of Scotland's Soil [online] Available at: https://www.sepa.org.uk/media/138741/state-of-soil-report-final.pdf (accessed 03/11/2022)

[179] European Commission (2016) JRC Technical Reports - Soil threats in Europe - Status, methods, drivers and effects on ecosystem services [online] Available at: http://esdac.jrc.ec.europa.eu/public_path/shared_folder/doc_pub/EUR27607.pdf (accessed 08/08/2022)

[180] SEPA (2019) Guidance on consideration of soil in Strategy Environmental Assessment [online] Available at: https://www.sepa.org.uk/media/162986/lups-sea-gu2-consideration-of-soil-in-sea.pdf (accessed 08/08/2022)

[181] Scotland's Environment (undated) Scotland's Freshwater [online] Available at: https://www.environment.gov.scot/our-environment/water/scotland-s-freshwater/ (accessed 08/08/2022)

[182] Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf (accessed 08/08/2022)

[183] Scotland's Environment (2014) Rivers and Canals [online] Available at: https://www.environment.gov.scot/media/1179/water-rivers-and-canals.pdf (accessed 08/08/2022)

[184] Scotland's Environment (undated) Scotland's Seas [online] Available at: https://www.environment.gov.scot/our-environment/water/scotland-s-seas/#:~:text=Most%20of%20our%20seas%2C%20coasts,past%20have%20largely%20been%20addressed (accessed 09/08/2022)

[185] Scotland's Environment (undated) Scotland's freshwater [online] Available at: https://www.environment.gov.scot/our-environment/water/scotland-s-freshwater/#:~:text=Lochs%20%2D%20Number%20and%20areas&text=The%20condition%20of%20Scottish%20rivers,Scotland%20are%20in%20good%20condition. (accessed 08/08/2022)

private drinking water (75%)[186]. Around 80% of Scotland's groundwater is in good condition, although there are particular regions with widespread problems; for example, in the Central Belt[187]. Agriculture and the legacy of industrial activity are the main causes of regional-scale groundwater problems, whereas inadequate construction of private water supplies and inappropriate management of wastes can create localised problems[188].

C.44 Flooding can have significant and long-lasting impacts on people, communities, and businesses. Flood Risk Management Strategies[189] co-ordinate action to tackle flooding in Scotland, setting out the national direction for flood risk management and helping target investment and coordinate action across public bodies. Flood maps have also been produced which help to show where areas are likely to be at risk of flooding from rivers, seas and surface water[190]

C.45 Scotland's peatlands play an important role in natural flood management. Healthy peatlands help with flood management by slowing the flow of water over a rough vegetated surface, and by water retention by sphagnum moss which has a water holding capacity of more than 20 times its dry weight. Therefore, peatland has the ability to soak up and store vast quantities of water, particularly in pools, hollows and depressions, thereby slowing flow of water through a catchment. This can prevent flooding downstream within catchments, particularly if large areas of peatland are present upstream[191]. Likewise, other habitats such as woodland and forestry may also contribute towards natural flood management by intercepting precipitation, reducing surface water runoff through increased infiltration, and increased use of water through evapotranspiration[192]. Fallen branches and trees may also create natural dams along watercourses, helping to slow the flow of the water.

Evolution of Baseline – Pressure and Trends

C.46 Key pressures on the surface water environment include urbanisation, an increase in invasive non-native species, intensive agriculture/aquaculture and climate change. Rural and urban diffuse pollution remains a concern for water quality, particularly in relation to agriculture, forestry, and urban development[193]. Increased degradation of peatlands will contribute towards worsening of water quality due to increased erosion on bare peat which would result in the loss of carbon and high rates of dissolved organic carbon content. High DOC content in water can have adverse effects on biodiversity and humans (through pollution and increased treatment cost etc.). Furthermore, peat extraction will alter drainage and water table levels, impacting on the flux and quality of surface and groundwater.

C.47 Airborne pollution, particularly associated with vehicle emissions can impact upon water bodies. Heightened nitrogen concentrations can cause the acidification and eutrophication of water bodies. Eutrophication occurs when the concentrations of otherwise limiting nutrients increase, allowing aquatic plants and algae to grow unchecked and depleting oxygen levels.

C.48 The predicted effects of climate change such as increased temperatures and changes to rainfall patterns could affect flows in rivers and impact on water resource availability[194]. This could be further exacerbated if waterflow is altered due to the ongoing extraction of peat. A changing climate is also expected to have ecological impacts, such as warmer sea temperatures and an increasing risk of non-native species spreading and becoming established in water environments[195].

C.49 The risk of flooding from rivers, surface waters and sea is predicted to increase. This can damage material assets, pose risks to population and human health through the spread

[186] Scotland's Environment (2011) Groundwater [online] Available at: https://www.environment.gov.scot/media/1230/water-groundwater.pdf (accessed 08/08/2022)

[187] ibid

[188] ibid

[189] SEPA (undated) Flood Risk Management Strategies [online] Available at: http://apps.sepa.org.uk/FRMStrategies/ (accessed 08/08/2022)

[190] SEPA (undated) Flood maps [online] Available at: http://www.sepa.org.uk/environment/water/flooding/flood-maps/ (accessed 08/08/2022)

[191] Allot et al. (2019) Peatland Catchments and Natural Flood Management [online] Available at: https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2019-11/COI%20Peatlands%20and%20NFM.pdf (accessed 08/08/2022)

[192] Natural Flood Management Network Scotland (2020). Woodland [online] Available at: https://www.nfm.scot/topics/woodland (accessed 08/08/2022)

[193] SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf (accessed 08/08/2022)

[194] Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf (accessed 08/08/2022)

[195] SEPA (2015) The river basin management plan for the Scotland river basin district: 2015–2027 [online] Available at: https://www.sepa.org.uk/media/163445/the-river-basin-management-plan-for-the-scotland-river-basin-district-2015-2027.pdf (accessed 08/08/2022)

of infectious diseases and also lead to a loss of habitats, resulting from erosion.

Air

Overview of Baseline

C.50 As discussed in 'Population and Human Health', air pollution can result in adverse impacts on human health and can significantly affect many aspects of quality of life. Air pollution can also cause adverse effects in the wider environment. For example, it can increase nutrient levels in water bodies and soil and contribute to acidification, both of which can impact on plant and animal life, as well as damage the fabric of buildings and monuments.

C.51 The quality of the air around us is affected by the pollutants released into the atmosphere through human activities, such as transport, industry and agriculture as well as pollutants arising from natural sources. The main air pollutants are nitrogen oxides (NO_x), particulate matter (PM_x), sulphur dioxide (SO_2), ammonia (NH_3), volatile organic compounds (VOCs), and ozone (O_3). Sulphur dioxide, oxides of nitrogen, particulates, and low-level ozone are generally considered to be of most importance in relation to human health and the environment[196].

Evolution of Baseline – Pressure and Trends

C.52 Air quality in Scotland has improved considerably over the last few decades. Between 2005 and 2019 there were decreases of 51% for carbon monoxide (CO), 53% for nitrogen oxides (NO_x), 15% for non-methane volatile organic compounds, 30% for fine particulate matter (PM_{10}) and 85% for SO_2[197]. However, air pollution is still estimated to reduce the life expectancy of every person in the UK by an average of 7–8 months[198] and there are some areas of towns and cities where air quality has been identified as a concern.

C.53 Section 83(1) of the *Environmental Act 1995*[199] sets out a requirement that where air quality objectives are not being met or are unlikely to be met within the relevant period, Local Authorities must designate an Air Quality Management Area (AQMA). In Scotland, 41 AQMAs have currently been declared, with 14 of Scotland's 32 Local Authorities having declared at least one. The majority of these are in urban areas as a result of NO_x alone or in combination with PM_{10} levels, and primarily as a result of traffic emissions[200].

C.54 Air pollution often originates from the same activities that contribute to climate change; notably transport, agriculture and energy generation. Transport is the most significant source contributing to poor air quality in urban areas[201]. Measures such as using alternative fuels sources and encouraging travel by more sustainable modes of transport can help improve air quality in addition to reducing GHG emissions.

C.55 Cleaner air provides multiple benefits, and actions taken, such as a shift towards low or zero emissions transport and energy sources, should provide mutual benefits for both air quality and climate change[202].

C.56 The Covid-19 pandemic has led to short term air quality improvements especially in urban areas mainly due to the reduction in private and public transport use. Evidence suggests that due to the pandemic, air pollution of NO_2 and NO_x across 7 sites in Scotland has on average decreased by -55% and -61% respectively[203]. However, such results have been gained by implementing very strict measures.

Cultural Heritage

Overview of Baseline

C.57 Scotland's many and varied historical sites are unique and irreplaceable. These sites and features are regarded as making a valuable contribution to our quality of life, cultural identity, education and economy. While these assets are

[196] Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf (accessed 08/08/2022)

[197] National Atmospheric Emissions inventory (2021) Air Pollutant Inventories for England, Scotland, Wales and Northern Ireland: 2005 – 2019 [online] Available at: https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2109270949_DA_Air_Pollutant_Inventories_2005-2019_Issue1.1.pdf (accessed 08/08/2022)

[198] DEFRA (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland[online] Available at: http://www.scottishairquality.scot/air-quality/ (accessed 08/08/2022)

[199] Environment Act 1995, c.25 [online] Available at: http://www.legislation.gov.uk/ukpga/1995/25/introduction (accessed 08/08/2022)

[200] Air Quality in Scotland (2022) Air Quality Management Areas [online] Available at: https://www.scottishairquality.scot/laqm/aqma (accessed 08/08/2022)

[201] Scotland's Environment (2016) Air quality [online] Available at: https://www.environment.gov.scot/our-environment/air/air-quality/ (accessed 08/08/2022)

[202] Scottish Government (2021) Cleaner air for Scotland 2: Towards a Better Place for Everyone [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2021/07/cleaner-air-scotland-2-towards-better-place-everyone/documents/cleaner-air-scotland-2-towards-better-place-everyone/cleaner-air-scotland-2-towards-better-place-everyone/govscot%3Adocument/cleaner-air-scotland-2-towards-better-place-everyone.pdf (accessed 08/08/2022)

[203] Ricardo Energy and Environment (2020) COVID-19 lockdown effects on air quality. [online] Available at: http://www.scottishairquality.scot/assets/documents//COVID19_lockdown_effects_on_air_quality.html (accessed 08/08/2022)

distributed widely throughout Scotland, there are clusters of sites in and around settlements and also around coastlines.

C.58 Some parts of Scotland's historic environment are protected through a process of designation. The process aims to identify parts of the historic environment for their significance and enhance their protection. As of 2016, it is estimated that around 5-10% of the historic environment is designated[204]. Designated assets currently include World Heritage Sites, Listed Buildings, Scheduled Monuments, Conservation Areas, Designed Gardens and Landscapes, Historic Marine Protected Areas, Scheduled Wrecks and Nationally Important Battlefields[205]. However, whilst most of the historic environment is undesignated (90-95%), these known but undesignated assets provide important contextual information which helps us better understand designated sites[206]. The waterlogged, acidic and anaerobic conditions that characterise peatlands are ideal environments for the long-term preservation of organic and some inorganic archaeological remains, and historical and paleo climatic and environmental evidence. Many of the geological SSSI and Geological Conservation Review (GCR) sites are protected for their 'Quaternary of Scotland' feature category.

C.59 Furthermore, blanket bog can decrease detection likelihood from all types of archaeological survey, and there is likely to be unknown heritage assets beneath peatland, which could potentially be of high significance. Peatlands (especially upland peatlands) can therefore be thought of as likely caches of unknown heritage assets. Limiting peat harvesting will therefore help protect unknown heritage assets hidden within peatlands.

C.60 Peatlands are also valued for the information they hold on past changes in climate, environment and vegetation, which can be revealed through the study of pollen, plant, insect remains and other 'proxies'[207].

C.61 Peatlands are of particular importance for cultural heritage as they not only help preserve heritage assets, but they also can form an important component to the setting of heritage assets. Their alteration (e.g., through extraction) could adversely affect the setting of heritage assets. Likewise, the use of alternative growing media can have implications for heritage assets through development of processing facilities or removal of woodland or forestry nearby heritage assets.

Evolution of Baseline – Pressure and Trends

C.62 Development is a key pressure on the historic environment and cultural heritage, both directly in terms of damage to known and unknown features, and the potential for impacts on setting. Other known pressures include changing land use and land management, tourism/visitors, pollution and climate change.

C.63 It is projected that Scotland will become warmer and wetter as a result of climate change, resulting in the increased weathering of stone, rotting timbers and corrosion of metals. Rising sea levels and increased storm events may increase coastal erosion, endangering our historic landscapes, structures, buildings and archaeology in the coastal zone. Some of Scotland's unique and special sites, such as Skara Brae in Orkney, are at most risk[208].

C.64 Increased rainfall will mean that historic buildings and assets will be wetter for longer periods of time, and as such may result in the penetration of water, dampness, condensation and fungus growth, ground instability and structural collapse. This can potentially have damaging effects on the fabric of buildings and the health of those using it. This threat will grow in the future, given the future predictions of the likely effects of global warming and climate change for the remainder of this century.

Landscape

Overview of Baseline

C.65 Rich in diversity, Scotland's landscapes are internationally renowned. Scotland's distinctive landscapes are a significant part of the country's natural and cultural heritage and make a significant contribution to both the country's economic performance and the well-being of its people. Scotland's landscapes play a key role in attracting tourism,

[204] Historic Environment Scotland (2016) Scotland's Historic Environment Audit: Summary Report 2016 [online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=bac8296b-fcd4-4fdf-8617-ab9e009235db (accessed 08/08/2022)

[205] Scotland's Environment (undated) Historic Environment [online] Available at: https://www.environment.gov.scot/our-environment/people-and-the-environment/historic-environment/ (accessed 08/08/2022)

[206] Historic Environment Scotland (2016) Scotland's Historic Environment Audit: Summary Report 2016 [online] Available at: https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=bac8296b-fcd4-4fdf-8617-ab9e009235db (accessed 08/08/2022)

[207] Gearey, B., Bermingham, N., Chapman, H., Charman, D., Fletcher, W., Fyfe, R., Quartermaine & Van de Noort, R. (2010). Peatlands and the Historic Environment. Edinburgh: IUCN UK Peatland Programme [online] Available at: https://www.iucn-uk-peatlandprogramme.org/sites/www.iucn-uk-peatlandprogramme.org/files/Review%20Peatland%20Historic%20Environment,%20June%202011%20Final.pdf (accessed 11/09/22)

[208] Scotland's Environment (2014) Scotland's State of the Environment Report 2014 [online] Available at: https://www.environment.gov.scot/media/1170/state-of-environment-report-2014.pdf (accessed 08/08/2022)

affording opportunities for business and providing the setting for outdoor recreation.

C.66 There are currently two National Parks (Loch Lomond and The Trossachs, and the Cairngorms) and 40 National Scenic Areas in Scotland. Over 13% of Scotland's land area has been classified as a National Scenic Area[209]. Designations such as Local Landscape Areas, Special Landscape Areas, Regional Scenic Areas and Areas of Great Landscape Value have also been established at a regional and local level by many local authorities[210]. These areas of important nature or landscape value have been designated locally for conservation purposes and are afforded protection from inappropriate development[211]. 42 wild land areas are also recognised as nationally important in Scotland reflecting landscapes with minimal human influence[212].

C.67 Peatlands in Scotland extend over large areas of Scottish uplands but are most extensive in the north and west in areas with gentle slopes and poor drainage[213]. Blanket bog is the most extensive semi-natural habitat in Scotland, covering around 23% of the land area[214], and as such is an important component for the landscape character of an area Peatlands are at risk from land use change and the effects of climate change, and their loss or degradation (and the associated loss of carbon) has the potential to adversely affect landscape character. It is estimated that 70% of Scotland's blanket bog and 90% of Scotland's raised bog area are damaged to some degree[215], and this could be detrimental to the landscape character of the area.

Evolution of Baseline – Pressure and Trends

C.68 Scotland's landscapes are constantly changing and evolving in response to both natural processes and the changing demands of society. Changes in landscape tend to occur over long periods of time, and gradual change, as a result of development such as housing and renewable energy can be difficult to determine[216]. Land use, land use change and forestry can also contribute towards changes in the landscape, both positively and negatively. For example, if changes are enacted as part of a restoration or enhancement policy.

C.69 Climate change is expected to lead to extensive landscape change across Scotland and is viewed as an increasing pressure on landscape, not only as a result of direct effects but also as a result of indirect impacts[217]. Direct impacts are likely as a result of changing temperatures and patterns of precipitation, weather events and sea level change[218].

C.70 The greatest changes are likely to be seen in areas of highest population, such as lowland and coastal areas. Mitigation and adaptation measures are expected to have a greater influence on both Scotland's landscapes and the quality of life than that of the direct effects of climate change[219].

Material Assets

Overview of Baseline

C.71 Scotland's natural resources are material assets. Mineral resources and aggregates are used for purposes such as fuel (e.g. coal), construction (e.g. sand, gravel and rock) and for other purposes such as horticulture (e.g. peat). However, the quantity of these resources is finite and once they are used up, they cannot be replaced.

C.72 Waste management and transportation of peat, and land use, form key considerations in the proposed ban on sales of peat for all horticultural use, and therefore have the potential for environmental impacts. Environmental baseline information

[209] NatureScot (undated) National Scenic Areas [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/national-designations/national-scenic-areas (accessed 08/08/2022)

[210] NatureScot (undated) Local Designations [online] Available at: https://www.nature.scot/professional-advice/safeguarding-protected-areas-and-species/protected-areas/local-designations (accessed 08/08/2022)

[211] Ibid

[212] NatureScot (2014) Wild Land Areas map and descriptions 2014 [online] Available at: https://www.nature.scot/doc/wild-land-areas-map-and-descriptions-2014 (accessed 08/08/2022)

[213] NatureScot (2014) Commissioned Report No. 701 - Scotland's peatland – definitions & information resources [online] Available at: https://www.nls.uk/e-monographs/2014/701.pdf (accessed 08/08/2022)

[214] ibid

[215] NatureScot (2015) Scotland's National Peatland Plan [online] Available at: https://www.nature.scot/doc/scotlands-national-peatland-plan-working-our-future#:~:text=Scotland%27s%20National%20Peatland%20Plan%20provides,which%20are%20damaged%20or%20degraded. (accessed 03/11/2022

[216] Scotland's Environment (2014) Landscape [online] Available at: https://www.environment.gov.scot/media/1196/land-landscape.pdf (accessed 08/08/2022)

[217] NatureScot(2019) Landscape: Climate change [online] Available at: https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-climate-change (accessed 08/08/2022)

[218] Scotland's Environment (2014) Landscape [online] Available at: https://www.environment.gov.scot/media/1196/land-landscape.pdf (accessed 08/08/2022)

[219] NatureScot (undated) Landscape: climate change. Available at: https://www.nature.scot/professional-advice/landscape/landscape-policy-and-guidance/landscape-climate-change (accessed 08/08/2022)

relevant to each of these sectors is presented in the following sections.

Waste management

C.73 There is limited data available on waste in Scotland for 2019 and 2020, with the last complete dataset published in 2018. Over 11.45 million tonnes of waste was generated in Scotland in 2018; which is unchanged since 2017. The largest increase of wastes generated between 2017 and 2018 was Animal and mixed food waste (increase of 58,119 tonnes, 15.9%). This is consistent with the implementation of the Waste (Scotland) Regulations 2012 that requires businesses in Scotland to source segregate materials, including food waste in urban areas[220].

C.74 The largest proportions of waste produced in 2018 consisted of soils (37.5%), household and similar wastes (18%) and mineral waste from construction and demolition (11.1%)[221]. Of this, around 7.07 million tonnes was recycled, reused or composted, an increase of 0.4% than in 2017[222]. The remaining waste comprised 4.0 million tonnes disposed via incineration or landfill, and 0.50 million tonnes recovered through incineration/co-incineration processes, a reduction of 29.6% from 2017[223]. Soils accounted for 41.1% (2.9 million tonnes) of all waste recycled, and 35.3% (1.41 million tonnes) of all waste disposed.

C.75 There has been a progressive reduction in landfilled waste volumes since 2005 (around 50%)[224]. However, following significant reductions seen between 2005 and 2010, coinciding with the publication and implementation of Scotland's Zero Waste Plan, there has been increased variation in recycled volumes in recent years. In 2018, over half (55.5%) of recycled wastes were classed as soils and mineral wastes from construction and demolition, with the remainder consisting of vegetal, paper and cardboard, metallic, sludge, animal and mixed food waste and other wastes[225]. Although general trends show that there has been a steady increase in waste recovered through energy generation at co-incineration or incineration facilities, in 2018 there was a 29.6% decrease compared to 2017. Most of this decrease is due to sorting residues managed outside of Scotland[226].

Transportation

C.76 Generally, there has been an increase in car, air, rail, and ferry passenger numbers, as well as distance cycled over more recent years. The exception to this is in 2020-21 where transport was significantly affected by the COVID-19 pandemic.

C.77 In 2020, 37.9 billion vehicle kilometres were travelled on Scotland's roads, the lowest recorded since 1996 recorded level and a decrease of 22% compared to the previous year. Cars account for nearly three quarters (72%) of the total volume of traffic on the roads while the remaining traffic is shared between light goods vehicles (19%) and heavy goods vehicles (6%). As of 2020, there were 56,959 kilometres of public road in Scotland, of which 7% are Trunk roads. 38% of the distance travelled on the road network is on Trunk roads[227].

C.78 In 2020, an estimated 93.3 million tonnes of goods were lifted within Scotland by UK HGVs and transported to destinations within Scotland. 17% of tonnes lifted by road in Scotland in 2020 were carried a distance of no more than 25 kilometres, and 27% travelled over 50 km but no more than 100 km. The average journey distance, which is calculated by dividing the total tonne-kilometres by the total tonnes lifted, was 108 km[228]. Goods moved on journeys originating in Scotland with a destination in Scotland accounted for around 7.5 billion tonne-kilometres in 2020[229].

C.79 Transport emissions, including Scotland's share of international aviation and shipping, accounted for 36% of Scotland's total emissions in 2019[230], a decrease of 2.2% compared to 2018. Road transport is by far the largest source of these emissions, accounting for 66.2% of all transport emissions. Heavy Goods Vehicles and Light Goods Vehicles were the other significant contributors to transport emissions accounting for 12.3% and 12.2%, respectively[231].

Peatland

C.80 Most of the peat extracted in Scotland in 2014 (0.47 million cubic meters) was for horticultural use, with the remainder for 'other uses' such as animal bedding, fuel and whisky production.

[220] SEPA (2020) Waste from all sources summary document and commentary text [online] Available at: https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/waste-data-for-scotland/ (accessed 15/08/2022)

[221] ibid

[222] ibid

[223] ibid

[224] ibid

[225] ibid

[226] ibid

[227] Transport Scotland (2022) Scottish Transport Statistics 2021 [online] Available at: https://www.transport.gov.scot/publication/scottish-transport-statistics-2021/ (accessed 16/08/2022)

[228] ibid

[229] ibid

[230] ibid

[231] ibid

C.81 In 2021, 266,803 cubic meters of peat was commercially extracted in Scotland for growing media. This accounts for nearly 43% of all peat extracted across the UK in that timeframe[232].

C.82 The volume of peat used in the retail horticultural sector in 2021 was 3.43 million m^3, with 1.21 million m^3 used in the professional sector and a further 0.12 million m^3 for export. It is indicated that peat removal in the retail sector is on a downward trajectory that is likely to accelerate given the demand among retailers for peat free product and the increasing costs and difficulties of sourcing peat economically from within the UK and Ireland. There is also evidence of a movement away from peat in crop production, reflecting these similar issues.[233]

C.83 The Scottish Government does not hold up-to-date information on peat extraction planning permissions. The most recent DCLG 'Mineral extraction in Great Britain' report (2014)1 highlights that:

- 0.5 million cubic metres of peat was commercially extracted in Scotland in 2014 = 63% of peat extracted from the UK as a whole (0.8 million m3).
- The majority of Scotland's peat (0.47 million m3) was for horticultural use and the rest for 'other' uses e.g. animal bedding, domestic fuel, whisky production and mushroom compost.[234]

C.84 The restoration of these peatland sites which have been previously worked for the extraction of peat will require different considerations for effective restoration compared to restoration of degraded peatland habitats. In the latter case, degraded peatlands retain some underlying soil and functioning peatland vegetation. This is removed when peat is extracted, and once extraction ceases it is not possible for these sites to naturally restore[235]

C.85 In the UK, commercial extraction is largely but not exclusively restricted to lowland raised mires. Natural rates of peat accumulation are less than 2 mm per year, and are outpaced by modern extraction methods that typically remove 100 times that depth each year. Blanket bog is less commonly extracted commercially. The rate of blanket peat accumulation can be less than half that of raised bogs. Blanket bog peat deposit is invariably much thinner and so the resource may be exhausted much sooner. Peat extraction is a type of extractive mining rather than a form of sustainable harvesting. Peat accumulation is too slow to support repeat commercial extraction.

C.86 The most widespread method of peat extraction is surface milling for horticultural peat. This entails removal of the living vegetation (acrotelm), to expose the mass of the waterlogged catotelm peat deposit (catotelm) beneath. An extensive drainage system is then installed across the site. The drains separate the peat mass into long 'milling fields', from which several thin layers of peat are then stripped during a year, amounting to around 200 mm per year – loss of carbon and loss of the peat archive. Peat extraction results in the loss of almost all biodiversity, surface pattern and a radical change in the hydrology of the site. The process of stripping and draining extensive peat fields for milling and leaving them bare (unvegetated) makes the peat vulnerable to weathering and erosion, leading to the loss of dissolved organic carbon (DOC) and particulate organic carbon (POC).[236]. Therefore, areas of commercial peat extraction in the upper reaches of peat-dominated catchments used for public drinking-water supplies may result in increased water-treatment costs because of the increased levels of DOC and POC.[237] Stripping and draining peatland for milling can also result in the emission of carbon at high rates as draining lowers the water table enabling oxygen to enter the pore spaces of the peat, resulting in aerobic decomposition which operates at a faster rate than in saturated soils.

C.87 Another form of extraction is deep dug peat or 'sausage cutting', which is common for whisky production and the mushroom growing industry. This process is undertaken by tractor driven machines which cut slits beneath the surface and extracts a pipe of peat from deep below. This pipe of peat is then laid on the surface to dry out before being cut into briquettes. This is an intensive means of extraction, with the creation of sub-surface drainage channels, and damage to peatland vegetation and structure due to the use of heavy

[232] Growing Media Association, Department for Environment, Food and Rural Affairs, AHDB, HTA (2021) Growing media monitor report Trends in the composition of growing media supplied 2011 to 2021 [online] Available at: https://hta.org.uk/news-events-current-issues/sustainability/growing-media
[233] Growing Media Association, Department for Environment, Food and Rural Affairs, AHDB, HTA (2021) Growing media monitor report Trends in the composition of growing media supplied 2011 to 2021 [online] Available at: https://hta.org.uk/news-events-current-issues/sustainability/growing-media
[234] IUCN Peatland Programme Review of extant planning permissions for commercial peat extraction in Scotland. [online]. Available at: Summary of ROMP review findings_EG.pdf (iucn-uk-peatlandprogramme.org)
[235] NatureScot (unknown) Guidance on how to restore Peatland once commercial peat extraction has ceased [online] Available at: https://www.nature.scot/doc/guidance-how-restore-peatland-once-commercial-peat-extraction-has-ceased (accessed 03/11/2022)
[236] IUCN UK Committee Peatland Programme Briefing Note No. 6, Commercial peat extraction [online] Available at: Commercial peat extraction - 5th November 2014_0.pdf (iucn-uk-peatlandprogramme.org)
[237] IUCN UK Committee Peatland Programme Briefing Note No. 6, Commercial peat extraction [online] Available at: Commercial peat extraction - 5th November 2014_0.pdf (iucn-uk-peatlandprogramme.org)

machinery. This form of extraction makes the site hard to restore.

C.88 The volume of peat used by professional growers has remained fairly static despite the value of UK produced ornamental plants increasing by 23% in value between 2011 and 2019 (Defra Horticulture Statistics). The amount of peat used by amateur gardeners has continued to increase, however; there was a peak during the pandemic in 2020 with around 3 million new gardeners.

C.89 In 1999, peat made up 94% of the total growing media volume. This has reduced to around 41% currently, but there is still a large volume of peat which needs to be removed from the market.

C.90 Historically the majority of the peat used in UK growing media has been from the Republic of Ireland. However, Ireland's largest producer, Bord na Mona, ceased peat extraction for horticultural use from its 50,500ha of peat bogs in 2019. Professional growers have also used peat imported from the Baltic states because of its favoured characteristics.

C.91 Of the 5.44 million cubic metres of growing media used in 2020, 79% was used by amateur gardeners. Removing peat use from retail products will therefore have the biggest impact.[238]

C.92 Peat extraction in Scotland occurs mainly on lowland raised bogs in the south and east of the country. Estimation of extraction volumes is hampered by information gaps, but is of the order of 0.5 million m^3 per year. This represents perhaps 60% of the estimated 0.8 million m_3 of UK production.[239]

C.93 Around 8,000 hectares of peatland were set on the road to restoration in 2021-2022[240], which is off-track against the 20,000 hectares per year target. In 2022-23, it is forecast that around 11,000 hectares of peatland restoration will be set on the road to recovery[241].

C.94 Some areas of peatland are legally protected as SSSIs. The total area of the SSSIs containing notified features with peatland habitats amounts to 5.6% of Scotland[242]. Of these designated sites with peat forming habitats, condition assessments indicated that 61.7% of blanked bog designated features are in favourable condition, and 9.6% in unfavourable recovering condition. 61.2% of upland fens, flushes and swamps are in favourable condition with 13.4% in unfavourable recovering condition, and 57.7% of lowland raised bogs are in favourable condition with 18% in unfavourable recovering.

Evolution of Baseline – Pressure and Trends

C.95 A key driver to waste management has been achieving the aim of 'moving up' the waste hierarchy, and promoting the long-term benefits of waste prevention, use minimisation and reuse in preference to disposal options. Much of Scotland's policy approach to waste management was set out in Scotland's Zero Waste Plan[243], Safeguarding Scotland's Resources: Blueprint for a More Resource Efficient and Circular Economy[244] and Making Things Last: A Circular Economy Strategy for Scotland[245].

C.96 Increasing the use of biological wastes in processes such as anaerobic digestion can provide anaerobic digestate for horticultural purposes whilst the production of biogas can be a source of renewable fuel and heat[246]. This can help divert waste materials away from landfill, reducing the amount of waste going to landfill and in turn, lead to a reduction of sequestered gases that would otherwise be released into the atmosphere.

C.97 Flooding poses the greatest long-term climate related risk to infrastructure performance, however, growing risks

[238] Holmes, S. & Bain, C. (2021) 'Peat-free Horticulture – Demonstrating Success', IUCN UK Peatland Programme, Edinburgh. [online] Available at: iucn-uk-peatlandprogramme.org
[239] Litterick, A, Bell, J., Sellars, A., Carfrae, J. (2019) Rapid Evidence Assessment on the Alternatives to Horticultural Peat in Scotland. Climatexchange [online] Available at: https://www.climatexchange.org.uk/media/4022/rapid-evidence-assessment-of-the-alternatives-to-horticultural-peat-in-scotland.pdf
[240] Scottish Government (2022) Climate Change Plan: Monitoring Reports May 2022 [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/progress-report/2022/05/climate-change-plan-monitoring-reports-2022/documents/climate-change-plan-monitoring-reports-2022/climate-change-plan-monitoring-reports-2022/govscot%3Adocument/climate-change-plan-monitoring-reports-2022.pdf (accessed 16/08/2022)
[241] ibid
[242] NatureScot (2014) Scotland's peatland - definitions & information resources. Scottish Natural Heritage Commissioned Report No 701. [online] Available at: https://www.nature.scot/doc/naturescot-commissioned-report-701-scotlands-peatland-definitions-and-information-resources (accessed 16/08/2022)
[243] Scottish Government (2010) Scotland's Zero Waste Plan. Available at: http://www.gov.scot/Publications/2010/06/08092645/0 (accessed 16/08/2022)
[244] Scottish Government (2013) Zero Waste - Safeguarding Scotland's Resources: Blueprint for a More Resource Efficient and Circular Economy [online] Available at: https://www2.gov.scot/Resource/0043/00435308.pdf (accessed 16/08/2022)
[245] Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: http://www.gov.scot/Resource/0049/00494471.pdf (accessed 16/08/2022)
[246] Scottish Government (2016) Making Things Last: A Circular Economy Strategy for Scotland [online] Available at: http://www.gov.scot/Resource/0049/00494471.pdf (accessed 16/08/2022)

posed from heat, water scarcity and slope instability caused by severe weather could also prove significant[247].

C.98 Whilst areas of peatland will help mitigate against the effects of climate change, they may be adversely affected due to the impacts of climate change, such as flooding, drought, unseasonable weather and increased risk of pests and diseases. Furthermore, changes in temperature and rainfall may put increased pressure on peatlands by altering rates of decay of organic materials[248]. An increase in temperatures would increase the rate of decomposition in peatlands, However, increased temperatures would also increase the rate of photosynthesis and growth of peatland vegetation. Decreases in rainfall will lower the water table, which if this occurs alongside increased evaporation due to warmer temperatures, will lead to further lowering of the water table. To increase their resilience to climate change, appropriate hydrology should be reinstated into degraded and drained peatlands.

[247] Committee on Climate Change (2022) UK Climate Change Risk Assessment 2022 [online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1047003/climate-change-risk-assessment-2022.pdf (accessed 16/08/2022)

[248] IPS (undated) Peatlands and Climate [online] Available at: https://peatlands.org/peatlands/peatlands-and-climate/ (accessed 16/08/2022)

Appendix D

SEA Matrices

Stage 1 assessment

Ban on sale of all peat in Scotland

Table D.1: Ban on sale of all peat in Scotland

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
++	+/-	+	++	+	++	+	+	+/-	Banning the sale of all peat in Scotland, no matter the end use, will likely result in positive environmental effects both within Scotland, and within other countries which export peat to Scotland. This would mean peat could only be extracted if the extractor did not intend to sell the peat. For example, whisky producers with their own areas of peatland could extract peat for their own use provided it was not sold. Likewise, people with domestic peat cutting rights could extract peat for their personal use such as for domestic heating. In Scotland, Peatlands cover 2.5 million hectares (or one third) of Scotland's land[249], and 75% of these peatlands are currently degraded. The amount of carbon stored in these peatlands is equivalent to 140 years' worth of Scotland's GHG[250], with degraded peatlands contributing approximately 15% of Scotland's total net emissions annually. The ban on sale of all peat will likely reduce the amount of peat being extracted in Scotland. This will therefore reduce the amount of peat derived carbon released into the atmosphere, having significant positive effects on **climatic factors**. Furthermore, banning the sale of peat may help protect peatlands by preventing the need for peat extraction. This will help peatland maximise their potential for carbon sequestration and will have further benefits in relation to **climatic factors**. Additionally, by banning

[249] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf
[250] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									the sale of peat products (both peat imported into and exported out of Scotland), all emissions associated with transporting peat would also be eliminated. Overall, significant positive effects are identified in relation to **climatic factors.** A reduction in the carbon released from peat, alongside the elimination of transport related (of peat) emissions may also lead to improvements in **air quality** and subsequently respiratory health amongst the population, having minor positive effects on **air quality** and **population and human health.** Furthermore, as peatlands provide a range of ecosystem services such as water quality regulation and natural flood management, their protection through reduced extraction because of the ban on sales of peat will have further positive effects on the population. It is also acknowledged that peatlands provide recreational opportunities, and their continued presence may help promote healthier and more active lifestyles. Peatlands support a variety of different species, and protecting unexploited peatlands by banning the sale of peat products, and subsequently reducing the need for peat extraction, may have positive effects for biodiversity. Furthermore, more and better-quality peatlands (from reduced need for extraction) will provide better habitats for species which live in and frequent peatland areas. It could also result in the reintroduction of important species which had been lost through previous degradation of peatland. Considering the scale of extraction in Scotland, this would result in a significant positive effect in relation to **biodiversity**. Banning the sale of peat products will reduce the need for peat extraction. This will have significant positive effects for **soil** resources in Scotland and in countries currently exporting peat to Scotland. These important soil resources will remain intact and undisturbed, helping to provide a carbon store and sufficient nutrients to support peatland species. Therefore, significant positive effects are identified in relation to **soil**.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Furthermore, a ban on sales of peat products is likely to result in greater ecosystem services by reducing the need for peat extraction, particularly in relation to **water** quality. Peatlands help store and clean water, and act as natural flood plains by absorbing excess water and regulating run-off. The protection of peatland will likely result in improved water regulation as water from peatlands is naturally of high quality with few pollutants. Therefore, minor positive effects are identified for **water**. Peatland's ability to filter water is expected to have minor positive effects in relation to **material assets**, as it helps reduce water treatment costs for public supplies and maintains quality drinking water for private supplies. As mentioned above, this provides further benefits in relation to **population and human health.** However, the banning the sale of peat for all uses will likely have adverse effects on the horticultural and whisky industries, which provide economic benefits to the Scottish economy, particularly peated whisky. There are limited alternatives to peat in the whisky industry. Some alternatives are currently being explored, including *c. sativa, c. indicia* and *c. ruderalis*[251]. However, these are very much in the early stages, and would need to be legalised so may not be a realistic alternative. Furthermore, the complete ban of peat sales will also affect those who extract peat for fuel commercially. The adverse effects on the horticultural and whisky industries may result in subsequent negative effects in relation to population and human health as a result of loss of jobs etc. Furthermore, banning the use of peat for fuel (commercially) may increase the likelihood of fuel poverty amongst the rural population. Therefore, the overall effects in relation to **population and human health**, and **material assets** are identified as mixed (minor positive and minor negative) effects.

[251] https://blog.thewhiskyexchange.com/2019/04/greener-alternatives-to-peated-whisky/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									The banning of peat sales in Scotland will result in reduced need for peat extraction, which may help preserve more peatland. This will have positive effects on the landscape by helping maintain the 'wilderness', and preventing further areas of peatland from becoming degraded. Furthermore, the reduced need of peat extraction, particularly in lowland bogs, may help avoid negative effects on the historic environment. The reduced need for peat extraction in the uplands may also help preserve any unknown heritage assets within the peatlands. Peatland in Scotland are culturally significant, and lowland peatlands can be important to the setting of heritage assets, whilst upland peatlands may contain significant unknown heritage assets. Therefore, by reducing the need for peat extraction, minor positive effects are expected in relation to **landscape** and **cultural heritage.**

Ban on sale of peat for any purposes with the exception of peat for domestic whisky production

Table D.2: Ban on sale of peat for any purposes with the exception of peat for domestic whisky production

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
++?	+?	+?	++?	+?	++?	+?	+?	+/-	Banning the sale of all peat except for domestic whisky production, will greatly reduce the amount of peat used and extracted in Scotland. In 2014, only 6% of peat extracted was used for non-horticultural purposes, but it is uncertain just how much of this was for domestic whisky production and other uses such as domestic peat cutting, as this figure also includes other uses such as commercial peat extraction for fuel, peat for exportation and peat for animal bedding etc[252]. Figures indicate that the whisky industry accounts for less than 1% of peat extracted in Scotland[253]. Under this scenario, peat could only be extracted and sold if it was for domestic whisky production (e.g., peat could not be extracted and exported for whisky production in other countries). Domestic peat cutting rights would remain as this peat would be for domestic use only and would not be sold. In Scotland, Peatlands cover 2.5 million hectares (or one third) of Scotland's land[254], and 75% of these peatlands are currently degraded. The amount of carbon stored in these peatlands is equivalent to 140 years' worth of Scotland's GHG[255], with degraded peatlands contributing approximately 15% of Scotland's total net emissions annually. The ban on sale of peat for all uses except for domestic whisky production (domestic peat cutting not for sale is also included) will result in a large reduction in peat sales (and associated extraction) in Scotland. This will subsequently result in a large

[252] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505631/Mineral_Extraction_in_Great_Britain_2014_final.pdf
[253] https://vclvintners.london/whisky-journal/the-blog/the-environmental-impact-of-peat-from-the-production-of-whisky/
[254] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf
[255] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									reduction of peat-derived carbon released into the atmosphere, having significant positive effects on **climatic factors**. Furthermore, banning the sale of peat (with the exception for the domestic whisky industry) may help protect peatlands by preventing the need for peat extraction. This will help peatland maximise their potential for carbon sequestration and will have further benefits in relation to **climatic factors**. Additionally, by banning the sale and export of peat products, and use of imported peat products (for purposes other than whisky production), there is potential for further positive effects due to reduced transport, and by reducing peat extraction in host countries which export peat to Scotland. However, the significant positive effects are uncertain as the ban on sales would make exceptions for peat for domestic whisky production, and therefore there is potential for continued negative effects in relation to climatic factors, depending on peat sales for domestic whisky production (around 1% of all peat extracted currently). Overall, significant positive but uncertain effects are identified in relation to **climatic factors** due to ban on sales of peat for all purposes except domestic whisky production**.** A reduction in the carbon released from peat, alongside a reduction in transport related emissions as a result of the ban on sales of peat may also lead to improvements in air quality and subsequently respiratory health amongst the population, having minor positive effects on **air quality and population and human health**. Furthermore, peatlands provide a range of ecosystem services such as water quality regulation and natural flood management, and therefore, protecting peatlands from extraction could have further positive effects on the population. However, some uncertainty is attached to this as the ban of peat would exclude peat used in the domestic whisky industry (including imported peat) and domestic peat cutting. Whilst domestic peat cutting has negligible effects in terms of transport emissions, emissions may continue to arise from transport to whisky distilleries and the import of peat for

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									these purposes. Overall, minor positive but uncertain effects are identified in relation to **air quality** and **population and human health**, with uncertainty arising due to the continued use of peat in for domestic peat cutting and domestic whisky production. Peatland support a variety of different species, and protecting unexploited peatlands by banning the sale of peat products (excluding for domestic whisky production), and subsequently reducing the need for peat extraction, may have positive effects for biodiversity. Furthermore, more and better-quality peatlands (from reduced need for extraction for uses other than whisky and domestic peat cutting) will provide better habitats for species which live in and frequent peatland areas. It could also result in the reintroduction of important species which had been lost through previous degradation of peatland. Considering the scale of extraction in Scotland, this would result in a significant positive effect in relation to biodiversity. However, uncertainty is attached to this as the continued sale (and extraction) of peat for domestic whisky production will continue to have adverse effects on biodiversity. Overall, given the large reduction in peat use (excluding domestic whisky and peat cutting) significant positive but uncertain effects will be identified in relation to **biodiversity.** Banning the sale of peat products (excluding for domestic whisky production) will reduce the need for peat extraction. This will have significant positive effects for soil resources in Scotland and in countries currently exporting peat to Scotland. These important soil resources will remain intact and undisturbed, helping to provide a carbon store and sufficient nutrients to support peatland species. Therefore, significant positive effects are identified in relation to **soil**. Uncertainty is attached to this effect as the ban makes exclusions for the continued use of peat for domestic whisky production and peat cutting, which will continue to have adverse effects on soil quality, albeit at a relatively small scale. Furthermore, there will continue to be adverse effects on soils in countries Scotland imports peat from for whisky production. Overall,

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									considering the relatively small amount of peat used in whisky, the ban on sales will have significant positive but uncertain effects on **soils.** Furthermore, a ban on sales of peat products (excluding for domestic whisky production) is likely to result in greater ecosystem services by reducing the need for peat extraction, particularly in relation to water quality. Peatlands help store and clean water, and act as natural flood plains by absorbing excess water and regulating run-off. The protection of peatland will likely result in improved water regulation as water from peatlands is naturally of high quality with few pollutants. Therefore, minor positive effects are identified for **water**. However, these effects are uncertain, as the continued extraction and use of peat for domestic whisky production and domestic peat cutting may continue to adversely affect local water quality. Therefore, minor positive but uncertain effects are identified for **water**. Peatland's ability to filter water is expected to have minor positive effects in relation to **material assets**, as it helps reduce water treatment costs for public supplies and maintains quality drinking water for private supplies. As mentioned above, this provides further benefits in relation to **population and human health.** However, the ban on sales of peat (excluding for domestic whisky) may continue to have adverse effects on other industries reliant on peat. This includes the horticultural sector, commercial peat extraction for heating purposes, and peat for animal bedding etc. These industries will experience a loss of income from peat-derived product sales. Overall, mixed minor positive and minor negative effects are identified in relation to **material assets.** The banning of peat sales except for domestic whisky production will result in reduced need for extraction of peat across Scotland, which subsequently will help protect and preserve peatland. This will have positive effects on the landscape by restoring the 'wilderness' especially where peatland has been degraded. Furthermore, the reduced extraction of peat, particularly in lowland bogs, may help avoid negative effects on the

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									historic environment. Reductions in extraction will also help preserve any unknown heritage assets within upland peatlands. Peatland in Scotland are culturally significant, and lowland peatlands can be important to the setting of heritage assets, whilst upland peatlands may contain significant unknown heritage assets. Therefore, minor positive effects are expected in relation to **landscape** and **cultural heritage**, however these are uncertain depending on the location and scale of continued extraction for domestic heating and domestic whisky production, which may continue to have some negative effects.

Ban on sale of peat for amateur horticultural purposes

Table D.3: Ban on sale of peat for amateur horticultural purposes

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
+?	+?	+?	++?	+?	+?	+?	+?	+/-?	Banning the sale of peat for amateur horticultural (retail) use will likely result in positive environmental effects both within Scotland, and within other countries which export peat for amateur horticultural purposes to Scotland. Out of the 0.26 million cubic metres of peat extracted in Scotland for horticultural use in 2021, 0.15 million cubic metres were for amateur (retail) use[256]. In Scotland, peatlands cover 2.5 million hectares (or one third) of Scotland's land[257], and 75% of these peatlands are currently degraded. The amount of carbon stored in these peatlands is equivalent to 140 years' worth of Scotland's GHG[258], with degraded peatlands contributing approximately 15% of Scotland's total net emissions annually. The ban on sale of peat for amateur horticultural use will likely result in less need for peat extraction in Scotland. This will result in a reduction of peat derived carbon released into the atmosphere, having positive effects on climatic factors. Furthermore, by not disturbing as much peat, there will be less damage to peat resources, helping to maximise their rates of carbon sequestration. This will have further benefits in relation to climatic factors. Additionally, by banning import of peat products for amateur horticultural use, there is potential for further positive effects in host countries which export peat, by reducing their rates of peatland extraction, and reducing transport related emissions. However, whilst the ban on sales would prevent the extraction, use, and import and export of peat products for amateur horticulture, peat sales (and the

[256] https://hta.org.uk/news-events-current-issues/sustainability/growing-media
[257] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf
[258] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									subsequent extraction) would continue for non-amateur horticulture purposes. This includes for professional horticulture, whisky production, commercial extraction of peat for heat, and peat for animal bedding etc. This would likely result in minor positive effects on climatic factors, considering 58% of peat extracted in Scotland is for amateur horticulture use. Uncertainty is attached to this as emissions will still arise from the continued use of peat for professional horticulture (42% of peat extracted for horticulture use), whisky and fuel industries. Overall, minor positive but uncertain effects are identified in relation to **climatic factors.** A reduction in the carbon released from peat, alongside a reduction in transport related emissions associated with amateur horticulture products may also lead to improvements in **air quality** and subsequently respiratory health amongst the population, having minor positive effects on air quality and population and human health. Furthermore, peatlands provide a range of ecosystem services such as water quality regulation and natural flood management, and therefore, protecting peatlands from extraction for amateur horticultural purposes could have further positive effects on the population**.** However uncertainty is attached to this as peat sales would continue for non-amateur horticulture purposes, and the transportation of these peat products (including imports and exports) may continue to have implications for air quality and the health of the population. It could also have adverse effects on the ecosystem services peatlands provide. Overall, minor positive but uncertain effects are identified in relation to **air quality** and **population and human health.** Peatlands support a variety of different species, and the reduced extraction of these sites due to a ban on sales of peat for amateur horticultural purposes may have positive effects for biodiversity. Peatlands that are in a more favourable condition will provide better habitats for species which live in and frequent peatland areas. It could also result in the reintroduction of important species which had been lost through previous degradation of peatland. These positive effects on biodiversity will be

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									experienced in locations where peat is currently extracted for sale to the amateur horticultural sector in Scotland and countries which export peat to Scotland. However, uncertainty is attached to this as peat sales would continue for non-amateur horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have implications for biodiversity. Overall, minor positive but uncertain effects are identified in relation to **biodiversity.** Banning the sale of peat products for amateur horticulture will reduce the need for peat extraction. This will have result in significant positive effects for **soil** resources in Scotland and in countries exporting peat to Scotland, considering that 58% of peat extracted in Scotland for horticultural use was for the amateur sector. The ban will help reduce extraction of these important soil resources, helping to provide a carbon store and sufficient nutrients to support peatland species. However, uncertainty is attached to this as there will continue to be adverse effects on soil resources due to sales of peat (including from extractors) for non-amateur horticultural uses. Overall, significant positive but uncertain effects are identified in relation to **soil**, but these effects will largely be dependent on where peat is still being extracted. Furthermore, a ban on sales of peat products for amateur horticultural use is likely to result in greater ecosystem services by reducing the need for peat extraction, particularly in relation to **water** quality. Peatlands help store and clean water, and act as natural flood plains by absorbing excess water and regulating run-off. The protection of peatland will likely result in improved water regulation as water from peatlands is naturally of high quality with few pollutants. However, uncertainty is attached to this as peat sales would continue for non-amateur horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have implications for water quality. Overall, minor positive but uncertain effects are identified in relation to **water.**

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Peatland's ability to filter water is expected to have minor positive effects in relation to material assets, as it helps reduce water treatment costs for public supplies and maintains quality drinking water for private supplies. As mentioned above, this provides further benefits in relation to population and human health. However, the continued extraction for non-amateur horticultural purposes may continue to still have adverse effects on water quality and water treatment costs, however uncertainty is attached to this. Furthermore, the banning of peat for non-amateur horticultural use may have adverse effects on this horticultural industry, due to loss of income from peat-derived product sales. By banning the sale of peat for amateur horticulture, those within the industry may start to extract peat for other uses allowed under the scope of the ban. Overall, mixed and uncertain minor positive and minor negative effects are identified in relation to **material assets.** The ban on sales of peat in amateur horticulture will result in reduced extraction of peat, which may help preserve more peatland. . This will have positive effects on the landscape by helping to maintain the 'wilderness' and preventing further areas of peatland from becoming degraded. Furthermore, the reduced need for peat extraction, particularly in lowland bogs, may help avoid negative effects on the historic environment. Reductions in extraction will also help preserve any unknown heritage assets within upland peatlands. Peatland in Scotland are culturally significant, and lowland peatlands can be important to the setting of heritage assets, whilst upland peatlands may contain significant unknown heritage assets. Therefore, minor positive effects are expected in relation to **landscape** and **cultural heritage**, however these are uncertain depending on the location and scale of extraction, and the extent to which peat is used for non-amateur horticultural uses may continue to adversely affect the landscape and historic environment.

Ban on sale of peat for professional horticultural purposes.

Table D.4: Ban on sale of peat for professional horticultural purposes.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
+?	+?	+?	++?	+?	+?	+?	+?	+/-?	Banning the sale of peat for professional horticultural (retail) use will likely result in positive environmental effects both within Scotland, and within other countries which export peat for amateur horticultural purposes to Scotland. Out of the 0.26 million cubic metres of peat extracted in Scotland for horticultural use in 2021, 0.11 million cubic metres were for professional use[259]. In Scotland, peatlands cover 2.5 million hectares (or one third) of Scotland's land[260], and 75% of these peatlands are currently degraded. The amount of carbon stored in these peatlands is equivalent to 140 years' worth of Scotland's GHG[261], with degraded peatlands contributing approximately 15% of Scotland's total net emissions annually. The ban on sale of peat for professional horticultural use will likely result in less need for peat extraction in Scotland. This will result in a reduction of peat derived carbon released into the atmosphere, having positive effects on climatic factors. Furthermore, by not disturbing as much peat, there will be less damage to peat resources, helping to maximise their rates of carbon sequestration. This will have further benefits in relation to climatic factors. Additionally, by banning import of peat products for professional horticultural use, there is potential for further positive effects in host countries which export peat, by reducing their rates of peatland extraction, and reducing transport related emissions. However, whilst the ban on sales would prevent

[260] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf
[261] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									the extraction, use, and import and export of peat products for professional horticulture, peat sales (and the subsequent extraction) would continue for non-professional horticulture purposes. This includes for amateur horticulture, whisky production, commercial extraction of peat for heat, and peat for animal bedding etc. This would likely result in minor positive effects on climatic factors, considering 42% of peat extracted in Scotland is for professional horticulture use. Uncertainty is attached to this as emissions will still arise from the continued use of peat for amateur horticulture (58% of peat extracted for horticulture use), whisky and fuel industries. Overall, minor positive but uncertain effects are identified in relation to **climatic factors.** A reduction in the carbon released from peat, alongside a reduction in transport related emissions associated with professional horticulture products may also lead to improvements in **air quality** and subsequently respiratory health amongst the population, having minor positive effects on air quality and population and human health. Furthermore, peatlands provide a range of ecosystem services such as water quality regulation and natural flood management, and therefore, protecting peatlands from extraction for professional horticultural purposes could have further positive effects on the population**.** However, uncertainty is attached to this as peat sales would continue for non-professional horticulture purposes, and the transportation of these peat products (including imports and exports) may continue to have implications for air quality and the health of the population. It could also have adverse effects on the ecosystem services peatlands provide. Overall, minor positive but uncertain effects are identified in relation to **air quality** and **population and human health.** Peatland support a variety of different species, and the reduced extraction of these sites due to a ban on sales of peat for professional horticultural purposes may have positive effects for biodiversity. Peatlands that are in a more favourable condition will provide better habitats for species which live in and frequent peatland areas. It could

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									also result in the reintroduction of important species which had been lost through previous degradation of peatland. These positive effects on biodiversity will be experienced in locations where peat is currently extracted for sale to the professional horticultural sector in Scotland and countries which export peat to Scotland. However, uncertainty is attached to this as peat sales would continue for non-professional horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have implications for biodiversity. Overall, minor positive but uncertain effects are identified in relation to **biodiversity.** Banning the sale of peat products for professional horticulture will reduce the need for peat extraction. This will have result in significant positive effects for **soil** resources in Scotland and in countries exporting peat to Scotland, considering that 42% of peat extracted in Scotland for horticultural use was for the professional sector. The ban will help reduce extraction of these important soil resources, helping to provide a carbon store and sufficient nutrients to support peatland species. However, uncertainty is attached to this as there will continue to be adverse effects on soil resources due to sales of peat (including from extractors) for non-professional horticultural uses. Overall, significant positive but uncertain effects are identified in relation to **soil**, but these effects will largely be dependent on where peat is still being extracted. Furthermore, a ban on sales of peat products for professional horticultural use is likely to result in greater ecosystem services, particularly in relation to **water** quality. Peatlands help store and clean water, and act as natural flood plains by absorbing excess water and regulating run-off. The protection of peatland will likely result in improved water regulation as water from peatlands is naturally of high quality with few pollutants. However, uncertainty is attached to this as peat sales would continue for non-professional horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									implications for water quality. Overall, minor positive but uncertain effects are identified in relation to **water.** Peatland's ability to filter water is expected to have minor positive effects in relation to material assets, as it helps reduce water treatment costs for public supplies and maintains quality drinking water for private supplies. As mentioned above, this provides further benefits in relation to population and human health. However, the continued extraction for non-professional horticultural purposes may continue to still have adverse effects on water quality and water treatment costs, however uncertainty is attached to this. Furthermore, the banning of peat for non-professional horticultural use may have adverse effects on this horticultural industry, due to loss of income from peat-derived product sales. By banning the sale of peat for professional horticulture, those within the industry may start to extract peat for other uses allowed under the scope of the ban. Overall, mixed and uncertain minor positive and minor negative effects are identified in relation to **material assets.** The ban on sales of peat in professional horticulture will result in reduced extraction of peat, which may help preserve more peatland. This will have positive effects on the landscape by helping to maintain the 'wilderness' and preventing further areas of peatland from becoming degraded. Furthermore, the reduced extraction of peat, particularly in lowland bogs, may help avoid negative effects on the historic environment. Reductions in extraction will also help preserve any unknown heritage assets within upland peatlands. Peatland in Scotland are culturally significant, and lowland peatlands can be important to the setting of heritage assets, whilst upland peatlands may contain significant unknown heritage assets. Therefore, minor positive effects are expected in relation to **landscape** and **cultural heritage**, however these are uncertain depending on the location and scale of extraction, and the extent to which peat is used for non-professional horticultural uses may continue to adversely affect the landscape and historic environment.

Ban on sale of peat for all horticultural use

Table D.5: Ban on sale of peat for all horticultural use

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
++?	+?	+?	++?	+?	+?	+?	+?	+/-?	Banning the sale of peat for horticultural use will likely result in positive environmental effects both within Scotland, and within other countries which export peat to Scotland. In Scotland, peatlands cover 2.5 million hectares (or one third) of Scotland's land[262], and 75% of these peatlands are currently degraded. The amount of carbon stored in these peatlands is equivalent to 140 years' worth of Scotland's GHG[263], with degraded peatlands contributing approximately 15% of Scotland's total net emissions annually. The ban on peat for horticultural use will likely result in less need for peat extraction in Scotland. This will result in a reduction of peat derived carbon released into the atmosphere, having positive effects on climatic factors. Furthermore, banning the sale of peat for horticulture will help protect further areas of peatland from being extracted, helping to maximise their rates of carbon sequestration. Additionally, by banning the use of imported peat products for horticultural use, there is potential for further positive effects in host countries which export peat, by reducing their rates of peatland extraction and reducing transport related emissions. However, whilst the ban prevents of the sale of peat for horticultural purposes, it is still possible to sell peat for non-horticultural purposes (e.g. whisky production, fuel, animal bedding etc.). Non-horticultural uses accounts for approximately 6% of peat extraction in Scotland[264]. Overall, the ban on sale of peat for horticultural purposes would likely

[262] UK Centre for Ecology & Hydrology (2022), 'Peatlands factsheet'. Available at: https://www.ceh.ac.uk/sites/default/files/Peatland%20factsheet.pdf
[263] NatureScot (2017) 'Scotland's National Peatland Plan'. Available at: https://www.nature.scot/sites/default/files/2017-07/A1697542%20-%20150730%20-%20peatland_plan.pdf
[264] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/505631/Mineral_Extraction_in_Great_Britain_2014_final.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									result in significant positive effects on climatic factors, considering 94% of peat extracted in Scotland is for horticulture use. Uncertainty is attached to this as emissions may still arise from the continued use of peat for non-horticultural purposes, particularly if peat for horticulture switches to peat for non-horticultural purposes. Overall, significant positive but uncertain effects are identified in relation to **climatic factors.** Therefore, the use of this peat will likely result in the release of carbon and have negative effects on climate. Overall, mixed (significant positive and minor negative) effects are identified in relation to **climatic factors,** however this is uncertain depending on the amount of peat sold and used for non-horticultural purposes. A reduction in the carbon released from peat, alongside a reduction in transport related emissions associated with banning the sale of peat for horticultural purposes may also lead to improvements in **air quality** and subsequently respiratory health amongst the population, having minor positive effects on **air quality** and **population and human health.** Furthermore, peatlands provide a range of ecosystem services such as water quality regulation and natural flood management, and therefore, protecting peatlands from by banning the sale of peat for horticultural purposes could have further positive effects on the population**.** However uncertainty is attached to this as peat can still be sold for non-horticultural purposes, which may continue to have negative implications for air quality and population and human health due to release of carbon emissions and transport-related pollution. Peatland support a variety of different species, and the reduced extraction of these sites due to a ban on sales of peat for horticultural purposes may have positive effects for biodiversity. Peatlands that are in a more favourable condition will provide better habitats for species which live in and frequent peatland areas. It could also result in the reintroduction of important species which had been lost through previous degradation of peatland. These positive effects on biodiversity will be experienced in

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									locations where peat is currently extracted for sale to the horticultural sector in Scotland and countries which export peat to Scotland. However, uncertainty is attached to this as peat sales would continue for non-horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have implications for biodiversity. Overall, minor positive but uncertain effects are identified in relation to **biodiversity.** Banning the sale of peat products for horticulture will reduce the need for peat extraction. This will have result in significant positive effects for **soil** resources in Scotland and in countries exporting peat to Scotland, considering that 94% of peat extracted in Scotland is for horticultural use. The ban on sales of peat will help reduce extraction of these important soil resources, helping to provide a carbon store and sufficient nutrients to support peatland species. However, uncertainty is attached to this as there will continue to be adverse effects on soil resources due to sales of peat (including from extractors) for non-horticultural uses. Overall, significant positive but uncertain effects are identified in relation to **soil**, but these effects will largely be dependent on how much peat is used for non-horticultural purposes. Furthermore, a ban on sales of peat products for horticultural use is likely to result in greater ecosystem services, particularly in relation to **water** quality. Peatlands help store and clean water, and act as natural flood plains by absorbing excess water and regulating run-off. The protection of peatland will likely result in improved water regulation as water from peatlands is naturally of high quality with few pollutants. However, uncertainty is attached to this as peat sales would continue for non-horticulture purposes, and the sale and extraction of these peat products (including in countries which export peat to Scotland) may continue to have implications for water quality. Overall, minor positive but uncertain effects are identified in relation to **water.** Peatland's ability to filter water is expected to have minor positive effects in relation to **material assets**, as it helps reduce water treatment costs for public supplies and

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									maintains quality drinking water for private supplies. As mentioned above, this provides further benefits in relation **to population and human health.** However, the continued sale (and subsequent extraction) of peat for non-horticultural purposes may continue to still have adverse effects on water quality and water treatment costs, however uncertainty is attached to this. Furthermore, the banning the sale of peat for non-horticultural use may have adverse effects on the horticultural industry, due to loss of income from peat-derived product sales. By banning the sale of peat for horticulture, those within the peat extraction industry may start to extract peat for other uses allowed under the scope of the ban. Overall, mixed and uncertain minor positive and minor negative effects are identified in relation to **material assets.** The ban on sales of peat in horticulture will result in reduced extraction of peat, which may help preserve more peatland. This will have positive effects on the landscape by helping to maintain the 'wilderness' and preventing further areas of peatland from becoming degraded. Furthermore, the reduced extraction of peat, particularly in lowland bogs, may help avoid negative effects on the historic environment. Reductions in extraction will also help preserve any unknown heritage assets within upland peatlands. Peatland in Scotland are culturally significant, and lowland peatlands can be important to the setting of heritage assets, whilst upland peatlands may contain significant unknown heritage assets. Therefore, minor positive effects are expected in relation to **landscape** and **cultural heritage**, however these are uncertain depending on the location and scale of continued extraction, and the extent to which peat is used for non-horticultural uses may continue to adversely affect the landscape and historic environment.

Alternative Growing Media

Use of wood-based products as an alternative growing media

D.2 Wood-based products (primarily wood fibre) is a growing medium which, due to its fibrous texture, can be mixed with other growing media to increase airiness and porosity, and improve drainage and re-wettability of mixtures containing peat. Wood fibre is derived from wood products and tends to be produced from primary (e.g. fresh wood chips) and waste woods (e.g. shredded pallets) under high temperatures and pressures.

Table D.6: Use of wood-based products as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-	-	-	+	-?	+?	0?	0?	+/-	Wood fibre is a material that can be produced from primary (e.g. fresh wood chips) and waste woods (e.g. shredded pallets)[265], which is used as a supplement to growing media. As it is formed from a renewable source and sometimes from waste products, it is considered to result in positive effects in relation to **material assets** as it promotes circular economies and the efficient use of resources. However, this is mixed with minor negative effects as there is potential competition for forestry by-products to produce energy generation (e.g. bioenergy and wood-based ethanol)[266], which is causing increases in the cost of wood-fibre for horticulture. Wood fibre materials commonly used in horticulture are required to undergo extensive secondary processing methods including high pressures and temperatures. These can be energy intensive[267], and result in the release of greenhouse gas emissions, having minor negative effects in relation to **climatic factors.** Although decomposition of wood results in the release of carbon dioxide, the carbon dioxide released is considered biogenic, not anthropogenic, and therefore the use of wood fibre is carbon neutral[268]. Processing and the subsequent transport of wood fibre will result in the additional release of emissions and transport-related pollutants, having potential minor negative effects on **air** quality and subsequent minor negative effects on **population and human health**.

[265] https://reader.elsevier.com/reader/sd/pii/S030442381630471X?token=5207AEFE654BA6A8BC086CD67663F2B1C8E9A8EF90B9D3CDFEEF6F8A68B2D7B947FF103BA24A151A114640C8A069D688&originRegion=eu-west-1&originCreation=20220926124131

[266] Ibid.

[267] Ibid.

[268] https://unhsimap.org/cmap/resources/biogenic#:~:text=Biogenic%20emissions%20will%20not%20affect,a%20comprehensive%20and%20transparent%20report.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									As wood fibre is characterised by high porosity and air holding capacity[269], it is rarely used as a growing medium by itself as it retains insufficient plant-available water and can become compressed over time. Instead, it is generally mixed with other growing media, to help increase air space, ensure long term structural stability of the substrate due to the strong fibre structure and helps improve the re-wetting capacity of soils[270]. The use of wood fibre therefore promotes improvements to soil quality and rapid root growth in plants. However, it is noted that wood fibre immobilises nitrogen as it decomposes, and as a consequence additional nitrogen fertiliser is required to counteract this. Overall mixed minor positive and minor negative effects have been identified in relation to **soil**. Improvements to soil quality may have subsequent benefits for biodiversity, particularly flora. The surface of wood fibre dries quickly, preventing the growth of weeds, mosses and algae. It also prevents waterlogging of substrate, preventing root rot. This can have subsequent benefits for fauna too. Deforestation will result in the loss of habitats, having adverse effects on biodiversity. However, wood fibre products are primarily a by-product of other wood industries, and these operations and associated deforestation would continue in the absence of wood fibre production. Therefore, the effects of wood-fibre on biodiversity is limited, negative effects could arise if the primary reason for deforestation was to produce bark, however this is unlikely. Overall, minor positive but uncertain effects are identified in relation to **biodiversity.** Wood fibre production requires the wood to be cut down into wood chips before being washed prior to compression or grinding. This requires the use of water which may have adverse effects on water resources and material assets. Overall, minor negative

[269] Ibid.
[270] Ibid.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									effects are identified in relation to **water,** however this is uncertain depending on the amount of water used in the processing stage**.** Deforestation as a result of wood industries could have adverse effects on **landscape** character of the area and may potentially have adverse effects on the setting of **cultural heritage** assets and the wider historic environment. However, wood fibre is primarily a by-product of other wood-related operations (e.g. forestry management, residual waste from rotational harvesting), and any associated deforestation would likely continue in the absence of wood fibre production. Therefore, effects on the **landscape** and **cultural heritage** are negligible, but uncertain depending on the scale and location of operations, and if any deforestation would occur as a direct result of bark production.

Use of bark as an alternative growing media

D.3 Bark is a growing medium which is spread across soil. Bark is used to help retain moisture in soils, regulate soil temperature (particularly in winter) and enhance soil fertility as nutrients and organic matter are released during decomposition of the bark. Bark is derived from the outermost layer of woody plants such as trees, and is produced when this outer layer is stripped from the trees once they are cut down. Bark can be produced at various sizes depending on its end use, from fine mulch to larger chips.

Table D.7: Use of bark as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-	-	-	+/-	+	+?	0?	0?	+/-	Bark is the outermost layer of stems, trunks and roots of woody plants, notably trees. It gets stripped from trees once they are cut down or fall from natural causes. Bark is often a by-product from sawmill and forestry operations[271] and from wood-based construction and demolition waste[272]. Deforestation will result in the loss of habitats, having adverse effects on biodiversity. However, bark is primarily a by-product of the sawmill and forestry operations, and these operations and associated deforestation would continue in the absence of bark production. Therefore, the effects of bark production on biodiversity is limited. However, the use of bark and bark mulch in horticulture helps suppress weeds, provides moisture control and helps protect plant roots from frost in winter[273]. This could therefore help support plants, which subsequently can support fauna. Overall, minor positive effects are identified in relation to **biodiversity** although these are uncertain based on the assumption that all bark production is by-product of other sawmill and forestry operations**.** Negative effects could arise if the primary reason for deforestation was to produce bark, however this is unlikely.

[271] https://www.gro-bark.com/post/sustainability
[272] https://nwdistrict.ifas.ufl.edu/hort/2019/05/17/is-colored-mulch-bad-for-the-environment/
[273] https://www.rhs.org.uk/soil-composts-mulches/mulch

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Although decomposition of bark, as an organic material, results in the release of carbon dioxide, the carbon dioxide released is considered biogenic, not anthropogenic, and therefore the use of bark is considered carbon neutral[274]. However, the processing of bark requires energy to strip the bark from trees and shred it down to appropriate sizes, which will result in release of greenhouse gas emissions. The transportation of bark to final destinations will also result in the release of transport-related emissions, noting that the majority of bark supplied to UK horticulture is imported from Europe[275]. Overall, minor negative effects are identified in relation to **climatic factors.** In addition, trees play an important role in improving air quality[276] and the loss of trees for the production of bark may therefore have adverse effects on air quality. This may be further exacerbated by the release of pollutants during processing and transportation of bark. Overall, minor negative effects are identified in relation to **air quality.** This could also result in subsequent negative effects on **population and human health** by causing and aggravating respiratory illnesses. The use of bark will help retain moisture in soils, regulate soil temperature and enhance soil fertility as nutrients and organic matter are released during decomposition of the bark[277]. This will result in positive effects on **soil** quality. These positive effects are mixed with minor negative as the loss of trees from forests and woodland may result in enhanced soil erosion. Furthermore, it is noted that bark

[274] https://unhsimap.org/cmap/resources/biogenic#:~:text=Biogenic%20emissions%20will%20not%20affect,a%20comprehensive%20and%20transparent%20report.
[275] https://www.hse.gov.uk/pesticides/pesticides-registration/data-requirements-handbook/fate/resources/use-disposal-growing-media-adas.pdf
[276] https://www.woodlandtrust.org.uk/trees-woods-and-wildlife/british-trees/tackling-air-pollution-with-trees/#:~:text=Trees%20and%20other%20vegetation%20planted,particles%20on%20their%20leaf%20surfaces.
[277] https://www.scotbarkuk.com/blog/faq-bark-and-mulching#:~:text=Retains%20Soil%20Moisture%20%2D%20Bark%20softens,weather%20fluctuations%20throughout%20the%20year.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									immobilises nitrogen as they break down, and as a consequence additional nitrogen fertiliser is required to counteract this[278]. Bark helps retain moisture in soils, which will result in a more efficient use of water resources, with watering of plants required less often. This will have minor positive effects in relation to **water**. Improving the efficiency of water resources will also have minor positive effects in relation to **material assets**. This minor positive effect is further enhanced as bark is a by-product from sawmill and forestry operations[279] and from construction and demolition waste[280], and therefore promotes circular economies. However, it is noted that it can be difficult to secure a consistent and reliable supply of bark in large quantities[281]. Deforestation as a result of wood industries could have adverse effects on **landscape** character of the area and may potentially have adverse effects on the setting of **cultural heritage** assets and the wider historic environment. However, bark is primarily a by-product of other operations, and the associated deforestation would likely continue in the absence of bark production. Therefore, effects on the landscape and cultural heritage are negligible, but uncertain depending on the scale and location of operations, and if any deforestation would occur as a direct result of bark production.

[278] https://www.hse.gov.uk/pesticides/pesticides-registration/data-requirements-handbook/fate/resources/use-disposal-growing-media-adas.pdf
[279] https://www.gro-bark.com/post/sustainability
[280] https://nwdistrict.ifas.ufl.edu/hort/2019/05/17/is-colored-mulch-bad-for-the-environment/
[281] https://www.hse.gov.uk/pesticides/pesticides-registration/data-requirements-handbook/fate/resources/use-disposal-growing-media-adas.pdf

Use of coir as an alternative growing media

D.4 Coir is a natural fibre derived from the outer husk of coconuts. Coir can be used as a growing medium to increase water holding capacity and aeration within soils, and also help deter fungus, gnats and algae. Coir is produced by extracting the fibre form the husk of coconuts and processing it to remove the bristle fibres. Coir undergoes extensive washing to remove salt and has calcium nitrate added to balance the pH.

Table D.8: Use of coir as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
--	-	-	+/-	-	+	0	0	+/-	Coir is the natural fibre extracted from the husk of coconut. It is a waste product from the coconut industry which can be used as a growing medium, either as coir pith (dust) or coir chips or fibre. The use of coir promotes circular economies by using a waste product which would otherwise go to landfill. This therefore has minor positive effects in relation to **material assets.** However, as it is a waste product, the quality can often be inconsistent[282]. Once extracted from the coconut husk, the processing of coir can be an energy intensive process. Coir can have a very high salt content, and its processing requires salt, tannins and phenolic compounds to be removed and calcium nitrate to be added, to displace the sodium and balance pH[283]. This process itself produces waste products, having adverse effects in relation to material assets. Overall, mixed (minor positive and minor negative) effects are identified in relation to **material assets.** In addition, the coir has to be buffered and washed. This requires a large amount of water, with volumes of 300-600 litres needed to wash one cubic meter of coir[284], with contaminated water potentially released back into watercourses and waterbodies. This

[282] https://www.climatexchange.org.uk/media/4022/rapid-evidence-assessment-of-the-alternatives-to-horticultural-peat-in-scotland.pdf
[283] https://areapeat.lv/conclusion-coco-coir-not-sustainable/
[284] https://www.gardenmyths.com/coir-ecofriendly-substitute-peat-moss/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									therefore will have negative effects in relation to **water** resources and quality, and also material assets. As coir is derived from coconuts, which grow in tropical environments such as Southeast Asia, Indonesia, the Caribbean, South America and Africa. Coir is generally processed in the country in which the coconut is grown, and as such the resulting product requires extensive transportation around the world to reach its end destination in non-tropical locations. This has associated negative effects on **air** quality and **climatic factors**, due to the release of transport-related greenhouse gas emissions and pollutants. The composition of the coir will also influence the amount of transport required. Coir is commonly sold in either a loose form or compressed into briquette form which require rehydrating before use. Loose coir takes up more space than compacted briquettes during transportation, and as such may result in increased transportation emissions. The negative effect in relation to climatic factors is further impacted due to the processing of coir being energy intensive. Emissions and pollutants released during the processing and transportation of coir may contribute towards increases in respiratory illnesses amongst the population. Furthermore, the processing of coir results in a very dusty environment which may have adverse effects on workers, resulting in negative effects in relation to **population and human health.** The production of coir may have negative effects on soil quality in the country in which the coconuts are grown, as the nutrients from the soil are removed during coconut growth and not replaced naturally, as the coir from the coconut gets exported. This results in more fertiliser needed in coconut plantations, which may have adverse effects in relation other environmental topics such as water quality. However, the use of coir provides benefits for **soils** its applied to by increasing water holding capacity,

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									deterring fungus, gnats and algae[285], and improving aeration through soils, which may promote and enhance plant growth whilst also minimising use of water[286]. Therefore, coir is expected to have mixed effects in relation to **soil**, with minor positive effects identified in the country of use, and minor negative in the country of origin. Further, benefits for **material assets** may arise due to improved efficiency of water resources and improved plant yields. Coir helps deter fungus, gnats and algae by helping to keep the soil surface dry. This can promote the healthier growth of flora species, having minor positive effects in relation to biodiversity. Furthermore, preventing fungus and algae may also provide further benefits to fauna species. Overall, minor positive effects are identified in relation to **biodiversity.** Coir is not expected to result in any notable effects on **landscape** or **cultural heritage**.

[285] https://www.nurserymag.com/article/coir-offers-pros--cons/
[286] https://www.gardenmyths.com/coir-ecofriendly-substitute-peat-moss/

Use of compost as an alternative growing media

D.5 Compost is a mixture of organic material which can be used as a fertiliser or growing medium to improve the physical, chemical and biological properties of soil. Compost is produced during a composting process whereby green waste such as garden and food waste decomposes. Compost can be produced at several scales, from small, domestic-scale to commercial scale.

Table D.9: Use of compost as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
+	0?	0?	+	+/-?	-	-?	-?	+/-	Composting is the natural process of recycling organic matter into a nutrient rich fertiliser, which can be used in the horticultural sector. Composting allows for the reuse of many organic materials which would otherwise end up in landfill[287].Composting can be done at various scales, from household-scale right through to commercial scales. In Scotland, many local authority councils collect domestic garden and food waste which is composted in vessels or in windrows. During in-vessel composting, food and garden waste is shredded to a uniform size and then loaded into a bay(s) where naturally occurring micro-organisms start the composting process and sanitise the material by killing pathogens and weed seeds at temperatures of 60-70 degrees Celsius[288].Once this process is complete, the compost is left to mature in open windrows for several weeks to ensure stabilisation. In other cases, green waste material can be shredded and piled up into open windrows immediately. During this process they are left to compost over time with occasional turning of material to improve porosity and oxygen content, allowing microbial activity to continue. The compost produced at these commercial scale facilities is distributed to local farmers and is often available for the public to purchase. Household scale composting is generally undertaken using small composting bins, with the compost produced primarily for personal use.

[287] https://www.hse.gov.uk/waste/composting.htm
[288] https://wrap.org.uk/resources/guide/vessel-composting-ivc

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Composting therefore helps promote a circular economy and eases strain on landfills, having minor positive effects in relation to **material assets**. Furthermore, as compost reduces need for the use of chemical fertilisers[289], there may be further benefits for material assets by allowing the chemicals which would otherwise be used for fertiliser to be used for other purposes. It can also help reduce risk of surface water flooding and need for watering by increasing the water retention capabilities of soil[290], however it is recognised that reductions in flood risk would be at a very local scale. As compost can have high nutrient levels (notably potassium) and a high pH, it often needs to be diluted down with low-nutrient material such as coir before it can be used as a growing medium[291]. This additional material requirement could have adverse effects on **material assets.** Preventing organic waste going to landfill reduces methane emissions which are more potent than carbon dioxide, having minor positive effects in relation to **climatic factors**. Furthermore, carbon within compost can be sequestered into soil[292], thereby reducing carbon emissions in the atmosphere. However, there is uncertainty about the amount of carbon sequestered. Research found that substituting compost for peat as a constituent of growing media could result in the potential reduction of 70-150 kg CO2e per tonne of growing media[293]. The composting process whereby organic matter is broken down results in the release of carbon dioxide, and subsequent use of compost can result in further emissions being released. Although composting results in the release of carbon dioxide, the

[289] https://www.planetnatural.com/composting-101/environmental-issues/compost-chemicals/
[290] https://www.growerexperts.com/how-to-improve-water-retention-in-soil/
[291] https://www.hse.gov.uk/pesticides/pesticides-registration/data-requirements-handbook/fate/resources/use-disposal-growing-media-adas.pdf
[292] https://www.ioes.ucla.edu/project/carbon-sequestration-through-compost/#:~:text=Using%20agricultural%20byproducts%2C%20predominantly%20manure,greenhouse%20gases%20in%20the%20state.
[293] https://www.climatexchange.org.uk/research/projects/alternatives-to-horticultural-peat-in-scotland/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									carbon dioxide released during composting is considered biogenic, not anthropogenic, and therefore is carbon neutral[294]. Overall, minor positive effects are identified in relation to **climatic factors.** The production of compost from organic waste reduces the need for chemical fertilisers. The natural nutrients within compost will help improve soil condition and increase water absorption within soil, having overall positive effects on the quality of **soils**. The use of compost can also help improve contaminated and compacted soils, and help enhance water retention in soils, further enhancing these positive effects. Overall, minor positive effects are identified in relation to **soil**. Reducing the use of chemical fertiliser will prevent harmful chemicals leaching into nearby watercourses, thereby contributing to improvements in water quality. However, poor management of leachate from composting facilities may have potential adverse impacts on water quality. There is uncertainty attached to this depending on the particular scheme, and it is expected that this would be appropriately managed through the planning and/or permitting systems. Overall, uncertain mixed minor positive and negative effects are identified in relation to **water**. Composting plants can release emissions to the atmosphere which, depending on the amount released, can be harmful to humans. This includes the release of dust, bacteria and fungi, and actinomycetes and endotoxins, which can all contribute towards respiratory illnesses[295] and reductions in air quality. This is further exacerbated by transport emissions from the transportation of organic waste to composting facilities, and compost to end-users. Compost could therefore have negative effects in relation to **air** quality and **population and human health**, however

[294] https://unhsimap.org/cmap/resources/biogenic#:~:text=Biogenic%20emissions%20will%20not%20affect,a%20comprehensive%20and%20transparent%20report.
[295] https://www.tarjomefa.com/wp-content/uploads/2017/10/7824-English-TarjomeFa.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									this would largely be controlled and managed through the planning and permitting system. Therefore, negligible effects are identified in relation to **population and human health** and **air,** however some uncertainty is attached to these**.** In terms of **landscape** and the **historic environment**, the construction of composting facilities may have minor adverse effects if not sited and designed sensitively, particularly when considering cumulative effects of several of these schemes. However, these effects are uncertain depending on the location and specifics of each scheme. The construction of large-scale composting facilities has the potential to adversely affect biodiversity due to loss or damage of habitats, or disturbance from emissions or noise. Therefore, minor negative effects are identified in relation to **biodiversity**.

Use of anaerobic digestate (from food and agricultural waste) as an alternative growing media

D.6 Anaerobic digestate is a mixture of nutrient-rich organic material which can be used as a fertiliser or growing medium to improve the properties of soil. Anaerobic digestate is produced when organic material such as garden, food or agricultural waste is broken down in anaerobic conditions (without oxygen). Anaerobic digestate can be spread across soils (for horticultural and agricultural use) to help increase organic matter content, reducing reliance on chemical fertilisers, improve plant growth, and reduce soil erosion and nutrient runoff.

Table D.10: Use of anaerobic digestate (from food and agricultural waste) as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
+/-	+/-?	-	+	+/-?	-	-?	-?	+/-	Anaerobic digestion is the process by which organic waste material is broken down by microorganisms in the absence of oxygen (anaerobic conditions). The result is the production of biogas and digestate (solid and liquid end products). Digestate is a nutrient-rich by-product which can be used as a fertiliser or as a growing medium in the horticultural sector[296]. Anaerobic digestion diverts waste organic material such as food scraps (residential and business derived), commercial food processing waste, fats, oils and greases, wastewater and agricultural waste[297], which would otherwise be sent to landfill, and uses these to produced biogas and digestate. Anaerobic digestion therefore helps reduce reliance on fossil fuels by producing its own reliable source of renewable biogas. Biogas can also be purified to make renewable natural gas, which depending on the quantities produced can be injected into the gas network. Therefore, by reducing reliance on non-renewable energy sources, anaerobic digestion is expected to have minor positive effects on climatic factors. Furthermore, diverting organic waste from landfill sites will prevent the release of methane to the atmosphere as this waste decomposes. As methane is more potent than carbon dioxide, this will have additional

[296] https://www.biogas-info.co.uk/about/digestate/
[297] https://www.epa.gov/anaerobic-digestion/environmental-benefits-anaerobic-digestion-ad

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									benefits in relation to climate change. However, this positive effect is mixed with a minor negative effect due to the release of transport-related emissions of organic waste prior to anaerobic digestion, and transport of digestate following processing. Overall, mixed (minor positive and minor negative) effects are expected in relation to **climatic factors**. The anaerobic digestate produced helps keep nutrients within the ecosystem as they can go back into the soils as the digestate is spread or used. Therefore, digestate can help improve the health of soils by increasing organic matter content, reducing reliance on chemical fertilisers, improving plant growth, and reducing soil erosion and nutrient runoff[298]. Therefore, minor positive effects are identified in relation to **soils**. Furthermore, these benefits for soils may result in subsequent benefits for material assets due to improved crop/plant yield. In addition, the use of organic waste in anaerobic digestion facilities will reduce the pressure on landfill sites, having minor positive effects in relation to **material assets**. However, the drawback of anaerobic digestion facilities is the high start-up cost and the constant supply of materials needed to run the facility. This may result in less businesses investing in anaerobic digesters, and potential conflicts in resource management for the feedstock going into the digester if crops are grown for the sole purpose of being used as a feedstock, instead of for the food industry. Overall, mixed minor effects are anticipated in relation to **material assets**. Digestate can help increase soils water retention ability and thus reduces the need for irrigation, have positive effects in relation to **water** and **material assets** by reducing water consumption. Furthermore, the anaerobic digestion process helps to remove phosphorous and other metals from the waste products, which if sent to landfill may

[298] https://www.epa.gov/anaerobic-digestion/environmental-benefits-anaerobic-digestion-ad

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									end up contaminating water supplies[299]. As digestate is nutrient rich, there is potential for nutrient leaching into nearby watercourses, resulting in potential adverse effects on water quality by causing eutrophication. Furthermore, the anaerobic digestion process produces wastewater[300] which needs to be treated to avoid pollution of watercourses. Overall, mixed minor effects are identified in relation to **water** quality. However, the negative effect is uncertain depending on whether nutrient leaching occurs. Anaerobic digestion facilities and plants need to operate 24 hours a day, and there can be some effects which may adversely affect local people. For example, noise, vibration and dust can be a potential cause of nuisance to local residents having adverse effects on **population and human health.** However, the delivery of renewable energy (especially if injected into the gas network) may improve security of energy supply for people, having positive effects in relation to **population** and **material assets**. Overall, mixed minor effects are identified for **population and human health,** but these are uncertain depending on the location of AD facilities and their proximity to the local population. Adverse effects on the population may also arise during construction, however it is anticipated that these would not be significant, as they would be controlled and managed through the planning and any relevant permitting systems. In addition to pollutants released during transport activities, the creation of dust at the anaerobic digestion facility may also result in reductions in air quality locally. Therefore, minor negative effects are identified in relation to **air**. In terms of **landscape** and the **historic environment**, the construction of anaerobic digestion facilities may have adverse effects if not sited and designed sensitively.

[299] https://greencoast.org/facts-about-anaerobic-digesters/
[300] https://blog.enduramaxx.co.uk/news/anaerobic-digestion-process-water#:~:text=Wastewater%20From%20Anaerobic%20Digestate,reactions%20in%20the%20digestion%20systems.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									However, these effects are uncertain depending on the location and specifics of each scheme. As large-scale developments often found in rural settings, the construction of anaerobic digestion facilities has the potential to adversely affect biodiversity due to loss or damage of habitats, or disturbance from noise. Therefore, minor negative effects are identified in relation to **biodiversity**.

Use of cultivated sphagnum moss as an alternative growing media

D.7 Sphagnum farming is the cultivation of peat moss (Sphagnum) aiming for the production and harvest of peat moss biomass. For this purpose the Sphagnum is cultivated in order to gain renewable raw material for the production of horticultural growing media. Potential sites for Sphagnum cultivation on peat soils are degraded former raised bog sites such as cut-over peat bogs or cultivated bogs, which are currently used as pastures and meadows. Alternatively, Sphagnum can also be cultivated on floating rafts on open water, former peat cuttings in degraded raised bogs or lakes which developed after open-cast lignite mining.

Table D.11: Use of cultivated sphagnum moss as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
+	?	+	+	-	+	0	+	+	Cultivating sphagnum moss can reduce the use of peat helping retain a carbon sink reducing carbon emissions. [301]. If cultivating sphagnum moss is managed properly, it can be considered renewable and can easily regenerate. Therefore, minor positive effects are identified in relation to **climatic factors**. Minor positive effects are identified in relation to **air** as reducing carbon emission as a result of farming sphagnum instead of using peat will improve air quality through maintaining peat as a carbon store. As sphagnum moss can be farmed at a small scale, it is not as land intensive as other growing media. Therefore, minor positive effects are identified in relation to **soil**. Minor negative effects are identified in relation to **water** as Sphagnum mosses as the farming of the moss is quite a water intensive process through needing to keep the sphagnum moss in boggy and swamp lands. Sphagnum moss is protected in the UK under the Wildlife and Countryside Act, 1981, and is a Priority Species under the UK Post-2010 Biodiversity Framework. Sphagnum

[301] https://abanahomes.com/what-is-peat-moss/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									moss helps create and maintain peatland habitats by keeping the peat bogs waterlogged. These habitats support a variety of wildlife. Therefore, by managing the farming of sphagnum moss instead of extracting from peatland will help maintain these import peat habitats. Therefore, minor positive effects are identified in relation to **biodiversity**. Furthermore, cultivating sphagnum moss will help maintain peatlands which are important for sustaining the natural landscape. Minor positive effects are identified in relation to **landscape**. Sphagnum moss is fairly simple to grow and easy to farm. This can be done at a variety of scales from at a domestic level but also on a larger commercial scale. The moss acts well dry and wet as a reliable medium with the ability to retain water well. Therefore, minor positive effects are expected in relation to **material assets**.

Use of bracken as an alternative growing media

D.8 Bracken is the UK's most common fern and grows in dense stands on heathland, moorland, hillsides and in woodland. It is a large fern that favours dry, acid soils and spreads by underground rhizomes. The young green fronds of bracken can be collected for composting where they will rot down slowly, enriching the nutrient content of the compost. Domestic gardeners can use bracken as a mulch to protect tender plants and suppress weeds.

Table D.12: Use of bracken as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-	+/-	-	+	-	++/-	0	+	--/+	Bracken stores carbon well, about 79 tonnes of carbon per hectare, although very little research has been done on carbon storage in bracken[302]. Therefore, the use of bracken could reduce a significant carbon store resulting in less emissions being captured but there is uncertainty on its impact. Additionally, the transport and harvesting of bracken is quite an intensive process requiring specialist machinery. Therefore, minor negative effects are identified in relation to **climatic factors**. The harvesting and transporting of bracken is intensive and challenging, potentially resulting in transport related emissions which could affect air quality. Therefore, minor negative effects are identified in relation to **air**. Mixed effects are identified in relation to **population and human health** as bracken can be toxic and carcinogenic. Bracken can make recreational access more challenging due to its growth in size[303]. However, bracken is sometimes considered an invasive plant and is not always desired by farmers and land managers[304]. It is very difficult to control due to its extensive underground root systems. Bracken has the potential to negatively affect sheep and beef production resulting in increasing food

[302] https://www.lakedistrict.gov.uk/caringfor/farming/farming-and-carbon
[303] https://www.nature.scot/sites/default/files/Publication%202008%20-%20Bracken%20Control%20-%20A%20Guide%20to%20Best%20Practice.pdf
[304] https://www.plantlife.org.uk/uk/discover-wild-plants-nature/plant-fungi-species/bracken#:~:text=Did%20you%20know%3F,is%20thought%20to%20be%20carcinogenic.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									prices[305]. Therefore, the control of bracken could reduce the negative impacts of its growth on farmers and land managers. Minor positive effects are identified in relation to **soil** as bracken can provide protective cover on steep slopes that are at risk of erosion. Additionally, bracken can make good compost when used as a soil improver. Using bracken as a growing medium instead of peat has a low water retention level affecting the growth of plants. Therefore, minor negative effects are identified in relation to **water**. Bracken can inhibit woodland regeneration and replace other important habitats such as heathland and species-rich grassland. Bracken reduces the potential grazing area available to livestock and wildlife and can also harbour ticks which may cause can cause disease. Therefore, the control and management of bracken across the landscape will have significant positive effects in relation to **biodiversity.** However, these are mixed with minor negative effects as bracken provides an important habitat for a variety of species including invertebrates, small mammals, and birds, and the loss of this habitat could have adverse effects on this biodiversity. Overall, mixed significant positive and minor negative effects are identified in relation to **biodiversity**. Bracken is considered an invasive species which is a serious problem in some parts of Scotland and easily dominate landscapes due to its ability to rapidly colonise. Bracken has the ability to outcompete other plants. Bracken has an extensive underground stem (rhizome) system which can store large amounts of nutrients and carbohydrate which means that it can recover quickly if not controlled properly. Bracken can also increase the risk of fires from accumulation of dry bracken. Therefore, it's use as an

[305] https://www.yorkshirepost.co.uk/news/environment/why-spread-bracken-spells-danger-1935642

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									alternative growing media will have minor positive effects on **landscape** due to better controlling and managing Bracken. Mixed effects are identified in relation to **material assets**. No research or feasibility studies have been performed either into the economics of producing bracken as an input into growing media, nor into the necessary logistics and processing that would be required to convert the crop into a useful ingredient in growing media[306]. However, given that there are large areas of bracken within the UK and particularly in Scotland this will reduce transport and allow the growing media to be harvested and produced in the UK. Additionally, bracken will not require additional land use as it is already abundant within the natural landscape. Therefore, minor positive effects with uncertainty are identified in relation to **material asset** for using bracken an alternative growing media. Bracken is expensive and challenging to harvest and transport making it not a financially viable as a growing media. The harvesting of bracken will likely require the use of specialist equipment and is time consuming to harvest with a limited harvest period.. Therefore, significant negative effects are identified in relation to **material assets**.

[306] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

Use of loam as an alternative growing media

D.9 Loam is a combination soil which comprises clay, silt and sand particles. Due to this unique composition, it is an effective growing medium to supplement soil as it has good water- and nutrient- retaining properties, whilst providing high levels of drainage and aeration. Loam soils are found naturally across the country. Loam can be excavated and added to non-loam soils to improve the physical structure of soil resources,

Table D.13: Use of loam as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-?	-?	-	-	-	-	-?	-?	+/-	Loam is a combination soil comprising sand, silt and clay in a 40-40-20 ratio. It is an ideal growing medium because the clay has good water- and nutrient-retaining properties, the sand provides good drainage and aeration, and the silt helps the clay and sand to mix well. In 2021, loam made up 4.9% of the growing media used in the retail sector and 0.2% in the professional sector[307].

[307] https://hta.org.uk/news-events-current-issues/sustainability/growing-media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Loam tends to be topsoil with a low organic matter content[308], and its excavation to provide a growing medium in the horticultural sector could result in a variety of environmental effects. Loam is difficult to source, and most is sourced from surplus soil from construction operations (e.g. road building) or dredged from ports and rivers. The use of loam from construction projects for horticultural purposes will have minor positive effects on material assets as it provides an alternative use to an otherwise waste product. However, if loam is to be produced commercially it is likely that it could not be solely sourced from waste topsoil associated with construction projects, and might need to be purposely extracted. This therefore would result in mixed (minor positive and minor negative) effects on **material assets.** The removal of loam from soil on land or in aquatic environments has the potential to have adverse effects on biodiversity, due to disturbance of soil/sediment and the subsequent implications for habitats and species. Therefore, minor negative effects are identified in relation to **biodiversity.** Furthermore, the excavation of loam soil for horticultural purposes is expected to have minor negative effects on **soils**, by depleting resources, causing disturbance to the soil, and potentially increasing rates of soil erosion. Additionally, when compacted, loam can result in poor drainage which adversely affects the quality of soil resources. Disturbance of soil resources (and loam sediment within the water environment) is likely to have minor negative effects on **climatic factors** by disturbing stored carbon. However, the carbon content of loam is uncertain, and will be largely dependent on the overlying land use (e.g. loam under woodland or forestry will likely store more carbon than loam under open grassland etc.). The excavation and transportation of

[308] https://www.hse.gov.uk/pesticides/pesticides-registration/data-requirements-handbook/fate/resources/use-disposal-growing-media-adas.pdf

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									loam will also result in the emission of greenhouse gas emissions, and could result in the generation of dust, which would have adversely effects on **air quality**. In addition to pollution and emissions released during transportation, the excavation of loam may produce dust and noise, which may adverse effects on the local population. Therefore, minor negative effects are identified in relation to **population and human health,** however these are uncertain as it largely depends on the location of extraction and proximity to people or residents**.** The use of loam may result in minor negative effects on **water** quality, as soil excavation may increase soil erosion, resulting in more sediment entering watercourses and reducing water quality. The excavation of loam on land and in aquatic environments has the potential to affect buried and underwater archaeology, and as such could result in minor negative effects in relation to **cultural heritage**. However, this uncertainty is attached to this, as it is largely dependent on where loam is extracted and the archaeology assets in the area. Likewise, the excavation of loam may have adverse effects on landscape character as a result of extraction processes and also through altering vegetation above land. Minor negative effects are identified for **landscape**, but these are uncertain.

Use of vermiculite, Perlite and other expanded clay minerals as an alternative growing media

D.10 Vermiculite is a mineral that forms naturally due to the weathering or alteration of biolite or phlogopite. Vermiculite is lightweight, non-toxic and sterile and does not deteriorate over time. It has a neutral pH. For use in horticulture, it is sold as lightweight, absorbent brown-gold flakes. Vermiculite can absorb three or four times its weight in water and also attracts various plant nutrients such as potassium, magnesium and calcium. These qualities make it useful for propagation and for potting up plants that do best in moist compost. Expanded clay aggregates are porous ceramics with a uniform pore structure of fine, closed cells. They are used as loose or cement-bound material in the construction industry and also as loose material in garden and landscape design. Perlite is an inorganic, non-toxic, lightweight soil amendment. Perlite is a mined volcanic rock that is mixed into many industrial building products for stability. Perlite is not a fertiliser, and has no nutritional or microbial value to plants or soil. Its benefits are derived solely from keeping the soil structure loose and light. Perlite is a soil amendment used for aeration and drainage. Similarly, perlite is a mined mineral that also greatly expands when heated and is used for water and nutrition retention in gardening.

Table D.14: Use of vermiculite, Perlite and other expanded clay minerals as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-	-	-	-	-	-	-	-	-	Vermiculite is a natural mineral. Formed mainly by silicates of iron and magnesium, its manufacture goes through the extraction of raw material in mines. The extraction is done in open-pit mines. The extracted vermiculite is processed by separating rocks and other impurities. Subsequently a heat treatment, known as exfoliation, is performed to expand the mineral. When heated, vermiculite expands (exfoliates) to up to 12 times its original volume. The exfoliation process converts the dense flakes of ore into lightweight porous granules containing innumerable air layers. The exfoliated vermiculite is light and clean, has a high thermal and acoustic insulation value, is incombustible and insoluble in water and has the ability to absorb liquids[309]. Lightweight expanded clay aggregate or expanded clay is a lightweight aggregate made by heating clay to around 1,200 °C (2,190 °F) in a rotary kiln.

[309] https://perlindustria.com/en/vermiculita/#1470062152639-5df13ca5-9a7ad6a1-50a6

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Perlite is a dense, amorphous volcanic glass with very high water content. In its natural state perlite is brown or black in colour, as it's typically formed during the cooling process of lava that produces obsidian. During processing, raw perlite is superheated very rapidly to temperatures of 1560°F to 1650°F, which causes the material to soften and the moisture inside the glass to turn to steam. As the trapped moisture inside bubbles, trying to escape, it expands the material from 7 to 16 times its original size. The expanded material turns white due to the reflectiveness of the trapped bubbles, and the resulting perlite is a chemically inert, sterile material that takes on an ultra-lightweight, foamy texture. Perlite is mined by employing heavy machinery to rip or cut the material out of the earth, or by precise blasting[310]. There are no chemicals involved in processing perlite. Perlite does not create any by-products[311]. Therefore, there is unlikely to be any contamination or pollution of natural resources from the processing of perlite. In order to use vermiculite and expanded clay minerals, it must be mined. Mining is an extractive industry which can do a lot of environmental harm. Additionally, processing the materials involves intense heating and high temperatures. This process is normally carried out by burning fossil fuels to create heat. Furthermore, the transportation of vermiculite other expanded clay minerals from its mining location to the UK may require the use of fossil fuels resulting in transport related emissions. South Africa, Brazil, the US and China are some of the main produces of mined vermiculite. Perlite is mainly mined in the USA. Therefore, **minor negative effects** are identified in relation to **climatic factors** as the mining and transportation of vermiculite is a carbon intensive process[312].

[310] https://www.earthmagazine.org/article/mineral-resource-month-perlite/#:~:text=Perlite%20is%20mined%20by%20employing,and%20sized%20into%20marketable%20fractions.
[311] https://www.pomona.edu/farm/blog/posts/organic-farming-are-our-alternatives-actually-sustainable
[312] https://horticulture.co.uk/perlite-vs-vermiculite/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Processing and the subsequent transport of perlite will result in the additional release of emissions and transport-related pollutants, having potential **minor negative effects** on **air** quality and subsequent **minor negative effects** on **population and human health**. Additionally, people who work in mining face a variety of health risks caused by mining such as different cardiovascular diseases, food, and water contamination. As a growing media, Vermiculate, Perlite and other expanded clay minerals are normally added to compost and therefore does not require large quantities. To access the mining area for excavating, the surface soil, rocks, and available vegetation is destroyed. This can also result in deforestation. This eliminates the topsoil and causes soil erosion. Additionally, mining has negative effects in terms of disturbing the visual aspect of the landscape. Therefore, **minor negative effects** are identified in relation to **soil** and **landscape**. The mining of vermiculite could result in water contamination due to waste products or disturbing water bodies such as rivers and lakes through construction of a mine. Therefore, **minor negative effects** are identified in relation to **water**. Mining has the potential to have negative effects on known and unknown historical and cultural heritage assets during mining activities. Therefore, **minor negative effects** are identified in relation to **cultural heritage & historic environment**. Mining could result in **minor negative effects** in relation to **biodiversity, flora and fauna**. This is a result of irreversible disturbances to habitats and local ecosystems disrupting wildlife due to mining activities. Open-pit mining cause mass land degradation limiting habitat availability. However, effects on the landscape and natural environment will be dependent on the scale and location of mining activities.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Vermiculite, Perlite and other expanded clay minerals is a finite resource and is therefore, not renewable. To use vermiculite as an alternative growing media will require the extraction of raw materials. Therefore, **minor negative effects** are identified in relation to **material assets**.

Use of bentonite as an alternative growing media

D.11 Bentonite is a clay generated frequently from the alteration of volcanic ash, consisting predominantly of smectite minerals, usually montmorillonite. The special properties of bentonite (hydration, swelling, water absorption, viscosity, thixotropy) make it a valuable material for a wide range of uses and applications.

Table D.15: Use of bentonite as an alternative growing media

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
-	+/-	-	0	-	-	0	0	-	Bentonite extraction is carried out through surface mining. Under appropriate hydrothermal conditions, i.e. under the influence of water and temperature, bentonite is formed. For a successful bentonite extraction, exploratory drilling has to be carried out to find the mostly lenticular enclosed bentonite. The clay mineral is extracted in surface mining. After the closure of mines the resulted pits are recultivated. The new area again can be used for forestry and agriculture[313]. Mining bentonite is an extractive industry which can do a lot of environmental harm. Additionally, processing the materials involves intense heating and high temperatures. This process is normally carried out by burning fossil fuels to create heat. Furthermore, the transportation of vermiculite from its mining location to the UK may require the use of fossil fuels resulting in transport related emissions. Important bentonite deposits are found not only in the United States, but worldwide. In Europe it is mined around the Mediterranean and in Germany. Therefore, **minor negative effects** are identified in relation to **climatic factors** as the mining and transportation of vermiculite is a carbon intensive process[314]. Processing and the subsequent transport of perlite will result in the additional release of emissions and transport-related pollutants, having potential **minor negative effects**

[313] https://www.acat.com/files/get/5063e2249799e1cc0fdaf7173a7b2918/bentonit-einvielseitigeinsetzbaresnaturprodukt-englisch.pdf
[314] https://horticulture.co.uk/perlite-vs-vermiculite/

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									on **air** quality. However, as a growing media, Bentonite is normally added to compost and therefore does not require large quantities. **Minor positive effects** and **minor negative effects** are identified in relation to **population and human health**. Surface mining of bentonite has a lower financial cost and is a lot safer to the people working in mining activities than underground mining because all mining operations take place above the surface. However, people who work in mining face a variety of health risks caused by mining such as different cardiovascular diseases, food, and water contamination. To form bentonite is a water intensive process. This could have a negative impact of water quantity with also the potential risk for water pollution. Therefore, **minor negative effects** are identified in relation to **water**. Surface mining is a form of mining in which the soil and the rock covering the mineral deposits are removed. Surface mining can result in the loss of topsoil while having a negative effect on the existing land use pattern. Additionally, mining has negative effects in terms of disturbing the visual aspect of the landscape. However, following the surface mining of bentonite the land can be restored and recultivated. Therefore, **negligible effects** are identified in relation to **soil** and **landscape**. The mining of bentonite has the potential to have negative effects on known and unknown historical and cultural heritage assets during mining activities. However, following the surface mining of bentonite the land can be restored and recultivated. Therefore, **negligible effects** are identified in relation to **cultural heritage & historic environment**. The mining of bentonite could result in **minor negative effects** in relation to **biodiversity, flora and fauna**. This is a result of disturbances to habitats and local ecosystems disrupting wildlife due to mining activities.

Climatic Factors / Emissions Reduction	Population and Human Health	Air	Soil	Water	Biodiversity, Flora and Fauna	Cultural Heritage & Historic Environment	Landscape	Material Assets (Waste, Energy, Transport and Land Use)	Likely Environmental Effects
									Bentonite is not a renewable resource and requires the extraction of a raw material from the environment. Therefore, **minor negative effects** are identified in relation to **material assets**.

Stage 2 assessment

Combined effects of Reasonable Alternatives based on weighting

D.12 To calculate the combined effects of all reasonable alternatives, each effect was given a score (e.g. -2 (significant negative), -1 (minor negative), 0 (negligible or mixed effects), 1 (minor positive), or 2 (significant positive)), which could then be used alongside data on the current usage of each alternative in the retail and professional sectors to calculate a weighted average for each sector. An overall weighted average was calculated using the weighted averages for the retail and professional sectors individually. This was based on data that 58% of peat extracted in Scotland for horticulture is used for retail horticulture, and 42% for professional horticulture. The numerical weighted scores were rounded to the nearest integer to determine the overall score. For example a weighted score of -0.6 was identified as being a minor negative effect (-1 when rounded).

D.13 The effects for each alternative are set out in the table below. The numerical score is shown in the brackets – mixed and uncertain effects were given a score of 0. The percentage use of each alternative in the retail and professional sectors is outlined at the bottom of the table and was used to calculate the weighted scores in the last three columns of the table.

Table D.16: Combined effects of alternative growing media based on current usage

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
% of market retail (2021)[315]	29	9	6	8	unknown	0	0	5	1.5	1.5			
% of market professional (2021)[316]	18	5	25	1	0	0	0	0	0	0			
Climatic Factors /	- (-1)	- (-1)	-- (-2)	+ (1)	+/- (0)	+ (1)	- (-1)	-? (-1)	- (-1)	- (-1)	- (-0.8)	-- (-1.5)	- (-1.1)

[315] https://hta.org.uk/news-events-current-issues/sustainability/growing-media
[316] https://hta.org.uk/news-events-current-issues/sustainability/growing-media

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
Emissions Reduction													
Population and Human Health	- (-1)	- (-1)	- (-1)	0? (0)	+/-? (0)	? (0)	+/- (0)	-? (-1)	- (-1)	+/- (0)	- (-0.9)	- (-1.0)	- (-0.9)
Air	- (-1)	- (-1)	- (-1)	0	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	- (-1)	- (-0.9)	- (-1.0)	- (-0.9)
Soil	+ (1)	+/- (0)	+/- (0)	+ (1)	+ (1)	+ (1)	+ (1)	- (-1)	- (-1)		+ (0.6)	0 (0.4)	+ (0.5)
Water	-? (-1)	+ (1)	- (-1)	+/-? (0)	+/-? (0)	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	- (-0.5)	- (-0.8)	- (-0.6)
Biodiversity, Flora and Fauna	+? (1)	+? (1)	+ (1)	- (-1)	- (-1)	+ (1)	++/- (1)	- (-1)	- (-1)	- (-1)	+ (0.5)	+ (1.0)	+ (0.7)
Cultural Heritage & Historic Environment	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	0 (0)	0 (0)	-? (-1)	- (-1)	0	0 (-0.2)	0 (0.0)	0 (-0.1)
Landscape	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	+ (1)	+ (1)	-? (-1)	- (-1)	0	0 (-0.2)	0 (0.0)	0 (-0.1)

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
Material Assets (Waste, Energy, Transport and Land Use)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+ (1)	--/+ (-1)	+/- (0)	- (-1)	- (-1)	+/- (0)	+/- (0)	+/- (0)

D.14 In addition to the above combined effects of alternative growing media, combined effects based on future use have been calculated. These have been calculated under two temporal scenarios; the first being in the medium term (2024-2028) where compost and anaerobic digestate are expected to have greater potential to displace the volume of peat in horticulture, and the longer term (2028 onwards) where cultivated sphagnum moss and bracken are seen as viable options at a commercial scale[317].

D.15 In the below scenarios, it is assumed that each alternative growing medium occupies the same share of the market in both the retail (amateur) and professional sectors. The percentage of market share has been estimated based on the general trend opportunities highlighted by the HTA study[318], but no quantitative data has been used to predict these and the percentage share is given as an **indication only.**

[317] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf
[318] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

Table D.17: Combined effects of alternative growing media based on predicted future usage (medium term 2024-2028)

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
% of market retail (2024-28)	10	5	5	30	20	15	10	0	2.5	2.5			
% of market professional (2024-28)	10	5	5	30	20	15	10	0	2.5	2.5			
Climatic Factors / Emissions Reduction	- (-1)	- (-1)	-- (-2)	+ (1)	+/- (0)	+ (1)	- (-1)	-? (-1)	- (-1)	- (-1)	0 (0.1)	0 (0.1)	0 (0.1)
Population and Human Health	- (-1)	- (-1)	- (-1)	0? (0)	+/-? (0)	? (0)	+/- (0)	-? (-1)	- (-1)	+/- (0)	0 (-0.2)	0 (-0.2)	0 (-0.2)
Air	- (-1)	- (-1)	- (-1)	0	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	- (-1)	0 (-0.4)	0 (-0.4)	0 (-0.4)
Soil	+ (1)	+/- (0)	+/- (0)	+ (1)	+ (1)	+ (1)	+ (1)	- (-1)	- (-1)		+ (0.8)	+ (0.8)	+ (0.8)
Water	-? (-1)	+ (1)	- (-1)	+/-? (0)	+/-? (0)	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	0 (-0.4)	0 (-0.4)	0 (-0.4)

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
Biodiversity, Flora and Fauna	+? (1)	+? (1)	+ (1)	- (-1)	- (-1)	+ (1)	++/- (1)	- (-1)	- (-1)	- (-1)	0 (-0.1)	0 (-0.1)	0 (-0.1)
Cultural Heritage & Historic Environment	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	0 (0)	0 (0)	-? (-1)	- (-1)	0	- (-0.5)	- (-0.5)	- (-0.5)
Landscape	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	+ (1)	+ (1)	-? (-1)	- (-1)	0	0 (-0.3)	0 (-0.3)	0 (-0.3)
Material Assets (Waste, Energy, Transport and Land Use)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+ (1)	--/+ (-1)	+/- (0)	- (-1)	- (-1)	0 (0)	0 (-0.1)	0 (-0.1)

Table D.18: Combined effects of alternative growing media based on predicted future usage (long term 2028 onwards)

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
% of market retail (2028-)	9	5	5	15	14	25	17	0	5	5			
% of market professional (2028-)	9	5	5	15	14	25	17	0	5	5			
Climatic Factors / Emissions Reduction	- (-1)	- (-1)	-- (-2)	+ (1)	+/- (0)	+ (1)	- (-1)	-? (-1)	- (-1)	- (-1)	0 (-0.1)	0 (-0.1)	0 (-0.1)
Population and Human Health	- (-1)	- (-1)	- (-1)	0? (0)	+/-? (0)	? (0)	+/- (0)	-? (-1)	- (-1)	+/- (0)	0 (-0.2)	0 (-0.2)	0 (-0.2)
Air	- (-1)	- (-1)	- (-1)	0	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	- (-1)	0 (-0.4)	0 (-0.4)	0 (-0.4)
Soil	+ (1)	+/- (0)	+/- (0)	+ (1)	+ (1)	+ (1)	+ (1)	- (-1)	- (-1)		+ (0.8)	+ (0.8)	+ (0.8)
Water	-? (-1)	+ (1)	- (-1)	+/-? (0)	+/-? (0)	- (-1)	+ (1)	- (-1)	- (-1)	- (-1)	- (-0.6)	- (-0.6)	- (-0.6)

	Wood-based	Bark	Coir	Compost	Anaerobic digestate	Cultivated Sphagnum Moss	Bracken	Loam	Vermiculite, Perlite and other expanded clay minerals	Bentonite	Retail weighted scores	Professional use weighted scores	Combined weighted scores
Biodiversity, Flora and Fauna	+? (1)	+? (1)	+ (1)	- (-1)	- (-1)	+ (1)	++/- (1)	- (-1)	- (-1)	- (-1)	0 (0.2)	0 (0.2)	0 (0.2)
Cultural Heritage & Historic Environment	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	0 (0)	0 (0)	-? (-1)	- (-1)	0	0 (-0.3)	- (-0.3)	- (-0.3)
Landscape	0? (0)	0? (0)	0 (0)	-? (-1)	-? (-1)	+ (1)	+ (1)	-? (-1)	- (-1)	0	0 (0.1)	0 (0.1)	0 (0.1)
Material Assets (Waste, Energy, Transport and Land Use)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+/- (0)	+ (1)	--/+ (-1)	+/- (0)	- (-1)	- (-1)	0 (0)	0 (0)	0 (0)

Ban on sale of all peat in Scotland

Table D.19: Ban on sale of all peat in Scotland

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
Climatic Factors / Emissions Reduction	++	-	+	Overall, a minor positive effect is identified. This minor positive effect is a combination of significantly reduced emissions from land use as a result of no more peat being used across all sectors in Scotland (excluding domestic peat cutting and whisky production where the producers have their own peat extraction rights so do not buy peat from another source), balanced by an increase in GHG emissions from the transportation and processing of alternative growing media. In particular, the more popular alternatives in both the retail and professional sectors (wood-based, bark and coir) are identified as having negative effects on climatic factors due to their energy intensive processing, transportation (particularly coir). These effects are likely to be shorter term, whereas the associated benefits of anaerobic digestion and green waste composting may not be experienced to their full extent until a later date. The HTA[320] expect composting and anaerobic digestion to be deployed at greater scale in the medium term (2024-2028).	Capture and utilise emissions from the composting and anaerobic digestion process Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport emissions. Reinstate the appropriate hydrology in degraded and drained peatlands will increase their resilience to climate change. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry.

[319] Scores weighted based on growing media used in the professional and retail sectors in 2021, and based on current peat use across the professional and retail sectors.
[320] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
Population and Human Health	+/-	-	+/-	Overall, a mixed (minor positive and minor negative) effect is identified. The mixed effect is a combination of mixed effects identified in relation to banning the sale of peat, combined with the overall minor negative effects associated with alternative growing media. Positive effects are identified due to ecosystem services peatlands provide, which would be protected through the ban, from a reduction in the transportation of peat and subsequent reduction in air pollution, and from the renewable energy potential of alternatives such as anaerobic digestion. The latter may help alleviate fuel poverty and improve security of energy supply. Negative effects may arise from transport associated emissions of alternative growing media, along with noise and vibration associated with processing (e.g. loam and mineral extraction) and construction of facilities for growing media (e.g. anaerobic digestion facilities).	Avoid and minimise adverse effects arising from development of growing media processing facilities, through regulation via the planning and permitting system.
Air	+	-	-	Overall, minor negative effects are identified in relation to air quality. Minor positive effects will arise from the elimination of transport-related air pollution due to a ban on sale of peat products. However, increased transportation and extraction (notably minerals, clay and loam) of other alternative growing media will result in increased air pollution. The increased pollution would likely exceed the reduction from less peat use, particularly as a lot of growing media	Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport - related pollution.

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
				is imported into Scotland (e.g., coir, bark etc.) which will need to be transported greater distances.	
Soil	++	+	++	Overall, a significant positive effect is identified. A significant positive effect is identified as the ban on sales of peat, will result in reduced need to extract peat. This would have significant positive effects on soil resources in Scotland and countries which export peat to Scotland. This positive effect is further enhanced by the use of alternative growing media which help improve the physical, chemical and biological properties of soil by regulating moisture and temperature, and enhancing soil fertility through release of nutrients during decomposition of organic material. Some adverse effects may be experienced as a result of soil sealing during development (e.g., composting and anaerobic digestion facilities), mining activities, and immobilisation of nitrogen in soils.	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system.
Water	+	-	+/-	Overall, a mixed (minor positive and minor negative) effect is identified. This mixed effect is a combination of minor positive effects because of reduced need for peat extraction which is positive for the water environment, balanced by the water usage during the processing of alternative growing media, notably coir (in the source country). Peatlands play an important role in regulating water quality and quantity, by helping store and clean water, regulating run-off and acting as a natural floodplain. Therefore, reducing	Identify the water requirements of producing alternative growing media and commission research into reducing water use in the production process. Manage potential adverse effects on water quality from composting, anaerobic digestion and loam production through the planning system or environmental permitting.

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
				extraction of peat by banning sales will have positive effects on water quality and quantity local to peat extraction sites. Several alternative growing media have the potential to benefit water resources, by enhancing the water retention capacity of soils. However, minor negative effects are associated with alternative growing media such as coir and wood fibre which both require water during processing, and composting and mineral extraction (including loam, vermiculite, perlite, bentonite and other clay minerals) which could result in pollution of nearby watercourses due to leachate and sediment entering watercourses.	
Biodiversity, Flora and Fauna	++	+	++	Overall, a significant positive effect is identified. A significant positive effect is identified as the ban on sales of peat, will result in reduced need to extract peat. This will therefore help avoid the destruction of peatland habitats which are important for biodiversity. Although areas of worked peat are of lower value for biodiversity, they can be restored to valuable habitats. The main proportion of peat substitutes are based primarily on waste materials and no adverse impacts on habitats and species were identified from utilising these waste streams. It is noted that the alternative growing media could have positive effects on biodiversity by regulating soil temperatures and moisture content. Some adverse effects may arise through siting of processing development (e.g. composting facilities) due to loss of habitat, however this would be expected to be managed through the planning	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Ensure timber-based alternatives based on waste- or by-products sourced from productive forests and not semi-natural and/or ancient woodland. Reinstate the appropriate hydrology in degraded and drained peatlands. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
				system. Similarly, the mining of minerals such as loam, vermiculite, perlite and bentonite would likely disturb habitats, having adverse effects on biodiversity.	adverse effects on the landscape character and deliver biodiversity net gain.
Cultural Heritage & Historic Environment	+	0?	+?	Overall, a minor positive but uncertain effect is identified. This effect is a combination of the minor positive effects expected on cultural heritage due to reduced use (and extraction) of peat, which are culturally important and can contribute towards the setting of heritage assets, along with the combined negligible but uncertain effects identified in relation to the alternative growing media. Most growing media will have limited effects on cultural heritage, as they are primarily a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, these will be location dependent and expected to be managed through the planning system. Likewise, extraction of minerals such as loam, vermiculite, perlite and bentonite have the potential to impact on heritage assets. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in the short or	Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Avoid development in heritage designations or in proximity to heritage assets.

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
				medium term, instead likely to become more popular from 2028 onwards[321].	
Landscape	+	0?	+?	Overall, a minor positive but uncertain effect is identified. This effect is a combination of the minor positive effects expected on the landscape due to reduced use (and extraction) of peat, along with the combined negligible but uncertain effects identified in relation to the alternative growing media. Most growing media will have limited effects on the landscape, as they are primarily a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, and extraction of minerals and clays, these will be location dependent and expected to be managed through the planning system. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in the short or medium term, instead likely to become more popular from 2028 onwards[322].	Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Avoid development in locally or nationally designated landscapes. Promote use of waste or by-products to produce growing media (e.g., wood fibre, bark etc.) instead of being a primary product of deforestation. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.

[321] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf
[322] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of all peat assessment	Score from combined substitutes[319]	Combined Score	Justification	Mitigation and Enhancement
Material Assets (Waste, Energy, Transport and Land Use)	+/-	+/-	+/-	Overall, mixed (minor positive and minor negative) effects are identified in relation to material assets as a result of the ban on sales of peat in combination with the use of alternative growing media. Whilst the ban on sale of peat will help protect peatland, enabling it to continue to provide ecosystem services such as the filtering of water and supply of drinking water, it will also have adverse effects on industries reliant on peat (e.g., whisky, heating, horticulture etc.). The subsequent use of alternative growing media will also have mixed effects as most are made from the waste- or by-products of other industries and processes, and therefore this promotes a circular economy and reduces pressure on landfill sites. In many cases the alternatives will help promote resource efficiency by minimising water usage as a result of higher water retention capacities. However, conflicts of land-use and end products (e.g., wood for bioenergy instead of wood fibre), and requirements for other substances (e.g., nitrogen or chemical fertilisers) will have negative effects.	Reinstate the appropriate hydrology in degraded and drained peatlands Capture and utilise emissions from the anaerobic digestion process to ensure maximum resource efficiency and utilisation of renewable energy.

Ban on sale of peat for any purposes with the exception of peat for domestic whisky production

Table D.20: Ban on sale of peat for any purposes with the exception of peat for domestic whisky production

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Climatic Factors / Emissions Reduction	++?	-	+	Overall, a minor positive effect is identified. This minor positive effect is a combination of significantly reduced emissions from land use as a result of no more peat being used across most sectors in Scotland (excluding domestic peat cutting and peat sold for use in whisky production, including imported peat), balanced by an increase in GHG emissions from the transportation and processing of alternative growing media. In particular, the more popular alternatives in both the retail and professional sectors (wood-based, bark and coir) are identified as having negative effects on climatic factors due to their energy intensive processing, transportation (particularly coir) and carbon released during decomposition of the organic material. These effects are likely to be shorter term, whereas the associated benefits of anaerobic digestion and green waste composting may not be experienced to their full extent until a later date. The HTA[323] expect composting and anaerobic digestion to be deployed at greater scale in the medium term (2024-2028).	Capture and utilise emissions from the composting and anaerobic digestion process Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport emissions. Reinstate the appropriate hydrology in degraded and drained peatlands will increase their resilience to climate change. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry.

[323] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Population and Human Health	+?	-	-?	Overall, a minor negative effect is identified. The minor negative effect is a combination of the minor positive effects identified in relation to banning the sale of peat (excluding for domestic whisky production), combined with the overall minor negative effects associated with alternative growing media. Positive effects are identified due to ecosystem services peatlands provide, which would be protected through the ban on sales for everything except domestic whisky production, from a reduction in the transportation of peat and subsequent reduction in air pollution, and from the renewable energy potential of alternatives such as anaerobic digestion. The latter may help alleviate fuel poverty and improve security of energy supply. Negative effects may arise from transport associated emissions of alternative growing media, along with noise and vibration associated with processing (e.g. loam and mineral extraction) and construction of facilities for growing media (e.g. anaerobic digestion facilities).	Avoid and minimise adverse effects arising from development of growing media processing facilities, through regulation via the planning and permitting system.
Air	+?	-	-	Overall, minor negative effects are identified in relation to air quality. Minor positive effects will arise from the elimination of transport-related air pollution due to a ban on sale peat products (excluding Scottish sale and imports for domestic whisky production). However,	Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport - related pollution.

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				the increased transportation and extraction (notably minerals, clay and loam) of other alternative growing media will result in increased air pollution. The increased transport-related pollution from alternatives would likely exceed the reduction of transport-related air pollution from less peat use, particularly as a lot of growing media is imported into Scotland (e.g., coir, bark etc.) which will need to be transported greater distances (e.g., tropical regions for coir and southern Europe for bark).	
Soil	++?	+	++?	Overall, a significant positive effect is identified. A significant positive effect is identified as the ban on sales of peat (excluding for domestic whisky production), will result in reduced need to extract peat. This would have significant positive effects on soil resources in Scotland and countries which export peat to Scotland. This positive effect is further enhanced by the use of alternative growing media which help improve the physical, chemical and biological properties of soil by regulating moisture and temperature, and enhancing soil fertility through release of nutrients during decomposition of organic material. Some adverse effects may be experienced as a result of soil sealing during development (e.g., composting and anaerobic digestion facilities), mining activities and immobilisation of nitrogen in soils.	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Promote peatland restoration through the whisky industry. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system.

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Water	+?	-	+/-	Overall, a mixed (minor positive and minor negative) effect is identified. This mixed effect is a combination of minor positive effects because of reduced need for peat extraction (excluding for domestic whisky production and peat cutting), which is positive for the water environment, balanced by the water usage during the processing of alternative growing media, notably coir (in the source country). Peatlands play an important role in regulating water quality and quantity, by helping store and clean water, regulating run-off and acting as a natural floodplain. Therefore, reducing extraction of peat by banning sales (excluding for domestic whisky production) will have positive effects on water quality and quantity local to peat extraction sites. Several alternative growing media have the potential to benefit water resources, by enhancing the water retention capacity of soils. However, minor negative effects are associated with alternative growing media such as coir and wood fibre which both require water during processing, and composting and mineral extraction (including loam, vermiculite, perlite, bentonite and other clay minerals which could result in pollution of nearby watercourses due to leachate and sediment entering watercourses.	Identify the water requirements of producing alternative growing media and commission research into reducing water use in the production process. Manage potential adverse effects on water quality from composting, anaerobic digestion and loam production through the planning system or environmental permitting.

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Biodiversity, Flora and Fauna	++?	+	++?	Overall, a significant positive effect is identified. A significant positive effect is identified as the ban on sales of peat (excluding for the domestic whisky industry), will result in reduced need to extract peat. This will therefore help avoid the destruction of peatland habitats which are important for biodiversity. Although areas of worked peat are of lower value for biodiversity, they can be restored to valuable habitats. The main proportion of peat substitutes are based primarily on waste materials and no adverse impacts on habitats and species were identified from utilising these waste streams. It is noted that the alternative growing media could have positive effects on biodiversity by regulating soil temperatures and moisture content. Some adverse effects may arise through siting of processing development (e.g. composting facilities) due to loss of habitat, however this would be expected to be managed through the planning system. Similarly, the mining of minerals such as loam, vermiculite, perlite and bentonite would likely disturb habitats, having adverse effects on biodiversity.	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Ensure timber-based alternatives based on waste- or by-products sourced from productive forests and not semi-natural and/or ancient woodland. Reinstate the appropriate hydrology in degraded and drained peatlands. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.
Cultural Heritage & Historic Environment	+?	0?	+?	Overall, a minor positive but uncertain effect is identified. This effect is a combination of the minor positive effects expected on cultural heritage due to	Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system.

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				reduced sale of all peat, with the exception of sales for the domestic whisky industry and domestic peat cutting. This positive effect is because peatlands are culturally important and can contribute towards the setting of heritage assets, along with the combined negligible but uncertain effects identified in relation to the alternative growing media. Most growing media will have limited effects on cultural heritage, as they are primarily a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, these will be location dependent and expected to be managed through the planning system. Likewise, extraction of minerals such as loam, vermiculite, perlite and bentonite have the potential to impact on heritage assets. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in the short or medium term, instead likely to become more popular from 2028 onwards[324].	Promote peatland restoration. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Avoid development in heritage designations or in proximity to heritage assets.
Landscape	+?	0?	+?	Overall, a minor positive but uncertain effect is identified.	Avoid and minimise adverse effects arising from development of growing media processing facilities,

[324] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				This effect is a combination of the minor positive effects expected on the landscape due to reduced sale (and extraction) of peat (except for domestic whisky production), along with the combined negligible but uncertain effects identified in relation to the alternative growing media. Most growing media will have limited effects on the landscape, as they are primarily a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, and extraction of minerals and clays, these will be location dependent and expected to be managed through the planning system. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in the short or medium term, instead likely to become more popular from 2028 onwards[325].	through careful siting and regulation through the planning system. Avoid development in locally or nationally designated landscapes. Promote use of waste or by-products to produce growing media (e.g., wood fibre, bark etc.) instead of being a primary product of deforestation. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.
Material Assets (Waste, Energy, Transport and Land Use)	+/-	+/-	+/-	Overall, mixed (minor positive and minor negative) effects are identified in relation to material assets as a result of the ban on sales of peat (excluding	Reinstate the appropriate hydrology in degraded and drained peatlands

[325] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of all peat (excluding domestic whisky) assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				domestic whisky production) in combination with the use of alternative growing media. Whilst the ban on sale of peat (excluding for domestic whisky production) will help protect peatland, enabling it to continue to provide ecosystem services such as the filtering of water and supply of drinking water, it will also have adverse effects on industries reliant on peat (e.g., heating, amateur and professional horticulture, animal bedding etc.). The subsequent use of alternative growing media will also have mixed effects as most are made from the waste- or by-products of other industries and processes, and therefore this promotes a circular economy and reduces pressure on landfill sites. In many cases the alternatives will help promote resource efficiency by minimising water usage as a result of higher water retention capacities. However, conflicts of land-use and end products (e.g., wood for bioenergy instead of wood fibre), and requirements for other substances (e.g., nitrogen or chemical fertilisers) will have negative effects.	Capture and utilise emissions from the anaerobic digestion process to ensure maximum resource efficiency and utilisation of renewable energy.

Ban on sale of peat for horticultural purposes (including amateur horticulture only, professional horticulture only, and all horticulture)

Table D.21: Ban on sale of peat for horticultural purposes

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Climatic Factors / Emissions Reduction	++?	-	+?	Overall, a minor positive but uncertain effect is identified. **Ban on sale for amateur horticulture** Positive effects are identified due to a large reduction in emissions from land use because of no more peat being sold and used across the amateur horticultural sector, which accounts for 58% of all peat extracted in Scotland for horticultural use. **Ban on sale for professional horticulture** Positive effects are identified due to a large reduction in emissions from land use because of no more peat being sold and used across the professional horticultural sector, which accounts for 42% of all peat extracted in Scotland for horticultural use. **Ban on sale for all horticulture** Significant positive effects are identified due to a large reduction in emissions from land use because of no more peat being sold and used across the entire horticultural sector, including both the amateur and professional sectors. This accounts for 94% of the peat extracted in Scotland. All these effects are balanced by an increase in GHG emissions from the transportation and	Capture and utilise emissions from the composting and anaerobic digestion process Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport emissions. Reinstate the appropriate hydrology in degraded and drained peatlands will increase their resilience to climate change. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				processing of alternative growing media. The most popular alternative in the amateur sector is wood fibre (nearly one third of all growing media) which is identified as having minor negative effects on climatic factors due to its energy intensive processing. Other alternatives (e.g., bark, coir, compost and loam) each account for less than 10% of the amateur retail market share currently. The most popular alternatives in the professional sector are coir (one quarter of all growing media) and wood fibre (one fifth) which are identified as having minor negative effects on climatic factors due to their energy intensive processing and also associated transportation which is of particular importance for coir which is transported from tropical regions. Other alternatives (e.g., bark, compost and anaerobic digestion) each account for less than 5% of the professional market share currently. Other more sustainable alternatives (in terms of climate change) include cultivated sphagnum moss, but this is not expected to be a viable option at a commercial scale until 2028 onwards. Effects are uncertain as the sale of peat could continue for professional horticultural purposes under the ban on sales for amateur horticulture. Likewise, the sale of peat for amateur horticulture could continue under a ban on sale for professional horticultural purposes.	

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Population and Human Health	+?	-	+/-	Overall, mixed (minor positive and minor negative) effects are identified in relation to population and human health. **Ban on sale for amateur horticulture** Minor positive effects will arise from a reduction in the carbon released from peat, protecting ecosystem services, and improved air quality (transport-related) associated with banning the sale of peat for amateur horticultural purposes. **Ban on sale for professional horticulture** Minor positive effects will arise from a reduction in the carbon released from peat, protecting ecosystem services, and improved air quality (transport-related) associated with banning the sale of peat for professional horticultural purposes. **Ban on sale for all horticulture** Minor positive effects will arise from a reduction in the carbon released from peat, protecting ecosystem services, and improved air quality (transport-related) associated with banning the sale	Avoid and minimise adverse effects arising from development of growing media processing facilities, through regulation via the planning and permitting system.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				of peat for both amateur and professional horticultural purposes. These positive effects are combined with minor negative effects associated with the use of alternative growing media. Negative effects may arise from transport associated emissions of alternative growing media, along with noise and vibration associated with processing (e.g. loam and mineral extraction) and construction of facilities for growing media (e.g. anaerobic digestion facilities), which could cause disruption to people.	
Air	+?	-	-?	Overall, minor negative but uncertain effects are identified in relation to air quality. **Ban on sale for amateur horticulture** Minor positive effects will arise from the elimination of transport-related air pollution due to a ban on sale of peat products for the amateur horticultural sector. **Ban on sale for professional horticulture** Minor positive effects will arise from the elimination of transport-related air pollution due to a ban on sale of peat products for the professional horticultural sector. **Ban on sale for all horticulture** Minor positive effects will arise from the elimination of transport-related air pollution due to a ban on	Promote use of alternatives near their point of origin Prioritise transportation of coir in its less voluminous briquette form to minimise transport - related pollution.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				sale of peat products across the amateur and professional horticultural sectors. However, these positive effects are mixed with negative effects as the increased transportation and extraction (notably minerals, clay and loam) of other alternative growing media to replace peat will result in increased air pollution. The increased pollution would likely exceed the reduction from less peat use, particularly as a lot of growing media is imported into Scotland (e.g., coir, bark etc.) which will need to be transported greater distances.	
Soil	++?	+	++?	Overall, a significant but uncertain positive effect is identified, depending on how much the ban on sales of peat in the amateur and professional horticultural sector would contribute to reduced need for extraction. **Ban on sale for amateur horticulture** The ban on sales of peat for amateur horticulture, will result in reduced need to extract peat. Considering amateur horticulture accounts for 58% of all peat extracted for horticulture in Scotland, banning the sale will have significant positive effects on soil resources. **Ban on sale for professional horticulture** The ban on sales of peat for professional horticulture, will result in reduced need to extract	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				peat. Considering professional horticulture accounts for 42% of all peat extracted for horticulture in Scotland, banning the sale will have significant positive effects on soil resources. **<u>Ban on sale for all horticulture</u>** The ban on sale of peat for all horticulture will reduce the need for peat extraction for these purposes, having significant positive effects on soil. These positive effects are further enhanced by the use of alternative growing media across the amateur, professional, and entire (combined) horticulture sectors which will help improve the physical, chemical and biological properties of soil. Some adverse effects may be experienced as a result of the development of processing facilities and mining activities etc. but these are expected to be managed through the planning and permitting system. Effects are uncertain as the sale of peat (and extraction) could continue for professional horticultural purposes under the ban on sales for amateur horticulture, and vice versa.	
Water	+?	-	+/-	Overall, a mixed (minor positive and minor negative) effect is identified. **<u>Ban on sale for amateur horticulture</u>**	Identify the water requirements of producing alternative growing media and commission research into reducing water use in the production process. Manage potential adverse effects on water quality from composting, anaerobic digestion and loam

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				Minor positive but uncertain effects are expected by banning the sale of peat for amateur horticultural use, due to reduced need for peat extraction. **Ban on sale for professional horticulture** Minor positive but uncertain effects are expected by banning the sale of peat for professional horticultural use, due to reduced need for peat extraction. **Ban on sale for all horticulture** Minor positive but uncertain effects are expected by banning the sale of peat for amateur and professional horticultural use, due to reduced need for peat extraction. Peatlands play an important role in regulating water quality and quantity, by helping store and clean water, regulating run-off and acting as a natural floodplain. Therefore, reducing extraction of peat by banning sales in each of the above scenarios will have positive effects on water quality and quantity local to peat extraction sites. Effects are uncertain as the sale of peat (and extraction) could continue for professional horticultural purposes under the ban on sales for amateur horticulture, and vice versa. These minor positive effects are mixed with minor negatives associated with the increased use of alternative growing media. Several of the alternative growing media require extensive water use during processing (e.g. wood fibre and coir)	production through the planning system or environmental permitting.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				and mineral extraction (including loam, vermiculite, perlite, bentonite and other clay minerals), and other alternatives could result in pollution of watercourses (e.g., leachate from composting, or sediment from loam extraction).	
Biodiversity, Flora and Fauna	+?	+	+?	Overall, significant positive but uncertain effects are identified in relation to biodiversity, flora and fauna. **Ban on sale for amateur horticulture** Minor positive but uncertain effects are expected by banning the sale of peat for amateur horticultural use, due to reduced need for peat extraction, which would help avoid the destruction of peatland habitats. **Ban on sale for professional horticulture** Minor positive but uncertain effects are expected by banning the sale of peat for professional horticultural use, due to reduced need for peat extraction, which would help avoid the destruction of peatland habitats. **Ban on sale for all horticulture** Minor positive but uncertain effects are expected by banning the sale of peat for amateur and professional horticultural use, due to reduced need for peat extraction, which would help avoid the destruction of peatland habitats.	Promote peatland restoration throughout Scotland, including areas of previously worked peat. Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Ensure timber-based alternatives based on waste- or by-products sourced from productive forests and not semi-natural and/or ancient woodland. Reinstate the appropriate hydrology in degraded and drained peatlands. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				These positive effects are further enhanced as alternative growing media could have positive effects on biodiversity by regulating soil temperatures and moisture content. Furthermore, as the main proportion of peat substitutes are based primarily on waste materials and no adverse impacts on habitats and species are identified from utilising these waste streams. Whilst some adverse effects may arise through siting of processing development (e.g. composting facilities) due to loss of habitat, this is expected to be managed through the planning system. Similarly, the mining of minerals such as loam, vermiculite, perlite and bentonite would likely disturb habitats, having adverse effects on biodiversity.	
Cultural Heritage & Historic Environment	+?	0?	+?	Overall, a minor positive but uncertain effect is identified in relation to cultural heritage and the historic environment. **Ban on sale for amateur horticulture** Minor positive effects expected on cultural heritage assets due to reduced sale (and extraction) of peat for amateur horticultural use, noting that peatlands are culturally important. **Ban on sale for professional horticulture** Minor positive effects expected on cultural heritage assets due to reduced sale (and extraction) of peat	Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Avoid development in heritage designations or in proximity to heritage assets.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				for professional horticultural use, noting that peatlands are culturally important. **<u>Ban on sale for all horticulture</u>** Minor positive effects expected on cultural heritage assets due to reduced sale (and extraction) of peat for amateur and professional horticultural use, noting that peatlands are culturally important. The positive effects for the above peat sale ban scenarios are combined with negligible but uncertain effects arising from the use of alternative growing media. Most growing media will have limited effects on cultural heritage, as they are primarily a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, these will be location dependent and expected to be managed through the planning system. Likewise, extraction of minerals such as loam, vermiculite, perlite and bentonite have the potential to impact on heritage assets. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in the short or medium term, instead likely to become more popular from 2028 onwards[326].	

[326] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
Landscape	+?	0?	+?	Overall, a minor positive but uncertain effect is identified. **Ban on sale for amateur horticulture** Minor positive effects expected on the landscape due to reduced sale (and extraction) of peat for amateur horticultural use. **Ban on sale for professional horticulture** Minor positive effects expected on the landscape due to reduced sale (and extraction) of peat for professional horticultural use. **Ban on sale for all horticulture** Minor positive effects expected on the landscape due to reduced sale (and extraction) of peat for all horticultural use. All of these effects are combined with negligible but uncertain effects identified in relation to the alternative growing media, as most growing media will have limited effects on the landscape due to being a by-product of other industries (e.g., sawmill and forestry operations). Whilst some minor negative effects may arise from the processing of compost and anaerobic digestate, and extraction of minerals and clays, these will be location dependent and expected to be managed through the planning system. Other alternatives which may have adverse effects, such as cultivated sphagnum moss are not expected to be realistic alternatives in	Avoid and minimise adverse effects arising from development of growing media processing facilities, through careful siting and regulation through the planning system. Avoid development in locally or nationally designated landscapes. Promote use of waste or by-products to produce growing media (e.g., wood fibre, bark etc.) instead of being a primary product of deforestation. Promote peatland restoration throughout Scotland, including areas of previously worked peat and the whisky industry. Where large-scale processing facilities are to be constructed (e.g. anaerobic digestion and composting facilities), promote the use of landscaping schemes as a way to improve/avoid adverse effects on the landscape character and deliver biodiversity net gain.

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				the short or medium term, instead likely to become more popular from 2028 onwards[327].	
Material Assets (Waste, Energy, Transport and Land Use)	+/-?	+/-	+/-	Overall, mixed (minor positive and minor negative) effects are identified in relation to material assets. **Ban on sale for amateur horticulture** Mixed (minor positive and minor negative) effects are likely to arise from the ban on sale of peat for amateur horticultural use as although the ban will help to protect peatlands which provide ecosystem services, it will also have negative effects on the amateur horticulture industry. **Ban on sale for professional horticulture** Mixed (minor positive and minor negative) effects are likely to arise from the ban on sale of peat for professional horticultural use as although the ban will help to protect peatlands which provide ecosystem services, it will also have negative effects on the professional horticulture industry. **Ban on sale for all horticulture**	Reinstate the appropriate hydrology in degraded and drained peatlands Capture and utilise emissions from the anaerobic digestion process to ensure maximum resource efficiency and utilisation of renewable energy.

[327] https://hta.org.uk/media/jhfdycfh/growing-media-taskforce-horticultural-peat-consultation-response-2.pdf

SEA Topic	Score from ban on sales of peat for horticulture assessment	Score from combined substitutes	Combined Score	Justification	Mitigation and Enhancement
				Mixed (minor positive and minor negative) effects are likely to arise from the ban on sale of peat for horticultural use as although the ban will help to protect peatlands which provide ecosystem services, it will also have negative effects on the horticulture industry. The mixed effects identified under the above peat sale ban scenarios are further enhanced by mixed effects associated with the various growing media alternatives. Use of alternative growing media will also have mixed effects as most are made from the waste- or by-products of other industries and processes, and therefore promote circular economies. Furthermore, alternatives will help promote resource efficiency by minimising water usage because of higher water retention capacities. However, conflicts of land-use and end products (e.g., wood for bioenergy instead of wood fibre, crops for feedstock instead of food), and requirements for other substances (e.g., nitrogen or chemical fertilisers) will have negative effects.	

Appendix E

Habitat Regulations Appraisal Requirements

E.1 This appendix sets out the requirements for Habitat Regulations Appraisal (HRA). The purpose of HRA is to enable the competent authority to ascertain whether there are any adverse effects on the integrity of European sites.

Legislation and Regulations

E.2 Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), were developed under the European Commission 'Habitats Directive' (Directive 92/43/EEC) and the 'Birds Directive' (Directive 79/409/EEC). SACs are strictly protected sites designated under the **Directive 92/43/EEC**[328] (the 'Habitats Directive') and form a European network of important, high quality conservation sites which contribute to conserving 189 habitat types and 788 identified species.

E.3 SPAs are strictly protected sites classified in accordance with Article 4 of **Directive 2009/147/EC**[329] (the 'Birds Directive') for rare and vulnerable birds (identified in Annex II of the Directive) and also for regularly occurring migratory species.

E.4 Ramsar sites are identified under the *Convention on the Conservation of Wetlands of International Importance*[330], and Scottish Ministers require these sites to be subject to the same protection as European sites. In Scotland, all Ramsar sites are also designated as either SPAs or SACs, i.e. Natura sites. Collectively, SPAs, SACs and Ramsar sites will be referred to as 'European sites' in this report.

E.5 These Directives resulted in legislation being adopted into Scots law through **The Conservation (Natural Habitats, &c.) Regulations 1994**[331] as amended[332].

E.6 The Conservation (Natural Habitats &c) Regulations 1994 requires that any plan (or project) which is not directly connected with or necessary to the management of a European site, but would be likely to have a significant effect on such a site, either individually or in combination with other plans or projects, shall be subject to an 'appropriate assessment' of its implications for the European site in view of the site's conservation objectives. Proposed or candidate European sites should also be given the same consideration.

[328] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31992L0043
[329] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009L0147
[330] Full title: Convention of Wetlands of International Importance especially as Waterfowl Habitat 1971; signed by the UK in 1973, entered into force 1975
[331] The Conservation (Natural Habitats, &c.) Regulations 1994.
[332] The Conservation of Habitats and Species Regulations 2010.

E.7 The Habitats Regulations apply a precautionary approach to developments potentially affecting SACs and SPAs. The interest features of the European sites must be maintained so as to avoid deterioration of habitats and significant disturbance of species. An appropriate assessment is required where there is a probability or a risk that a plan or project will have significant effects on a site. However, it is recognised that an assessment of a spatial plan is likely by its nature to be less specific and detailed than the assessment of an individual project. This procedure is applied in Scotland through the **Habitats Regulations**, and is known as the 'Habitats Regulations Appraisal' of plans.

E.8 The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019[333] amend the Conservation (Natural Habitats, &c.) Regulations 1994 to ensure they continue to operate effectively following the UK's withdrawal from the EU. (The 1994 Regulations deliver the protected areas and species requirements of the EU Habitats Directive and the protected areas requirements of the EU Wild Birds Directives.) It also makes minor changes in salmon conservation legislation to reflect the changes made to the 1994 Regulations to ensure that the provisions continue to operate as intended following EU withdrawal.

E.9 The Regulations transferred the existing powers and obligations currently exercised by the European Commission to Scottish Ministers to ensure their operability; but do not introduce any policy changes[334].

E.10 The proposed ban on sale of peat for horticultural use can only be adopted if it can be ascertained that it will not adversely affect the integrity of a European site.

The HRA Process

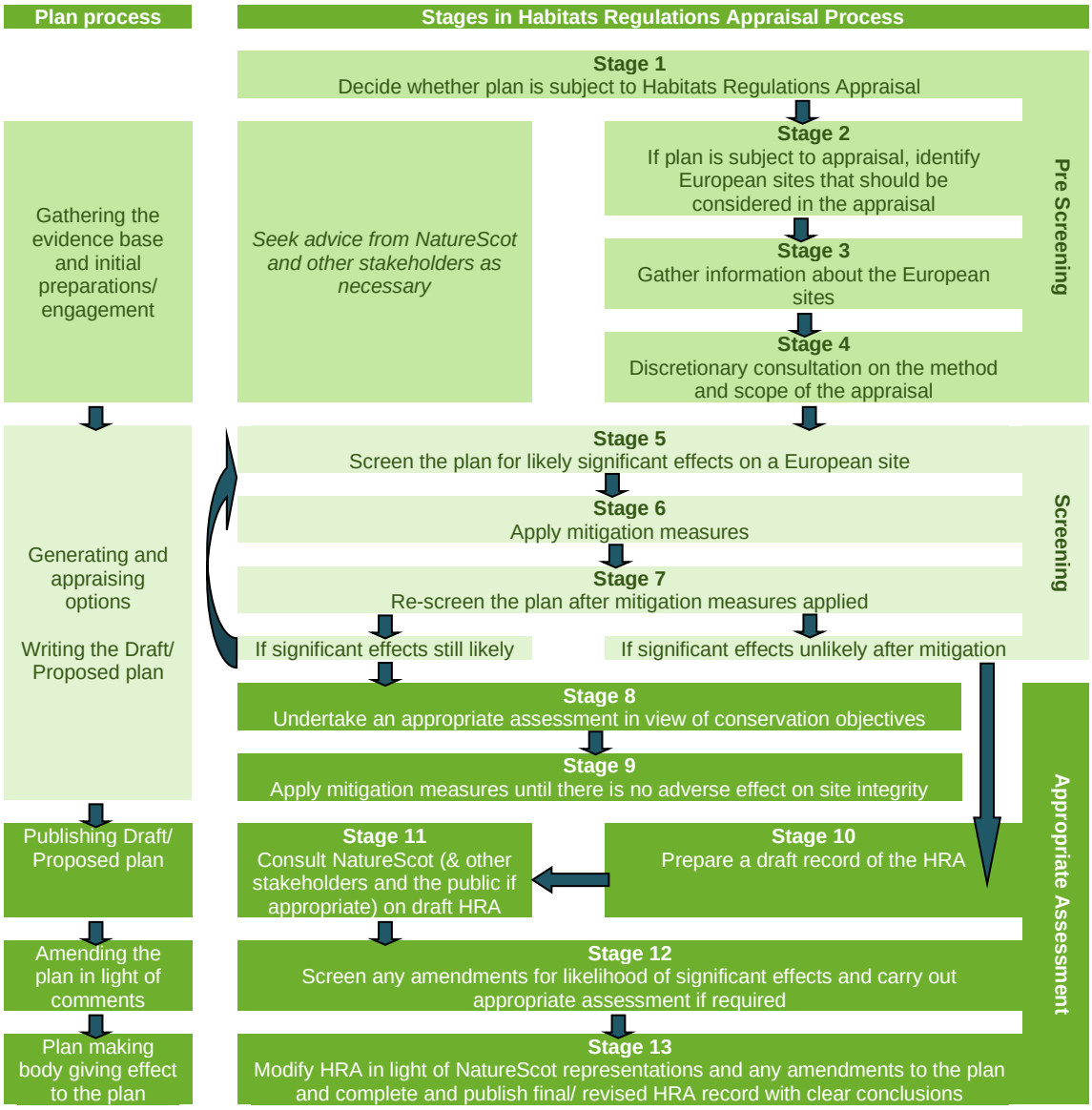
E.11 The key stages to the Habitat Regulations Appraisal process are outlined in the NatureScot's Guidance on Habitats Regulations Appraisal of Plans[335] and are illustrated in Figure E.1.

[333] The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019. These regulations come into force on exit day.

[334] https://digitalpublications.parliament.scot/Committees/Report/ECCLR/2019/3/7/The-Conservation--Natural-Habitats---c.---EU-Exit---Scotland---Amendment--Regulations-2019#The-Conservation--Natural-Habitats---c.---EU-Exit---Scotland---Amendment--Regulations-2019

[335] NatureScot, 2015. Habitats Regulations Appraisal of Plans: Guidance for Plan-Making Bodies in Scotland. [pdf] Available at: Habitats Regulations Appraisal of Plans - Guidance for plan-making bodies in Scotland - Jan 2015 | NatureScot [Accessed 28/10/2022].

Figure E.1: Key stages of the Habitats Regulations Appraisal Process for Plans (adapted from David Tyldesley and Associates (2015) Habitats Regulations Appraisal of Plans Guidance for Plan-making bodies in Scotland



Stage 1

E.12 Stage 1 of the HRA process is deciding whether a plan should be subject to HRA. This involves determining whether the plan would be likely to have a significant adverse effect on the integrity of a European site.

E.13 The proposed ban on sales of peat for horticultural use, will likely lead to reduced need for peat extraction. Reduced extraction is expected to have positive effects on peatland areas, many of which are designated as European sites. As only positive effects are expected to arise in relation to peatlands and European sites.

Conclusion

E.14 Given the proposed ban on sale of peat for horticultural use will not have any adverse effects on European sites, no HRA needs to be undertaken.