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Identifying factors that support or hinder peatland restoration in Scotland

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Thesis submitted for the degree of Doctor of Philosophy

University of Edinburgh, School of Geosciences

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Identifying factors that support or hinder peatland restoration in Scotland

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Abstract
It is estimated that peatlands cover around 20% of Scotland’s land area. Scotland’s peatlands are important ecosystems in terms of the services they provide; carbon sequestration, water chemistry and flow regulation, biodiversity, as well as for the homes and livelihoods they offer to their inhabitants. Due to historical management practices over 70% of Scotland’s peatlands are damaged to some degree, and are now in need of restoration. The remaining peat bogs need to be conserved. Peatlands are complex landscapes that require good governance in order to be managed fairly and effectively. This thesis sets out to explore the issues surrounding peatland management and offer some recommendations.

Workshops were carried out in Dumfries, The Cairngorms, Thurso and Shetland in order to explore how landowners and managers perceived peatlands and peatland restoration and the potential to fund restoration through the Peatland Code Payment for Ecosystem Services Scheme. The main findings were; there was confusion over the policy concerning peatlands, landowners and managers felt uncertain of the potential carbon benefits and methods to predict them, the Peatland Code focuses on carbon benefits and landowners and managers cared more about water and wildlife. These findings prompted a more in depth study of the objectives, priorities and values of landowners and managers through the use of qualitative interviews, and a policy analysis to clarify funding options and regulations and to identify potential barriers.

Sixty-seven semi-structured interviews were carried out with landowners and managers from the four regions around Scotland. These were analysed in order to find common themes. Many of the interviewees had social and environmental aims for their land, as well as financial aims. There was a very strong sense of care and responsibility for the land, which was linked to heritage, legacy and identity. Communication was poor between different groups (landowners vs crofters, locals vs incomers, landowners and managers vs NGOs, Scientists, Politicians), fostering a sense of discord or antagonism. This lead to a lack of trust and a reluctance to engage
with other groups, exacerbating communication issues. Poor communication means that the good environmental intentions of evident from the interviews did not always translate into action. Exceptions to this always involved face-to-face communication, site visits, and a long term relationship allowing the build-up of trust.

Policy documents relating to peatlands were reviewed. Findings were presented at a workshop attended by peatland policy experts, in order to identify gaps or misconceptions, which were then addressed. Peatlands do not have their own policy area, but are mentioned in policy related to agriculture, forestry, fresh water and biodiversity. Peatlands are most often mentioned in terms of their carbon sequestration potential. They are poorly integrated in fresh water policy. This shows a mismatch between the interests of policy-makers, and the interests of practitioners, as identified in the workshops. Funding for peatland restoration is limited, restrictive in terms of activities that will be funded, and the application process is onerous. The regulations are poorly communicated leading many to fear they will be penalised for undertaking management that is beneficial to peatlands. There are few policies with the intention of building capacity through information provision or training. The uncertainty surrounding funding options for peatland restoration may discourage contractors from diversifying in this area, leading to a shortage of people with the skills necessary to carry out the work.

In all three chapters there is a common thread that the various policies and schemes created in order to facilitate conservation and restoration of peatlands do not adequately harness the feelings of care and responsibility towards the environment that are present in the landowning and managing communities. This is due to poor communication and a misunderstanding of the various perspectives of groups in these areas, leading to sometimes obstructive policies which fall short of their ambitions.
Lay summary

Peatlands are areas of land dominated by deep carbon-rich soil, which has been building up for thousands of years. They are found in cold, wet, flat places and, as they have historically been poor for agriculture, are often remote, sparsely populated, poor regions. It is estimated that peatlands cover around 20% of Scotland’s land area. Due to the large amounts of carbon stored in peatlands, they have recently become more highly regarded, as they have the potential to help reduce carbon emissions and mitigate climate change. Peatlands also play an important role in regulating water quality and flow, and support a wide range of unique wildlife. For the people who live in peatlands regions, they provide a home and a livelihood as well as having cultural significance. Historic management practices, often linked to attempts to increase productivity in a difficult environment, have led to over 70% of Scotland’s peatlands being damaged to some degree. This degradation causes peatlands to emit large amounts of carbon, reduces water quality from peatland sources, and diminishes the quality of the habitat for wildlife. Through peatland restoration and changes to peatland management practices, this damage can be reversed, and the environmental benefits of peatlands re-instated. This may inhibit the ability of landowners and managers to make a living from the land. These landscapes are valued for different reasons by different people. It can be difficult to find ways to manage the land so that the social, environmental and economic benefits it provides can be maximised.

In this study the issues surrounding peatland restoration are explored, with the intention of identifying the main problems, and suggesting some solutions. Workshops were carried out in Dumfries, The Cairngorms, Thurso and Shetland in order to determine how landowners and managers perceived peatlands and peatland restoration and the potential to fund restoration through the Peatland Code Payment for Ecosystem Services Scheme. Landowners and managers from each of the aforementioned regions were also interviewed so that individual perspectives could be explored in more depth. Policy was identified as a barriers in both the interviews and...
workshops, and so a policy review was conducted. The main findings were as follows:

Landowners and managers understand the need for restoration and for changes in the way peatlands are managed. They care a great deal about the land and feel a sense of responsibility to act in its interests. While this is very positive this can mean different things to different people. When it comes to the Peatland Code and most of the policy relating to peatlands, carbon sequestration is the main motivation for restoration. Landowners and managers were more interested in the benefits to water quality and wildlife, however, and so were less enthusiastic about the idea of peatland restoration through the code. There were also differences in opinion about the degree to which grazing and burning should be reduced. Many of those interviewed felt that low level grazing encouraged greater diversity of plant life.

It was often stated in interviews that scientists and policy makers did not know what they were talking about, and that they did not trust their advice. This was, in part, due to the contradictory policy and advice delivered to landowners and managers in the past 50 years or so. This problem is exacerbated by the gaps in research, making it seem uncertain, and the poor communication between different groups with a stake in the area. There was some antagonism between these different groups (NGOS, landowners, crofters, policy makers, and scientists), due to, often slight, differences in ideas about what the land should be like. There was, in fact, a great deal of overlap in these ideas, but poor communication obscured this.

The policy analysis revealed that the funding for peatland restoration is limited, restrictive in terms of activities that will be funded, and the application process is onerous. The regulations are poorly communicated leading many to fear they will be penalised for undertaking management that is beneficial to peatlands.

In short, landowners and managers were not willing to commit to a change in management, based on the advice of people they don’t trust, in order to deliver carbon benefits which they don’t understand or value. If these barriers could be
overcome, the difficulty in accessing funding may still prevent people from carrying out restoration work.
# Table of Contents

Acknowledgements ................................................................................................. iii
Abstract .................................................................................................................... v
Lay summary ............................................................................................................. vii
List of tables ............................................................................................................ xiii
List of figures .......................................................................................................... xiv
Declaration ............................................................................................................... xvi

1 Introduction to thesis .......................................................................................... 2
   1.1 Why are Peatlands Important? .................................................................. 2
   1.2 Socio-economic issues in peatland areas .............................................. 5
   1.3 Study Context ......................................................................................... 7
   1.4 This study ............................................................................................... 13
       1.4.1 Thesis outline .............................................................................. 14
2 Theoretical background ..................................................................................... 15
3 Methods ............................................................................................................. 21
   3.1.1 Study regions .................................................................................. 26
4 Ecology of peatlands and implications for management .......................... 33
   4.1 Ecology of peatlands ............................................................................ 33
       4.1.1 Water table ............................................................................. 33
       4.1.2 Temperature ........................................................................... 35
       4.1.3 Vegetation .............................................................................. 36
       4.1.4 Human intervention ............................................................... 38
   4.2 Causes of Peatland Degradation ............................................................ 39
       4.2.1 Drainage .................................................................................. 39
       4.2.2 Burning .................................................................................. 39
       4.2.3 Grazing and trampling ............................................................. 40
       4.2.4 Forestry ............................................................................... 41
       4.2.5 Cutting ............................................................................... 42
       4.2.6 Atmospheric deposition ......................................................... 43
       4.2.7 Climate change .................................................................... 43
   4.3 Effects of restoration .............................................................................. 45
       4.3.1 Water flow and quality ............................................................ 45
       4.3.2 Carbon ................................................................................. 46
       4.3.3 Biodiversity .......................................................................... 47
5 Using deliberative workshops to gauge stakeholder response to peatland restoration through the Peatland Code .................................................. 48
   5.1 Introduction ......................................................................................... 48
   5.2 Methods .............................................................................................. 54
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2.1</td>
<td>Workshop format</td>
<td>58</td>
</tr>
<tr>
<td>5.3</td>
<td>Results</td>
<td>66</td>
</tr>
<tr>
<td>5.3.1</td>
<td>Problem trees</td>
<td>66</td>
</tr>
<tr>
<td>5.3.2</td>
<td>Effects matrices</td>
<td>70</td>
</tr>
<tr>
<td>5.3.3</td>
<td>Story telling</td>
<td>77</td>
</tr>
<tr>
<td>5.3.4</td>
<td>Feasibility tool discussion</td>
<td>83</td>
</tr>
<tr>
<td>5.4</td>
<td>Discussion</td>
<td>89</td>
</tr>
<tr>
<td>5.4.1</td>
<td>Causes and effects of management</td>
<td>89</td>
</tr>
<tr>
<td>5.4.2</td>
<td>Storytelling</td>
<td>93</td>
</tr>
<tr>
<td>5.4.3</td>
<td>Feasibility tool and fair price deliberation</td>
<td>94</td>
</tr>
<tr>
<td>5.4.4</td>
<td>Conclusions</td>
<td>96</td>
</tr>
<tr>
<td>5.4.5</td>
<td>Recommendations</td>
<td>97</td>
</tr>
<tr>
<td>6</td>
<td>Qualitative analysis of stakeholder values and priorities regarding land management</td>
<td>98</td>
</tr>
<tr>
<td>6.1</td>
<td>Introduction</td>
<td>98</td>
</tr>
<tr>
<td>6.2</td>
<td>Methods</td>
<td>101</td>
</tr>
<tr>
<td>6.3</td>
<td>Results</td>
<td>104</td>
</tr>
<tr>
<td>6.3.1</td>
<td>Causes of degradation</td>
<td>106</td>
</tr>
<tr>
<td>6.3.2</td>
<td>Effects of management</td>
<td>109</td>
</tr>
<tr>
<td>6.3.3</td>
<td>Communication</td>
<td>116</td>
</tr>
<tr>
<td>6.3.4</td>
<td>Trust</td>
<td>124</td>
</tr>
<tr>
<td>6.3.5</td>
<td>Priorities and incentives</td>
<td>135</td>
</tr>
<tr>
<td>6.3.6</td>
<td>Identity</td>
<td>140</td>
</tr>
<tr>
<td>6.4</td>
<td>Discussion</td>
<td>157</td>
</tr>
<tr>
<td>6.4.1</td>
<td>Trust</td>
<td>159</td>
</tr>
<tr>
<td>6.4.2</td>
<td>Self-identify and Place-identity</td>
<td>163</td>
</tr>
<tr>
<td>6.4.3</td>
<td>Conclusion: Incompatible values and objectives?</td>
<td>166</td>
</tr>
<tr>
<td>6.4.4</td>
<td>Recommendations</td>
<td>168</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of policies relating to peatland management</td>
<td>169</td>
</tr>
<tr>
<td>7.1</td>
<td>Introduction</td>
<td>169</td>
</tr>
<tr>
<td>7.2</td>
<td>Methods</td>
<td>177</td>
</tr>
<tr>
<td>7.3</td>
<td>Results</td>
<td>182</td>
</tr>
<tr>
<td>7.3.1</td>
<td>Policy review</td>
<td>182</td>
</tr>
<tr>
<td>7.3.2</td>
<td>Scottish Government National Plans, Frameworks and Strategies</td>
<td>182</td>
</tr>
<tr>
<td>7.3.3</td>
<td>Sectoral Plans, Policies and Strategies</td>
<td>191</td>
</tr>
<tr>
<td>7.3.4</td>
<td>Overview of policy across sectors</td>
<td>211</td>
</tr>
<tr>
<td>7.3.5</td>
<td>Policy interviews and questionnaires</td>
<td>215</td>
</tr>
</tbody>
</table>
List of tables
Table 1 Workshop timetable ................................................................. 59
Table 2 Example of the effects matrices used in the workshops ......................... 61
Table 3 Combined effects matrices from Cairngorms, Dumfries and Shetland, showing the perceived effects of revegetating bare peat............................................................... 71
Table 4 Combined effects matrices from Cairngorms, Dumfries and Shetland, showing the perceived effects of ditch-blocking ............................................................... 73
Table 5 Effects matrix from Thurso, showing the perceived effects of ditch-blocking .... 75
Table 6 Feasibility tool choice leading to the price of carbon in the Cairngorms ........... 86
Table 7 Feasibility tool choices leading to the price of carbon in a)Dumfries, b)Thurso and c)Shetland ........................................................................................................ 87

Table 8 Summary of the proportions of interviewees from different regions, occupations and land types. There may be some disparity between the land types and occupations, as some estates have their own foresters and managers etc........................................ 104
Table 9 Organisation and role associated with delegates in attendance at the SNH workshop "From Policy to Practice - Peatland Restoration and Integrated Land Use" .................. 178
Table 10 An overview of national and sectoral policies relevant to peatlands, and how they link together ............................................................................................................ 184
Table 11 Frequency with which policy issues were ranked by policy workshop delegates. R1 is considered most important, R4+ is least important ...................................................... 215
List of figures

Figure 1 The key components of the Deliberative Value Formation (DVF) model courtesy of Kenter et al (in press). The diagram shows how an individual forms contextual values through deliberation with others. The key factors that influence this process and its potential outcomes are also shown. Arrows indicate directions of influence. Dashed arrows indicate repeated deliberation. ................................................................. 10

Figure 2 Conceptual model of this study and the system boundary. Green circles represent peatland landscapes within the national landscape. The other circles represent actors in the landscape, circle size representing the number of these actors that might be present, arrows and arrow direction representing the interactions between different actors. ................. 19

Figure 3 Diagram showing the first and second iterations of the adaptive management cycle and how this study fits in with the existing research................................................................. 20

Figure 4 A summary of the different forms of data collection and analysis and the order in which they occurred........................................................................................................... 23

Figure 5 Map of peat depth in Scotland (ScotGov 2010). Study sites are indicated by black stars. ................................................................................................................................. 28

Figure 6 Distribution of the main land cover types in Scotland (ScotGov 2010)................. 29

Figure 7 Diagram showing the acrotelm and catotelm, and the associated change in conditions with depth through a cross section of peat (Lindsay 2010) ...................... 34

Figure 8 Diagram of Sphagnum moss showing capitulum, branches, leaves and stem (Moors for the Future, 2012) ............................................................................................................. 37

Figure 9 Summary of problem trees from each region. The letters accompanying each “root cause” denote the regions in which they were mentioned. C = Cairngorms, D = Dumfries, T = Thurso, S = Shetland. Those with no letters following them were mentioned in all regions. ........................................................................................................................................ 67

Figure 10 Flow diagram detailing the steps taken in the Grounded Theory Analysis undertaken in this study. Adapted from Bryman (2015) ......................................................... 103

Figure 11 Timeline showing development of environmental policies, relevant to peatlands, at national, European and international level ........................................................................... 171

Figure 12 Flowchart showing the method used to analyse policy documents for mentions of peat................................................................................................................................. 181

Figure 13 Context in which peatlands are discussed in the national and sectoral strategies, frameworks and policy documents ......................................................................................... 192
Figure 14 Timing of typical land use activities in peatland regions. The upper rows describe the timing of commercial land management activities. The lower rows describe the timing of wildlife considerations which are protected by designations.

Figure 15 Overview of policy instruments used in relation to peatlands, categorised by sector.
Declaration

I declare that I composed this thesis; the work presented is entirely my own (except where otherwise acknowledged) and has not been submitted, either in whole or in part, for any other degree or qualification.

Kathleen Allen

September 2016
“Ring the bells that still can ring
Forget your perfect offering
There is a crack in everything
That's how the light gets in”

Leonard Cohen
1 Introduction to thesis

1.1 Why are Peatlands Important?
Healthy peatland ecosystems provide numerous benefits to society, at a regional, national and international scale. Peatlands have been storing carbon in layers of peat for tens of thousands of years, and continue to sequester carbon now (Lindsay 2010). This is significant on an international level, because the restoration of degraded peatlands and the conservation of healthy peatlands has the potential to play a role in mitigating climate change (Erwin 2009). In the UK, peatlands are present at the headwaters of many water sources that provide drinking water to large portions of the population (JNCC 2011). These peatlands, unless degraded, help to filter the water, providing clean drinking water and reducing treatment costs. Peatlands can also help to maintain steady river flow rates reducing downstream flood risks and improving conditions for salmon stocks. Peatland habitats support unique assemblages of birds, plants, fungi and invertebrates, some of which are of European importance (Littlewood et al. 2010). The layers of peat provide ideal conditions in which to preserve archaeological artefacts, as well as pollen and other vegetative matter, helping to provide detailed information about past cultures and environments (Bain et al. 2011). Peatland areas are also home to rural communities who may use the landscape to provide a livelihood through agriculture, or may simply appreciate them for the wildlife, the beauty and the quiet.

Many of the benefits described above are only provided if the peatland is in good condition. A history of poor management has led to the degradation of 80% of the UK’s 2.5 M ha of peatland (JNCC 2011). There are 1.8 M ha of peatland in Scotland, a large proportion of which is in a degraded condition which continues to decline. The peatlands of the UK and Scotland currently store 2300 Mt C and 1600 Mt C respectively (Billett et al. 2010). When these peatlands are degraded through erosion and loss of vegetation cover, they lose their capacity to sequester carbon, and start to emit the carbon stored in the peat, either through aquatic or atmospheric fluxes (Lindsay 2010). The water quality from peatlands is also reduced due to increased
levels of Dissolved Organic Carbon (DOC) and other pollutants which otherwise had been filtered by the peatland vegetation. Loss of vegetation causes changes in water flow leading to higher flood risks. These changes in hydrology can be damaging to fish populations, while the loss of vegetation reduces the quality of habitat for other wildlife (Littlewood et al. 2010).

A lot of the degradation seen in peatlands is due to historic management practices, some of which are still practised. Some rural communities make a living managing these landscapes to exploit their resources, through agriculture, sport or forestry. Over-exploitation of these resources has compromised the ability of peatlands to keep providing them. Loss of vegetation cover reduces the available nourishment for sheep, grouse and deer, while erosion and changes to soil chemistry increase the amount of fertiliser required for forestry (Holden et al. 2007). Climate change is also likely to reduce the resilience of peatlands, making them even less able to withstand exploitation (Holden et al. 2007).

Peatland restoration attempts to reverse the damage done to peatlands by repairing their hydrology and ecology, thus halting their deterioration and the associated negative environmental impacts and enabling them to provide benefit to society again (Lunt et al. 2010). The costs of restoration work can be high, however, especially if the bog is very badly damaged, or particularly inaccessible. In the UK, a lot of the land that needs to be restored is privately owned and so carrying out the work requires the support of the landowner. Following the capital works, restored peatlands would need to be managed in a way that did not cause more damage. This is likely to reduce the potential income that the landowner can generate from that land and would certainly require some changes in management practices. Such changes in land use and management practices may have knock-on effects for the local economy and may impinge on the cultural heritage of the region. Resolving these issues requires collaboration between the various stakeholders in the area to achieve management solutions that balance the social, economic and environmental needs of the area.
The next sections will describe these issues in greater detail, starting with an overview of the ecology of peatlands then describing how this is affected by various management practices, and how these effects may be reversed through restoration. The socio-economic characteristics of peatland areas are then described in order to give some context for the land management issues that have been outlined previously. An outline of the research presented in this thesis forms the final part of this introductory section.
1.2 Socio-economic issues in peatland areas

For this description of the socio-economic issues in peatland areas, the focus will be generally on remote and rural areas in the UK, rather than specific peatland areas.

Rural populations are often associated with lagging economies, ageing populations and migration into urban areas (Farmer et al. 2003, Hubacek et al. 2008). In the UK, there is a persistent trend of migration from rural to urban areas, especially among the young, leading to ageing rural populations. In the UK, the rural population in age bands under 40 years is decreasing at a faster rate than that of urban populations, while the opposite is true for age bands over 40 (Hubacek et al. 2008). In recent times there has also been some increase in migration from urban to rural areas, due to generally higher levels of car ownership, willingness to commute further and improved infrastructure enabling a degree decentralisation and de-industrialisation of the economy (Buller et al. 2003, Farmer et al. 2003). This trend is only the case in rural areas with good links to urban areas, however. Remote and peripheral areas, with poor transport links, are not so attractive to businesses or urban dwellers. These characteristics are often associated with peatland areas (Farmer et al. 2003).

The rural economy used to be centred on agriculture, and associated activities. The make-up of rural economies in the UK, is now not too dissimilar to that of urban areas, being comprised of sectors such as manufacturing, retail, hospitality, catering, health and social care, among others (Hubacek et al. 2008). There are also larger number of small businesses and self-employed people (Lowe & Ward 2007). As mentioned previously, however, these industries depend on good infrastructure, and so tend not to flourish in remote and inaccessible regions. Despite the boom in some rural regions, there are still pockets of deprivation (Hubacek et al. 2008).

One part of the rural economy which is struggling, and which is particularly pertinent to peatlands is hill farming. This area suffers from falling incomes, a reduction in agricultural labour, an ageing demographic structure and farm abandonment (Burton et al. 2005). Incomes from hill farming are strongly linked to fluctuating and declining prices for produce and are, therefore, heavily reliant on agricultural subsidies
(Hubacek et al. 2008). Hill farming is unsustainable without subsidies as it is not possible to make enough money from the sale of goods alone.

Hill farming communities, and other agricultural communities, were associated with strong social networks and co-operation as this was required in order to manage the land (Pretty & Ward 2001). With the abandonment of farms and the reduction in farm labour this feature is in decline, potentially reducing the resilience of these communities (Burton et al. 2005). Those farmers and communities that remain often have a cultural attachment to the land, and to the ideal of making a living from it.

Game shooting is an important source of income in moorland areas, especially in Scotland. It is estimated that grouse-shooting alone contributes £5 million to the Scottish economy, and creates 1,240 jobs either directly or indirectly (Hubacek et al. 2008). While this may be small compared to other industries, it may be a significant source of employment in remote rural areas. Approximately 1000 jobs in Scotland are related to the management and hunting of deer, while the increase in tourism revenues associated with deer stalking will also contribute to the economy (Hubacek et al. 2008). Both grouse and deer management are controversial in terms of their environmental impacts (see "Grazing and Trampling", section 4.2.3).
1.3 Study Context

The factors described in the previous sections combine to make something of a perfect storm for peatland ecosystems. They are sensitive and finely balanced landscapes where recovery is slow. Agriculture and other land-based activities, which operate on tight margins have cultural and economic significance in peatland areas. The increasing difficulty of generating an income from the land has encouraged people to exploit it beyond its sustainable limits, thus damaging the ecosystem and its ability to continue supporting the communities that live there. Their remote and esoteric nature may make it difficult to raise awareness and support among the general public.

Healthy peat bogs can provide numerous benefits to society, while degraded bogs already lead to poor water quality in their catchments, flashy storm flows, reduced base water yield and declines in biodiversity, while continued loss of carbon from peatlands could contribute to climate change.

Peatland restoration could mitigate some of these negative impacts of poor management and enable peatlands to provide benefits to society once again. This requires the co-operation of landowners and managers, who will have to carry out the work on their land, and requires financial support from the public or private sectors, and public support to justify this expenditure.

The peatland code

The IUCN peatland programme began developing the peatland code in 2012. This venture built on a number of research projects looking at various aspects of the peatland system, as well as the social and political system in which it lies (Reed et al. 2017).

The peatland code is a voluntary standard for peatland restoration projects in the UK (Reed et al. 2013). The code ensures a high level of quality in these restoration projects by providing guidance to land owners and managers in how to carry out restoration. It also provides a way of measuring and monitoring the carbon and other environmental benefits resulting from restoration. The restoration projects are to be
supported by sponsorship from business and enterprises that can cite these environmental benefits towards their corporate social responsibility commitments. The code, therefore, gives sponsors confidence that their contributions are making a quantifiable and verifiable difference. At present, the Peatland Code does not allow for the carbon savings accrued through peatland restoration to be traded or used to offset emissions, but this is something that may be possible in later iterations of the code.

The Pilot Phase of the Peatland Code ran from 2013-2015. During this phase a number of pilot restoration projects were carried out in southwest England, the Lake District, the Peak District and Wales (Reed et al. 2017). Projects were also carried out in Scotland in partnership with Peatland Action. These projects covered a range of ecological conditions, restoration requirements and levels of sponsorship. This phase enabled the collection of data regarding the effects of restoration, the costs and practicalities of work, and the economics of such projects (Smyth et al. 2015, Reed et al. 2017).

The Peatland Code feasibility tool was developed using some of this data. This tool, described in more details in section 5.2, allows an individual to plan a restoration project and see the economic and environmental impacts of different restoration and management options. In this way it is possible to assess the viability of the project under different scenarios, allowing both landowners and sponsors to make a more informed decision about involvement in the project. Data gathered through the pilot phase was also used by a Defra-funded research project to develop metrics and measurement protocols to assess carbon benefits of restoration based on vegetation proxies (Smyth et al. 2015). These protocols and proxies can be used by landowners and managers to monitor the progress of their projects.

For one of the pilot projects in the Peak District, a workshop was organised to look at stakeholder perspectives on peatlands and peatland restoration through the peatland code (Kenter & Reed 2014). One of the aims of the workshop was to determine a ‘fair price’ for carrying out restoration work, and assessing whether this made restoration
prohibitively expensive. This workshop used the Deliberative Value Formation model developed by Kenter et al. (in press).

The deliberative value formation model

The deliberative value formation model is a theoretical model and methodological template, which is informed by social-psychological theory (Kenter et al. in press). It looks at a range of potential positive and negative effects of deliberation and how these might be influenced by certain key characteristics in the deliberative process. The model shows how transcendental values might be converted to more specific contextual values, through the use of the model.

The model consists of three components:

1. An understanding of the key factors that influence how deliberation forms values;
2. An understanding of the potential outcomes of deliberation in a valuation context;
3. A chain of influence that conceptualises deliberative value formation as a translation of transcendental values into contextual values and value indicators, and links the key components that constitute this process.

Figure 1 shows the way in which these link together in the DVF model.
The key components of the Deliberative Value Formation (DVF) model courtesy of Kenter et al (in press). The diagram shows how an individual forms contextual values through deliberation with others. The key factors that influence this process and its potential outcomes are also shown. Arrows indicate directions of influence. Dashed arrows indicate repeated deliberation.

The key factors that influence the outcome of deliberation do not necessarily occur in isolation but may well interact. The way in which these factors interact and manifest themselves will depend on the facilitators and the overall design of the process (Kenter et al. in press).

The outcomes of the deliberation must be distinguished from the output. The output might be a set of indicators, a ranking of outcomes, a monetary value etc. The outcomes of the process will depend on the objectives of the process and the degree to which certain outcomes are considered desirable or not.

The chain of influence referred to in the DVF model describes the way in which transcendental values can be converted to contextual beliefs, norms and values and then value indicators. The conceptualisation is based on social-psychological theory,
particularly the Value-Belief-Norm (VBN) theory, the Theory of Planned Behaviour (TPB), and the Value Change Model (VCM).

The VBN was developed by Stern (2000) is one of the most elaborate theories of environmentally significant behaviour that also accounts for moral aspects of behaviour. The theory sets out a causal chain of variables leading to ‘environmentally significant behaviour’. Transcendental values are thought to influence a person’s world view, which in turn affects their belief system regarding the relationship between humanity and nature. These beliefs about the consequences of human behaviour and an individual’s responsibility to act should in turn lead to the development of personal norms which may determine behaviour.

The TPB was developed by (Ajzen 1985, Ajzen 1991). They theorise that a person’s behaviour is comprised of intentions, which are influenced by attitudes, the effort associated with the behaviour, and subjective norms. Environmentally significant behaviour would, therefore, depend on having a positive attitude to the action in question, feeling support or approval from peers, and feeling able to make a difference.

The VCM, developed by Goodwin and Bardi (2011) looks at the relative importance of different transcendental values and how this might change in different social and cultural contexts. They suggest that these changes might happen passively, or can be brought about actively, by altering social and cultural contexts through deliberation.

The DVF model draws on these theories to create the chain of influence seen in Figure 1. Societal, cultural and communal transcendental values are thought to influence an individual’s transcendental values. An individual will form contextual values by applying transcendental values to a particular context or problem. This process is mediated by their beliefs and understanding of that context or problem (Kenter et al. in press). This is a dynamic process, affected at each stage, by environmental cues. For example transcendental values can be dormant, and activities or situations may encourage them to be expressed. Deliberation and knowledge exchange can lead to a
change in understanding or belief about the context in question (Kenter et al. in press). For example the deliberative process which encourages sharing of lay and expert knowledge might lead to a change in understanding of the social-ecological system and how it operates, the associated problems and potential solutions. The final stages of chain require support, encouragement and even pressure from peers in order to translate contextual beliefs into norms and values (Kenter et al. in press). This is also something that can be achieved through deliberation, knowledge exchange and other activities which may alter the social or cultural context.

Kenter et al (in press) have produces a template designed to facilitate deliberative valuation which would take a group through the stages described above and ultimately produce a set of value indicators. The template involves six steps:

1) The institutional context – This step involves establishing the scope and limitations of the project or decision-making context. It is important to explain the aims of the process, how the results will be used, the rationale behind certain key decisions e.g. who is involved and why. The scope of the process should be appropriate so that important issues are not omitted, the aims are achievable, but hopes are not raised too high.

2) Transcendental values – In this step there is deliberation regarding the transcendental values of individuals as well as those of the communities they represent and their societal and cultural values.

3) Contextual beliefs, broader policy impacts and systemic relations – in this step, the beliefs surrounding the concerns at hand are explored. For example it can be helpful to look at the consequences of particular actions or policy options, to explore the roles of different institutions and decide who should be responsible. In this step participants can explore whether and how individuals can make a difference.

4) Implications for transcendental values – having looked at the options for action in the previous step, participants can then explore how well these options fit in with their transcendental values.
5) Norms and contextual values – in this penultimate step, the conclusions from previous stages are integrated so that conclusions can be drawn about norms and contextual values.

6) Value indicators – the final stage is to determine indicators that reflect the contextual values that have been elicited. These indicators could be monetary or non-monetary.

1.3.1 This study

The research described in this thesis initially followed on from one of the pilot studies carried out during the development of the Peatland Code. The intention was to carry out workshops across Scotland and compare the results with those obtained in the Peak District pilot study. Through the interviews which accompanied the workshop preparation, it became clear that there were wider issues to research and address, and so this project became broader in its scope, and the form and focus of the work changed.
1.4 Thesis outline

This study explores the issues surrounding peatland management, looking at factors that may be hindering the progress of peatland restoration, as well as identifying attributes which may be advantageous. This information is used to make recommendations about how to overcome some of the barriers to peatland restoration, while lessons learned from the research process and outcomes may have wider implications for environmental governance methods.

To this end, workshops and interviews were carried out in Dumfriesshire, the Cairngorms, Caithness and Sutherland, and Shetland.

The workshops explored the situation regarding peatlands, as perceived by the stakeholders who attended. The workshops looked at their understanding of the causes of peatland degradation, the effects of different management practices, the perceived value of peatlands and the potential benefits associated with their restoration. This information could then be used to make a preliminary assessment of the willingness and ability of stakeholders to get involved with peatland restoration through PES schemes.

Although many of the workshop findings appeared to indicate a positive response to peatland restoration, the response to the peatland restoration PES scheme was largely negative. The interviews were used to triangulate the findings of the workshop chapter and to look and to explore the values and motivations of landowners and managers in more detail.

In both the workshops and interviews, the policy situation was identified as a barrier to peatland restoration. The third results chapter explores the policy relating to peatland restoration in order to identify these barriers, and to suggest ways of overcoming them.
2 Theoretical background

This thesis, its focus and form evolved as the research process progressed. The research was not developed around a conceptual framework. The project began with certain themes in mind, and other themes emerged throughout the process. These are described in detail in the relevant results chapters, but the main themes are summarised here. During the analysis and synthesis of the work, the approach and ethos of the project were seen to align with the Adaptive Management framework. This chapter concludes with a description of that framework and how it fits with this study.

2.1.1 Ecosystem Services and Cultural Ecosystem Services

Ecosystem services and natural capital are frameworks that take account of social-ecological interactions and make explicit the dependence of society on ecosystems (Costanza et al. 1997). In this way the value of functioning ecosystems can be recognised and taken into account in land use planning, and decision making (de Groot et al. 2002). The concept can also be used as a pedagogical tool to communicate the importance of ecosystems to the general public (Gómez-Baggethun et al. 2010).

Ecosystem services can be grouped into provisioning (production of food and energy), regulating (clean air, flood control), supporting (nutrient cycling and pollination) and cultural services (recreation and heritage) (MA 2003). Pure neoclassical economics restricts its scope to environmental goods and services which have a price (Gómez-Baggethun et al. 2010). Many of the environment’s contributions to the economy have, therefore, been neglected and undervalued when it comes to decision making. One can see that provisioning services such as forestry and farming can easily be marketed, whereas regulating services such as clean air and water cannot. This causes problems when the exploitation of an ecosystem for a particular service jeopardises its ability to provide other services. In the case of peatlands, intensive sheep farming reduces the ability of peatlands to regulate water flow and chemistry. To account for this, research efforts have increasingly focused on the economic valuation of ecosystem services and, with the publication of the Millennium
Ecosystem Assessment, among other high profile research initiatives, the concept has gained prominence in national and international policy agendas (Gómez-Baggethun et al. 2010).

Cultural ecosystem services (ES) are defined in the Millennium Ecosystem Assessment as “the nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation and aesthetic experiences” (Sarukhán & Whyte 2005). They are highly valued by a diverse set of stakeholders. In industrialised countries, cultural ES are often valued more highly than other services (Quétier et al. 2010, Palomo et al. 2011). The trend in these countries for an increasing emphasis on recreation means that the demand for cultural ES in industrialised countries is expected to grow (Carpenter et al. 2009, Ingold & Zimmermann 2011). In traditional societies cultural ES are often very important for identity as well as survival (Brown & MacLeod 2011). In marginalised or threatened communities, these can be critical. Cultural ES often score highly in assessments of public perception and are seen to be of growing importance (Milcu et al. 2013). They are, however, often poorly integrated into management plans, and can be sacrificed in favour of economic or ecological concerns (Chan et al. 2012).

Cultural ES are difficult to quantify because of their intangible nature, a characteristic which many of them share. They are subtle and intuitive, and often implicitly or indirectly expressed. Their value is, therefore, often very subjective and depends on individual and cultural assessments of their contribution to wellbeing.

2.1.2 Payment for Ecosystem Services

While the ecosystems services framework is useful for raising awareness and communicating value, mechanisms are needed to encourage and facilitate changes in behaviour. The increase in monetary valuation of ecosystem services has led to a new focus on the creation of Market Based Instruments to create incentives for conservation and sustainable management (Wunder 2005). Payment for Ecosystem Services (PES) schemes aim to take account of the costs associated with producing ecosystem services. This may take the form of remuneration for carrying out
conservation or restoration work such as planting trees or guarding against poachers. In other cases, it may take the form of compensation for avoiding intrusive management practices, thus enhancing ecosystem service provision, but decreasing yields. In rural communities, where land-based economies are suffering, such schemes have the potential to provide a new income stream (Wunder et al. 2008).

2.1.3 Participation and deliberation

Establishing a successful PES scheme requires good governance, which takes into account the diverse sets of interests and concerns of the stakeholders involved (Engel et al. 2008). Environmental governance can be defined as interventions aiming at changes in incentives, knowledge, institutions and decision-making relating to the environment (Lemos & Agrawal 2006). It concerns the ways in which the various components of social-ecological problems can best be organised and governed.

As was discussed in the previous section, many rural communities have developed around agriculture and other land based activities, and these have led to strong social cohesion and cultural heritage. Despite the remote and sparsely populated nature of these areas, there is likely to be a diverse set of stakeholders with different interests and perceptions of the situation. Ecosystem services are often generated across a landscape, but effects associated with them and their management may have wider significance. The interactions of political and economic institutions and organisations at various scales must also be considered.

Participation and deliberation are increasingly recognised as important components in the valuation of ecosystem services and decision-making regarding ecosystem services. Kenter et al (in press) describe deliberation as “a group-based process of participation, social exchange, reflection, learning and meaningful debate”. Through such a process, involving a wide range of stakeholders, it is possible to learn about, and take account of, ecosystem services and the values associated with them and their management when making decisions. The formation and articulation of values through deliberation is described in more detail in section 1.3.1 and 5.3, while the importance of participation is described in section 5.2.
2.1.4 Adaptive management

Adaptive management (AM) is a structured, iterative process of decision-making, designed to enable communities to deal with the uncertainty inherent in social-ecological systems (Foxon et al. 2009). By recognising the dynamic nature of these systems and acknowledging the human aspects such as institutions, social interactions, individual behaviours, AM accepts that knowledge about social-ecological systems will always be uncertain and pluralistic (Carpenter & Gunderson 2001). In order to take account of this, AM advocates an iterative form of governance, that allows for the involvement of different stakeholders at different iterations of the process. In this way policies, institutions and practices can be adapted as needed over time (Stringer et al. 2006). Uncertainty is reduced, or resilience increased, by monitoring the effects of management practices or policy options, and using the information to make better decisions in the future (Pahl-Wostl 2009). In this way, it is possible to change the system, and learn about the system at the same time.

AM emphasises the need to engage with a range of stakeholders at multiple levels in order to ensure that policies and management decisions reflect multiple viewpoints (Stringer et al. 2006). The system boundaries are often set using special features such as watersheds. This allows a range of social and ecological processes to be included at multiple scales (Olsson et al. 2005). AM is an iterative process, but often involves 4 key steps as part of each iteration (Foxon et al. 2009). These are: establishing the context, establishing goals and strategies, developing mechanisms and indicators, collecting data to monitor progress.

AM can be used to apply the ecosystem framework using participation and deliberation. This research could be thought of as the second iteration of an adaptive management process with the aim of restoring peatlands in Scotland. The system boundaries for this study are conceptualised in Figure 2.

First iteration

As mentioned in the ‘study context’ the IUCN Peatland Programme was set up in 2009 to promote peatland restoration in the UK. The first step was to set up the
Commission of enquiry on peatlands which, through the combined efforts of experts in peatland ecology, land management and policy, produced a set of reports outlining the latest understanding of peatlands, their function and importance (Bain et al. 2011). The commission of enquiry also set out a strategy for peatlands which led to the creation of Peatland Action and the development of the Peatland Code. Pilot projects were set up across the UK. These were funded by a combination of public and private sources, but the funding process was not competitive. The economics and ecological effects of restoration could be measured and monitored and a set of metrics were

![Conceptual model of this study and the system boundary.](image_url)

*Figure 2 Conceptual model of this study and the system boundary. Green circles represent peatland landscapes within the national landscape. The other circles represent actors in the landscape, circle size representing the number of these actors that might be present, arrows and arrow direction representing the interactions between different actors.*
produced to enable more effective monitoring in the future. The first iteration of this AM process focused on carrying out peatland restoration in a more controlled setting and monitoring the projects, taking note of successes and failures in order to learn from them. The peatland code was adapted and refined based on this process, and a set of tools were produced to facilitate planning projects through the code.

**Second iteration**

The second iteration is concerned with how the funding options and metrics, developed and piloted in the previous stage, can work in a less controlled setting. This thesis can be thought of as establishing the context and setting some of the goals and strategies for the next iteration. The interviews, workshops and policy analysis explored the practical and ideological barriers to peatland restoration that still exist. This study then explores how to overcome these barriers through better communication and better integration of policy and funding options. Recommendations are made to inform strategies and goals for the next iteration.

![Diagram showing the first and second iterations of the adaptive management cycle and how this study fits in with the existing research](image.png)
3 Methods

Workshops and interviews were carried in four regions: The Cairngorms, Dumfries, Thurso and Shetland. These regions were chosen through discussion with Scottish Natural Heritage and the IUCN UK Peatland Programme to represent the widest possible range of peatlands in which there was ongoing policy intervention via the Scottish Government’s Peatland Action restoration programme. Peatland Action officers for each of these sites were also consulted to gain a greater understanding of the social, economic and environmental contexts of each site. Based on this information, sites were selected to represent a range of land uses, land types, economic and social circumstances (see section 3.1.5).

In collaboration with local Peatland Action officers and other key peatland experts and organizations, a stakeholder analysis was performed in each site, following methods described by Reed et al. (2009) and Reed and Curzon (2015). This consisted of the identification of stakeholders who could affect or be affected by peatland restoration (based on Freeman’s (2010) definition of “stakeholders”), followed by categorisation into functional categories based on the roles that different groups play in relation to restoration. Individuals and organisations within each category were prioritised by their relative interest and influence, with any other relevant information, such as conflicts or alliances between particular individuals or groups, noted and taken into consideration as appropriate. The list can be seen below.

List of stakeholders

- Landowners, farmers, tenant farmers, crofters
- Land managers
- Land Agents
- Conservation organisations and agencies
- Local NGO’s and wildlife trusts
- Representatives of designations
- Partnerships e.g. Moors for the Future etc.
- Tourism and access groups
3.1.1 Contacting Stakeholders

Stakeholders were initially contacted through trusted intermediaries such as Scottish Land and Estates (the union for landowners and managers in the UK), the National Farmers Union in Scotland, the Heather Trust (an NGO promoting heather moorland), and the Peatland Action officers working in each region. Stakeholders were contacted with information about the study and PES schemes more generally, and invited for an interview and to a workshop.

In each region, the interviews were conducted before the workshop, as they served the multiple purposes of gathering data, informing workshop content, and encouraging people to attend. The analysis of the interviews, however, did not take place until after the workshops had been completed and analysed. The focus of the interview analysis was, therefore, influenced by the workshop findings and so the presentation of the workshop results comes before that of the interviews. During the interviews and workshops it became clear that the policy situation was a, potentially, significant barrier to peatland restoration.

The timing of the various forms of data collection and analysis as well as a summary of the date collected are presented in Figure 4.

3.1.2 Workshops

The workshop design was based on the DVF template used in the Peak District pilot study and described in section 1.3. This template was adapted to take account of lessons learned in the pilot study. The adjustments are described in section 5.2.

The workshop format was as follows:

1. Problem trees – participants described their understanding of the causes, effects and possible solutions for peatland degradation
2. Presentation on the scientific justification for restoration – the content of the presentation was altered depending on issues that arose in interviews, and the main land use in the area
3. Restoration techniques – this session was run by the local peatland action officer and was included as a result of the interviews.

Figure 4 A summary of the different forms of data collection and analysis and the order in which they occurred.
4. Funding options: public and private – in this session the peatland code was described, as was funding through the Common Agricultural Policy. This session was also included as a result of the interviews.

5. Peatland restoration effects matrices – participants thought about what the social, environmental and economic effects might be of different types of restoration, as well as who would be affected.

6. Storytelling – participants were invited to tell stories that demonstrated their attachment or values associated with peatlands.

7. Fair price deliberation – as a group participants planned a project using the DEFRA feasibility tool (described in section 5.2.1). This allowed them to explore the practical aspects of restoration and decide on a compensatory price that was considered fair by the group.

After analysing the workshops, it became clear that the factors that influence decision-making for landowners and managers are complex. These were explored in more depth in the interviews. It was also apparent that the policy situation may be a barrier to peatland restoration. This prompted a policy analysis.

3.1.3 Interviews

Semi-structured interviews were carried out with stakeholders in each region prior to the workshop for that region. In total, 67 interviews were carried out: 17 in the Cairngorms, 18 in Dumfries, 17 in Thurso and 11 in Shetland. The interviews were analysed after all the workshops were complete and so their analysis was influenced by the workshop findings. The interviews, therefore, served a methodological as well as an empirical purpose.

Methodological:

- They were used as scoping interviews, to get an initial idea about individual attitudes towards the scheme and to note down any particular themes.
- Information from the interviews helped to determine the content and the focus of the workshops.
They also provided an opportunity to talk to people about the workshops and try and persuade them to attend.

They were used to obtain further contact details from stakeholders in each region

Empirical

- The interviews were used to corroborate the findings from the workshops
- They were analysed to explore the perspective of landowners and managers in more depth
- And to determine their priorities regarding land management

The interviews were recorded and transcribed before being coded for themes using NVIVO. Grounded theory analysis was used as a methodological framework.

During the interview analysis, it became clear that the factors influencing the decision-making process for landowners and managers had not been adequately explored. An email was sent out to all those landowners and managers who had been interviewed with a question asking them to describe their priorities and objectives in life and in land management. Some responded by email, some requested a phone call. These responses were analysed in the same way as the interviews.

3.1.4 Policy analysis

A policy review was carried out by looking at all sectors of the Scottish Government and assessing the policies which may have implications for peatland management. This initial review was summarised to produce a SWOT/PEST analysis and questionnaire. The questionnaire asked which policies were considered helpful or problematic, and which areas were in most need of improvement. The questionnaire was taken to a workshop, organised by SNH, entitled ‘From Policy to Practice - Peatland Restoration and Integrated Land Use’. The workshop delegates were asked to fill in the questionnaire. Some delegates requested that the questions be answered over the phone. Based on the responses and discussions with policy experts, a further review was carried out to fill any gaps that had been identified.
3.1.5 Overall methodological approach

A grounded theory approach was used, not only in the analysis of the interviews, but in the formation of the entire thesis. The form and focus of the workshops was grounded in the information gathered from the interviews. The interview analysis, in turn, was influenced by the workshop findings. The interview analysis lead to further data collection through the emails about aims and objectives, as this was considered an area that needed further exploration. Policy barriers emerged in the workshops and also in the interviews, inspiring the policy analysis of the final results chapter.

This approach meant that the concerns and interests of stakeholders could be incorporated into the research as it progressed. Interviewing stakeholders before the workshops allowing them to participate in the workshop design, and ensuring that the workshop content was relevant to those attending. Throughout the thesis there was an emphasis on learning from each stage, adapting the methods or the focus based on information from stakeholders. This approach is in keeping with the ethos of adaptive management, participation and deliberation.

3.1.6 Study regions

The research in this thesis focuses on Scottish peatlands, and began with a set of workshops and interviews in four regions: Dumfriesshire (Dumfries), The Cairngorms, Caithness and Sutherland (Thurso) and Shetland.

These regions were chosen because they represent different mixtures of land uses and management types and all contain significant peat resources, which are being targeted for restoration. Figure 5 shows the distribution of peat depth around Scotland. From the map, one can see that some of the deepest peat deposits in Scotland are found in Shetland, Caithness and Sutherland, and the Cairngorms. Dumfriesshire also has substantial peat deposits but many of these have been lost to afforestation or drainage for agriculture, as can be seen by the dominance of land cover types such as improved and semi-natural grassland, and coniferous woodland shown in Figure 6. Restoration work could be particularly important in these areas.
The land cover map shows large swathes of mountain, heath and bog habitat in the north of Scotland. Although there are areas of deep peat in this region, there are also likely to be large areas of drained heather moorland and heathland. Within this, one can also see pockets of coniferous woodland, especially in Caithness and Sutherland.

The next section describes each region in more detail using information based on a series of reports written by SNH which describe the natural heritage, land use, land use change and socio-economic characteristics of Scottish regions (SNH 2009).
Figure 5 Map of peat depth in Scotland (ScotGov 2010). Study sites are indicated by black stars.
Figure 6 Distribution of the main land cover types in Scotland (ScotGov 2010)
Dumfriesshire

Dumfriesshire is located to the north and east of the Solway Firth. The landscape is characterised by narrow, steep-sided valleys between rounded hills. The hill ground is dominated by heather moorland, blanket bog, grass heath and conifer plantations, while the valley bottoms support more productive grassland and some native woodland.

The area relies on farm incomes, with hill sheep farming occurring in the upland areas, and cattle in the valleys. Hill sheep farms have experience a severe decline in recent year, resulting in farm abandonment. Forestry and grouse moors are also major land uses, and provide employment in the area. Tourism is an important industry and mostly concerns grouse shooting, fishing and walking.

The intensification of farming methods, and increase in forestry have led to degradation of blanket bog, with a 50% reduction in blanket bog cover due to forestry expansion.

Cairngorms

The Cairngorms area is located in the eastern highlands of Scotland and is dominated by the Cairngorms mountain range. The highest plateaux reach altitudes of over 1200m and support alpine heath and blanket bog habitats.

Many estates in the area are managed as deer forests and are significant sources of employment and income for local communities. Red deer are part of the natural heritage, but their numbers have been increasing in recent decades, to the detriment of the fragile habitats in the area, especially the bogs. Muirburn is also common practice in the area to maintain grouse moors. Agriculture, specifically hill sheep farming, makes an important contribution to the local economy. Agricultural subsidies have encouraged high stocking densities in places, which has led to the degradation of the blanket bog.
**Caithness and Sutherland**

The regions of Caithness and Sutherland are located in the north east tip of Scotland. They are dominated by open undulating moorland, and are home to the largest, most intact area of blanket bog in Scotland.

Field sports, deer stalking and fishing, are an important source of employment in the area. Red deer populations increased significantly between the 60s and 80s but, as a result of culling programmes, have now stabilised. There are some native woodlands in the area, but the majority of woodland consists of conifer plantations.

Agriculture is one of the main land uses and is of cultural importance in the area. Until recently, agriculture in the area consisted of low intensity mixed livestock farming and crofting. Agricultural subsidies encouraged a shift towards intensive sheep farming, leading to an increased vulnerability to market fluctuations. A recent decline in agricultural prices has led to a decline in sheep farming, and an increase in farm abandonment. Many farmers and crofters have had to seek full time employment, and so do not have time to participate in the communal management of common grazing.

**Shetland**

Shetland is an archipelago of 100 islands to the north east of the Scottish mainland. The islands are characterised by moorlands and coastal cliffs. Peatlands cover approximately one third of the Shetland Islands.

The economy is dominated by fishing, aquaculture, fish processing and the oil industry. Agriculture, especially crofting, is the principle land use, having great cultural significance and providing an important source of employment. Tourism is also important for the economy, with the historical and natural assets being the main attraction.

The Shetland landscape has been shaped by low intensity agriculture, but this type of land management has declined over the last 30 years. Agricultural subsidies encouraged intensification of sheep farming. As in Thurso, a decline in market prices
for hill sheep, meant that many farms and crofts were abandoned as they were not financially viable. Many crofters now have full time jobs and do not have time to take part in communal management of grazing areas. The result is abandonment in some areas, or higher stocking densities in others, as there is less control over grazing regimes.
4 Ecology of peatlands and implications for management

4.1 Ecology of peatlands

Peat is a soil characterised by its relatively high organic matter content (30% to almost 100%) (Lindsay 2010). It is formed in situ from semi decayed plant remains (Rydin & Jeglum 2006). Peatlands are areas where layers and layers of peat have accumulated over thousands of years. The formation and accumulation of peat arises through a combination of factors, namely water table, temperature, vegetation and human intervention.

4.1.1 Water table

The accumulation of plant matter is quite unusual in itself – in most ecosystems plant matter is broken down and recycled. It does not usually persist and accumulate (Lindsay 2010). The reason for this unusual behaviour is that peatlands are waterlogged for much of the year.

A lot of oxygen is needed for the aerobic decomposition of plant matter. Oxygen diffuses through air approximately 10000 times faster than through water (Lindsay 2010). Peatland vegetation lives and dies in a waterlogged environment and there is not enough oxygen to keep up with the supply of dead plant matter (Rydin & Jeglum 2006). The aerobic microorganisms, deprived of oxygen, are replaced by their anaerobic counterparts (Charman 2002, Rydin & Jeglum 2006). Anaerobic decomposition is much slower than aerobic and so not all of the plant matter is broken down and much of it remains and accumulates.

Peat landforms have two layers; the acrotelm and the catotelm (Error! Reference source not found.). The acrotelm is the upper layer, containing living vegetation. It is usually quite thin, often 10-20cm, but rarely more than 75cm deep. The water table fluctuates in this layer and so oxygen is able to penetrate. The environment is aerobic and oxidative decomposition dominates (Charman 2002).
Beneath the acrotelm is the catotelm. This layer is permanently waterlogged creating an anaerobic environment. Plant remains are broken down slowly into small fragments. This partially decayed plant matter accumulates, forming peat, and increasing in thickness by approximately 1mm a year (Lindsay 2010). There are no worms and no turnover of the soil so that the thin layers of peat that build up year on year remain in chronological order (Rydin & Jeglum 2006). This characteristic is what allows it to be used to find out about past climates and environmental conditions.

In the acrotelm, the sphagnum (a moss with a high water holding capacity, which is the primary peat forming vegetation in the UK) is arranged in a highly structured lattice and as a result, the hydraulic conductivity in this upper layer is high (Charman 2002). As the plant matter from the upper layer undergoes further decomposition and compression, making the transition in to the waterlogged catotelm, the structured lattice arrangement collapses, reducing the space between particles (Lindsay 2010). The result is a considerable reduction in hydraulic conductivity. Movement of water is, therefore, very slow and so the catotelm remains largely unaffected by changes in rainfall and climate at the surface.

Without the decomposition and break down of plant structure, there would only be a very thin catotelm, with high hydraulic conductivity. The subsequent accumulation of organic matter would not occur and there would be no peatlands (Lindsay 2010).

Figure 7 Diagram showing the acrotelm and catotelm, and the associated change in conditions with depth through a cross section of peat (Lindsay 2010)
The type of peatland will depend on the source of water feeding the peatland. In areas of the landscape where water tends to accumulate, waterlogging occurs as a result of increases in groundwater (Charman 2002). The characteristics of the surrounding catchment will influence the water chemistry and flow patterns in such an area. These groundwater-fed peat systems are called minerotrophic mires, but are more commonly referred to as fens (Charman 2002).

In contrast, ombrotrophic mires are formed solely as a result of an atmospheric water supply. In areas where there is enough regular precipitation in the non-frozen part of the year, peat can accumulate to the extent that it rises above the mineral-soil, influencing groundwater and remaining isolated from it (Charman 2002). This can only occur if the input of water through precipitation is enough to balance out the small amount of water that seeps through to the groundwater layer. These peatlands are often called raised bogs as they can have a raised, dome-like shape (Charman 2002).

Blanket mire is the term used to describe a landscape of peat forming systems. They are found in areas which receive enough regular precipitation throughout the year to allow peat-forming species to become established directly on the ground surface over an entire landscape (Lindsay 2010). Peat accumulates and eventually covers the landscape in a blanket of peat of varying thickness that has the effect of smoothing the edges of underlying features associated with the underlying mineral soil (Lindsay 2010).

4.1.2 Temperature

Many physical and biological processes are temperature dependent. Development of ombrotrophic mires is quicker in conditions of high precipitation and low evapotranspiration, and so the process of bog formation will be favoured by cool wet climates (Rydin & Jeglum 2006). Higher temperatures can lead to an increase in rates of photosynthesis and plant growth, but they can also increase the rates at which the various microbe communities, present at different depths in the peat, break down the
organic matter and produce CO$_2$ and CH$_4$ (Rydin & Jeglum 2006). Peatlands in northern latitudes tend to be cool and wet and so biological process are slow.

Changes in temperature and microbial activity can also have knock-on effects on nutrient pH and nutrient availability. These processes react differently to changes in temperature, contributing to spatial variations in peatland plant communities, and carbon fluxes (Rydin & Jeglum 2006). For example, higher temperatures and access to oxygen in depressions in peat bogs can promote decomposition and so accentuate their depth (Rydin & Jeglum 2006).

4.1.3 Vegetation

*Sphagnum* mosses are the main peat forming vegetation in northern peatlands. They are instrumental in creating the waterlogged conditions required for the formation of peatlands. They are well adapted to acid, cool, wet and nutrient-poor conditions, and alter their environments to create these conditions (Rydin & Jeglum 2006).

*Sphagnum* grows vertically, with an apical meristem in the top of the vertical stem. As the shoot grows, the meristem produces new cells in the stem and side branches, with branch leaves (*Error! Reference source not found.*). The apex is known as the capitulum and consists of shorter, more tightly packed branches (Rydin & Jeglum 2006). As sphagnum grows upwards, the lower part of the shoot is buried. Light only penetrates a few cm below the surface, depending on how densely packed the moss is, and so photosynthesis mostly occurs in the top parts of the shoot. The lower part is still alive and creates side shoots which can replace the apex if it is damaged. Below a depth of ~5-15cm the shoot is dead and becomes part of the peat (Rydin & Jeglum 2006).
The morphology of *Sphagnum* depends on the wetness and level of exposure of the habitat. *Sphagnum* spp. which grow in pools or hollows (close to the water table) tend to grow horizontally with branches that spread out from the stem. A large portion of the shoot is exposed to sunlight, and these species can even grow when submerged (Rydin & Jeglum 2006).

Species more commonly found in hummocks (raised drier areas of the bog) have hanging branches close to the stem. This creates an efficient capillary network which acts as a wick for water movement. *Sphagnum* species in hummocks tend to grow in dense populations and so the collective exposed surface area is quite low. This combined with the combined effects of capillary transport mean that these species can grow in areas higher above the water table (Rydin & Jeglum 2006). Some wetter *Sphagnum* species can grow individually in between hummock species, taking advantage of conditions created by the capillary action of the hummock species (Lindsay 2010). *Sphagnum* growth is often limited by desiccation in the summer, but hummock species can keep the capitulum wet by capillary water transport, and so maintain high rates of photosynthesis. Pool and hollow species are more vulnerable to desiccation as, when the water table drops, they tend to fall apart (Rydin & Jeglum 2006).

Peat is 90-95% water by weight, and so contains fewer solids than milk (Lindsay 2010). *Sphagnum* mosses have an outstanding capacity to store water. Water is stored between the leaves, and inside some of the leaf cells an in pore spaces (Lindsay 2010). This capacity to store water helps to create the waterlogged conditions necessary for peat formation.
*Sphagnum* mosses reduce the pH of their environments through the production of phenolic acids and uronic acids. These substances help the *Sphagnum* to deal with low levels of solutes in bogs, by creating cation exchange sites (Rydin & Jeglum 2006). Phenolic acids are also important in preventing and slowing the decay of the moss, allowing peat to develop (Rydin & Jeglum 2006, Lindsay 2010). Another method that *Sphagnum* mosses use to cope with low nutrient environments, is to conserve them by transporting metabolites to the capitulum from further down the stem (Rydin & Jeglum 2006).

Hummocks, hollows, lawns and pool systems develop as a result of underlying topography, water flow, and the subsequent colonisation by different species of *Sphagnum* and other bog vegetation such as sedges and dwarf shrubs (Charman 2002, Rydin & Jeglum 2006, Lindsay 2010). The characteristic patterning of peatlands develops as a result. On tops of this, gradients in wetness, pH, nutrient level mineral content and exposure lead to transitions between habitats such as fens, wet and dry heath, acid grasslands and bog woodland (Charman 2002). These transitions and combinations of habitats in the landscape can lead to some confusion regarding suitable management (Charman 2002, Lindsay 2010).

### 4.1.4 Human intervention

While peat bogs are often perceived as ‘natural’ environments, in reality they are likely to have been created and maintained through management (Holden *et al.* 2007). During the mid-Holocene, woodland were cleared to create pasture. Tree growth was prevented through a mixture of grazing and prescribed burning. Over hundreds to thousands of years, woodlands were replaced by blanket peat in cooler, wetter regions (Charman 2002).

Management continues to impact on these environments, converting peatland to dry heath, or grassland and even to forestry (Charman 2002). Management practices, in combination with the environmental factors described above have had, and continue to have a big impact on the condition of peatlands, and the potential formation of new habitats (Charman 2002).
4.2 Causes of Peatland Degradation

4.2.1 Drainage

Moorland areas have been extensively drained since the late 19th C in order to improve the land for agriculture (Bonn et al. 2009). The drainage of peatlands has led to considerable environmental degradation.

Natural peatlands have a moisture content greater than 95%. Water can move relatively freely in the acrotelm, but not in the catotelm. Drainage ditches, therefore, tend to empty the acrotelm of water, but not the catotelm (Lindsay 2010). The drying of the catotelm leads to a reduction and eventually a complete loss of peat forming vegetation (Ramchunder et al. 2009), and so fresh peat is no longer formed. Water drains from the peat adjacent to the ditch, leading to subsidence and a gradual widening of the ditch. The impact on the hydrology of adjacent peat can extend for hundreds of meters in some cases, and will alter the vegetation composition of these areas (Lindsay 2010).

Ditches also allow oxygen to penetrate the, normally waterlogged, catotelm and enable the relatively rapid decomposition of the peat store (Holden et al. 2007). The drying and shrinking peat can deform and crack and develop peat pipes (Holden et al. 2004). These are subsurface pipes which for within the peat, often following a drying and cracking of the peat. Ditches and peat pipes provide channels for fast flowing water during storms, speeding the delivery of water from land to streams and potentially increasing flood risks. The fast flowing water increases erosion and loss of the peat store as Particulate Organic Carbon (POC) and Dissolved Organic Carbon (DOC) (Holden et al. 2006). The changes in water flow and chemistry lead to declines in the diversity of aquatic invertebrates and can damage fish stocks (Parry et al. 2014).

4.2.2 Burning

Fires occur naturally on bogs, but are rare. They are caused by lightning strikes when heather is dry after hot weather. If the bog is wet, then only the surface vegetation
and drier hummocks are burned. If the peat is dry then it can catch fire, and will burn readily due to its high organic matter (OM) content (Worrall et al. 2010).

Rotational burning is used to manage moors for sheep and grouse, and has been common practice since the 19th Century (Holden et al. 2007). Burning encourages young heather shoots and the growth of more palatable sedges and grasses (Davies et al. 2008). Rotational burning is carried out on a cycle of, typically, 8-25 years (Holden et al. 2007). Sphagnum is sensitive to burning and can take 50 years to return if burning results in bare peat (Worrall et al. 2010). Burning rotations used in moorland management occur at a frequency which is too high for the Sphagnum to recover properly. The reduction in Sphagnum mosses encourages the dominance of fire-tolerant plants such as Calluna, Molinia and Eriophorum (Worrall et al. 2010). These are not peat forming species, and so peat accumulation is reduced.

Heather and other vascular plants have deeper roots which penetrate the peat leading to the formation of cracks and peat pipes (Holden 2005). This, combined with the presence of bare peat, increases oxidation and erosion of the peat (Worrall et al. 2010). Carbon is lost in the form of greenhouse gases, DOC and POC.

4.2.3 Grazing and trampling

Blanket bog vegetation can sustain low stocking rates of wild or domestic herbivores. High stocking rates cause damage through grazing pressure, trampling and urine/faecal returns (Lindsay et al. 2014).

Grazing causes problems at high densities because the herbivores, whether they be sheep or deer, consume more dry vegetation matter than the bog can replenish (Lindsay et al. 2014). This leads to a loss of peat forming vegetation. Persistent high stocking densities can result in a complete loss of peat forming vegetation and either colonisation by non-peat forming species, or the development of patches of bare peat (Gimingham 1995, Ward et al. 2007).

Trampling damages vegetation, and the tracks formed by herds of sheep or deer can provide a focal point for erosion (Evans 1998, Evans 2005). Bog vegetation is sensitive
to trampling, but *Sphagnum* mosses are particularly sensitive, and can take a long time to recover (Lindsay *et al.* 2014).

Faecal droppings and urine from sheep or deer can affect the bog by altering the nutrient balance, and dispersing plant seeds (Lindsay *et al.* 2014). In some cases this can be beneficial, but in areas where there are shrubs or trees, this can increase the colonisation of undesirable plants (Holden *et al.* 2007).

Damage to the acrotelm, areas of bare peat and increased erosion along tracks can lead to a loss of peat as POC and DOC (Lindsay *et al.* 2014). If vascular plants dominate, these can penetrate the peat leading to increased oxidation of the acrotelm, and increased greenhouse gas (GHG) emissions (Holden *et al.* 2007).

It should be noted that grazing often occurs in conjunction with burning and drainage.

**4.2.4 Forestry**

In order to establish forestry on peat, the area is often prepared by digging ribbon plough furrows across the site (Holden *et al.* 2007, Parry *et al.* 2014). This reduces the water table, and the mounds above the water surface provide a microclimate for the seedlings (Lindsay *et al.* 2014). Fertiliser is also often applied to the mounds.

The drains lower the water table and lead to subsidence of the peat surface due to compression and shrinkage (Anderson *et al.* 2000). These processes are exacerbated by the weight of the trees, which further compress the peat. Moisture is lost from the peat as the trees increase rates of evapotranspiration (Lindsay *et al.* 2014). As the canopy develops and closes, precipitation is intercepted reducing the amount of water that reaches the bogs surface by up to 40% (Lindsay *et al.* 2014). The net drying effect that forestry has on peat can be felt some distance from the forest, in the adjacent peatland (Holden *et al.* 2007).

The carbon stored in the catotelm can be lost through oxidation, leading to GHG emissions, and increased aquatic fluxes of POC and DOC, as a result of the ploughing, and the increased numbers of cracks and pipes which form as a result of tree roots.
Water quality is reduced, with streams becoming more acidic, and with higher concentrations of aluminium as a result of the forest leaf litter (Holden et al. 2007). Stream flow can initially increase in both the number and amount of peaks. As the forest matures, however, water yield can be reduced (Holden et al. 2007).

Afforestation can have negative effects on wetland birds, up to 1km from the forest edge. It is thought that this is related to predators living in the forest (Moss et al. 1996). Changes in invertebrate communities also occur, while the reduced water quality can have negative impacts on aquatic wildlife (Lindsay et al. 2014).

4.2.5 Cutting

Peat has been used as a fuel for thousands of years, usually extracted on a domestic scale, from peat near the home. Peat is also cut and burned in the production of whiskey. More recently peat has been extracted on a commercial scale, to produce energy or, more commonly, for use in horticulture (Bain et al. 2011).

In both cases the rate of peat extraction exceeds the rate at which peat is deposited. Peat typically accumulates at a rate of 1mm per year. One meter of peat removed will have taken 1000 years to accumulate (Lindsay 2010).

In commercial extraction, all the vegetation is removed and the area is drained, leading to complete destruction of the bog (Lindsay et al. 2014, Parry et al. 2014). When peat is harvested for domestic use, the top layer of vegetation is often removed, the peat blocks cut away, and then the vegetation is replaced. The bog has more chance of recovery in this case (Lindsay et al. 2014).

Individually, domestic peat extraction, may appear to have a relatively low impact on the peatland ecosystem. The collective impacts, over an extended period of time can cause considerable damage, however (Lindsay et al. 2014).

Carbon is mostly lost through bulk removal and oxidative decomposition – as oxygen reaches the catotelm during cutting (JNCC 2011, Lindsay et al. 2014). There can be small increases in DOC and POC. In cases where the top layer of vegetation is not
replaced, oxidation, erosion and losses through DOC and POC will be greater (Lindsay et al. 2014).

4.2.6 Atmospheric deposition

There have been substantial changes in the chemistry of atmospheric deposition across the UK in the last 250 years (Holden et al. 2007). This has been caused by changes in industrial and vehicular emissions and agricultural productivity. The main atmospheric pollutants are either acidifiers (SO$_2$ and NO$_x$) or fertilisers (NH$_4$ and NO$_x$), and both can have significant impacts on peatlands (Holden et al. 2007).

Acid deposition occurs as a result of fossil fuel combustion and mostly involves SO$_2$. Changes in vegetation composition can occur as a result of acid deposition on peatlands, with Sphagnum mosses being particularly sensitive (Lee et al. 1993, Holden et al. 2007). Acid deposition also increases the solubility of heavy metals which are toxic to most plants, resulting in a decrease in plant growth and changes in vegetation and soil organism communities (NEGTAP 2001). The acidity of streams coming off the peatland will also increase, reducing the diversity and size of invertebrate and fish populations (Holden et al. 2007).

Nitrogen deposition also changes the composition of vegetation communities, resulting in a reduction of moss and lichen species and an increase in grasses (NEGTAP 2001). Stream waters and soil processes can also be affected (Holden et al. 2007).

4.2.7 Climate change

Peatlands rely on regular precipitation and low levels of evapotranspiration, achieved due to low temperature or high humidity, or both. Precipitation patterns and temperatures are expected to change as a result of climate change. Drier summers and wetter winters are predicted in the UK, with more precipitation occurring in heavier rainfall events. Such conditions would be problematic for peatlands (Charman 2002, Rydin & Jeglum 2006, Lindsay et al. 2014).
Peatland archives show that low water tables, and periods of high temperatures have occurred in the past, however, and that peatlands have continued to accumulate peat (Lindsay et al. 2014). This resistance to changes in climate is linked to the living surface of active bogs. In drier conditions, ridges and hummocks expand as these are composed of *Sphagnum* mosses which are more tolerant to dry conditions (Lindsay et al. 2014). These hummock species are also more resistant to decomposition than pool or hollow species, so peat still accumulates, despite the increased rates of microbial activity that are often associated with higher temperatures (Rydin & Jeglum 2006, Lindsay et al. 2014).

*Sphagnum* has no vascular tissue so, even in dry conditions, water is not transmitted up the stem. The stop layer of moss often dries out, forming a thin layer of pale, highly reflective vegetation, which may also protect the moss below keeping it cool and moist (Lindsay et al. 2014).

In this way, peatlands have been resilient to changes in climate over the last 10,000 years. The effects of future climate change on peatlands are still unclear, and this is an active area of research. The current understanding is that the resilience demonstrated in the past, and the potential for resilience in the future depends on the presence of an active, living peat surface (Lindsay et al. 2014). Degraded peatlands will not have this resilience, and so will degrade more rapidly without intervention.
4.3 Effects of restoration

The objective of peatland restoration is to re-establish vegetation associated with an active peat formation. This aim is to be achieved through restoring the vegetation and the hydrology of the peatland. Typical restoration practices include revegetation using heather brash, seeds or textile mats, ditch and gully-blocking and the removal of trees and shrubs. Such works are often accompanied by changes in management practices such reduced stocking densities and cessation of burning. This section will look at the effects of restoration on water flow and chemistry, carbon balance, and biodiversity.

4.3.1 Water flow and quality

There is evidence to show that levels of Particulate Organic Carbon (POC) in the run off from peat bodies is reduced following ditch-blocking and re-vegetation of degraded sites (Freeman et al. 2001, O’Brien et al. 2007, Evans et al. 2009). This reduces sedimentation in catchment reservoirs and can have positive impacts on raw drinking water quality (Lunt et al. 2010). Changes in levels of Dissolved Organic Carbon (DOC) are more variable and site specific (Parry et al. 2014), although a national survey conducted by Armstrong et al (2010), showed a general reduction in DOC and water discoloration following drain-blocking. Where particularly dry bogs have been rewetted levels of DOC in run off can increase immediately following restoration (Lindsay 2010). This may be due to the revitalisation of the microbial community and a flushing of mineralisation products (Lindsay 2010, Lunt et al. 2010). Where longer term data is available, a reduction in DOC can be seen after about 3 years (Parry et al. 2014).

The impacts of restoration on water flow are less clear, and less dramatic. Comparisons of hydrographs before and after restoration show an initial reduction in peak flow following drain-blocking (Lunt et al. 2010). A longer term study comparing storm hydrographs in areas with different proportions of bare peat, has shown that peakier hydrographs, and a higher peak storm discharge are associated with higher proportions of bare peat (Grayson et al. 2010). These effects are most likely
due to changes in surface characteristics, increasing overland flow velocities. Holden et al (2008) showed that land cover type influences overland flow velocities, with highest velocities being associated with areas of bare peat, and the lowest velocities being associated with areas of sphagnum cover. Blocked drains can slow the path of water to catchments by diverting it across the peat surface (Lunt et al. 2010).

There are some theories that peatland restoration will increase the water storage capacity of the peat, and so reduce storm flows. As peatland restoration acts to bring the water table to the surface, any increase in storage capacity due to increased vegetation cover is thought to be negligible (Parry et al. 2014).

4.3.2 Carbon

There is some evidence to suggest that carbon sequestration will increase in the short to medium term following restoration (Worrall et al. 2007, Worrall et al. 2009, Lindsay 2010). There are concerns, however that any increases in carbon sequestration will be cancelled out by increased in methane emissions, as methane has a very high global warming potential (GWP) (Baird et al. 2009).

High emissions of methane are associated with high water levels. Following drain-blocking, pools of water are likely to form behind the dams, potentially leading to increased methane emissions (Baird et al. 2009). Methane is produced in the waterlogged layers of the peat and, in natural peat bogs, a large proportion of it is oxidised, with the aid of Sphagnum mosses, before it reaches the atmosphere (Rydin & Jeglum 2006). The main pathways by which methane can reach the atmosphere are ebullition, or through vascular plants which act as conduits, or ‘shunts’ (Lindsay 2010). Studies have shown record low levels of methane production in hollows dominated by Sphagnum (Frenzel & Karofeld 2000, Bortoluzzi et al. 2006), while similar findings were noted in un-vegetated hollows (MacDonald et al. 1998, Laine et al. 2007). Lindsay (2010) has suggested that high methane emission may, therefore, be primarily associated with the presence of vascular plants such as bog bean and cotton grass. Sphagnum carpets are also thought to reduce the ability of vascular plants to
establish (Lindsay 2010). It is, therefore, vital to ensure that *Sphagnum* mosses colonise after restoration.

Another important factor which is highlighted by Lindsay (2010) is that, although some restored bogs may never return to a state of sequestration, the emissions avoided through restoration are significant. Avoided loss of carbon from peatlands, whether that be from atmospheric or aquatic pathways will still have important positive implications for climate change mitigation and water quality.

A number of factors need to be taken into account in order to determine the carbon balance of forest-to-bog restoration. As trees sequester carbon, this must be balanced against the carbon sequestration potential of a restored bog. The rate at which the forest is sequestering carbon will depend on the growth of the trees, this can be very low on peatlands. If trees are felled to waste, their decomposition increased emissions of CO₂. The methane emissions associated with a restored bog, and their GWP must also be taken into account. This can be reduced by the early establishment of *Sphagnum* mosses which facilitate methane oxidation. Lindsay (2010) suggest that it would not take very long for a restored bog to sequester enough carbon to balance out and then exceed the carbon lost in forestry removal.

### 4.3.3 Biodiversity

There is limited research on the effects of peatland restoration on biodiversity, as the re-establishment of communities of birds, plants and invertebrates can take some time, and there have been few long term studies (Parry *et al.* 2014). A review carried out by Lunt *et al.* (2010) for the IUCN, suggested that most restoration practices (ditch- and gully-blocking, re-vegetating bare peat, removal of grazing, cessation of burning, removal of scrub and woodland) led to a general increase in biodiversity. A study by Ramchunder *et al.* (2012) showed that blocking drains led to improvements in the aquatic ecology of the catchment. This was attributed to reductions in POC.
5 Using deliberative workshops to gauge stakeholder response to peatland restoration through the Peatland Code

5.1 Introduction
The importance of peatlands and the need for restoration of degraded peatlands has been recognised at the national and international level (Bonn *et al.* 2014). There are, however, insufficient public funds to restore and protect peatlands and so maximise the ecosystem services they have the potential to provide. The Peatland Code is a UK based Payment for Ecosystem Services (PES) scheme, which provides a mechanism to facilitate private funding for peatland restoration. Although peatland restoration can lead to improvements in many of the ecosystem services most commonly included in PES schemes - carbon sequestration in biomass (soil or wood), provision of habitat, protection of landscapes and hydrological functions (Wunder 2005) payments are only tied to carbon benefits as these are considered to be the easiest to quantify and market (Worrall *et al.* 2009, Dunn & Freeman 2011).

The Code is a voluntary standard which quantifies and verifies the carbon benefits accrued as a result of a peatland restoration project, over its 30-year contract length. A business can, therefore, invest in a project of their choosing and have some assurance of the additional carbon sequestration they have funded, and can cite this towards their Corporate Social Responsibility. The Peatland Code is in development, but has already benefitted from a range of research projects addressing some of the technical components of such schemes such as market research (Reed *et al.* 2013), methods for assessing, predicting and monitoring the state of ecosystem service provision (Smyth *et al.* 2015), and the best way of packaging and delivering services (Quick *et al.* 2013).

PES schemes have evolved from a way of conceptualising and communicating the importance of functioning ecosystems, to a mechanism for funding the restoration or
preservation of ecosystems (Gómez-Baggethun et al. 2010). As such the framework is well placed to complement the government initiatives linked to peatlands. The Peatland Code adheres to Wunder’s (2015) definition of a PES scheme in that it involves a voluntary transaction between a buyer (a business) and a provider (landowner or manager) based on the condition of the provision of a well-defined ecosystem service (avoided carbon emissions and sequestration). The code does not quite fit into the three distinctions that Wunder (2005) makes between different types of PES scheme, however, as it includes aspects of almost all of them. The peatland code could be described an area-based rather than product-based scheme. It relies on a combination of private and public funding, in order to be economically viable and can be both use-restricting and asset-building as restoration work must be carried out, and then management practices altered for the remaining contract period.

PES schemes are supposed to use market mechanisms to make the payment and provision of ES more efficient and cost effective (Gómez-Baggethun et al. 2010). The reality is that there are often a number of issues that need to be addressed in order to be truly effective and efficient, as the PES concept necessitates a collaboration between the natural, social and economic sciences (Engel et al. 2008, Spash 2009, Hayes et al. 2015, Jones et al. 2016). One of these issues is that traditional, top-down methods of natural resource management, can be inadequate as they often ignore local knowledge, beliefs and values (Lynam et al. 2007). There has, therefore, been something of a merging of conservation management and development theories and practices, with participatory processes being a central tenet of the subsequent theories, frameworks and projects (Campbell & Vainio-Mattila 2003).

There are a number of reasons given for the importance of participation on project planning and implementation or problem solving. These can be thought of as more philosophical or normative reasons, or pragmatic reasons. The philosophical rationale is that people have a right to be involved and taken account of in projects that will affect them (Reed 2008, Pahl-Wostl 2009). It is also thought that stakeholder participation would lend credibility to the decision-making process and increase the
trust the people have in their institutions (Richards et al. 2004). Finally, by including stakeholders in the process of problem solving and project delivery it is hoped that they will be empowered, increasing their capacity to effect change in their communities (Reed 2008).

As well as these ideological reasons for stakeholder engagement, there are more pragmatic incentives. If stakeholders are involved in the development of solutions, plans and technologies, these are likely to be better suited to their needs, and this in turn should improve the adoption of these practices or technologies (Reed 2007). Linked to this, is the thought that by incorporating local knowledge and expertise, potential impediments can be pre-empted and dealt with sooner rather than later (Dougill et al. 2006). When it comes to research, acquiring this local knowledge may help provide a more complete picture of the situation (Koontz & Thomas 2006, Newig 2007). A participatory process which increases social capital and establishes trust between and within stakeholders and projects should help to reduce the potential for conflict, and expedite their resolution if they occur (Gong et al. 2010).

A combination of these factors would therefore increase the quality, strength and longevity of a project. A number of more recent projects in both developed and developing countries, cite effective stakeholder engagement as one of the most important elements for success (Asquith et al. 2008, Bennett 2008, Dobbs & Pretty 2008, Frost & Bond 2008).

The main issues that need to be addressed through the participation of stakeholders are educational or information barriers, the negotiation of payment, and identification of values and beliefs linked to the ecosystem in question and its management.

In order to gain support for environmental programmes and encourage participation it is important for potential ES providers and other stakeholders to understand the link between management practices and provision of ecosystem services (Asquith et al. 2008). Lack of information and education was identified by Feliciano et al (2014) as
one of the main barriers to implementation of climate change mitigation practices, whilst education programmes and information provision was one of the main enablers identified by stakeholders in their study. As part of a PES scheme in Bolivia selling the dual benefits of endangered bird species protection and improved water quality, Asquith et al (2008) discuss the need to set up an education programme so that the link between management and environmental functions and services is understood by future generations. On the other hand, a study of a large PES scheme in China cites the incorrect explanations of management implications as one of the most worrying barriers to the success of the project (Bennett 2008). Information provision may also refer to details about the schemes themselves such as how they work, application procedures, how to find contractors etc. In a case study of agri-environment schemes in the UK, the role of advisory services was highlighted, as was the importance of good relations between these organisations and the ES providers (Dobbs & Pretty 2008).

Payment can be awarded to the ecosystem service provider in order to compensate them for their time, expenses, income foregone, and other opportunity costs or can be used as an incentive for taking part in the scheme. If the award is too low, it may not be an attractive option, and adoption of the scheme may be poor. If the award is too high, this would be a waste of resources and, in instances where funds are limited, may reduce the number of people that can take part in the schemes and, therefore, the extent of the environmental benefits that can be delivered (Engel et al. 2008). There is also evidence to suggest that economic incentives can undermine the more altruistic incentives people might have for conservation activities, if the scheme focuses too heavily on remuneration that encourages “self-regarding” behaviour (Bowles 2008). This can lead to increased project costs, and low levels of permanence (Clements et al. 2010). It has been shown that economic incentives alone are also unlikely to transform behaviours and values, and so are limited in the environmental benefits they can hope to achieve (Turner & Daily 2008). Other aspects of project design must, therefore, be considered.
“Ecosystem services” is a socially derived concept as it relies on viewing ecosystems through the prism of human needs (MA 2003, Vatn 2007, Gómez-Baggethun et al. 2010). The extent of the need, the presence of substitutes and the importance attached to it will depend on the individual and the communities in question and may change over time (Hubacek et al. 2009). Attaching an economic value to these services adds another social and cultural dimension to the concept, which may also be somewhat subjective. It follows that an understanding of the values, beliefs and preferences of those managing or depending on the ecosystems in question must be considered early on in the development of such schemes (Lynam et al. 2007). This is likely to increase participation and reduce costs as, without it, participants may require more compensation in order to override values which run counter to those of the project.

In the study by Feliciano et al (2014), mentioned previously, personal interests and values were also identified as an important barrier to implementation of environmentally friendly practices. In their report on the Vittel PES schemes in France, Perrot-Maître (2006) states that the most important factor in the project’s success was the time taken to understand the perspectives of the farmers participating, not only in terms of farming, but also life choices. These considerations are particularly important if the project has social as well as environmental aims.

As well as the issues described in the previous paragraphs, stakeholder engagement can be important for identifying practical barriers to do with techniques, timings, competing activities and institutional barriers. The issues described above, can be classed into those that affect the willingness of a potential ES provider to take part in the scheme, and those that affect their ability to take part. Stakeholder engagement which addresses these issues can enable co-ordination and strategic decision making concerning trade-offs and risks (Mills et al 2016), and so facilitate the efficient delivery of ecosystem services.

Willingness to take part in pro-environmental activities could be in part related to a person’s attitudes and beliefs regarding that behaviour (Beedell & Rehman 2000). Schwartz (1977) theorised that a personal norm (in this case about nature) could
develop if the two following conditions are satisfied: they are aware of the consequences of their actions for nature (AC), they recognise their own ability to help and feel a sense of responsibility to act (AR). The significance of this theory has been shown by Johansson and Henningsson (2011). AC is likely to depend on having an understanding of the ecosystem in question and so necessitates education and information provision. AR is likely to depend partly on education, but also on personal and community values, as well as a belief that their actions will actually produce a result (Beedell & Rehman 2000).

The ability of a person to take part may depend on any of the practical barriers listed previously. Financial compensation may be used to overcome some of these practical barriers by covering project costs or opportunity costs. Payment may also be used as an incentive, if personal norms alone are not enough to engender a willingness to take part.

This chapter presents the results of a series of workshops held in four regions around Scotland, with the primary aim of understanding the barriers and incentives required in order to encourage participation in peatland restoration funded through the Peatland Code. To this end, workshops were designed in such a way as to address the issues described previously. The methodology section, which follows, will describe in more detail how the workshop design achieved these aims. The results will then be presented and discussed.
5.2 Methods

Kenter et al.’s (in press) Deliberative Value Formulation Model provides a theoretical model and a methodological template for deliberative valuation of ecosystem services, whether in monetary or non-monetary terms. It is informed by social-ecological theory and centres around the use of deliberation to incorporate ethical and cultural concerns, as well as the consideration of uncertainty and risk, in decision-making. It is thought that deliberation can “ease the participants cognitive burden” by providing a way to work through the problem, gain a better understanding of the topic in question and crystallise opinions and preferences. The process is also thought to bring core values and beliefs to the fore, enabling links to be made between personal values, the values of others present, and the environment. Finally, through this methodical negotiation and consideration of the relevant concerns, it is hoped that a more democratic outcome can be achieved.

The DVF template includes 6 key elements to include in the design of a deliberative workshop:

1) “Institutional context” – explaining the purpose of the study, why certain people have been included or excluded, what to expect etc.

2) “Transcendental values” – this involves deliberating the values and beliefs of individuals, communities and the societies and cultures to which they belong

3) “Contextual beliefs” – beliefs surrounding the consequences of different actions, who will be affected, who should act, which institutions and groups or most important or powerful

4) “Implications for transcendental values” – assessing the implications that the actions in question may have on the values identified

5) “Norms and contextual values” – integrating material from previous steps to determine implications

6) “Value Indicators” – establishing indicators to reflect the values of the group.
In 2014, a pilot study was conducted looking at the values held by stakeholder in the Peak District in relation to peatlands, peatland restoration and the Peatland Code (Kenter & Reed 2014). This workshop followed the methodology outlined above. Lessons learnt from this workshop were used to inform the design of the workshops described here.

The workshops designed for this research included a number of adjustments to the methods piloted by Kenter and Reed (2014) in the Peak District, to account for the practicalities of conducting the workshops and encouraging attendance, as well some adaptations based on a wider theoretical framing. For example, the DVF model does not include any framing of the issues being deliberated. Checkland (1981) said, whoever owns a problem should be the co-owner of the process to solve it, and indeed defining the “problem” and ensuring that there is some agreement over that definition should be an important element of the deliberative process. Young et al (2008) describe a set of questions or issues that need to be addressed in order to develop good regimes for environmental and resource management. They classify these into Problems, Politics, Players and Practices, and state that it is important to start with an assessment of the problem. In the case of land management, and peatlands in particular, this is particularly important as different stakeholders are likely to have different objectives for the land and these will determine what is thought to be problematic. Mostert et al (2007) describe a process of integrating the different “frames” of stakeholders. Frames influence the way people see reality, and so will affect the way they perceive the problem. Furthermore, the DVF model does not devote much, if any, time to education and information provision. With complex and esoteric ecosystem processes and services, such as those found in peatlands, this step is likely to be particularly important. For these reasons, the DVF method was adapted to include an initial discussion of the different perceptions and framings of the problem, and information was provided about peatland ecosystem processes and services, based on a review of the available evidence at the start of each workshop.
Transcendental values were considered through the narrative technique of storytelling. Narrative techniques are used in a number of ways and for various reasons. It is understood that different use of language affects people’s thoughts, languages and actions (Ison 2005, Lakoff 2010, Baud et al. 2011). Framing things as a “story” is used in the media, politics and science communication to convey difficult topics, and is also used in land management workshops to frame scenarios and explain concepts (Paschen & Ison 2014). Research has shown that people can find it easier to understand and relate to concepts if they are presented as a story (Hornig 1993, Kearney 1994, Stewart et al. 2013).

Stories can also help people to articulate difficult values (Gould et al. 2015). These may be particularly deeply held or intangible values, which may not be amenable to question and answer formats (Satterfield et al. 2013). Sharing stories in a group, has been shown to help people to understand each other, to bond, and to see things from another perspective (Satterfield 2001).

Shanahan et al (1999) approach the idea of environmental attitude and behaviour from a communication perspective, arguing that people develop environmental beliefs and values through communicative processes. They hypothesise that environmental opinions depend on the communication context. In the case of workshop design, there is the concern that placing a value on an ecosystem, through purely pragmatic discussions of profit and loss, may affect the values and considerations that most influence the decisions made.

Narrative techniques are also used as part of the set up to decision making. Being aware of how language can influence behaviours, thoughts and actions, it is important to be aware of how and why people are being influenced (Paschen & Ison 2014). The aim of a workshop and its activities should be to engage participants, facilitate understanding and learning, and help participants to recognise values, and to use the experience to help make a decision. Chan et al (2012) recommend a mixed method approach, where metrics such as scales and weighted preferences are accompanied by narration and deliberation.
With these interpretations and uses of narrative techniques in mind, the workshops in this study were designed to facilitate the articulation and sharing of nonmaterial values, and to provide a context for economic value deliberation which keeps these nonmaterial values in mind. As such, the order in which the elements listed in the DVF model were addressed differed slightly from the order in which they were used in the workshops presented here. The main difference is that the transcendental values were considered before the “fair price deliberation” or “value indicator” session.

In the Peak District pilot workshop (Kenter & Reed 2014), value indicators were determined through analysing the costs associated with different peatland restoration and management options, and agreeing on the profit margin required in order for them to take part. Participants were given an overview of costings associated with the different management options and then asked to work through opportunity costs and indirect costs as well as benefits and a profit margin. The participants were divided into four groups, who each looked at one of four management options, with the intention of sharing and discussing the results of each group in a second round of deliberation. During the workshop there was not enough time to carry out the second round of deliberation, and so participants were not able to look in detail at all of the options. Being able to compare the different options, and compare the implications of different practice is an important part of the deliberation, and efforts should be made to allow this to happen.

The different groups chose different values for direct costs and different project set-ups. For example, one group in the pilot workshop was looking at “gully blocking with no burning permitted”, the other “gully blocking with burning permitted”. The groups chose different methods and different costs for gully blocking leading to a difference in direct costs of £12,013 and £6,234. Opportunity costs and profit margins were also calculated in very different ways – one group calculated the profit margin as 10% of the direct costs and opportunity costs. This obscures the reasoning behind the “fair price” eventually chosen for the different management options. In contrast
to the pilot workshop, in this study standard costs were used wherever appropriate, in order to simplify the discussion and make comparisons easier. Standard costs could be varied by participants if they felt they were not appropriate for their context. This enabled a more focused discussion with time for all management options to be evaluated by all participants. The deliberation took place as one group so that any issues could be discussed and addressed, and the result was more representative of the views of the stakeholders taking part.

Early discussions with organisations that work with landowners and managers such as Scottish Land & Estates and the Heather Trust indicated that information about agricultural policy would be appreciated and may be an incentive for people to attend the workshop. Funding options were identified as a potential barrier peatland restoration, and so more time was devoted to this than in the Peak District workshop.

As a result of the extra elements included in these workshops, and the time constraints associated with voluntary workshops, less time was devoted to the deliberation of values. In particular, the fourth element of the pilot workshop, “implications for transcendental values”, was omitted. The process of integrating material from the different sessions happened throughout, as discussion was encouraged.

The process of identifying and inviting participants will now be described. The different components of the workshop will then be described in the order they occurred on the day.

5.2.1 Workshop format

Each workshop consisted of seven sessions, with breaks for refreshments and lunch (Table 1). Descriptions of the sessions are presented below, in the order they were conducted during the workshops. There were two exceptions to this. The Cairngorms the workshop was executed over two days over the course of a month, based on feedback during the stakeholder analysis that participants were more likely to attend if the day was shorter. However, it transpired that people were not willing to attend
two workshops, so that only two people attended both the first and second part of the Cairngorms workshop. It was also very difficult to find two dates when all of the workshop organizers were free. Subsequent workshops were, therefore, held over one day.

**Table 1 Workshop timetable**

<table>
<thead>
<tr>
<th>Times</th>
<th>Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00</td>
<td>Refreshments on arrival, workshop introduction</td>
</tr>
<tr>
<td>10.15</td>
<td>Activity: Problem tree</td>
</tr>
<tr>
<td>10.40</td>
<td>Presentation: Science</td>
</tr>
<tr>
<td>11.10</td>
<td>Tea/coffee break</td>
</tr>
<tr>
<td>11.20</td>
<td>Presentation: Restoration techniques</td>
</tr>
<tr>
<td>11.50</td>
<td>Presentation: Funding options for peatland restoration</td>
</tr>
<tr>
<td>12.20</td>
<td>Activity: Positive and negative effects of peatland restoration</td>
</tr>
<tr>
<td>12.50</td>
<td>Lunch</td>
</tr>
<tr>
<td>13.30</td>
<td>Activity: Storytelling</td>
</tr>
<tr>
<td>14.00</td>
<td>Activity: Feasibility tool and fair price deliberation</td>
</tr>
<tr>
<td>16.00</td>
<td>Round up of the day, and discussion on how to proceed</td>
</tr>
</tbody>
</table>

In Dumfries the speaker covering funding options through SRDP was only free in the early morning and late afternoon. He gave his talk at the very beginning of the workshop, and the other sessions followed on in the same order as the other workshops.

1. **Problem Tree**

The problem tree is an exercise aimed at getting an understanding of the causes and effects of a problem (Leeuwis *et al.* 2004). The trunk of the tree is the problem; in this case that was ‘peatland modification’. The roots of the tree are the causes of the problem while the branches are the effects. Potential solutions can also be added in the form of fruits. The aim of this exercise is to get an idea of how the group perceives the situation (Leeuwis *et al.* 2004).
This exercise was carried out at the beginning of the workshop after an introduction to the day, and an explanation of the exercise. The participants had received no information about peatland management before this point – other than the workshop invitation and in some cases the interview. The problem tree should, therefore, represent their initial understanding of the situation. This was a group exercise. The importance of a suggestion cannot, therefore, be inferred by its frequency.

2. Presentation on the scientific justification for restoration

A presentation was given to provide an overview of the current state of research on the subject. The following topics were covered, although the focus was different in each area, reflecting the different types of habitat, dominant management practices and restoration relevant to each site (see Chapter 1, for more detail):

- Definition of peatland degradation (for the purposes of the workshop)
- Carbon balance of degraded vs. near natural bog
- Carbon balance of forest-to-bog restoration
- The impacts of peatland condition (eroded or restored) on water flow and quality
- The impacts of peatland condition on wildlife
- The impacts of peatland management on peatland resilience, particularly with regard to climate change

In each workshop there were experts in peatland management among the organizers and participants. Discussion based on this presentation was facilitated and recorded, either in note form (the Cairngorms) or as an audio recording. Notes were later taken from recordings for qualitative analysis. Workshops had either one or two trained facilitators, who each led on different activities during the workshop.

3. Restoration techniques

The aim of this exercise was to give an idea of what is involved in restoration work, and also what can be achieved. The Peatland Action officer in each region gave a
presentation describing the different techniques and showing pictures of existing restoration projects; the work being carried out, how the site looked immediately before and after, and, where possible, how the site looked some time later. In the Cairngorms this was accompanied by an optional site visit after the end of the first, half-day workshop. At that workshop there was also a case study talk from a landowner who had had his peat restored. It was not possible to find a similar speaker at the other workshops.

4. Funding options – public and private

The aim of this session was to give participants an overview of the various funding options available for peatland restoration. Either the Peatland Action officer for the region or another speaker with relevant experience gave a talk outlining the funding options available under Peatland Action and SRDP. This included information on the sort of work that would be covered, deadlines, and ways to improve applications.

A representative from the IUCN gave a talk about Payment for Ecosystem Services schemes and funding option under the IUCN Peatland Code.

As with the other sessions, these presentations inspired a great deal of discussion, which was recorded.

5. Peatland restoration effects matrices

The aim of this exercise is to help participants to discuss and digest evidence on management options presented as well as to consider how management options would affect communities more broadly. Two matrices of potential effects of different types of restoration, namely re-vegetation and ditch blocking, were attached to the wall. An example can be seen below (Table 2). Participants were asked to fill them in as a group.

Table 2 Example of the effects matrices used in the workshops

<table>
<thead>
<tr>
<th>Effect</th>
<th>Who is affected?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social + community values impacts</td>
<td></td>
</tr>
</tbody>
</table>
6. **Storytelling**

The aim of this session is to encourage participants to recognise the more intangible benefits they gain from peatlands for example, the beauty of the landscape, their childhood experiences etc. The following exercises were designed to bring such thoughts or feelings to the fore and to see whether some participants share some values and opinions despite their different uses of the landscape.

Participants were asked to tell a story that illustrated their relationship to the land, or which held some meaning for them, relating to peatlands. One of the facilitators told a story first, as an example. Participants were then given an opportunity to volunteer a story.

7. **Fair price deliberation**

In order to arrive at a fair price for carrying out a restoration project and altering management practices in the long term, the costs and benefits of such an undertaking need to be assessed. By agreeing a fair price for restoration, the goal was to be able to develop a landscape-scale restoration project for private investment under the Peatland Code, with prices standardised across the landscape to reflect different costs without leading to price competition and conflict between neighbouring landowners. To assist with this the Peatland Code feasibility tool, created by Defra was used (Smyth *et al.* 2015). In the workshops the participants, with some guidance from the organizers, worked through the pages of the tool, changing variables until they were satisfied with the final price. What follows is a brief description of the feasibility tool, which will clarify the process and the results to be discussed in later sections.

The area to be restored must be defined in the tool. The land that will be included in the project must be categorized into “Assessment Units”. These are areas that are in a similar condition and require the same form of management. They need not be contiguous. For the purposes of the workshop we used a standard areas of 50ha. This
The condition of the peat pre- and post- restoration must be stated, for the carbon savings to be calculated. There are four “condition categories” to choose from; Actively Eroding, Drained, Modified, Near Natural. Each of these categories has standard carbon emissions associated with it. Actively Eroding peat will have the highest emissions, and Near Natural the lowest. Over a 30 year period (the minimum contract length) a peat bog, undergoing restoration might change to an improved condition category e.g. Actively Eroding->Drained, Drained->Modified. The names of these categories are somewhat misleading. An actively eroding bog will not, after 30 years of restoration, become drained. The carbon emissions from that bog should have changed from a magnitude associated with an actively eroding bog, to a magnitude similar to that associated with a drained bog. According to the feasibility tool, 10ha of actively eroding peat will emit ~180 tCO2eq/yr while a drained peat bog will emit ~35 tCO2eq/yr. Such a project should save, through avoided emissions ~145 tCO2eq/yr and ~4350 tCO2eq over the 30yr contract length.

The condition categories were developed by DEFRA and the Crichton Carbon Centre. In this method vegetation is used as a proxy for water table, which is in turn used as a proxy for carbon emissions. This method was developed by analysing all the available data from direct measurements of greenhouse gas emissions from different types of peatland vegetation, and associated water table depth. This information was synthesized and standard emission categories developed. The Crichton centre developed this further so that the site types would apply more specifically to UK peatlands.

The feasibility tool is a spreadsheet with multiple pages, which take the user through the planning and costing of a project.

The first page is “Project Design and Development”. On this page the user stipulates the size of the project (area of land), the duration and the sort of work to be carried
out (“Actions required”), among other things. The actions required include details such as the number of drains to be blocked or gullies to be reprofiled etc. This part was filled in with assistance from the Peatland Action officer who had experience of restoration projects in the region. Potential grants are mentioned here as well as existing land uses and type of opportunity cost (grazing, forestry or sporting).

The participants decided on the project duration, opportunity cost and land use. The potential for grants was decided upon with advice from the Project Officer. Many of the other fields such as whether or not monitoring, staff and certification costs would be included were kept standard for all workshops.

The next page is “Project Costs”. In this page the actual costs for carrying out the work can be specified. The default values were used in most workshops unless the Project Officer suggested otherwise. In this section, the landowner could stipulate a profit per tonne of carbon to be gained on top of the project costs, in order for it to be worthwhile.

In the “Project Revenues” section the amount to be gained from grants and other subsidies can be specified. The default values were used in this section.

If you enter into a restoration contract, you agree at the outset that you will deliver a certain amount of carbon savings over the contract period. To account for the potential that the project does not go as planned, a buffer can be set up. This means that fewer emissions reductions are agreed upon than can be delivered, so that there is less chance of a breach of contract.

The output page shows the overall cost of the project, the potential income from grants and the remainder, which must be covered by a private investor through the Peatland Code. This shortfall is divided by the carbon savings accrued during the project to give the price per tonne of carbon that the project would need to secure from a carbon buyer (e.g. a corporate body taking voluntary action on its carbon footprint) to enable it to break even.
Landowners can organize their projects however they please, as long as the carbon benefits can be delivered. The feasibility tool is merely a guide. Once landowners have planned their projects and determined the cost, they must find a buyer who is willing to pay that price. The IUCN Peatland Code may help with this transaction, or a broker may be used.

Once the project has been signed, the landowner received the money for the contract period in advance, in one lump sum. They can then invest it as they please. After this point they cannot ask for more money if the project costs are higher than expected. They must also deliver the carbon benefits predicted, or they will be in breach of contract and will have to re-pay the buyer the value of the carbon that has not been saved.

Over 15% of the project cost must be covered by a private investor in order for the project to be considered additional. At the time of entering into the contract, the landowner cannot have already secured another source of funding such as SRDP funding, even if this only covers capital costs. In this situation funding through the code would not be considered additional.
5.3 Results

5.3.1 Problem trees

There are many similarities in the perceived causes and effects of peat modification in the different regions. Figure 9 summarises the problem trees from each region.

Causes

In all regions approximately half of the suggested root causes for peatland modification are linked to economic productivity. This link was not always made explicit although financial incentives are implied as many of the conflicting land uses are for financial ends. For example, drainage was stated as a root cause in all four regions and, while it was most likely carried out to improve the land for agriculture, this was not stated. Grazing pressure, mentioned in the Cairngorms, Dumfries and Shetland, is more obviously associated with increased financial gains. Thurso cited “intensive cultivation” as a root cause which may imply similar activities. Forestry was considered to be a cause in all regions except Shetland, were there are very few trees.

There was a strong sense that some of the causes were beyond the participants’ control, originating at a distance – whether this is far back in time, or in space. Atmospheric pollution leading to climate change or atmospheric deposition was mentioned in three regions (the Cairngorms, Dumfries and Shetland). The idea of past mistakes leading to current problems came through in all regions, although the particular past activity differed between regions. In the Cairngorms historic land use pressures were considered to be a cause while subsidies and government schemes were an issue in Dumfries. Peat cutting which had been quite important in Shetland in the past was put as a root cause. In Thurso they were less explicit about historical activities, saying that the “continuation of forestry monoculture” was a cause, implying a current problem with its origins in the past.

Effects

Water and wildlife were the only subjects that were mentioned in every region. In Dumfries 4 out of the 7 effects (57%) listed pertained to water flow or chemistry while
Figure 9 Summary of problem trees from each region. The letters accompanying each “root cause” denote the regions in which they were mentioned. C = Cairngorms, D = Dumfries, T = Thurso, S = Shetland. Those with no letters following them were mentioned in all regions.
this was the case for 5 out of 17 (29%) effects mentioned in the Cairngorms. A further 5 out of 17 of the effects stated in the Cairngorms related to wildlife or habitat. These effects were all negative or neutral, describing a change or a reduction in species and biodiversity. Some of the effects on wildlife were considered to be an impact of burning. Burning was written as a solution with its own specific potential effects. The effects resulting from burning were mostly positive. It was unclear whether this was intentional and understood by the other participants. In Thurso, they pointed out the reduced resilience of the habitat, as a result of modification.

A change in the productivity or economic capacity of the area was a theme that came up in three of the regions (Dumfries, Thurso and Shetland). In Dumfries this was simply the loss of grazing, presumably due to an expansion of bare peat, while in Shetland it was the loss of sheep in ditches and hags that was mentioned. In Shetland they also mentioned that more support was available for crofters if they improved their land for agriculture. Thurso had the most effects linked to production with 4 out of the 12 (33%) effects following that vein. These were mostly concerned with wasting a resource (the peat) although they did concede that forestry is more productive on a modified peat bog. The participants in Thurso were the only ones to speak of the effects on water in these terms, citing a reduction in aquatic productivity as a potential effect.

In most regions (all but Dumfries) there was some mention of the immediate effects on the peat, for example, bare peat, erosion, changes to the peat profile. In the Cairngorms upland path erosion was mentioned, which may reflect the touristic nature of the area – tourists were also mentioned as a cause of peat modification. Loss of heritage value was a concern in Shetland, where the peat landscape is perhaps more a part of their identity.

Potential solutions were put forward in only two of the regions; Dumfries and Thurso. Typical solutions such as drain-blocking and re-profiling were suggested in both regions, although this was much more the focus of participants in Dumfries. In Thurso the emphasis was placed more on integrated management and
communication. There was also a suggestion that it might be better to store carbon in woodland rather than peat.
5.3.2 Effects matrices

Re-vegetation

The effects of re-vegetating bare peat were only discussed in the Cairngorms, Dumfries and Shetland (Table 3). There was not enough time to go through both management options in Thurso and drain-blocking was considered most appropriate for the area.

Re-vegetating bare peat was the least controversial management activity of the two. Most of the comments, in all regions, were positive. The only comments that could be perceived as negative related to the economic impacts. In Dumfries there were questions asked about the effect of the work on annual payment (single farm payment) as, with this work, stock may need to be reduced, removed or excluded from certain areas. The capital cost of the work was mentioned in Shetland, while in the Cairngorms the concerns centred on changes in productivity – grouse numbers, stocking densities.

Not all of the economic impacts were thought to be negative, however. In Shetland it was thought that the quality of the livestock would improve with lower stocking densities and more vegetation cover. This sentiment was echoed in the Cairngorms where it was felt that there would be improved grazing for livestock, although a reduced ability to have livestock grazing on the land was also stated, as mentioned above.

In both Shetland and the Cairngorms there was a sense that the environmental health of the area was linked to social wellbeing. “Biodiversity” and “enhanced landscape” were put down as social effects in Shetland, while in the Cairngorms it was felt that re-vegetating bare peat would “heal landscape scars” and that this would have a social effect. In the Cairngorms this positive effect was thought to extend beyond the landowners themselves to the general public, improving public perceptions, community relations and providing a “good news story”. The peat bogs being easier to walk over was also mentioned, which may have been linked to tourism –
something that was mentioned in the problem tree and was mentioned explicitly in the Shetland workshop.

Environmental effects mostly focused on improvements to wildlife, vegetation and biodiversity. In the Shetland workshop a “landscape improvement” was mentioned. Carbon was only mentioned in the Cairngorms. Flooding was mentioned in Shetland but it was not clear whether the impact would be positive or negative. In the Cairngorms “water quality” was cited in each category – social, economic and environmental, illustrating that this is an important issue in the area.

| Table 3 Combined effects matrices from Cairngorms, Dumfries and Shetland, showing the perceived effects of revegetating bare peat |  |
|---|---|---|---|---|---|
| Revegetating bare peat | Effects | Who |
| | Cairngorms | Dumfries | Shetland | Cairngorms | Dumfries | Shetland |
| Economic | +ve and-ve effects on grouse | Annual payment? | Increased sheep production | Sporting estates | Hill farmers |
| | Improved grazing for livestock and deer | | Improved “condition” or quality of marketable livestock | | Crofters |
| | Easier access | | Cost | | Consumers |
| | Potential reduction to grazing | | Tourism | | Land managers |
| | Water quality | | | | |
| Social | Good news story | Improved aesthetic conditions | Landscape enhanced | All |
| | Heals landscape scars | | Biodiversity | |
| | Easier to walk over | | Tourism | |
| | Visual | | | |
| | Public perception | | | |
| | Community relations | | | |
| | Water quality | | | |
| Environmental | Stores carbon | Increased heather | Landscape improves | All |
| | Water quality | | Biodiversity | |
| | Stops erosion | | increase Biodiversity | |
| | Vegetation diversity | | increase Flooding | |
| | Biodiversity in general | | | |
The question of who would be affected by the different management practices was not touched upon in Dumfries and only superficially in Shetland and Cairngorms. In these latter two workshops it was only the economic effects that were considered to affect particular groups of people. These were sporting estates, farmers, crofters and land managers. Social and environmental effects were considered to affect everyone (Shetland) or no one was listed (Cairngorms).

**Ditch blocking**

The effects matrices for ditch blocking and re-vegetation in some regions are very similar and do not show effects particular to a form of management (Table 4). It might be that different groups of participants focused on different matrices and so listed more general effects of peatland restoration, rather than comparing the two forms of management.

In the Cairngorms, many of the effects of ditch blocking were linked to water. In the economic section, half of the effects involved water – lower treatment costs, better supply to users, reduced flooding. Impacts on grouse – reductions in chick mortality, more invertebrates for them to feed on – were also considered important. It was also felt that certain economies could be made by getting other work done while the diggers and machinery were already out on the hill. The social benefits were similar to those mentioned for re-vegetation (access, public perception), but with ditch blocking there was some concern about the changes to water regime on neighbouring land. The environmental benefits were positive overall, with much more of a focus on water benefits, as well as wildlife and carbon.
Table 4 Combined effects matrices from Cairngorms, Dumfries and Shetland, showing the perceived effects of ditch-blocking

<table>
<thead>
<tr>
<th>Ditch blocking</th>
<th>EFFECTS</th>
<th>WHO?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cairngorms</td>
<td>Dumfries</td>
</tr>
<tr>
<td>Economic</td>
<td>Water supply to users</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduced chick mortality?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less water treatment – chlorine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More insects for grouse (chicks)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other work while digger on hill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduces flooding/flash flooding downstream</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social</td>
<td>Better wildlife to see</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Changes to water regime on adjacent land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easier to walk across – more accessible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Educating the public</td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Wetter</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduces erosion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduces flooding</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Slows water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stores carbon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>More pools – increase in invertebrate numbers</td>
<td></td>
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</tbody>
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73
In Shetland, again, many of the effects were similar for the different management practices, but with a few more potentially negative effects. There was the same concern for sheep welfare, but while re-vegetation was perceived to have a positive effect on the quality of livestock, ditch blocking is thought to result in more sheep bogging and sheep death. The social effects were mixed. The same benefit of restoring the landscape was mentioned, but this time linking it to the cultural heritage of the area. It was felt that access would be impeded which contrasts with the feeling in the Cairngorms. It was stated that the water table would rise, but there was no indication as to whether this was considered to be a positive or negative effect. A higher water table would reduce grass for grazing but lead to more peatland vegetation and associated wildlife.

In Dumfries the economic effects were negative and associated with the health of livestock. Increased pooling can increase incidences of liver fluke, which can cause death in sheep. The social effects were mixed. As with Shetland it was felt that ditch blocking would make the land more boggy and difficult to walk across. Climate change mitigation was seen as a social benefit. The environmental effects were positive and all related to water – water quality and flood regulation. There was no mention of carbon or climate change benefits in this section.

The participants in Thurso produced a very comprehensive list of the potential effects of ditch blocking (Table 5). Many of the economic benefits relate to production capacity and these can be both positive and negative. Loss of timber income is mentioned a couple of times and the change in land use is considered to be a loss of habitat. There were also concerns that flexibility of land management options would be curtailed. There were, however, a number of positive economic effects perceived. As in the Cairngorms it was felt that fewer sheep would be lost in the drains. There were a number of comments indicating a benefit to the local community whether that be due to increased employment opportunities or more investment in the area. The potential for higher incomes for landowners, through carbon credits, and contractors, through more work, also came through. There was also a sense of developing the area
as a hub of expertise and research. The potential for reduced water treatment costs were also mentioned.

Table 5 Effects matrix from Thurso, showing the perceived effects of ditch-blocking

<table>
<thead>
<tr>
<th>Thurso</th>
<th>Effects of Blocking drains</th>
<th>Who?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic</td>
<td>Commercial planting, nature planting, loss of timber&lt;br&gt;Loss of habitat&lt;br&gt;Income from carbon credits&lt;br&gt;Reduced livestock losses in drain&lt;br&gt;Work for contractors&lt;br&gt;Loss of timber income&lt;br&gt;Loss of future land mgmt. flexibility&lt;br&gt;Commercial trees decrease in yield&lt;br&gt;Reduced water treatment costs&lt;br&gt;Build capacity in restoration expertise&lt;br&gt;Reduced tick burden&lt;br&gt;Local employment benefit – doing work&lt;br&gt;Funds for local community&lt;br&gt;Opportunities for research&lt;br&gt;Allows govt. land to contribute to rural economy e.g. tourism, fisheries&lt;br&gt;Income for landowners users&lt;br&gt;Work for contractors</td>
<td>Loss of productivity for graziers&lt;br&gt;More difficult ground to walk over&lt;br&gt;More soft ground to lose stock in&lt;br&gt;Contractors&lt;br&gt;Landowners&lt;br&gt;Farmers&lt;br&gt;Interested public (v. wide)&lt;br&gt;Universities&lt;br&gt;Stalkers (reduced access)&lt;br&gt;Landowners and the public interest&lt;br&gt;Water companies – reduced treatment cost&lt;br&gt;NFE&lt;br&gt;Timber industry&lt;br&gt;Timber haulage&lt;br&gt;Commercial offsetting for corporations&lt;br&gt;Community enterprise&lt;br&gt;National reputation</td>
</tr>
<tr>
<td>Social</td>
<td>Improve experience of flows&lt;br&gt;Restoration of landscape character&lt;br&gt;Change in pattern of employment&lt;br&gt;Loss of work places&lt;br&gt;CSR</td>
<td>Local residents&lt;br&gt;Local/rural workforce economy&lt;br&gt;Future generations&lt;br&gt;employment</td>
</tr>
<tr>
<td>Environmental</td>
<td>Improved salmonid conditions&lt;br&gt;Reduce bank erosion&lt;br&gt;Increase juvenile salmonid stocks&lt;br&gt;Erosion control&lt;br&gt;Restore 7000 yr. old habitat, undamaged in other ways&lt;br&gt;Climate benefit&lt;br&gt;Water quality benefit (2 people said this)&lt;br&gt;Increase productivity for waders&lt;br&gt;Habitat improvement&lt;br&gt;Restoration of hydrology&lt;br&gt;Slowing run off/ sedimentation&lt;br&gt;Wildlife benefit – birds aquatic invertebrates, water voles, plants&lt;br&gt;Improve bog habitat</td>
<td>Land audit&lt;br&gt;fishermen</td>
</tr>
</tbody>
</table>
The social benefits were similar to those mentioned in the other regions i.e. restoring the landscape character, improving the experience of the area. Employment was mentioned again – both in a neutral sense, acknowledging the changes that might occur, and in a negative sense, perceiving a reduction in employment. The environmental benefits were overwhelmingly linked to improvements in water chemistry and hydrology, with 6 of the 12 effects listed being linked to water. Salmonid stocks were mentioned a number of times as was water quality in general. The other effects mentioned were to do with wildlife, climate and restoring what is considered to be an almost pristine environment, with historical importance.

When it came to listing who would be affected by blocking ditches in peatland areas, participants in Shetland, Dumfries and the Cairngorms tended to list quite local groups of people – farmers, tourists, land managers. In the Cairngorms they mentioned fuel suppliers and carbon credits trackers as being affected economically.

In Thurso the list was quite extensive – although, as with all of the regions, it was mostly for the economic effects that people were listed. Land managers, farmers, graziers, stalkers were all thought to be impacted by the work, as was the case in other regions. The timber industry and haulage companies were mentioned as were water companies. Universities were listed – presumably being affected by the increase in research in the area. The public interest was quite a strong theme and the national reputation was also mentioned. Although these groups were in the economic category, implying that they would be affected by the economic implications of restoration, it is difficult to tell if this was intentional in all cases. For example the wider public was considered to be affected by the economic impacts, but not the environmental impacts.

Future generations were thought to be affected by the potential social effects of restoration work, as were the local residents and the local workforce.
5.3.3 Story telling

The story telling took place before looking at the feasibility tool and the discussion of a fair price for doing the work. This exercise was intended to allow the participants time to consider their values and think about why they, and others live and work in these areas and what aspects are important to them.

The Cairngorms

In the Cairngorms there was only time to hear from one person, an estate owner, but many of the themes that emerged were reflected in discussions throughout the workshop.

“This is all about custodianship... It’s all about sustainability. It’s about handing over something in a better state than what you were lucky enough to get it at.”

There was a strong sense of duty and responsibility, as well as a feeling of pride associated with the estate and its management. Contrasting with this sense of pride, there was a recognition of the negative image of landowners due to past behaviour, and some anxiety at being blamed for the poor management of peatlands:

“That means you’re a bad land manager and you’ve caused it”

“And immediately deer get blamed – why not? They get blamed for everything”

Land reform was mentioned and this seemed to contribute to the feeling of blame and perhaps injustice. The consultation on land reform had just come out and the image presented of a landowner was one he did not recognise. It is unclear whether this consultation identifies a new breed of landowner to which he does not belong, or whether landowners have simply been misrepresented.

There was a strong sense of integrity, of right and wrong, and perhaps this was where the feeling of injustice arose.
“I believe passionately in doing what is demonstrably right to address bad practice, which is demonstrably wrong, and not what is just expediently wrong”

This also fed into a frustration with the scientific community and a feeling that there was not enough communication between the scientific and land managing communities. The mistaken advice and policies of the past were mentioned and there was some frustration with current policies and their short term, single interest vision.

Another idea that came through was the need to be an active land manager, not leaving the land to become wilderness, but still being interested in improving its environmental condition.

“And why I’m interested in peatland restoration is because I believe in intervention.”

Dumfries

In Dumfries there was time to hear from two people, both estate owners.

Participant 1

This participant told the story of how he had inherited the estate and how he came to be in his current situation. Their attitude to the estate was much divided and illustrated some common issues for land owners: a pride and a joy in the land, coupled with a huge financial burden and responsibility to keep it going, both for oneself and one’s family as well as one’s tenants.

There was the same sense of responsibility and duty described in the Cairngorms, but the responsibility had not been taken on by choice.

“The only one with the resources to inherit it, let alone keep it…I drew the short straw”

“Has it been an asset or a millstone?”
This reluctant responsibility is accompanied with a dogged determination; the term “hang on in there” was used a number of times.

At the same time, owning and managing the estate is described as “a huge privilege”. The idea of ownership seems to be a big part of this and perhaps a sense of identity that that conveys:

“Can see five kingdoms from up there”

“To be master of all you survey is a wonderful thing”

Participant 2

Participant 2 also told the story of how he became an estate owner although this story was much less conflicted. There was an acceptance from the onset that this was not a lucrative occupation.

“You never become an estate owner through financial reasoning”

The overarching theme was a love and care for nature and a desire to improve the land and to contribute as much as possible to the preservation of the environment.

“Despite the rain we live in the most amazing place”

“I love creating all the different habitats”

“I cannot save the rainforest in Brazil but I can do something on the 800 acres that I have at the moment”

“I think it’s doing what you can against the onslaught of mass destruction”

There was, however, a very strong sense that the estate has to function in a commercial sense because, without that, one loses the power to do anything at all. There was, again, the mention of land reform and a concern that that power might be taken from them.
After the two stories there was some discussion from the rest of the group, echoing these sentiments. There was a feeling that the life they lead and the jobs they do are not easy and that they are perhaps undervalued, or at least misunderstood.

“A lot of people’s concept of a farmer is someone who’s been born and bred on that farm and given a silver spoon at birth and never had a problem since. This is far from the truth. It’s a very rugged, determined group of people that have stuck to the land and created what it still is now”

Thurso

In Thurso there was time to hear from two people. Participant 1 was a reserve manager for the RSPB, Participant 2 was a crofter and businessman.

Participant 1

The overarching idea that came through in this story was a love and care for nature and an appreciation for a landscape that has largely been left untouched. The pristine wilderness of peat bogs in the region was commented on a number of times as was the rarity of these qualities in a small and crowded island.

Combined with this, the esoteric quality of peat bogs was discussed. The participant described how his perception of the flows of Caithness changed from one of an “alien” and “strange” landscape to one that comes “alive” once its age and complexity is understood.

“You’ve got to understand a bit how it developed, why it looks like that…how it got there and how old it is…you’ve got to have a perception of that before you can appreciate them fully”

The story finished with a comment on the people living and working in these areas and that the communities, as well as nature, is part of “what is special in life”

Participant 2
Participant 2 considered his role to be one of balancing the incomings and outgoings of his holding, while improving the environment or habitat. Without an improved environment and the ability to “pass it on, to whoever, in good heart”, he felt he would have “failed”. This illustrates a very keen sense of duty and responsibility to the environment.

Underlying this was an assertion that the croft and business “has to survive financially above all the other principles” so that the environmental improvements can be made. Through this discussion some interesting perspectives on the public good and improved habitat emerged. It was felt that the public would not like a wild and untidy looking landscape and that agricultural activity of some sort was required to maintain the land in good condition, looking “as though it’s worked on” and with a diversity of habitats.

There was also an understanding of the need for environmental reparations, and a perception that they were the ones with the knowledge, understanding and skill to do it and do it well:

“I do feel I am probably a better steward than a public organisation because I have a heart, I have a stake in it”

“Because I’ve been there a long time, so know how it changes. I’ve seen it for a long time now”

The idea of public image and, perhaps, blame came through with the discussion of subsidies; “I can easily defend receiving a subsidy” and there was a very clear message that stewardship would be taken on willingly, but fair remuneration was necessary.

Shetland

In Shetland there was time to hear from two people, both crofters.

Participant 1
In Shetland there was a strong sense of heritage and identity tied to hill sheep farming, to the extent that stock removal was not an option and it was felt that the debate should be more about stock density, breed and exact location.

"The hills have to have sheep, because this is the one and only place where you find the Shetland sheep”

The value of the sheep, as an asset that is ancient and unique to the Shetlands was emphasised but there was a recognition that a balance must be struck between grazing and preserving the landscape.

There was a strong sense of pride associated with Shetland lamb and wool and a desire for these products to gain the respect that they deserve, something that does not happen at present.

The idea of restoring peatlands was welcomed but there was a concern that this might interfere with the traditional way of life on the hills.

“I wouldn’t want something that was going to create purely a museum piece of the hills of Shetland. The hills of Shetland have always been used…and abused. Maybe this would give a way of using the hills in a better way”

Alongside these values, and maybe because of them, there was a keen sense of using the distinct characteristics of Shetland produce to better market them and “enhance the value of a, potentially, smaller crop”. It was felt that this might be a way for their livelihoods and the environment to survive.

**Participant 2**

The same sense of identity and pride associated with sheep farming came through in this story; “Shetland men have sheep”. The participant was primarily interested in animal husbandry and wanted to produce good quality sheep. They had noticed a reduction in the quality of sheep that they linked to higher grazing pressure, bare peat
and, as a result, insufficient food for the sheep. With this in mind there was an interest in peatland restoration, and a hope that it would improve conditions for sheep.

Crofting was described as a way of life and a way of tracking the pattern of the years.

5.3.4 Feasibility tool discussion
There were a number of discussions during the afternoon going through the feasibility tool.

Carbon savings and the invisible crop
Quite a lot of the discussion centred on the potential carbon savings and how they were calculated and monitored. These were difficult concepts to explain because, as was re-iterated in every workshop, the land will “look pretty much the same, but with an extra 90 tonnes of carbon in it”. There were two parts to this problem. First, there was a general suspicion of the methods for estimating current and future emissions from peat bogs, especially as there would be no obvious difference in the bog. The second part of the problem was that there was felt to be no clear idea of what the ultimate aim of restoration was:

“Have you got any figures to say what was there, what we’ve lost and what we’re trying to get back to? Because I think it would be quite useful to know what we’re trying to achieve”

There was also some disappointment and incredulity at the realisation that, even a large and successful project may not sequester carbon over its lifetime and may only avoid emissions.

In the Cairngorms, especially, and in other regions, to a lesser degree, there was some argument over the use of terminology. Having “near natural” as the end point, with the lowest emissions, implies that peat hags and some drains do not occur naturally. Many land managers feel that they are blamed for what is, in their eyes, a natural phenomenon. The fact is that, in some of these areas, there is not enough information to determine whether some hags are natural or not.
**Timescale**

The project length was an issue with some and not with others. There were a number of concerns about a minimum 30-year contract length. Chief among them was the fear of missing out on future grant opportunities. This was linked to a general mistrust of policy makers and a recognition that trends in grants and government aims change fairly frequently. Another cause for trepidation was the idea of tying future generations into a contract and a form of management they may not agree with. There was some anxiety that the investors may go bankrupt within the 30 year period, and that the land owners would not get paid. The knowledge that they would be paid for the project upfront assuaged some of these financial concerns.

In contrast, there were some who felt that a guaranteed income over that period of time was a good opportunity, especially since the land in question is often not terribly productive. The argument was also put forward that such an agreement was no different to forestry or property, and was in fact more favourable as some other activities could still continue on this land, unlike in the afore-mentioned examples.

**Subsidies**

In all regions, the question of Single Farm Payment (SFP) and how this would be affected by grazing restrictions, came up multiple times. There was a consensus that, if there was a chance of losing this payment, they would not consider entering into a peatland restoration project. In Shetland it was felt that the profit per tonne of carbon would have to be comparable to the SFP in order for it to be worth entering into the scheme.

Across the regions there was a difference in the attitudes to the potential subsidies they might receive for restoration projects. In Shetland they admitted they felt “pessimistic about SRDP”. Receiving grants to help carry out the restoration work has significant implications for the viability of the project and the hopes of making a profit. Without the grants, the capital costs can be expensive to the extent that the price of carbon that is necessary to cover the project costs is unfeasible. This is especially true for ditch blocking where the carbon benefits are lower.
Risk

In each region, the attitude to the scheme changed considerably when it came to discussing the risks involved. The anxiety arose when the participants realised that, if they were to enter the scheme, they would be contractually obliged to deliver the predicted carbon savings. This brought back the misgivings about the method for predicting and monitoring changes in the carbon balance of peatlands. There were fears that, with new scientific discoveries, recommended management may change and the predicted outcomes of restoration would be completely wrong. Some participants had doubts that restoration was even possible in areas with extensive bare peat.

In the feasibility tool a percentage of the carbon savings can be removed and placed in a “buffer” to account for problems with the project and the subsequent inability to deliver all of the carbon that was promised. The idea is that one assesses the likelihood of certain eventualities e.g. wildfires, and removes a proportion of the carbon savings to account for that. During the workshop, each group looked at potential risks and decided how likely they were to arise. There were regional differences in what was considered a high risk. In Shetland the main concern was flooding and landslides, with one participant commenting “you may as well leave it all until you get to extreme weather”. In Thurso, participants mentioned the risk of atmospheric deposition damaging the vegetation. In Dumfries there was a fairly low perception of risk, while in the Cairngorms there was lower risk associated with ditch blocking than with re-vegetation.
Profit and Price of Carbon

The results of the fair price deliberation can be seen in Table 6 and Table 7 a, b, and c. The desired profit per tonne of carbon varied between £2 per tonne (Thurso) and £3.50 (Shetland). In the Cairngorms they were willing to enter into a 30 yr contract with no profit, but would require £3 profit to make a 50 yr contract worthwhile. These differences are because in the Shetlands the profit was based on a need to be earning close to £50/ha/yr in order to compete with the single farm payment, while in the other regions it seemed to be more a case of balancing out the profit and the resultant carbon price. They were all aware that they were unlikely to get an investor at a price of more than £15 per tonne of carbon.

| Table 6 Feasibility tool choice leading to the price of carbon in the Cairngorms |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Time                           | Re-vegetation   | Ditch-blocking  |
|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 30                             | 30              | 50              | 50              | 30              | 30              | 50              |
| Carbon saved                   | 28,950          | 28,950          | 53,250          | 53,250          | 3,000           | 3,000           | 8,650           |
| Capital cost                   | 214,018         | 214,018         | 214,018         | 214,018         | 10,500          | 10,500          | 10,500          |
| Risk                           | 23              | 23              | 23              | 23              | 19              | 19              | 19              |
| Profit                         | -               | 3               | 3               | 5               | -               | 3               | 3               |
| Opportunity cost: Sporting     | 30,000          | 30,000          | 50,000          | 50,000          | 30,000          | 30,000          | 50,000          |
| Subsidy                        | 20,000          | 20,000          | 20,000          | 20,000          | 30,500          | 30,500          | 30,500          |
| Cost of C                       | 12.29           | 16.58           | 11.84           | 14.70           | 10.78           | 20.40           | 14.86           |
| Opportunity cost: Grazing      | 60,000          | 60,000          | 100,000         | 100,000         | 60,000          | 60,000          | 100,000         |
| Subsidy                        | 40,000          | 40,000          | 40,000          | 40,000          | 50,500          | 50,500          | 50,500          |
| Cost of C                       | 12.74           | 17.03           | 12.58           | 15.43           | 20.44           | 24.51           | 19.14           |
Table 7 Feasibility tool choices leading to the price of carbon in a) Dumfries, b) Thurso and c) Shetland

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<thead>
<tr>
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<th>Dumfries</th>
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<tr>
<td></td>
<td>Re-vegetation</td>
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<td>Time period</td>
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<td>50</td>
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<td>Carbon saved</td>
<td>28,950</td>
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<td>3,000</td>
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<thead>
<tr>
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In each region there was a Peatland Action project officer, or a member of the community with experience in restoration projects. They helped to determine what sort of work would, typically, be needed. As a result, the capital costs vary quite considerably. The carbon savings are fairly standard, however, as we used a standard area. For this reason, the profit that could be charged differed in each region. With a £2 profit, the carbon price in Thurso for a re-vegetation project was £15.65, compared to £11.18 in Dumfries with a £3 profit.

The opportunity cost had a significant impact on the cost of carbon in the project. Default values were used in the workshops and these were as follows: Grazing - £40/ha. Sporting - £20/ha, Forestry - £100/ha. In most regions grazing was used as the opportunity cost. In Dumfries and the Cairngorms, it is likely that both sport and grazing would be impacted, but it is difficult to tell to what degree. The metrics for forest to bog restoration have not been calculated. As it was not possible to calculate the carbon savings due to this restoration, we did not look at forestry as an opportunity cost, although this would be the most likely scenario in Dumfries and Thurso. In Shetland grazing is the only possible opportunity cost (of the three options), but because both the inputs and the potential revenues from sheep farming are likely to be very different in this region, the default values would probably not apply.

The carbon benefits from ditch blocking are not sufficient to outweigh the project costs and so result in a carbon price that is probably prohibitively high (£15<). The Cairngorms is the only region in which this was not the case, and that was only if sporting rights were used as the opportunity cost. Projects with a mixture of ditch-blocking and re-vegetation, a situation which much better reflects reality, can balance out the high carbon savings of restoring bare peat with the lower savings possible from drained peat.
5.4 Discussion
An essential part of a successful PES scheme is engaging stakeholders (Turner & Daily 2008, Hubacek et al. 2009). In this case there was a need to talk to landowners and managers in particular as they would be carrying out the work and deciding whether to enter their land into the scheme. At the end of the workshops, the attendees were asked if they would be interested in pursuing the idea of entering into the scheme any further. They all said no.

The introduction set out two things that were needed in order for landowners and managers to get involved and for the work to go ahead. There needed to be a willingness and an ability to do the work. The workshops were designed to address these issues and to indicate incentives and barriers to restoration. As such, this discussion will consider the workshop sessions, assessing their effectiveness and discussing the lessons learnt before drawing conclusions and making some recommendations.

5.4.1 Causes and effects of management
In the introduction, the importance of defining the problem and ensuring that there is some agreement over the scope of the issues to be discussed, was identified. From the problem trees one can see that there is some agreement that attempts to increase productivity, whether that be forestry or sheep farming, have led to peat modification. There also appears to be an agreement that this modification has been negative for the environment. The effects matrices, presented a similar understanding, but with more detail. The effects mentioned in all regions include reductions in biodiversity, poor water quality and reductions in productivity. The consequences of restoration management were largely thought to be positive. Both ditch blocking and bare peat restoration were thought to have positive environmental effects. These perceptions are largely supported by the literature (see Chapter 1), although in reality the combination of current and historic management practices, as well as local and global environmental conditions interact in complicated ways (Holden et al. 2007).
The effects matrices did identify areas of concern which were not addressed in the workshop presentation and which were, perhaps, a little more controversial. The perceived social and economic impacts of restoration management were mixed and there was less consensus across the regions about the desirability of these effects. Of particular concern, in all regions was the impact on livestock, particularly the welfare of sheep, and grouse productivity. There has been very little research into either of these topics.

The main concerns for sheep welfare were increased numbers of sheep lost in newly wet bogs, increased incidences of liver fluke and a reduction in suitable vegetation for the sheep to feed on. There is some evidence to suggest that fewer sheep would be lost in restored bogs, as the dams provide crossing points and the open drains themselves were dangerous (IUCN 2011). There is little research on the impact of restoration on liver fluke. The liver fluke parasite (*Fasciola hepatica*) is most commonly transmitted through the freshwater snail *Lymnaea (Galba) truncatula*. The increased presence of this snail, and the liver fluke parasite has been linked to milder wetter winters caused by climate change (Rojo-Vázquez *et al.* 2012), but was also linked to the development of small wetlands through an ESA scheme in East Anglia (Pritchard *et al.* 2005, Blackwell & Pilgrim 2011). While there are a few studies providing some evidence of correlation, there is not enough to be in any way conclusive.

Draining moorlands does not, in fact, improve vegetation for sheep or grouse (Stewart & Lance 1983), and more recent research has shown that blocking drains does not have a detrimental effect on grazing for sheep (Wilson *et al.* 2011), but that these regions cannot support large populations – whether drained or not (Holden *et al.* 2007). It is, however, important to stress that very little research has been carried out on this topic, and so the effects on grazing remain largely unknown. There were concerns expressed during workshops that grouse chicks may be lost in blocked drains, but also the opposing theory that dams will provide crossing points. It was suggested that restored bogs will have richer communities of invertebrates for grouse chicks to feed on. However, there does not appear to be research to support or refute
any of these claims. The study by Stewart and Lance (1983) mentioned earlier, concluded that grouse populations did not increase as a result of drainage. It is not possible to comment on the implications that drain-blocking has on grouse populations, however. These issues are particularly important to landowners and managers. In order to persuade these stakeholder to take part in peatland restoration projects a clear understanding of the implications for their land is needed.

One of the potential effects of restoration, and one that was mentioned in workshop discussions, was an improvement in public perception of the area in question, and of landowners and managers. There has not been a great deal of research into public perceptions of peatlands. In workshops carried out with the general public in Aberdeen (Martin-Ortega et al. 2014), participants initially stated that they had little knowledge or experience of peatlands. In subsequent discussions, peatlands were described as “wasteland” or as “threatening” but were also considered to be important to Scotland’s image and identity. Another workshop, that was part of the same study, was carried out with communities in Lewis (Byg et al. 2015). The use and value of peatlands was more readily recognised in this area. It may be that local communities appreciate peatland restoration, but that communities further afield will be less aware of them. Peatlands are remote and inaccessible and public perception of landowners and managers may not alter a great deal as a result of peatland restoration. As mentioned previously, there is little research on this topic. There may be a stronger case for peatland restoration, if one could show that this was considered favourable by the general public.

These sessions also indicated some differences in the priorities of landowners and managers, and those of policy makers and researchers. The majority of the comments regarding the environment, throughout the workshops, were to do with water flow and chemistry, and biodiversity. Water was considered so important it was discussed in relation to social and economic effects. Water benefits do not appear to be the focus of funding schemes, however. The implications of peatland restoration for land
management were also mentioned frequently as a concern but, as has been discussed previously, there has been little research on these topics.

Carbon was mentioned rarely in the early sessions, when considering environmental benefits, and in later discussions was commented on with some scepticism. Much was made of the intangible nature of carbon, making it difficult for landowners to judge for themselves the success of their work, and to feel any pride in what they are doing. The method used to predict and monitor the delivery of carbon benefits was often questioned and was the source of some unease. Given that the Peatland Code is primarily focused on carbon benefits, there appears to be a mismatch between the emphasis of the Code and the priorities of landowners and managers who rarely mentioned these benefits as a motive for management activities. Focusing on this area of research, and this particular ecosystem service makes sense in terms of influencing national and global policy, and generating funding through schemes such as The Peatland Code. This focus may be a problem, however, if it reduces the engagement of stakeholders.

Although the problem tree and effects matrices showed a broad consensus in terms of the causes and effects of management practices, some of the comments in the more discursive sessions indicated different opinions of what is meant by “good environmental management” or “natural”. Such differences in perception have the potential to be problematic if not fully understood (Mostert et al. 2007). Stern (2000), in their theory of environmentally significant behaviour, incorporate the new ecological paradigm (Dunlap et al. 2000), with Schwartz’s value theories (Schwartz 1977, Schwartz 1992). In doing so, they introduce an element that concerns the individual’s perception of humanity’s relationship with nature. They suggest that this “ecological world view” is part of a belief system which is likely to influence behaviour. A better understanding of the “ecological world view” of landowners and managers may help policy makers to understand and influence behaviour.
5.4.2 Storytelling

Narrative techniques are thought to be a good method to use in group settings, to help people to share values, bond over these shared values, and understand each other’s perspectives (Robertson et al. 2000, O’Brien 2005). This aspect of storytelling has particularly been used in contexts where decisions about the land in questions must be made as a community (Schusler et al. 2003, Stewart et al. 2013). In the case of these workshops, and the Peatland Code, a group consensus was important because there was a desire to avoid a situation where landowners and NGOs were undercutting each other in order to get funding, and also because larger schemes involving a collaboration of landowners were considered favourable. In all workshops, the storytelling appeared to encourage reflection and there were nods of assent as participants recognised or agreed with aspects of the story. This was particularly the case in Dumfries where the stories told provoked further discussion which seemed to engender a feeling of bonding. This technique has been used in other ecological restoration settings, and has been effective in encouraging a compromise between a purely ecological outlook, and maintaining more human or cultural elements of a landscape (Stewart et al. 2004, Stewart et al. 2007). During these workshops disagreements between policy makers and scientists were mentioned. Greater use of this technique, with a wider range of stakeholders, may encourage greater empathy and understanding.

Narrative techniques such as storytelling can help people to articulate deeply held or intangible values. As such, they have been mostly used in the valuation of cultural or non-material ecosystem services (Satterfield 2001, Chan et al. 2012, Satterfield et al. 2013). Many of these studies have been conducted with indigenous communities, and often these narratives take the form of life stories, or the history of the place in question (Barkley & Kruger 2013). This was also the case in these workshops, even though the prompt given was more broad in scope - to tell a story that illustrated what was most important to them about their relationship with the land. This may be because, without preparation, a life story is an instinctive story to tell, or it could be
that their attachment to the land is linked to the lifetime spent there. During this exercise many of the values and themes that emerged related to heritage, legacy, and identity, lending credence to the second hypothesis. A sense of duty and responsibility to look after the land also came through, as well as a love and care for nature and the environment.

Emotions and themes such as blame, struggle and survival also emerged from the stories told. These may be partly due to current discussions about Land Reform, but may also be linked to identity, as there was a sense that many generations of landowners and managers had weathered changing situations and had still “stuck to the land”. Alongside these themes of struggle and survival, was often a mention of more practical concerns – the need to have a commercially viable business. These stories, therefore gave some insight into the various considerations that are taken into account when making land use decisions. There seems to be a process of balancing pragmatic and emotional factors. Understanding this balance may be key to explaining the negative response to involvement in the PES scheme, and developing successful environmental schemes and policies in the future.

The intention of the storytelling exercise was to help participants to articulate more intangible values, to facilitate sharing and bonding over these values and to set up the judgement context for the fair price deliberation. This method was successful in terms of value articulation and sharing. There was only time for one or two participants to share their stories, however. Although there appeared to be agreement from the rest of the group (as discussed previously), this is not enough to get a full understanding of the factors affecting decision-making, or to develop a clear idea of the range of values held by stakeholders.

5.4.3 Feasibility tool and fair price deliberation

When it came to the fair price deliberation, the price of carbon ranged from £11.18-£15.65 for re-vegetation, and £20.44-£34.92 for ditch blocking. These prices were certainly lower than those of the Pilot Peak District workshop, and the carbon prices of the MoorFutures PES schemes in Germany which range from £29.67-£56.76 (€35-
However, these projects were set up differently and refer to different restoration requirements and so cannot be directly compared. The profit margin chosen in each region in this study, ranged from £2 per tonne of carbon to £3.50 per tonne of carbon. The profit margins chosen in the Peak District were cited in £/ha, and so a meaningful comparison cannot be made in that respect either.

Participants were aware that there was a theoretical £15/tC limit to the feasible price of carbon. This was mentioned during the discussion about the Peatland Code, and is based on market research and comparisons with the Woodland Carbon Code. During the deliberation over the fair price, participants would re-visit the profit margin, altering it until the final carbon price was more realistic. This showed a willingness to reduce their own personal profit in order to make sure the project was possible, but also a desire to maximise their own profits, within this remit.

Although there were many factors to consider in the project set-up, and there was the mechanism to change these in the feasibility tool, these were not explored in detail as there was not enough time. As a result many project elements such as whether to pay for a management plan, whether to include maintenance costs as part of the project costs, the combination of opportunity costs etc. were kept fairly standard. Participants were not, therefore, making a fully informed choice, and did not have the chance to explore the implications of carrying out a restoration project fully.

In all of the workshops the enthusiasm for peatland restoration dropped when the terms of the contract were discussed. There was considerable apprehension at the thought of being committed to deliver a certain amount of carbon. This brought out considerable concerns about carbon, how it is measured and how savings will be predicted. At this point participants started to question whether restoration was actually possible, and to express doubt in the ability of scientists to predict carbon savings. With an uncertain understanding of carbon in peatlands, and a less innate appreciation of its value, landowners are asked to trust the judgement of scientists and policy makers. These are groups for whom they have expressed some misgivings.
There was considerable concern that carrying out peatland restoration, through the Peatland Code, and changing their existing land management practices accordingly, would prevent them from receiving their Basic Payments. This payment provides a base-line income to farmers. The potential loss of this payment was enough to put some participants off the project entirely. Despite the fact that there was a policy expert at each workshop, there was some confusion about the policy regulations and it was not possible to say with certainty that Basic Payments would not be affected. The 30 year contract length was also problematic. In this case the issue is that landowners and managers would like to maintain a degree of flexibility in their land management so that they, and future generations can adapt to future changes in policies or markets or, indeed climate.

The feasibility tool provided a quick way of planning a project and allowing participants to make choices about the project set up. It also provided a structure for discussions about various aspects of the project that might be of concern. This session highlighted the high perception of risk associated with this scheme. These risks were related to the policy situation, the methods for measuring, monitoring and predicting carbon savings and the long time commitment required by the code. The process of choosing profit margins indicated a desire to ensure that projects were feasible, and so not too expensive for investors.

5.4.4 Conclusions

In the introduction it was suggested that, a willingness to get involved was thought to depend on an understanding of the consequences of certain management practices for nature (AC) and a feeling of responsibility to act in such a way as to reduce negative consequences (AR). The problem tree and effects matrices sessions showed a good understanding of peatland ecosystems and the effects of different management practices on their health. One of the main threads running through the “Story telling” was a care for the environment as well as a feeling of duty and responsibility to be its custodians. These points would indicate that an understanding of consequences and a feeling of responsibility to act was present.
Aspects of the discussions throughout the workshop, and the storytelling exercises indicated that there might be a difference in what landowners and managers perceive to be a good environmental condition, and what this means to policy-makers and scientists. There is a lot of overlap in these perceptions, so they may be out of phase with each other, rather than completely different.

An important element component of AR is believing that one’s actions will produce a result. The feasibility tool session showed that many participants had doubts about whether restoration was possible, and that the benefits could be delivered. There was also some doubt that the policy system would enable them to take part in such projects without jeopardising their business.

The workshop method was effective in that it gave some understanding of the balance of factors that landowners consider when making decisions, and highlighted particular barriers and areas for future research.

5.4.5 Recommendations

Greater efforts should be made to understand the balance of values, priorities and practicalities that come into play during land management decision-making processes.

More clarity regarding the policy situation would enable better co-ordination of funding options, which may help to allay some fears.

Research should be carried out to enable the inclusion of forest-to-bog restoration in the Peatland Code. Such projects are expensive and so would greatly benefit from the extra funding option.

The evidence for the impacts on water regime are, at present, a little unclear. This means that it is not possible to calm concerns about negative impacts. It is also not possible to use the water benefits of restoration as a way of gaining support for these schemes. With such obvious interest and concern about the water environment, this seems like a wasted opportunity.
6 Qualitative analysis of stakeholder values and priorities regarding land management

6.1 Introduction

The workshops presented in Chapter 2 revealed a number of issues that need to be addressed in order to facilitate participation in peatland restoration. Some of these were related to the specific set up of the Peatland Code, but many of them had broader relevance to debates over the feasibility and potential role for Payments for Ecosystem Services in incentivising changes in land management.

One of the findings from Chapter 2 was the presence of a disconnect between the focus and priorities of different stakeholders in the landscape. During the workshops it became apparent that there was a difference in perception of what it means to a landowner or manager to care for the environment and manage it responsibly, and what this means according to policy makers, environmental organisations and researchers. Although there appeared to be consensus over the causes of degradation and the need for restoration, there were comments that indicated different opinions over the details of restoration and subsequent management. Synchronicity, or at least understanding, of the way different groups frame natural resource function and use has been shown to be an important factor in the success of land-based projects. Dewulf et al (2005) have written about the potential for win-win solutions to management problems, if these different frames are recognised, while Mostert et al (2007) describe a number of water resource management projects in which an understanding of the different perceptions of the resource and its management were central to project success.

This difference in perspective is more pronounced when one considers the priorities and concerns of landowners and managers, compared to the focus of peatland research so far. Workshop participants mentioned water and wildlife repeatedly, and potential effects on sheep welfare and grouse moor productivity as concerns. However, much of the research on peatlands is related to carbon dynamics, while
there is very little about the management implications of restoration (Bain et al. 2011). Kusmanoff et al (2016) argue that the framing of PES research and payment schemes may account for mixed success in engaging rural landholders in conservation initiatives (e.g. (Posthumus et al. 2010, Prager & Posthumus 2010). They argue therefore, that a more in depth look at the frames through which landowners and managers view their environment, and the consequences this has for their management choices, may help to influence research and tailor environmental policy (Kusmanoff et al. 2016).

Participants were also able to articulate and share some deeply held values during the workshops. Kenter et al (2015) describe the different types of values that someone might hold for a place. They distinguish between transcendental; guiding principles, often linked to end states or goals and contextual values; opinions about worth or importance often linked to preference or attitude. In the workshops, themes such as custodianship, a sense of duty and a feeling of responsibility to care for the environment emerged which could be thought of as transcendental values, which then related to the contextual value evident in the stated need for restoration. Themes such as blame, struggle and survival also emerged, which could be thought of as the transcendental value of security. The above-mentioned issue of different definitions of “good environmental management”, could be linked to contextual values about the landscape. When viewed through this framework, one can see the decision of whether or not to commit land to restoration, not only involves deliberation over costs and benefits, and beliefs and values, but also an understanding of different types of values and their interactions. The workshops hinted at these complex interactions of values, but there was not the time to explore these in depth, and it was not the aim of the study.

Interviews were conducted with landowners and managers before the workshops in each region. The intention of the interviews was, initially, to inform the workshops, to persuade participants to attend and to triangulate the workshop findings. As the interviews progressed some of the themes identified above began to emerge, without
prompting, and as the workshops were carried out, it became apparent that studying these issues may be important in order to understand attitudes to peatlands restoration, as well as other management choices. This work presented in this chapter therefore intends to:

1. Triangulate findings from the Chapter 2
2. Look in more depth at the perspectives of landowners and managers regarding peatland landscapes and how they should be managed
3. Determine the priorities of landowners and managers and analyse the different types of values that these ecosystems inspire.
6.2 Methods

Interviewees were identified and contacted as described in section 3.1.1.

Sixty-seven interviews were carried out over Skype, as interviewees were dispersed across Scotland with limited availability. 18, 17, 17 and 11 interviews were carried out in Dumfries, Cairngorms, Thurso and Shetland respectively with a representative cross-section of stakeholders including landowners, factors or gamekeepers, crofters or farmers, foresters, managers or consultants and others. The interviews were semi-structured. There was an interview guide, but the interview was allowed to follow whatever direction emerged. Interviews would often start with a brief description of the work, to put things in context. The broad topics to be covered in the interview were as follows:

- Could you tell me about your land? What land uses or economic activities are there?
- How do you manage your land? What are the aims/objectives for your land?
- Do you have peat?
- What condition is it in?
- How do you feel about peatlands and peatland restoration?
- What do you think are the barriers to peatland restoration?
- What sort of information would you like about peatlands, peatland management, peatland restoration?
- Have you heard of the peatland code?
- Would you like to come to the workshop?
- Would you be willing to put me in touch with other landowners, managers, farmers, crofters?

Not all of these topics were always covered. The first question was often used to start the interview, and would often end with the last three questions stated above. Interviews typically lasted between 30 and 90 minutes.
The interviews were transcribed and then coded using NVIVO 11 in order to reveal themes, concepts and eventually develop theories. An approximation of Grounded Theory Analysis (GTA) as described by Bryman (2015) was used to guide the methodology of this work.

This methodology differs from true GTA in the following ways:

- Purposive sampling was used instead of theoretical sampling. The interviews were carried out in part, in order to inform the workshops and increase attendance. As a result, interviews were carried out until the workshop date, rather than continuing until saturation point.

- Interviews were not analysed in tandem with data collection. Notes were taken during the interviews in order to inform workshops, but detailed analysis was not carried out until the workshops and all the interviews were complete.

All of the interviews were coded in a round of “initial coding”. This resulted in many concepts. Subsequent rounds of “focused” coding were then carried out, and concepts were grouped and regrouped into categories over a number of iterations. After a number of iterations, theories began to emerge regarding the relationship that landowners and managers have to the land.

In order to explore some of these theories further, more data collection was carried out. This was done via a short email survey with an open question sent to all interviewees about factors driving decision-making among landowners and managers. The goal was to elicit a wider range of motivations and values underpinning decision-making than had been elicited in the interviews, to triangulate and deepen findings about values from the story-telling exercise during workshops. Some responded by email, and some requested a phone call. A full copy of the email can be found in Appendix A. The responses were coded and added to the analysis. A final set of categories and theories were then created and written up. A diagram of the process can be seen in Figure 10.
Figure 10 Flow diagram detailing the steps taken in the Grounded Theory Analysis undertaken in this study. Adapted from Bryman (2015)
6.3 Results

Interviews were carried out with stakeholders in four regions around Scotland. In total 67 people were interviewed. Table 8 shows the number of people interviewed in each region, their occupation and the land type that they were associated with. Although efforts were made to talk to a range of stakeholders, just over 50% of those

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interviewed were associated with estates, either as owners or factors and gamekeepers.

Estates represent 82% of the land type associated with the Cairngorms interviewees, around 50% in the Dumfries and Thurso regions but only 9% in Shetland. Forestry is more common in Dumfries and Thurso, but not represented in Shetland and the Cairngorms. Crofts and small farm holdings comprise 82% of the land type in Shetland, 24% in Thurso. Environmental managers, agents, consultants and stakeholders involved with governmental and non-governmental organisations were interviewed in each region, but these comprised a relatively small proportion (16 interviewees, 24%) of those interviewed. This is partly due to the fact that most environmental organisations may have only one person responsible for a region. Four of these people were not associated with a particular location, but were considered to have expertise relevant to the whole of Scotland. They were associated with organisations such as Scottish Land and Estates, the Heather Trust, the Game and Wildlife Conservation Trust, the National Farmers Union for Scotland.

The broad topics covered in the interviews are described in the following sections. As the interviews were semi-structured, each was slightly different, and there was some variation in the focus and direction of the conversation. As a result, the themes that emerged were not necessarily related to the planned topics, and not all interviewees discussed all of the emerging themes. The main themes identified in the transcripts were:

- the causes of degradation
- the effects of different management practices
- communication
- trust
- priorities and incentives
- identity
What follows is a description of the aforementioned themes, elucidated with quotes from the interviews. The number of interviewees who did discuss the themes will be cited at the beginning of each section so that the percentages can be better understood.

6.3.1 Causes of degradation

The main perceived causes of degradation are to do with land use, historic management and large scale activities beyond individual control such as weather, climate change and atmospheric deposition.

Half of those interviewed commented on the causes of peatland degradation (33 interviewees, 49%). The most cited causes, mentioned by ten people each, were overgrazing, digging drains and afforestation. Nine people described natural causes of degradation such as extreme weather, but this was considered to be separate to changes in climate which were mentioned by six people. Browsing and trampling by deer was mentioned as a cause of degradation by 7 people. It must be noted that most people do not consider there to be one isolated cause of peatland degradation, but many issues which come together to cause and exacerbate this problem.

When each region is looked at separately, there is some variation in the most commonly mentioned causes of peatland degradation. In the Cairngorms draining was cited most frequently, primarily in order to improve the land for sheep and grouse, but also in relation to forestry. Draining was also thought to be the main cause of degradation in Thurso, but this was equally linked to forestry and improving agricultural land for grazing. In Dumfries forestry was considered to be the main cause of degradation followed by draining for both forestry and land improvement. In Shetland overgrazing and draining in order to improve the land for grazing were the main causes. In Shetland and Thurso it was stated by a few that damaging management practices had come about out of necessity. For example, cutting peat for fuel when oil prices are high, or needing to increase stocking density because one cannot forego the associated subsidies.
In all regions historic policies, encouraging and leading to the practices described above, were very often cited as the cause of peatland degradation. These policies were mentioned directly by 18 interviewees, but alluded to by many more. This was especially the case in Shetland where headage payments were mentioned numerous times.

“To me, the mistake people made in the past was that they felt nature hadn’t got it right and it had to be improved, ploughed, drained, and really that’s not what management’s about. They looked at the flow country and thought this is a desolate wilderness and we need to improve it. We need to damn it and plough it otherwise we won’t be able to support people. And maybe they were right to an extent. But trying to turn it into something it’s not, reduces its ability to provide for people and sustain communities. The value of what the flow country is, wasn’t recognised.” Factor, Thurso

“Until about 2000 the subsidy regime was based on a head payment so everything was dreadfully over stocked on the hills which obviously had a real bad effect on vegetation and also on the sheep themselves” Crofter, Shetland

Planting subsidies were also the cause of considerable resentment in Thurso and Dumfries.

“In the 60s and 70s planting all these hills with trees, it is only now that we are suddenly thinking that was massively damaging ploughing all that peat and releasing all that carbon into the atmosphere and nobody realised at the time” Farmer, Dumfries

“The government decided to plant trees on it. The problem comes from planting those trees. Before then there was absolutely no problem with those peatlands” Landowner, Thurso
Natural causes of degradation were mentioned in all regions. These might be extreme weather conditions such as heavy wind and rain or snowmelt, or browsing by non-commercial animals such as hares. It was also commonly stated that peat hags and drains were just a natural feature of peatlands. Climate change or the idea that this is a long term problem was mentioned by 6 people, while atmospheric deposition was mentioned by a few in Thurso and the Cairngorms.

Main Points

- The main causes of degradation cited in each region were:
  - High stocking densities
  - Drainage
  - Afforestation

- These could all be linked to historic policies

- Some felt that peatland degradation was a natural phenomenon
6.3.2 Effects of management

The effects of different management practices were commented on by 68% (46 out of 67) of those interviewed.

Ditching was carried out primarily in order to drain the land and to improve the vegetation for sheep and grouse. Depending on the extent to which they have been eroded and the local conditions, there can be a number of positive and negative impacts of digging ditches. It is felt by many that open ditches improve grazing for sheep or improve the heather cover for grouse. The negative impacts of open ditches, cited by many, are that grouse chicks can get lost in them, they can make access on foot or quad bike difficult and they lead to poor water quality and flash floods.

“The ditches themselves may have one small positive impact. If you imagine the sort of blanket bog area that’s quite wet. The heather plant is challenged by the wet, if it’s got to sit in the wet it doesn’t really like that too much, not when it’s really wet anyway. So possibly what we’ve got in some of these areas is a zone either side of this drain where there’s some better heather cover. And that would have a positive impact on grouse for example.

However, to balance it out you would have much better likelihood of like small hatched chicks falling into those ditches and drowning. So that would be a negative impact. And the main negative impact, in practical terms, all these ditches are a nightmare to cross. If you’re trying to go out on the hill on an ARGO or a quad bike to retrieve deer carcasses, then you’ve got to be careful of these ditches. We can’t use ponies anymore on the hill because if they got a leg caught in one of these ditches they could break their leg. Those are the negative practical impacts.

But the most important one from my perspective is that what these ditches have done is they’ve caused the whole hydrology of the river to change. So basically we get these flash floods. So we get very fast increasing water
heights like you’ll see the river, it kind of tumbles down, almost like a two foot wall of water coming at you. The river just ups, bang, in one go and it flows much more quickly as well so during these periods of spate you get water tearing through these drains, ripping up peat and other silt and sediment and that has an impact on the pH and the like. So I think it’s got quite a significant negative impact on the river.” Gamekeeper, Cairngorms

Blocking ditches is similarly felt to have a number of positive and negative consequences. In areas where the drains have become much eroded, blocking ditches can improve vegetation cover as erosion is reduced. There is also some concern that sheep will drown in the pools created by blocked drains. If these areas become unusable for sheep, then an alternative location must be found for them.

“That person has to find somewhere else to put their sheep, or find some other employment. OK he’s got income from the scheme but there’s no point in just walking through the hills you know” Crofter, Shetland

“I think if my father was a young man and starting out again and developing and expanding his sheep business I think he would be concerned about the effect of drowning the animals and them getting stuck in these types of areas. That was something he did comment on. That to me is something that… if these types of activities were taking place… would cause me concern” Crofter, Thurso

Stocking Density

Reducing stocking density was thought to improve the quality of vegetation. This was especially the case in Shetland where a few crofters described the changes they had noticed in the land and their stock before and after reducing stocking densities.

“I was aware that lambs coming off the hill weren’t as good as could be. I was sometimes carrying them off the hill they were that weak. The land was overgrazed – not enough good food for them. But while the land was
open there was no point in reducing the stock – someone else would just graze it” Crofter, Shetland

“If you drive around Shetland you can see just long fence lines. One side will be grey and the other side will be much more heathery and lusher looking and a lot of that is due to stocking intensities I think.” Crofter, Shetland

Conversely, there were many comments about the need for either grazing or burning in order to keep the heather in check, encourage younger “fresh” shoots and allow other less dominant species to come through. Seven people, out of the 25 who commented on the effects of different management practices, felt that light grazing was necessary in order to encourage biodiversity – whether that be wildlife or rare plant species.

“The ground relies on grazing because it supresses growth and it allows all those wild flowers to come up”. Gamekeeper, Thurso

“I said on the 5,000 acres that we sold you, I don’t think there are more than 10 deer on it, there used to be around 30 – 40 deer, and I said the place is dead, without grazing there is no droppings, no bird life, there is nothing on it, but that is what they want” Landowner, Thurso

I feel it is already doing a job, it is already supporting a phenomenal plant life, we do graze it, but that allows more delicate plants, it gives them a chance, whereas if you allowed the vegetation to become rank a lot of the smaller delicate plants would just be smothered. Farmer, Dumfries

It was also mentioned that sheep play an important role in controlling tick populations, which is important for grouse as well as walkers. The sheep are dipped in insecticide, and as they roam around the heather, they kill the ticks that come into contact with their wool. A number of landowners have sheep purely for this purpose.

Burning
There was a very strong feeling in all regions that burning was important in order to encourage wildlife as with light grazing, but also in order to reduce the fuel content and lower the risk of wildfires. For many this was a particular bone of contention with SNH and any government schemes.

“My forebears... they managed the hill land, they burnt the heather to create grazing areas, put in small fires, burnt small areas. I am finding certainly that is an element that is completely lacking because there is not the same bird life, there is not the same insect life... I go out on the hill now, and I’ll be out any time of the day from 6 o’clock onwards, a beautiful summer’s morning. Sit, spy on the hill with these animals and there’s nothing. I think there’s a lack of the management to encourage fresh growth and to encourage the birds and bees back to it.” Crofter, Thurso

“If you’ve left it... you have got a high fuel content and there is every chance of it getting away from you and burning into the peat and by then the water table will have dropped and you will have peat which will start burning into the winter months. So our attitude is actually you are better to keep the heather relatively well managed and low” Landowner, Cairngorms

Forestry

Plantations on peat were felt to have a detrimental effect on water quality because of the ditches that are ploughed during the planting phase, but also because of the change in pH caused by their leaf litter. Due to concerns from local people and neighbouring landowners, the forestry commission has been carrying out research into the impacts of these peatland plantations on water and land quality as well as wildlife.

“Forestry is so much to blame. It damaged the River Naver. There are 15,000 acres of forestry near the River Naver. If you plough a straight line from the top of the hill to the bottom, every 3 foot, in order to plant the tree
on the upturned furrow, you do that on 7000 acres with scarring that goes
down to the river, are you surprised that the environment changes?”

Landowner, Thurso

“If you look at the reality of these forests, they were established with
everous inputs of fertiliser, huge amounts of drainage – a lot of that is
not environmentally appropriate now, 15 or 20 years later. So if you take
that attitude and you add in factors like this, what we’re finding now. In
these acidic soils, with a soft wood canopy, after one rotation, the metal
concentration – aluminium – is increasing in the soils and it binds to
nitrogen. So that actually makes the site far harder to fertilise, so the
chances are that because there’s been a conifer monoculture these sites will
have degraded even further and will require even more inputs” Forestry
Commission, Thurso

“It was suspected that the forest edges were having an impact on some of
the qualifying features on designated sites. The qualifying features were
Golden Plover, Dunlin and Greenshank. So at the edge of the trees there
was a range of different factors which people suspected was having an
impact on their breeding success. Some were predators. Another one was
that there would be a natural avoidance of birds nesting near trees”

Forestry Commission, Scotland

Many interviewees across the regions commented on the dangers of too much or too
little of a particular type of management. It was mentioned often, that the key was to
balance the activities on the land and use grazing and burning in particular to achieve
the desired mix of biodiversity, productivity and land quality.

“It is really all very much to do with moving the deer numbers and rabbits,
hares, goats and sheep but also graze that land so that we end up with
grazing and sustainable land use - that is the basics of it all.” Factor
Thurso
“It is striking a balance between people’s livelihoods and looking after the environment.” Crofter, Thurso

“It is about management, about balance. And that is what I think we do need to decide is part of the management planning for these areas - which is where the work with Best Practice Burning Group comes in - ‘What are your objectives here? What is this land capable of achieving? Do we want it as bog pools? Are we going to get there? Or do we just want to raise water tables increase the amount of sphagnum?’” Environmental Charity, Scotland

It must be noted that many of the negative effects of management can be linked to historic, or current policies which have influenced the balance of management practices.

It is clear from the examples given above, that no form of management is considered to be wholly good or bad. There are trade-offs, however, and the way the balance falls, depends very much on what the aims are for that piece of land.
Main Points

- Digging ditches was thought to have a positive effect on vegetation for grouse and sheep, but may increase chick mortality as they drown in the ditches.

- Ditches were thought to have a negative effect on water flow and chemistry.

- Blocking ditches can improve vegetation by reducing erosion, but more sheep may be lost in the pools created by the dams.

- Reducing stocking density can improve the quality of vegetation, and the health of sheep in turn. Too little grazing and biodiversity can be reduced, however.

- Burning is thought to be necessary for reducing the fuel content of the hill, encouraging fresh growth of heather, and increasing the diversity of vegetation.

- Conifer plantations were thought to be detrimental to water quality, soil quality and wildlife.

- Emphasis was placed on the need to find balance in management practices.
6.3.3 Communication

Many of the comments that were made could be linked to communication or the lack of it. These could be divided into two categories: the communication of evidence justifying the desire to restore peatlands and the relationships between the different stakeholders/actors in peatlands landscapes.

Justifying peatland restoration

The justification for restoring peatlands appeared to rest on a number of factors: whether peatlands have value, whether they are damaged and need restoring, whether restoration is possible, and whether the resultant benefits can be delivered. There were comments from 46 interviewees (69%) questioning whether it was worth restoring peatlands or not, suggesting that the issues listed above had not been adequately addressed. Underpinning all of these concerns was a desire for convincing evidence.

Although most, if not all, of the interviewees did have an interest in peatlands and were somewhat aware of their value, there were many comments from interviewees which indicated that an awareness of their wider importance was new, and unusual within these communities.

“If you live in an environment, you don’t realise how precious it is. You don’t realise that everyone else hasn’t got it. If your sheep are being predated by eagles, you lose sight of the fact that there are only three of them in the world, and two of them are on your land!” Crofter, Shetland

Often the peatland areas of a person’s landholding will be the least productive and potentially the least accessible. They may be viewed as wasted land or lost income and may not be visited often.

“On any peatland you get virtually diddly squat for your land. There’s no reason why you’d want to increase your peatlands. If you’ve got good land and you reduce it to peatlands then you’re going from a half decent to a very bad rate.” Farmer, Dumfries
A number of interviewees suggested ways of raising the profile of peatlands in the landowning and managing community, and in the public consciousness. It was thought that a change in subsidies, with more money going towards peatland preservation and restoration would increase awareness of their value. A crofter from Shetland also mentioned that the planned development of a windfarm in the area had highlighted the value of the peatlands and the wildlife it sustains. Increasing awareness of peatland issues was thought by one interviewer to be a potentially positive effect of having commercial enterprises involved in the funding of peatland restoration. If they are funding the work due to CSR opportunities they will, no doubt, wish to publicise it and so draw attention to peatlands, their value and the need to conserve them.

While these are potential ways of raising awareness, it was mostly by going out onto the land with an SNH officer or other peatland specialist and looking at the peat, the vegetation and the wildlife that people actually began to appreciate its value.

“So it was when Wendy and Emily came out to have a look. Wendy who spotted it – she said I think this might be a lowland raised bog – worthy of further investigation and so that’s what generated momentum on all of that” Landowner, Dumfries

“I went on a sphagnum ID course in Perthshire last year and just the whole subject was an interest for me and I started to see much more value in peatland itself. “Crofter, Shetland

Is it damaged?

There seemed to be some uncertainty regarding what constitutes a healthy or a degraded peatbog. Of the 50 interviewees who owned or managed land 30 discussed the condition of their land. A quarter of these (26%, 8 out of 30) initially responded that their land was in good condition, but would then go on to describe hags and gullies and areas of bare peat.
“Q: What condition is the peat in?"

A: Pretty good really. There’s not been any peat cutting or anything like that.

Q: But are there gullies?

A: Oh yes – there’s gullies and drainage.”

Crofter, Shetland

Five people felt that drains and hags were natural features of peatbogs, and so not a sign of poor condition. This confusion may be due, in part, to the slow rate of change in these areas (described in Chapter 1). For some landowners and managers it may well be that they have never seen the land look any different. Another important factor is that the language used to describe the landscape features varies from place to place. “Ditches”, “drains” and “grips” are all terms used to describe the same thing. Much as “gullies”, “hags” and “bare peat” are used to describe similar features. In the Cairngorms one landowners described “peat hag deposits”, and considered them to be natural features. As well as the variation in terminology, the features themselves can look drastically different from location to location, making communication about peat bogs very difficult.

“It’s a bit like heather. That’s a good example. If you talk to people about heather, everyone has a different view based on their own experience. Recently I took the recently retired chairman of the Heather Trust who knows heather moorland in Aberdeenshire, he was brought up there, family has been there for a couple of generations, I took him to the Peak District and he was blown away. He’d never believe that heather moorland could be so different to what he’s used to” Environmental Charity, Scotland

A few people commented that they were not especially aware of the peat on their land or its condition as it was considered to be a peripheral part of the estate or holding. This might be in geographical terms, or in terms of economic use. Such
comments may be indicative of the general regard in which peatlands are held, as discussed in the previous section.

“There has never been any necessity on my part as the land manager to prompt an inspection of that sort of thing. Neither has there been any particular interest on the part of the landowner because there is just no reason to go there. Except for the occasional shooting exercise in August or September time.” Factor, Thurso

Nine people were aware that their peat bog was degraded or perhaps needed attention. This realisation was often brought about by discussions with trusted staff or local project officers.

“We’ve got keepers out there who are involved in habitat monitoring and heather burning and that sort of thing and they were starting to see more exposed peat and they were the ones who were pushing or looking to ways to improve the habitat which, in their view involves improving the peat as well.” Factor, Cairngorms

Twelve people appeared to agree that their land had been damaged by past management practices, but felt that it was restoring itself naturally.

“I wouldn’t actually say our side of the hill would warrant any kind of extensive drain blocking because it is naturally doing it itself.” Crofter, Thurso

Four people said their peat was in good condition, a further three had been managing their land with peatlands in mind so as to preserve its good state.

“I would say because we manage it – it’s a very extensive farming system – there’s no pressure on it – there’s not – the stocking rate – the ground’s not been poached or wasted in anyway – it’s a very traditional management system and I would say the peat - at the very worst its being
preserved at that level it’s at just now – there’s been no deterioration – and hopefully its improving.” Factor, Cairngorms

A number of interviewees commented that they wanted proof that there was a problem that needed to be solved, and that this should be investigated and presented in a systematic fashion.

“We need to be convinced that there is a problem in the first place.” Land Agent, Cairngorms

“I think perhaps the first thing I do wonder whether we need to be doing is looking at the peat, almost mapping the general condition and quantities of peat throughout the north so actually you could say to any one estate look to all intents purposes you’ve got 3-star peatland resource, you’ve got a 5-star peatland resource, you’ve got rock and come what have you.”

Factor, Thurso

As well as this desire for evidence there was a sense of confusion about the end goal. Questions such as “What are we trying to achieve?” were raised frequently, as were doubts about whether restoration was actually possible.

“What should peatlands look like? What are you restoring them from, and from where to where?” Landowner, Dumfries

“I would like to see what it looks like after 5 years. At the moment, to my knowledge, there is no one in Scotland who has done restoration 5 years ago and so you can go and have a look at whether it has worked.” Factor, Cairngorms

It was felt by many that there was insufficient information about the implications that restoration would have on existing land use. Restoration might preclude certain activities either because the land becomes unsuitable or because restoration requires that areas be fenced off.
“What would be nice is some clear science showing how peatland restoration sits with existing land use, what are the impacts on biodiversity, on species, particularly upland species. For example, curlews and lapwings, do they benefit from this or do they not. All these things need to be ironed out and understood better. And then how that harmonises with farming, with sporting and that sort of thing. It needs greater clarity.” Environmental charity, Dumfries

It was also pointed out that there are likely to be “winners and losers” when it comes to changes in biodiversity. One landowner in the Cairngorms said that he was re-considering restoring a certain area because he knew that blue hares liked to use the hags as shelter.

A number of interviewees felt uncertain about whether the public benefits that peatland restoration is supposed to bring, can actually be delivered. This was an important point for many. There were concerns that if these benefits were less than expected, there would be less funding.

“People aren’t going to pay money for restoring peatland if there’s no value in doing so.” Forester, Dumfries

For others the thought of providing real environmental benefits for society, or contributing in some way to the local economy, was a major incentive for getting involved and without proof of these benefits, restoration was less attractive.

“I think you need to understand exactly what you’re doing so you are actually getting the benefits that you say, rather than just ticking a box to say I’m doing this. I would like to see if it is actually making a big difference. With the peat dams and the building up the moorland, I just don’t know how much it’s really benefitting. I can see it benefits some, but you need to know how much.” Crofter, Shetland

“Peat at the top of the agenda? With farming – you can see how someone who is contributing to the local economy, maintaining land and buildings etc. peat management? Less clear.” Land agent, Cairngorms
Finally, one interviewee mentioned that land managers may find the prospect of restoration too risky as it could turn out to be damaging to their land or their business, should there be a change in the research, or the policy.

“Confusion leads to nothing happening. Or someone doing something that calls into question the whole validity of the scheme. But there are also those who are very conscious of not wanting to do something wrong – and if it looks as though it’ll come back and bite them then they won’t do it. Which is equally not good.” Forester, Dumfries

There were a number of comments, mostly from those who worked for NGOs, stating that the scientific evidence for peatland restoration was often confusing, at times contradictory and often poorly communicated. It was felt that this may prevent landowners and managers from signing up to this sort of project. It may also prevent NGO staff from fully supporting this sort of project and promoting it.

“The science is a challenge. Changes are very slow and influenced by trampling, grazing, weather etc. If there is more broken peat, if peat is condition is declining, how do you reverse it? …The tools available are quite limited. Not sure if we fully understand what is happening, even less how to influence it. That’s a BIG barrier for people signing up for things.” Land Agent, Cairngorms

“I even find that from a policy perspective you sort of think – ‘oh God! What are they telling me now!?’. For example, I was at a peatland event in York hosted by DEFRA and there were even scientists there saying – ‘It is confusing, were not even sure what’s going on’ and how it doesn’t seem to be very joined up. So that I think is a particular barrier.” Environmental Charity, Dumfries

“I remember going to a conference in Edinburgh and there were two eminent soil peat scientists. I do have to admit I got lost at some point.
There was some consensus, but there also seemed to be some disagreements on what seemed to be quite fundamental equations.” Forester, Dumfries

While the research evidence was considered to be unconvincing, there were a number of anecdotes describing visits to restored sites, and being inspired by the visible improvements in vegetation.

“I went to a demonstration site a few weeks ago to see what they were doing with sphagnum seeding and re-profiling and peat cutting and that’s been a bit of an inspiration up there. It’s rekindled our interest in trying to get something done up in these peat hags. It was at Glenlivet.”

Environmental Charity, Cairngorms

“It was done on another site last winter and there was a badly eroded site and even before the summer you could see what a huge difference it had made just by putting dams in and re-profiling the gullies. None of us expected it to occur so quickly just by stopping run off basically. We created small pools and then you get sediment building up behind the dams and we did a little bit of planting of cotton grass, spreading fragments of sphagnum around and they very quickly took hold. It was remarkable. I hope more crofters come on board with this. It may take a little while.”

Crofter, Shetland

There were similar stories about the effect of past schemes which encouraged a reduction in stocking density. In Shetland the land was particularly badly damaged by overgrazing, and the benefits of reducing stock were often remarked upon.

“Then we went into the ESA scheme…which meant you had to actually fence off common grazing from the adjoining areas, and so you had to deal with far less sheep, as you did not have any other sheep from common grazing areas coming into our area. Within about, I would say, 3 or 4 years you started to notice the ground under your feet was lusher. You were seeing plants like some ferns, sun dew that we had not noticed before,
more grouse and then after another 3 – 4 years suddenly you started to see eroded areas of peat starting to re-vegetate as well and sphagnum starting to come back and while that was going on the sheep were getting much healthier as well. We weren’t having to carry the sheep on our shoulders and the sheep were benefiting from the value of this as well” Crofter, Shetland

Main Points

- Evidence is needed to convince people that peatlands have value, they are damaged and they can be restored
- The communication of this message was confounded by the variation in terminology used to describe peatlands, and confusion over what is natural
- There was also a need for evidence of the public benefits that peatland restoration can provide
- Seeing is believing. Demonstration sites and walks out on the peat have the power to inspire and communicate
- Information and messages from trusted intermediaries are well-received
- There needs to be a clearer message from science and policy

Relations between groups

During the interviews, there were many comments made about other groups of stakeholders and their attitude to the environment and land management. Out of 67
interviewees, 42 (62%) made comments of that nature. The themes that emerged were quite telling of the tensions present in these communities.

Half of these comments were made by those linked to estates – either as owners or factors and gamekeepers. Although there was a general feeling from all interviewees that others are not necessarily managing their land properly and not with the right intentions, there appeared to be a slight divide between estates and smaller holdings such as farms and crofts.

The following quote from a factor in Thurso explains some of the perceived differences in management approach.

“There’s a split. Farmers and crofters still want to lime the peat, drain it, and make it good for sheep. Estate owners accept that mistakes were made in the past and are willing to change, take the environment into consideration. Then pure conservationists want to remove everything – re-wild, bring back lynx, no management and no people. I think you really need a balance.” Factor, Thurso

From the landowning community there was a feeling that the current government and society vilify them, and the style of land ownership and management that they represent.

“But there’s this other agenda which is basically anti-landowners and says anything a landowner does must be inherently bad and therefore we must try and stop it.” Landowner, Cairngorms

In contrast, there is a perception that crofters receive favourable treatment in terms of funding and enforcement of regulations. Some landowners seemed frustrated that the funding system appeared to be geared towards smaller holdings, and so were not appropriate for estates and the sorts of projects they are trying to carry out.

“If you spend more money than a crofter, you’re heavily cut back”
Landowner, Cairngorms
Crofters were seen as “untouchable” and described as “taking subsidies right left and centre” without complying with the associated regulations.

“The crofter will go out and put it alight and then go back to bed. If I went out and put a match to it, I’d be in jail.” Landowner, Thurso

With regard to tenant farmers it was stated by a few that one would have to be “brave” to approach them about environmental schemes, that they were “difficult to engage with” and that their main priority was to maximise income.

“And it’s because farmers were seen to be the guardians of the countryside. But actually their only interest in the countryside is to tear pounds out of it. And they will tear pounds of it in whatever way the government subsidises them into think is a lucrative way to tear pounds out of it.”

Landowner, Thurso

It was also recognised, however, that with a smaller piece of land to work with, there is not the financial luxury of farming more extensively.

Crofters did not mention their landlords very much and appeared to have little contact with them. One tenant said that the landowner took some interest in how he ran his farm, and that he would discuss his plans with him, but mostly as a courtesy. Crofters also complained of feeling “chastised” for the way they managed their land and the perceived impacts on the environment.

While there was this slight tension between smaller holdings (crofts and tenant farms) and larger estates, they had many common attitudes and grievances, mostly directed at governmental and non-governmental organisations.

Interviewees in all groups disapproved of landowners and managers receiving funding for doing little work. At the same time, they were all anxious not to be thought of as “milking subsidies”.
“But landowners in the last few years have had no problem whatsoever in taking large public subsidies for doing absolutely zero. I don’t know that every landowner needs to see what they’re producing to take a pound or two. Maybe a bit cynical!” Forester, Thurso

“Feel very bitter about the amount of money that the EU pays to farmers to do nothing.” Landowners, Thurso

“What is interesting is that the common grazing in the village area, the grazers all objected to the wind farm. So it went against the perception that crofters are greedy and will take any chance of grant money because, of course, being tenants on the Scapa, where this is going to be built, there would have been an income from it. But they still objected, which was quite significant.” Crofter, Shetland

“We’re not subsidy Junkies” Factor, Cairngorms

There were many comments about SNH “telling everyone what to do” and “throwing their weight around”. The general feeling was that the involvement of SNH would mean more restrictions and more regulations. Their approach to land management was described as “blinkered” and there were numerous comments suggesting that SNH had particular obsessions, such as removing sheep and deer and that, on those topics, “they would not listen to reason”.

“SNH are just focusing on the possible, but questionable, benefits of removing sheep” Farmer, Dumfries

Oh, they recommended killing more deer. Deer do everything apparently, nothing else is close, I’ve had recent correspondence with them about the sitting of birds, six or seven Plover as I’ve just told you and they write back, ‘oh that’s very interesting to hear your opinion, just shoot more deer’. Landowner, Thurso
Coupled with this, there was anger at not being shown respect by the SNH officers, or staff from other environmental organisations, who would survey their land. There were a number of stories where farmers had noticed monitoring equipment in the fields but had not been told what was being done or why. Others said that SNH would occasionally let them know that survey work was taking place but not always. There was also disappointment that the results of survey work were not shared, and that they were not invited to join in with the surveying.

“I came across someone who has been doing experiments on the hill. They’ve got little tubes stuck in the ground, and sticks and little disks the last time I was there. So there’s somebody obviously monitoring the hill but we’ve never, as the grazing’s committee, been made aware of it… I would be a bit miffed I think if they were just tramping about the place putting in whatever objects they chose. We don’t know what it is, why it’s there. Could it be a danger to my livestock?...It is common courtesy. And we’re very much people who have been brought up to embrace that and expect it off strangers.” Crofter, Thurso

“We don’t get much reports back. They don’t tell us what they have seen or what they have done. And it is quite important to the landowner. We need to know how it is changing. They do have a website and it is all on there and they show a broad picture of peat bog lands but they do not actually tell you what your area is doing. They don’t even invite you to come out with them. You should be able to walk with them and talk to them. We don’t get any feedback.” Crofter, Thurso

A number of those interviewed felt dismayed that there was no mechanism to recognise existing good management. This might be in relation to land that was already storing carbon, but could not be restored, or land that supported communities of flora and fauna, but did not have designated status.
“Government policy has, to date, seemed reluctant to recognise the amount of carbon that is already being stored in these peatlands that we are managing. And without that management there is a risk of losing that carbon that is being stored. And I think there would be a huge benefit if there was recognition for that” Factor, Dumfries

I think it is more a case of recognition of how we manage it. The new SRDP they are doing moorland management and it annoys me that you get points for being in SSSI or a special designation, but that is just a line on a map, and we have got just as exciting plants here, although I am not in SSSI, but somehow they are prepared to support you if you are in SSSI and not if you are not which seems illogical.” Farmer, Dumfries

“Just because it does not have a unique box to pick in European terms, does not mean to say that is not as equally important.” Landowner, Thurso

Environmental NGOs (mostly the RSPB) provoked similar feelings. They were criticised for not taking a “holistic view” of the land, and for disregarding anything but environmental objectives. Their approach was described by numerous people as an attempt to turn Scotland into a “wildlife park”, and that the livelihoods of local communities were not deemed important in light of this aim.

“If you just focus on wildlife trusts and ornithology groups, I feel they are slightly out of touch with the actual real economics of working with the landscape.” Farmer, Dumfries

“What are you expected to do? Give up your grouse moor and sack your gamekeepers because somebody somewhere says ‘oh it should all be wild land and unmanaged’. People get their livelihoods from these places!” Landowner, Cairngorms

“So don’t come to me saying that RSPB are the best ecologists in the world. They are making huge mistakes. As are some of the other NGOs. In terms
of land management they are so didactic, single minded – some of the stories that I've heard about some of their management practices have been abysmal!” Landowner, Cairngorms

It was felt that this outlook was fuelled by experts who, similarly, had no regard for the human aspect of these landscapes.

“Yes, well all I’m trying to do is to encourage scientists to go and talk to human beings. They are human beings themselves but, because they think a lot of the time in the abstract rather than in reality and human connections, I have found some scientists to be slightly divorced from the real world. And then when they say something which is very logical they don’t understand why they get a negative reaction.” Landowner, Cairngorms

There was also some resentment at being told what to do by incomers who were thought to have only a superficial understanding of the area. There was a very strong feeling that the accumulated knowledge and experience of generations of landowners and managers was valued less than the opinions of someone with an undergraduate degree.

“You know, we have fairly cordial discussions but at the end of it the opinion or evidence from the person on the ground is subsumed in the greater philosophy of deer being responsible for all vegetation damage.” Landowner, Thurso

“And there are cycles out there that are bigger than a lifetime. But because I have been cutting and burning the peat and delving into it, it has educated me in its own right, because I have two eyes and a mind, in a way that somebody working through a degree with a view to making a career for themselves might not realise. And they might be focused on the 3 or 4 years of work that they did to get that degree, but they might well benefit from the lifetime of broad knowledge, and in my case I would say the family
history of broad knowledge. I can think back 35 generations to a Viking ancestor of mine who was famous for his love of peat” Landowner, Thurso

The management practices endorsed by these agencies was described as “crazy” and not in touch with the reality of land management in these areas. There was considerable concern that these management practices were detrimental, not just to the economic prospects of the farm or estate, but also to the environment and so would not deliver the desired benefits. It was felt by many that local knowledge and local concerns were underutilised and not respected.

“Well that is always the problem. The people who are doing the egg sucking aren’t the grandmothers.” Landowner, Thurso

“We have the love and knowledge that has been brought up through your own experiences… You know where your sheep are roughly going to graze on the hill. They have got their own little patterns, and I have my own places that I go to gather them in, and bits where I can keep an eye on them and that” Crofter, Thurso

“And when you look at what they actually achieve – because of the way they set their objectives and all the things they say they can’t do – you’ll see that they actually achieve less than many private estates – in terms of the extra benefits.” Landowner, Cairngorms

When asked about their aspirations for the land, and their goals in life, a number of participant commented that the current policy situation actively prevented them from achieving either of their aims, even if these were in line with the stated policy objectives.

“There is a feeling that, whatever we do, the government don’t try to understand why we do it. They’re always making things more difficult.” Landowner, Cairngorms
“On the one hand they say ‘This is what we want’ and I’m saying ‘Here I am, I’m willing to do this’. And then they make it as hard as possible!”
Landowner, Dumfries

“Farming remains a state-controlled industry, but the state is not interested in sustainability. Therefore everything is a compromise and although I may invest my life, the system does not invest. It is a battleground here and success through the system comes by accident not design. And of course simple luck.” Crofter, Shetland

While this sort of situation was not uncommon, there were also examples of good relations with SNH and with other organisations. In these instances, positive reports depended mainly on the actions of individuals, highlighting the importance of good and trusted staff.

“It’s to do with stability. If officers keep changing then you never have time to build up a good relationship. Never build up a full understanding of an individual. ‘Cause everyone will have a different way of interpreting the rules and that can be frustrating. Thankfully, at the moment we have a bit of stability and our SNH area officer is fantastic. Been here for 4 years.”
Factor, Cairngorms

The consultants, agents, and those working for NGOs and governmental organisations were mostly aware of these conflicts and tensions, and the way they are viewed by landowners. They recognised the need for better communication and integration of local and scientific knowledge. Most of these interviewees represented smaller NGOs with a particular focus on upland areas and rural land management e.g. The Heather Trust, Scottish Land and Estates and the Galloway Fisheries Trust. There were few interviewees from SNH, the Forestry Commission and the RSPB.

“One of the things I always say though is – you always hear people getting sucked into to talking about numbers of deer, numbers of trees etc. – my sort of mantra is that it’s not really about any of that at all, it’s about
people. If you took the people out of the equation, it would be relatively straightforward. But it’s because different people have different objectives and different things they’re trying to do, different ideas and different ways of trying to achieve the same thing. To my mind that’s key.” Factor, Cairngorms

“But they do come up with some very interesting suggestions. Because they’ve worked and managed the land for years and they’ll often come up with practical suggestions that will fit with their management e.g. depending on how they work their sheep flock – someone sitting in an office reading theory might just say you need to remove your sheep” Consultant, Dumfries

There were a number of comments about the state of research on peatlands, as has been discussed in previous sections. The approach or attitude of scientists and experts was also something that causes some division. While it was recognised that there were many stakeholders in these landscapes, with many different views, policy makers and “experts” were criticised for not trying to understand things from the perspectives of those on the ground, and also not presenting information and policies with these people in mind. This problem was recognised by policy makers, and landowners alike.

“But you are often scarpled because you get different folk with different ideas and it’s bad enough to agree about everything anyway especially something like restoring peat!” Crofter, Shetland

“The jargon can be desperate. It can be so divisive.” Environmental Charity, Scotland

“But your hundreds of thousands of acres of peat are actually owned by people who are not scientists and not skilled in making applications and their interest actually is not in peat it is in something else.” Factor, Thurso
Main points

- There is some tension between larger estates and smaller holdings such as tenanted farms and crofts. There is a perception that they are favoured in this political climate.

- Estates feel that they are disliked by government and the public.

- There is widespread disapproval of people receiving money for doing nothing, and nobody wants to be accused of this.

- SNH is associated with increased regulation and restrictions and a narrow-minded attitude.

- They were criticised for showing a lack of respect and courtesy regarding feedback and monitoring for environmental schemes.

- It was felt that there was not enough recognition for existing good management.

- NGO’s and “experts” are criticised for ignoring the human aspect of these landscapes.

- There are feelings of resentment towards experts from elsewhere telling them what to do on their land.

- There are disagreements over recommended management practices which some feel are detrimental to the landscape.

- Individuals from all of the groups mentioned are respected and appreciated.
6.3.4 Trust

Many of the themes listed previously contribute to a mistrust of external interference on the part of landowners and managers. There are two sides to this: a lack of trust of the intentions of those interfering, and a lack of trust in the wisdom of those interfering.

When asked about the peatland code and the involvement of private enterprise in the funding of peatland restoration, many said they did not trust the intentions of the companies involved, but conceded that, if well regulated, this could be a good source of funding. A minority had stronger objections to the commodification of nature and felt uneasy at the thought of brokers and bankers evaluating the worth of their environment.

“Yeah. I firmly believe that you have to put a value on things for people [what they have] and it’s unfortunate that it has to be a monetary value but I do know there is kind of a movement afoot to make these things into commodities and then they would end up being traded like everything else. I’m really suspicious of that. You put it into the hands of bankers and stock brokers. And I think that’s really dangerous.” Factor, Thurso

Those who had had dealings with carbon brokers from various carbon trading schemes complained of attempts to sell them something that was too good to be true. These brokers were described as “rascals” and “used car salesman”.

“Yes I think it was a typical propaganda it was 90% media hype and 10% facts and they could not come up with the facts and nothing could be supported with any research so one had a good deal of scepticism. It was like someone trying to promote scientology that is the level I would have put it at. All hype and no fact.” Landowner, Cairngorms

There was very much a sense of wanting to understand the transaction – the pros and cons, what each person stands to gain, what the motivations are. In the first stages of
the interview it often felt like a process of determining these parameters, although I was only asked directly to explain my motivations on two occasions.

There was also some confusion about the large sums of money being spent and some suspicion that this was not being shared out fairly. There is often publicity about the amount of money being spent, but it is unclear where it is being spent and what is being achieved.

“I went to a meeting in Abernethy a few years ago in 2012 and I came away highly suspicious of the whole thing. I was not at all convinced, in fact it was almost the other way I thought this was another scam to put millions into the pockets of the RSPB and was nothing to do with saving the world and the nation!” Landowner, Cairngorms

“Europe pays millions to Scotland to maintain this ground and I just see this all going into government offices. I see nothing coming here.” Landowner, Thurso

“We are all in a very great muddle up in our part of the world because all we hear about is this huge sum of money, which has suddenly come flying into Forsinard. We don’t understand what on earth is going on, and how on earth 9 million pounds can be spent.” Landowner, Thurso

Interactions with SNH or other governmental organisations were commonly described by landowners and managers with a sense of foreboding and sometimes suspicion. The poor communication described in the previous section is one reason for this. One of the crofters where surveys had been carried out without prior notification, took this as an attempt to conceal information.

“And I’ve brought it up at one or two meetings that I’ve been chair of and with one of the other crofters who’s been involved with various government committees and organisations, and he said that nobody’s ever come to him to say there’s going to be monitoring going on. So somebody’s
obviously checking, doing some work but we never see or hear of the statistics or the findings or the purpose of what they’re actually doing. Which is kind of disappointing. Because they’re coming to us expecting us to embrace their ideas but then they don’t come and tell us what they find and what they don’t find. Whether what they find is not what they’re wishing us to know because it maybe against their own ideas. You know it just, makes you suspicious, shall we say.” Crofter, Thurso

Another landowner suggested that SNH officers tried to find things wrong with the land in order to justify their own jobs.

“There is no issue with it. I can guarantee SNH will find issues because quite frankly if they don’t find issues they are out of a job.” Landowner, Thurso

While these examples are fairly extreme, and by no means common even in the small sample of landowners and managers interviewed in this study, they do illustrate how poor communication can undermine trust and create unnecessary difficulties. In most cases such behaviour merely enabled poor relations and confusion to persist. Interviewees described feeling “fear” at the prospect of SNH involvement, mostly because they felt they would be reprimanded for their style of management. Such feelings were stated directly a few times and alluded to on many more occasions.

“Being farmers we’re fairly wary of getting SNH involved because wherever SNH goes disaster tends to follow them.” Landowner, Dumfries

Quite apart from whether the intentions of environmental organisations are honourable or not, there is a strong perception that they are misguided and that their advice is ill-founded. This is due, in part, to the “single-minded” approach described in the previous section. But also because of the terrible track record of environmental policies in these areas. These historic policies are described in detail in Chapter 4. In summary, many of the current environmental schemes are undoing the damage done
by policies which encouraged forestry plantations, high stocking densities and drainage in peatland areas.

“What happened is this land goes on the market and some boys bought it, and they got a grant to convert the land into grass and they built a factory to make grass pellets to sell in the south... That was all done by government money... What happened next, they failed, they go bust and the place looks like Klondike in Oz. So what is the next scheme that comes up? The government is giving all this money to the forestry! So they come up and drain it all and they put the conifers in. Twenty years later they realise it is an environmental catastrophe. So what is the next chunk of money? Government money comes – why? To restore the peatlands. You have got three chunks of government money that come up here causing chaos.”

Landowner, Thurso

There were many incredulous comments about the cyclic nature of these policies, but also a reluctance to commit to another round of policies if these are not only likely to change but, potentially, to undergo a complete reversal.

Many landowners and managers said that they wanted to manage their estate or holding sustainably, maintaining a viable business and a healthy environment (see section 1.4.5). They would only enter into schemes which helped them achieve this end, and abstain from those that might be damaging, unless this was financially ruinous. With this in mind, many felt that they could over-look the uncertain nature of environmental policies, if they could be certain that peatland restoration was beneficial for their land. The conflicting messages coming from the scientific community and the confusing way in which they are communicated means that many doubt that restoration is the right thing to do. There were even some concerns that the science was driven by politics, reducing its trust-worthiness.

“Practices that we have been encouraged to do for years, they are now suddenly saying well maybe that is not so good after all... and in the 60s
and 70s planting all these hills with trees. It is only now that we are suddenly thinking that was massively damaging ploughing all that peat and releasing all that carbon into the atmosphere and nobody realised at the time...So sometimes doing nothing is the best thing. Following the old traditional system where we left such a small footprint.” Farmer, Dumfries

Main Points

- There was a lack of trust in the intentions of those interfering in their land management and lack of trust in the wisdom of those interfering

- Intentions:
  - The idea of putting a price on nature put people off
  - With PES schemes, there was a feeling of being sold something that was too good to be true
  - As a result of the poor communication described in section 1.4.3 there was a feeling that SNH and other “experts” were hiding inconvenient information

- Wisdom:
  - As described in section 1.4.3, there is a feeling among land managers that the suggested management practices may be detrimental to the landscape
  - Historic policies have been shown to be damaging, and now must be reversed
  - The science appears uncertain
6.3.5 Priorities and incentives

Potential incentives for getting involved with peatland restoration were discussed by 52 interviewees, while 58 discussed their priorities, both in land management, and in life. Most, if not all, of the interviewees described numerous incentives and priorities, the percentages do not, therefore, add up to 100.

Financial gain was mentioned as an incentive for getting involved with restoration by 57% (30 out of 52) of those who responded. Financial gain was only considered a priority by 32% (19 out of 58), however. Financial gain was most often mentioned as a “means to an end”, rather than an end in itself.

“But what we can afford to do other than commercial depends on how well we’re doing with the commercial – so there’s a certain amount of cross-subsidy I have to do within our portfolio in order to achieve things. So there are things we would like to do but we can’t afford to do – so I have to wait until I can. Because if the commercial land fails – it all fails.” Forester, Dumfries

“You can have lots of lovely ideas, but without money, you can’t do anything!! Landowner, Dumfries

“It’s a very emotional commitment to the land, due to reasons other than profit. Profit is important. It allows you to pay for the land and to improve it.” Landowner, Cairngorms

Many interviewees mentioned the need for projects and for their land to be commercially viable. It was common for people to mention the need to break even or the desire to be self-sufficient but rarely to make a profit, unless this would facilitate other work such as building reparations or environmental projects.

“Success would be if I could have made our land holding so economically viable that I could have persuaded my children to stay and work here on the landholding in the way I have done.” Landowner, Cairngorms
There was some difference in the incentives cited in different regions. In Dumfries and the Cairngorms financial gain was cited as an incentive by 64% and 67% (8 out of 12, and 9 out of 14) of respondents in those regions respectively. In Thurso the proportion who responded in this way was 46% (6 out of 13), and 55% (5 out of 9) in Shetland. This is likely to reflect the kind of holding that dominates in these areas. Larger estates are more common in Dumfries and the Cairngorms, and these are often run more as a business, with a number of staff making decisions, and number of staff relying on the estate for employment.

“It’s a horrible situation when you get into it and you turn around and go – is there any money? Can we actually do it at no cost or if there is a cost a very low cost? Because you look at it and if it ends up being a cost item we’ve got to sell that to our trustees – and if it’s running to a few 10s of 1000s of pounds it doesn’t get very far very quickly.” Factor, Cairngorms

“Need to recognise that it will change how people work, who they support/employ. It’s challenging.” Land Agent, Cairngorms

Crofts dominate in Thurso and Shetland, with many crofters having a full time job and describing crofting as an “expensive hobby”. Financial gain is, therefore, less likely to be an incentive. Indeed when respondents are divided in terms of the land type on which they work, 58% (15 out of 26) of those associated with estates mentioned financial gain as a priority, while the same is true for only a third (3 out of 9) of those associated with crofts.

“I’ve not enough to sustain me so I work building as well. I’d like to make my livelihood out of the farm, but that just doesn’t happen.” Crofter, Shetland

Environmental benefits were seen as an incentive by 48% of respondents (25 out of 52) whereas 75% of respondents (44 out of 58) considered them a priority.
Productivity i.e. farming, deer, grouse shooting was also considered a priority by 75% respondents. Prioritising productivity may be partly linked to financial gain, but there was also a sense that these activities are part of what one does in that landscape, and as such are associated with heritage and identity. These activities were not considered to be at odds with the environmental objectives on the land, and indeed were often thought to be an essential management tool for achieving that end, as was described in section 1.4.2.

“I’m very keen on the environment and I see no reason why modern productive farming cannot run alongside environmental farming.”
Farmer, Dumfries

“Another important element is – it’s a community thing. Where we live, it’s peripheral and delicate in a socio-economic sense. As a conservationist, our interest in the land can be seen as abstract. The crofters view can be more utilitarian. I think you can have a combination. Achieve both things – protect the land and also get a return for it. We really need more integration between the two – communities using the land, and conservation.”
Factor, Thurso

Community benefits were mentioned as priorities by 20% (12 out of 58) of respondents, and as incentives by 11% (6 out of 52). Cultural heritage was mentioned as a priority by 5% (3 out of 58) of respondents. These figures represent instances where such motivations were mentioned directly. Both community and cultural heritage were alluded to by many more people in discussions about providing employment for the local area, and the desire to carry on a way of life, carry on traditions, and pass on knowledge and experience.

“We’re very healthily run, we’ve used a lot of the money gathered from different projects, different schemes, and we’ve ploughed it back into the community. Not taking anything as individuals for our crofts, which probably we should do because at the end of the day the money is being
generated by the actions of the crofts, but we’ve used it predominantly, solely actually, to do community projects.” Crofter, Thurso

“Community has always been a big part of the estate- we basically surround it – you are employers in the area, families that work on the estate will have kids going to the school – so we’re all integrated into the area. So that takes a high point in it.” Factor, Cairngorms

“Also I farm because it creates employment in an area where it is quite a remote area and it is not easy to keep people working in this kind of area… I have three full time shepherds and I have got a fourth, a youngster who is a learner... Apart from that my business supports I would say fencers, dykers, hauliers, feed merchants, vets, markets, plumbers, joiners, builders etc. There is a lot of economic activity as a result of hill farming in these areas… it is all very well managing Scotland as a giant wildlife park, but I am more thinking of the money that goes through my business and into the rural local economy in other words the £200,000 that comes into my business goes straight through it and out into the local rural economy so the local economy benefits by £200,000 per year from my business and then of course that generates further down the line. I think that is really impressive, but the problem is, and the problem remains that I do not have enough money to re-invest in the farm and to keep up with farm maintenance and even the likes of replacing quad bikes etc. the farm does not generate enough money for that kind of thing.” Farmer, Dumfries

There were repeated comments about integrated and sustainable management, trying to get the environmental aspects and the economic and productive aspects to work in tandem. Although in the previous paragraphs the frequency of various priorities and incentives are discussed, in most cases, if not all, multiple motivations were described.
“Well, we think, my boss and I, that if we make the environment right for things like waders, then you know, grouse and things like that will fall into place. If we keep our [countryside] in favourable condition then that’ll have a positive effect as well.” Factor, Thurso

“As far as land management goes it’s all about trying to achieve sustainability from both your production of game or forestry or the environment all the way through. And it’s just about trying to find that balance because you’ll please some people some of the time but never all the people all of the time.” Factor, Cairngorms

“It is striking a balance between people’s livelihoods and looking after the environment.” Crofter, Shetland

“I think most landowners would trot out the usual platitudes about leaving the place in better nick than they found it, giving the next generation the opportunity to prosper, leaving a lasting legacy of improvements, whatever…However, the reality is confounded by a myriad of highly specific situations and circumstances, leading often to highly individualised and idiosyncratic approaches from different landowners (which must drive the pigeon holing bureaucrats mad with frustration!).” Landowner, Cairngorms

If a scheme happened to align with existing objectives for the land, 42% (22 out of 52) considered this a good reason to get involved. On the other hand, if a scheme conflicted with their aims, 30% (16 out of 52) said that they would not sign up irrespective of any financial inducement.

“The schemes can seem lucrative, but they can take a lot of time. So they’re not always lucrative in reality. For one of the schemes we’re in we won’t get payed back for the capital works we carried out for another one and a half years. Because of the effort – time, energy, and money – it makes more
sense to do something like this if you’re already interested in it.”
Landowner, Dumfries

“A person will ask themselves - in doing this work and getting this grant scheme, never mind what the job actually is, what the money is, in theory, for, will I make a profit or will I, on the Salmon Fishery Board, be able to, by taking on this particular project or that particular project, will it bring in funds which will allow me to carry on doing something else. It’s almost as though it is not about this in the case of peatland restoration it is actually about something else entirely.” Factor, Thurso

“Some of the land is wet and pretty much unusable. We have some land that we actually never put stock in because it is too wet, so from that point of view if we can get some additional payment that works both ways because we are not putting stock on it anyhow and we can claim some payments for the environmental improvements then that is good and suits everybody but I suppose like all crofters and farmers the main reasons for going into the scheme is to help with additional payments it all helps with the costs.” Crofter, Shetland

“Funding is always welcome. We are doing it anyway.” Landowner, Thurso

“It’s interesting because while we’ve been doing this work we’ve had at least one who’s said he’s interested because he doesn’t think that peat restoration would have a significant effect on his sheep – and he’s particularly interested in the river and fishing but hadn’t really related that peatland restoration might actually be beneficial to the fish.” Environmental Charity, Dumfries

Managing the land for public benefit was mentioned as an incentive by 20% of respondents. In some cases providing public benefit was considered to be part of a
land manager’s role, and so they were willing to get involved with any activity that was deemed in the public interest.

“Before we get abolished, do some good in the world so we get some hope.”
Landowner, Cairngorms

“I’ve been a strong advocate that this is really about ecosystem services and actually the public benefits that we are providing such as maintaining improvement of the heather the abundance of ground nesting birds that management of the peat and therefore the huge carbon store and also the health benefits associated with places like that have to need a lot of management and were trying to find a way that the income generated through the grouse moor actually pays and funds these public benefits.”
Factor, Dumfries

In a few cases it was important to be seen to be providing public benefit, in order to improve their image. It was described by one land owner as “our CSR”. This view was only stated by those associated with estates, and is likely to be linked to land reform, and the feeling of being vilified.

“Again politically as you probably know we see long term that sporting estates are politically despised, and bad press basically, whereas if we plant lots of pretty trees and look after peatlands we would probably get more brownie points so, if you are taking the cynical view it is probably better for us to do something like that than simply to have it all as sport.” Factor, Thurso

One crofter did mention that involvement with peatland restoration would help with marketing his lamb, however.

“For me it is a bit of a marketing exercise. If I am convinced enough to say that I have got carbon positive land instead of carbon negative land, that gives me a little bit of potential, but more importantly it is just another
part of my story when you are marketing your product, people are actually interested that you are taking a positive view on environmentally friendly farming.” Crofter, Shetland

It was quite common among crofters, farmers, and estate owners and managers to want recognition for good land management, that was already being done, and carbon that was already being stored.

“So my point is that if somebody came and looked, and looked at the plants and looked at what we are doing and recognised that we are making a contribution to climate change mitigation and biodiversity and landscape... and I feel there should be a payment attached to that.” Farmer, Dumfries

There was a sense of disappointment from some of those who had been involved with peatland restoration or other environmental schemes in the past, regarding the lack of feedback and follow up surveys. It was evident from some of these discussions that they felt their efforts had not been recognised or appreciated.

“We never got any feedback as to - yes that was a successful programme or it was waste of time or maybe try some other means of what they were trying to achieve. We’ve had no feedback, certainly I was never given any feedback. It’s a bit disappointing because, they’re paying us - they do give us payment for it but we don’t get involved in feedback.” Crofter, Thurso

“I tell you what would be a really good start is if the government recognised the good work.” Landowner, Cairngorms

Descriptions of the wildlife that could be seen on their land, or of a particular sighting of rare birds or plants were quite common and evinced a love for their environment that evidently had an influence on the way they managed their land. The following quote illustrates that the influence does not always lead to rational decisions, as the
landowner in question describes keeping an unhealthy and unprofitable plantation forest, in order to maintain a home for crossbills.

“One more anecdote, if I can be so self-indulgent, and which may illustrate that there is more to understanding landowners’ behaviour than pure economic drivers. I will never to my dying day forget the first time I saw crossbills here. I was wandering through a plantation of lodge pole pine, planted in 1919, and showing the ravages of decades of gales, poor management and out wintered livestock. It was well past its sell by date and long overdue a clear fell and a fresh start if any economic gain was to be retrieved. Seeing a mass of bits of pine cone floating down to the ground like confetti, I looked up, fully expecting to see a red squirrel. Instead, I saw a family of crossbills, with two adult birds instructing two juveniles how to rip up a cone. Scarcely able to believe what I had witnessed, I raced home to dig out a bird book to verify the sighting. There, I read the most wonderful story that medieval ornithologists associated the birds’ curious crossed mandibles and the male’s bright red plumage with trying to remove the nails from Jesus’ hands and feet during the crucifixion, simultaneously smearing its feathers with his blood. Needless to say, that battered old pine wood is still standing and no action will be taken until suitable replacement, mature pines have been established nearby to accommodate these wonderful birds!” Landowner, Cairngorms
Main Points

- Financial gain was more often seen as an incentive than a priority, and was often described as a means to an end.

- Environmental benefits and productivity were described as a priority by similar numbers of interviewees.

- Productivity might be linked to identity and way of life.

- Community and cultural heritage were mentioned by fewer people directly but were often alluded to.

- Most interviewees described multiple priorities and incentives and considered land management to be about balancing and achieving multiple social, economic and environmental benefits in a sustainable manner.

- A scheme which allowed them to carry out work they had already planned would be popular, while schemes which conflicted with existing objectives would not.

- Providing public benefit was considered important.

- Being seen to provide public benefit was also important.

- Recognition for good work e.g. a follow up visit with comments on the success of the project, was felt to be important, and currently lacking.
6.3.6 Identity

Identity, or factors that tie into a sense of identity, seemed to play a big part in the decision making process. These themes were linked to the priorities described in the previous section (financial gain, environmental benefits, community, cultural heritage, long term sustainable management, public benefit, recognition), but seemed more deep-rooted and perhaps less rational. For some of the interviewees, their identity as a land manager or farmer, was something they often felt innately.

“In my heart I’ve always been a farmer” Crofter, Shetland

“I just knew there was something in me that I wanted to work on the land.”
Landowner, Cairngorms

In most other cases, this sense of identity was less well-defined, and the themes were more often alluded to in discussions about the land, their heritage and their aspirations.

Peatlands are often described as “poor” ground and, indeed, the potential profits to be made from using these areas are marginal, much as the variety of economic activities is limited (see Chapter 1). Many interviewees described how difficult it was to make a living in these areas. This was true for crofts, estates, and farms in all regions. This struggle and determination to survive in these places was mentioned by many and seemed to form part of how they see themselves. One interviewee described how landowners and managers in that part of the world had been through wars, changing politics and changing climate, but nothing had managed to prise them off the land.

“You need to understand where a lot of landowners are coming from - many have faced, and still face, pretty extreme adversity and it takes a peculiar blend of passion and dedication to take on these places.”
Landowner, Cairngorms
“My family have been landowners in Scotland since the early 12th century. The family has survived many troubles and tribulations in that time from foreign invasions and civil wars to religious persecution and now an unashamedly left wing reformist agenda. Two important drivers of what landowners do are pride and obstinacy - pride in their ability to withstand pretty well everything that is thrown at them, and obstinacy in refusing to bow to fads and fashion, and, instead, looking to a longer term goal of sustainability and survival.” Landowner, Cairngorms

The ability to make a living in this environment, to find creative ways of solving the problems that such an existence presents, was part of what they enjoyed about land management, and also formed part of their identity.

“Farming in remote areas – you have to be resilient.” Crofter, Shetland

“Nothing works on its own. Up here we live on the margins of profitability and you have to be quite creative in what you do.” Landowner, Thurso

“It is a very precarious existence. But it is also very satisfying.” Farmer, Dumfries

Another aspect of land management that seemed particularly important, was agency. Having the freedom to live as they please and manage the land as they choose was often mentioned as an important factor. There appear to be two parts to this. Freedom and autonomy were important part of the lifestyle of a landowner or manager

“When you work for yourself, you can act on all your cunning plans. You can be more resilient – you’ve no one else to please than yourself. You can say to yourself, I support that initiative. I’ll do that. It’s freedom basically... I’m my own boss. No answering to anyone else.” Crofter, Shetland

“This lifestyle is very attractive. I can determine when I work. Being in control of one’s life, is very attractive. Freedom of choice, how one uses
one’s time, is very important. People say “you’re so lucky”, but it was a choice. It suits us and what we value.” Landowner, Dumfries

“Farming historically has been an industry where nobody has ever told us what to do, which was a big factor in deciding to carry on the family farm. (Although now more and more the excessive regulations around farm payments are akin to “do what you’re told”!!).” Farmer, Dumfries

The power to influence the make-up of their surrounding environment, to work at improving things, was what many described as the “joy” of land management. This was true whether the person owned that land, was renting, or managing on behalf of someone else.

“Being in control of the environment, being able to make decisions over large areas. It’s quite exciting! The government is trying to restrict our ability to do that, but for the moment we still can.” Landowner, Dumfries

“Being in the driving seat is a huge plus. At the end of the day – you’re trying to take a holistic approach. You’re a custodian rather than an owner.” Landowner, Dumfries

“It’s the involvement with nature. The opportunity to influence the management of land on a large scale. And to improve it, by righting some of the past wrongs, passing it on in a better state that we found it, and to do as best you can with the resources you have, without doing any damage. That’s why I do it.” Factor, Thurso

Linked to this, is a pride in what they do, and in doing it well. This pride was linked to various aspects of land management – the stock they produce, the quality of timber or of woodland, the buildings, and the various habitats that might be present.
“From a personal perspective, success with land management is part of my life’s achievement. On a smaller scale, a job well done gives satisfaction. And jobs done in the past, to be able to look at them and think – that was good.” Landowner, Cairngorms

“It does give me great pleasure to have turned it around. It gives me great pleasure and great pride to have turned it into a good functioning amenity estate. It gives me great pleasure to manage the land, and to improve the land and buildings.” Farmer, Cairngorms

“It’s the satisfaction as a producer. Hearing from people that they enjoyed eating your lamb. When you’re out in the rain with your sheep. It makes it all worthwhile. You can’t buy that. Meeting someone in the street and they say “hey, we have one of your lambs for dinner and it was great” Crofter, Shetland

“I think it is just because I was born and brought up with it. And I had an interest in it. I enjoyed it, I enjoy working with the animals, and I enjoyed working with the sheep. And in a sense, my father was very good with sheep, he’s a very good stockman so I’ve got a challenge to be equally as good as him and to try and maintain that. I’ve done myself proud, I can’t say I’ve made a bad job of it. And i think maybe that’s what it is. It’s as much pride and looking at what I’ve done. You see your way forward and you think, that’s good that. I’m proud of that. It’s the pride and the enjoyment of it, to be quite honest.” Crofter, Thurso

There were numerous comments about how one could tell the boundary between different estates, because of the way the land was managed.

“It’s a physical thing – you can tell where the boundary is between different estates just because of the way it’s managed. Well managed land it very obvious to the eye.” Farmer, Cairngorms
Themes of heritage and legacy came up often. When asked what they were ultimately trying to achieve with the land, the most common response was “to leave the land in a better condition that I got it”. The wording, and the definition of “better” might vary, but only slightly, from person to person, but the concern and sense of responsibility for leaving something good for the next generation was ever-present.

“Motivation and decision making has been driven by my desire to make the landholding economically viable and attractive as a place to live and work by the next generation. Our stated objective of ownership is to preserve, develop and enhance the property in a sustainable way for the benefit of future generations whilst providing a living for the owner’s family, its staff and tenants.” Landowner, Cairngorms

“My objective is to hand over the estate in a better condition than that it was in when entrusted to me - that will be the measure of my success. In addition something more nebulous which is the beneficiary has an understanding of what the place is about which accords to my view - somewhere where personal benefit of the owner is balanced with public benefit for the common good of both the local and wider community. Leaving something which will pass the test of time is also important.” Landowner, Cairngorms

“The aim is to ensure that the land, environment, and social environment is in a robust and vibrant health, but also that it is economically sustainable going forward into the future. It is a very difficult thing to pin down, but the aim is to maximise the potential that there is to offer without ever exploiting what there is on the ground.” Landowner, Dumfries

Common definitions of “better” were to do with a combination of environmental and economic sustainability. The importance of these two facets of land management have been mentioned previously. Another important aspect was flexibility. This is something that was mentioned in the workshops, and was a stumbling block to
involvement with the code. It was assumed that this was related to the changes in policies, and the need to be able to go for whatever grants are available. This is, indeed a big part of it.

“You have to take the long term view. You have to be resilient and flexible. Things are always changing and you just need to accept that. Put not your faith in princes.” Crofter, Shetland

Another important aspect, is not wanting to leave a legacy which restricts the opportunities of the next generation. This was mentioned explicitly a few times, but complaints about the situation they had inherited were more common.

“What I might consider as a wonderful landscape might burden my successors with a nightmare! Circumstances and pressures change, so I would hope I could look back and say that I had made progress towards sustainability, while maintaining a degree of flexibility.” Landowner, Cairngorms

There was also a desire to be well thought of by the next generation, and that feeling was also part of the joy of land management.

“To be seen historically as having been good stewards of the land while it was in our care.” Factor, Cairngorms

“One of the things that I enjoy, is leaving the land as a legacy. The things I’m planting at the moment, I will have no ability to manipulate in my working life. So I’m leaving a resource for someone else to work with. And I want to leave something that they will appreciate, and that they will be pleased with. That to me is a positive thing, a legacy thing.” Landowner, Cairngorms

This idea of heritage and legacy ties in with a sense of belonging in the landscape and being a part of it.
“Got into farming because my families on both sides have been farmers since before records began… The prospect of nobody in the family carrying on the work of countless generations is quite un-quantifiable to my mind.” Farmer, Dumfries

There was a sense that their identity was linked to the landscape, but also that the identity of the landscape relied on them being there to manage it. With this, came a sense of responsibility to care for the land, and maintain its identity.

“It’s really important to me, it’s my habitat and I am one of the creatures of this place.” Landowner, Thurso

“It’s the world as I saw it, what was real to me, and I spent the rest of my working life here. I’ve done a bit of game keeping in other parts of the world but very much, the Thurso river catchment has been my territory.” Landowner, Thurso

“Without man’s involvement in managing the countryside we wouldn’t have this fabric, this countryside which is unique to Great Britain. It’s probably the most beautiful countryside in the world!” Farmer, Cairngorms

“And you need someone to look after this land. It doesn’t look after itself well. We’ve changed it too much. It does need to be managed, for it to look like what we’re used to.” Factor, Thurso

“The habitat that we have moulded – as a result, these habitats are no longer what they used to be. So the balance has shifted and there are repercussions. If we can manage for these repercussions, we have a duty to do so. To redress the balance.” Landowner, Dumfries
Main points

- There was a sense of identity linked to the struggle, determination and creativity required to make a living in quite a harsh landscape
- Agency and freedom were cited by many as being important parts of their motivations for choosing their lifestyle
- Many described the joy of being able to influence, work with and perhaps improve the landscape around them
- There was a sense of pride associated with managing the land well, and producing good stock from it
- The need to take a long term view of sustainability and the desire to “leave the land in better condition than you got it” was often mentioned
- Heritage and legacy were important parts of their identity and motivations. Being part of a long chain of land managers, and leaving something good for the next link in that chain were important drivers
- Many felt that their identity was linked to the landscape, that they were part of it, and it was part of them

6.4 Discussion
The causes of peatland degradation and the effects of different management practices that were discussed in the interviews echoed those that were mentioned in the workshops, and so were also broadly similar to the research consensus (see Chapters 1 and 2). The interview results show more clearly the areas where there is some
controversy. The correct amount of grazing and burning that should be permitted was a controversial topic, with many landowners feeling very strongly that prohibiting these practices was detrimental to the landscape. Although there are many calls from conservation groups to ban burning on moorlands, the effects of burning on vegetation composition, water quality and sediment release remain unclear (Stewart et al. 2004, Glaves & Haycock 2005, Holden et al. 2007). Similarly, although it is widely accepted that high stocking densities can be detrimental to peatlands (Evans 1998, Harrod et al. 2000, Evans 2005), the research suggests that there can be positive and negative effects of grazing and a lot can depend on the management strategy adopted (Bonn et al. 2009). Peatland areas can be influenced by a number of environmental and management factors, both current and historic. These can combine to produce quite specific impacts and sensitivities (Holden et al. 2007).

In some cases the presence of drains or gullies was not seen as a degradation and there appeared to be a great deal of variation in what was considered a “typical” or “natural” bog. This variation in peatland form and the terminology used to describe it is described at length by Lindsay (2010) and may partly explain some of the confusion and disagreement about peatland management described in this chapter. As was mentioned in the Chapter 1, peatlands are quite slow moving systems. It is likely that many of the landowners and managers interviewed had not seen parts of their land look any other way.

Charman (2002) describes how peatlands and heather moorlands have been created by human intervention in the mid-Holocene, and have been maintained by management since then. Some degree of management is, therefore, required in order for peatlands to remain (Charman 2002, Holden et al. 2007, Bonn et al. 2009). A comment that was made more than once in interviews and seemed to cause some frustration, was that there did not appear to be a clear end goal when it comes to peatland restoration and management. This frustration is, perhaps, justified in light of the unnatural state of UK moorlands, and the arbitrary nature of restoration objectives.
With this in mind, there was some doubt about whether restoration was possible, and would bring about the desired benefits. There were calls for proof of both of these claims, and complaints that the research on these topics was confusing. As with the research regarding grazing and burning, the impacts of restoration, although largely positive, can be area specific, and the extent of the benefits accrued and the speed with which they are realised can vary (Gorham & Rochefort 2003, Vasander et al. 2003, Armstrong et al. 2010, Haapalehto et al. 2011, Ketcheson & Price 2011). As with the workshops, there was some concern about the implications of restoration for existing land use, and frustration at the lack of research on these topics.

6.4.1 Trust

The interviews showed that there was some conflict between different groups of actors in the regions we studied, and that these conflicts may have their roots in a lack of trust, or active distrust in these relationships. Trust has been shown to be an important part of natural resource management, facilitating collaboration, reducing conflict, increasing compliance and generally enabling the creation of effective solutions (Ostrom 2003, Fulmer & Gelfand 2012, Smith et al. 2013).

Trust and distrust are most commonly described as psychological states in which an individual (the trustor) accepts some form of vulnerability or risk based upon expectations that the behaviours or actions of another (the trustee) will, at least, do no harm (Mayer et al. 1995, Rousseau et al. 1998, Möllering 2006). Hardin et al (2002) describe a relationship in which entity A (trustor), trusts entity B (trustee) to do action C. There are various theories in the literature describing the characteristics of each “entity” and the influence that this may have on the transaction, as well as the actions in question, and the context in which trust is developed (Stern & Coleman 2015). In this case, landowners and managers would mostly be thought of as the trustors; experts and policy makers would be the trustees; and the desired action might be to provide good advice, funding, schemes etc. that deliver the environmental and financial benefits that were promised. The relationship has been framed in this way because it was most often the landowners and managers who described feelings of
distrust towards experts and policy-makers. The opposite situation might also transpire where policy-makers need to trust landowners and managers to change management practices to deliver environmental benefits.

The characteristics of the trustor help to define their predisposition to be trusting or not (Mayer et al. 1995, Schoorman et al. 2007). This is likely to change depending on the context as trustors will be more or less vulnerable in different situations, and the issues at stake will hold varying degrees of importance for them (Huff & Kelley 2003, Fulmer & Gelfand 2012). In this case, one can see that where policy-makers must trust landowners and managers to enact management practices, the consequences of a breach of trust are unlikely to have very personal consequences. In the situation where a landowner or manager is choosing to enter into a management scheme based on the promise of positive environmental consequences and no negative implications for land use, there may be more immediate consequences for the trustor, if these promises are not delivered. The degree of significance placed on the outcome of the interaction, may lower or raise the bar for the development of trust (Stern & Coleman 2015). The weight attached to the aspects of land management, their relation to values, and their implications for decision-making will be discussed in more detail later.

The characteristics of trustees are most commonly described in terms of three features of trustworthiness as perceived by trustors: ability, integrity and benevolence (Mayer et al. 1995). Ability describes the extent to which the trustee is perceived to be capable of carrying out the action in question, and delivering the expected outcome. Integrity concerns whether the trustee is perceived to adhere to principles and norms, and so refers to the trustor’s perception of the trustees’ value system. Benevolence deals with the trustor’s perception that the trustee feels positively disposed towards them and will act in such a way as to do them good.

The interviews revealed that many of these characteristics of trustees were lacking in the perceptions that landowners and managers had of “experts” or scientists and policy makers. The frequent comments about the confusing and contradictory nature of the science regarding peatland restoration, the questions about whether restoration
was actually possible, and whether the consequences would be positive or negative, would suggest a lack of confidence in the wisdom of the research and policy communities. There were numerous comments that called into question the integrity of environmental organisations and policy-makers. Interactions with SNH were often described with a sense of foreboding or frustration at the lack of respect and there were questions about where and how money was spent, and the motivations behind environmental schemes. A strong theme that emerged from the interviews was that landowners and managers felt “despised” by the public and by the government. This is likely to be due to Land Reform, at least in part, but may also be due to changes in attitude to nature. The result is that the trustors in this case (landowners and managers) do not consider their potential trustees as benevolent.

While the previous descriptions are true of the various groups acting in peatland landscapes, there were numerous instances where landowners and managers would describe individual policy makers and the staff or environmental organisations in very positive terms. This serves to illustrate that, although individuals may have trusting relationships and aligning values, they may be part of larger organisations or have affiliations and responsibilities that prevent them from acting in accordance with these (Stern & Coleman 2015). Some interviewees commented on the importance of having permanent or at least longer term SNH or other policy staff, so that trust could be developed.

This is particularly important when one considers trust as a dynamic concept which develops through the interpretation of past and present experiences in order to help make judgements about the future (Dewulf et al. 2009, Idrissou et al. 2013). The behavioural theory of trust describes a rational choice based on the assessments of potential losses and gains, built through interactions between actors (Kramer 1999, Lewicki et al. 2006, Lewis 2008). In this light, one can see the damaging effect that ever-changing policy staff would have on the potential to build trusting relations. The implications of damaging historic policies and misguided historic advice are also
apparent. Past policies were mentioned often and quite understandably, many wondered why this round of policies should be any different.

Idrissou et al (2013) discuss how many of the conflicts that were present in their project, only became apparent in the interviews, but were not evident in the stakeholder workshops. This was also the case in this study. The antagonism between the various groups did not come up during the workshops, although there were members of the different groups present, but was a prominent theme in the interviews. Conflict, defined as an incompatibility of beliefs, ideas, behaviours, roles, needs and values (Lewicki et al. 2006), is not always visible, as stakeholders develop strategies to deal with the situation and to protect themselves (Idrissou et al. 2013).

Dietz and Den Hartog (2006) describe different types or levels of trust which can shed some light on how systems and relationships can persist where there is a lack of “real” trust. Deterrence and calculus-based trust describe situations where there is either a fear of negative consequences if trust is violated, or there is the promise of reward if trust is preserved. These are somewhat linked to Stern’s “Procedural trust” which depends on control systems such as laws and contracts to reduce the risk associated with interactions, assuming that people comply with the control systems (Stern & Coleman 2015). In all these forms of trust, there is a need for a system of regulation, punishment or reward in order to coerce individuals to act in the desired way. From the interviews there was a sense that in some cases landowners and managers adopted certain management practices such as the Muirburn code or reducing deer numbers for fear of being reprimanded, or because of agri-environment payments. Through the interviews it was evident that they did not agree with some of these management practices, however. Although these forms of trust or pseudo-trust, resulted in compliance, they require effort and cost to sustain, either through continued reward, or through systems of enforcement.

In order to avoid conflict, and develop sustainable solutions to natural resource management problems, real trust must be developed. Dietz & Den Hortog (2006) describe one version of this as “knowledge-based trust” and define it as “when parties
can predict each other’s behaviour because they know each other’s motives and abilities”. Stern (2015) describes two forms of trust which are particularly pertinent to natural resource management (NRM) situations: rational trust and affinitive trust. Rational trust involves reciprocity and predictability and is very much based on past positive experience with the trustee. This form of trust is thought to be linked to security values and is particularly important in situations where people seek to protect themselves and their communities. Affinitive trust relates to perceptions of benevolence, integrity, shared values and social connectedness, and has been shown to be particularly important in natural resource management. Affinitive distrust can lead to conflict and protest (Stern 2008, Stern 2008, Stern 2010), while the presence of this form of trust can lead to greater support for decisions and prescribed practices (Cvetkovich & Winter 2003, Vaske et al. 2007). As was mentioned previously, the legacy of historic land use policies in these areas has been damaging to the development of trust between actors, and may have eroded rational trust in particular. The good relationships, on an individual level, would indicate the presence of affinitive trust, but the antagonism towards certain organisations still creates a barrier.

6.4.2 Self-identify and Place-identity

Landowners and managers indicated different priorities and incentives. While financial incentives were most commonly cited as incentives for involvement with projects and schemes, finance was not the most commonly stated priority. A large proportion of those interviewed considered financial incentives to be a means to an end and would describe a process of weighing up the effort involved in applying for funding, against the potential for funding other side projects through the same scheme. Indeed, a common incentive for signing up to a scheme, was that it allowed them to fund work that was already planned, or fulfil other objectives such as improving habitats, or providing jobs in the community. This attitude has been noted in a study of agricultural schemes by Wilson & Hart (2001) and another looking at private, not-for-profit forestry owners (Church & Ravenscroft 2008). Wilson and Hart
noted that the predominant motive for adopting a particular management practice is rarely financial, although scheme participation figures might suggest as much.

Strong themes of freedom and autonomy emerged when interviewees described what they valued about their occupation. These were often accompanied by expressions of joy at the ability to control and influence their environment. Many interviewees also mention frustration at policies and legislation which seemed to curtail their ability to manage their environment as they would like, and so limited their freedom and autonomy. These values form part of a landowner or manager’s self-identity, and such themes are reported in a lot of the natural resource management literature (Schneider & Niederle 2010, Kietäväinen 2014, Groth et al. 2016). Similar themes emerged in a study of farmers in Switzerland and New Zealand (Stock & Forney 2014) while the perceptions of a right to control their land, and to resist pressures from changing policies were identified as barriers to participation in environmental schemes by Church and Ravenscroft (2008) and Wilson and Hart (2001).

There was also a strong sense of identity associated with being a landowner, a farmer or a crofter. This was linked to heritage and legacy in some cases, others seemed to feel it innately, but there was often a sense of them playing a vital role in the functioning of the landscape. Many mentioned their role as custodians or stewards of the land, although productivity was mentioned as a priority by a large proportion of interviewees. Burton & Wilson (2006) write about the changing conceptualisation of agriculture from productivist (dominated by production of food and fibre) to post-productivist (increased emphasis on environmental sustainability), and whether this is reflected in the way farmers see themselves. They argue that, although this framework does depict recent changes in modern agricultural regimes relatively accurately, the focus has been mostly on structural exogenous factors or ‘indicators’ of agricultural change such as policy changes, and scheme participation, rather than on endogenous characteristics that should also occur such as changes in the attitudes, values and motivations of farmers. Their survey of farmers in Bedfordshire (UK)
indicated that farmers still identified themselves primarily in production-oriented terms. Interviewees in this study appeared to place some importance in their role as producers and land managers. This was evident when interviewees described feelings of pride when looking at well-managed forestry, or receiving compliments about the meat they had produced and was indicated by the commonly stated priority of productivity. The value of a healthy environment, of biodiversity and unique species was also mentioned frequently, as was the need for balance in management aims and practices.

Peatland areas are not capable of intensive agriculture and the estates and farms in these areas often have a number of different land use activities occurring, in order to make best use of the land and generate income. Many interviewees, whether they were crofters or landowners, had a source of income other than the land holding. It may be these characteristics of land management in peatland areas that produce a less productivist attitude.

Identity can often be linked to “place” and this is something that seemed to emerge from the interviews. Place is commonly defined by its adherence to three criteria: geographic location, material form and investment with meaning and value (Gieryn 2000, Theodori & Kyle 2013). In the case of this study, place refers to the landscape in which the interviewees owned and managed land, and, in the majority of cases, where they lived.

The landowners and managers that were interviewed described a feeling of belonging to the landscape that was often linked to their heritage, their community, and also to their perceived role in the landscape. There was great pride associated with being part of a tradition of land management in the region which had persisted over many generations. There was also great concern about the need to keep these traditions and this chain of land management going. The preoccupation with legacy was felt by incomers, and even those who did not own their land, as well as landowners with a longstanding history in the area. These themes converged to give a sense that these landowners and managers perceived their identity to be linked with that of the
landscape. The identity of the land required their presence and their management, just as they needed to be managing the landscape in order to preserve their identity.

6.4.3 Conclusion: Incompatible values and objectives?

Identity is a powerful behavioural influence and, as such, is an important consideration in collaborative management of natural resources. The previous discussions indicate that the landowners and managers interviewed in this study have a strong sense of identity linked to the landscape, their role as managers of that landscape, and their place in the community and history of the area.

Many of their actions could be seen to be primarily concerned with maintaining this identity by ensuring that they remain on the landscape. It was often said that the financial aspect of the landholding was important because, without money they could not continue to manage the land and carry out environmental improvements. These elements of their identity: legacy, heritage, community, autonomy, could, therefore, be thought of as linked to the transcendental value of security (Kenter et al. 2015). Through the maintenance of these traditions and practices, and if given the freedom to act in accordance with these and their experience of the land, they can then deliver the environmental, community and productivity benefits that they consider to be their duty.

Many environmental schemes, and peatland restoration in particular, have the potential to jeopardise some of the values listed above. Agri-environment schemes and the associated regulations limit the autonomy of a land manager. Peatland restoration may have the same result by restricting future management options, for 30 years if done in association with the peatland code. Peatland restoration may reduce the productivity of existing land use practices thereby risking the financial viability of the holding. In extreme cases there is the concern that peatland restoration will require the complete cessation of agricultural activities, and there will be little active management for the land manager to carry out. Indeed there were numerous comments from interviewees that policy makers and environmental NGOs were
trying to remove the human element of these landscapes and turn them into a “wildlife park”.

Although there are potential benefits of peatland restoration (improved water quality, improved vegetation cover and diversity, wildlife, income from carbon credits etc.) and these were recognised by interviewees, there was some doubt that these would be realised. There was also some reluctance to get involved with bankers and brokers, or to submit to more monitoring and greater involvement with environmental agencies.

These issues relate to the break down in trust described earlier on. As a result of historic policies, bad advice and negative encounters, policy makers, researchers and environmental officers are not well received. Although there have been, and continue to be developments in peatland research, so that advice and policy should point in the right direction, relations between these groups may not be so simple to fix.

The perceptions of what these landscapes should look like and the services they should provide to society do differ between groups of stakeholders. It is clear that landowners and managers consider it to be a landscape with features of human settlement and agriculture and should be managed in that way. There is a perception among landowners and managers that policy makers and environmental NGOs would like it to be a pristine, natural landscape with no sign of human beings. The interviews would suggest that there is a great deal of overlap regarding the environmental aims of these groups e.g. the desire to provide a habitat for rare birds, the desire improve water quality for fish populations but environmental organisations to have a different focus and a different set of priorities, and agricultural concerns are often secondary at best. The perception of incompatible values, as regards the landscape, leads to distrust. If we accept that the primary aim of landowners and managers is to remain on the landscape, actively managing it, then one can see great potential for conflict if these perceptions persist.
6.4.4 Recommendations

Lack of trust is a significant barrier to any changes in management or behaviour in these regions. Further workshops, with a wider range of stakeholders, and a focus on communication may go some way to solving this problem. Narrative techniques have been shown to have some success in this area.

Research into the impacts of restoration on existing land use activities is needed.

Better communication of current research and understanding of peatlands and peatland management is needed. This should take the form of face-to-face communication and site visits, as much as possible.

Landowners and managers demonstrated feelings of care and responsibility for the environment, and a strong desire to remain involved with its management. Efforts should be made to develop ways in which landowners and managers can still have an active role in land management. This could be through involvement in environmental monitoring as well as more active tasks.
# Analysis of policies relating to peatland management

## 7.1 Introduction

This chapter aims to analyse the appropriateness and efficacy of national government policy for the conservation and wise management of Scottish peatlands. It is based on a review of the policy documents, as they stand, and on experiences of the application of these policies, as expressed in the workshops, of those who have been at the receiving end.

Throughout the stakeholder workshops, "policy" was identified as a barrier to peatland restoration. An explanation may be due to confusion about policies relating to peat, and a mistrust of policy makers. The result is that landowners and managers feel unsure about where to access funding and were cautious of entering into new schemes and changing management practices, lest they find themselves on the wrong side of future policy initiatives.

A brief look at the history of land use policy relating to peatland areas can help to explain some of this concern (Figure 11). The pressures faced by peatlands are drainage, grazing and trampling, afforestation, cutting, wind farm developments, atmospheric pollution and climate change (see Chapter 1). These pressures can be linked to historic land use policies that encouraged poor land management, or a lack of regulation that allowed damaging activities to be carried out unchecked.

Warren (2009) describes the work of Smout (1993) who charts the evolution of 6 attitudes to the natural world, and relates it to the British and Scottish context. He states that the natural world has been seen as:

1. A resource for natural produce
   - Dominant attitude pre 17/1800
2. A resource for game sport
3. A resource for industry
   - Industrial revolution

169
Each ‘attitude’ is not necessarily superseded by the next, more that each dominates the discourse for a period. The first two ‘attitudes’ have dominated for most of human history, and along with the third, these perspectives certainly dominated land use policy objectives well into the 20th century (Warren 2009).

In this time there was a long running trend towards intensification of agriculture and the modification of landscapes to accommodate it, which accelerated in the latter half of the 20th Century following the Second World War (Bowers 1985). The post-war drive to ‘produce for the nation’ led to policies encouraging increasingly intensive farming practices, and the ‘improvement’ or reclamation of large areas of marginal land (Robinson & Sutherland 2002). These trends have exacerbated or caused the pressures on peatlands described in Chapter 1 (Bonn et al. 2009).

Since 1847 there have been policies encouraging digging ditches to drain land, and increase its productivity (Bowers 1998, Marsden & Ebmeier 2012). This peaked between 1940 and 1950 with 20,000ha of agricultural land being drained per year (Robinson 1990) although drainage activity was still encouraged through state subsidised schemes until the 1980s (Wheater & Evans 2009).

The UK joined the EU in 1972, and the agricultural sector has, since then, been subject to the regulation and subsidy programmes of the Common Agricultural Policy (CAP). The CAP farm payments were linked to production, so that farmers would receive more subsidies the more they produced (Warren 2009). Farm size, as well as productivity, increased with a number of negative consequences. The larger farms on better land, received the bulk of the payments, whereas smaller holdings on marginal land were still struggling (Evans & Morris 1997). The incentive to produce more led to environmental degradation and, in upland areas, this meant stocking densities

4. A space for recreational sport
5. A spiritual or romantic resource
6. A home for flora and fauna

\{ 1800-1900 \\ Post WWII - present \}
Figure 11 Timeline showing development of environmental policies, relevant to peatlands, at national, European and international level.
were well above the carrying capacity of the land and so peatlands were badly damaged (Bonn et al. 2009).

As well as agriculture, other land use based industries were encouraged with state subsidies or relaxed regulation, over this time. Tax breaks for those investing in forestry encouraged the afforestation of peat bogs throughout the 70s and 80s until their abolition in 1988 (Lindsay et al. 1988). The end of this tax initiative was achieved, in part, due to public outcry over the planting of the Flow Country peatlands after a campaign led by the RSPB and the Nature Conservancy Council (Marsden & Ebmeier 2012). The use of peat for horticultural compost was common until the 1990s until targets were set to phase out the practice. This was also achieved due to the efforts of the Peatland Campaign Consortium, a coalition of conservation organisations (Marsden & Ebmeier 2012).

By the 1980s there were huge food surpluses, and a process of CAP reform began in earnest in 1992, with numerous changes to the funding rules. Arable farmers were required to set aside 15% of their land, and livestock farmers were set stocking density limits, as conditions of payment (Winter 2000). It wasn’t until 2003, however, that the de-coupling of subsidy and production occurred. Over this time there was also a gradual shift in allocation of the CAP budget from Pillar I, farm payments, to Pillar II, agri-environment and rural development (Warren 2009). In 2007 the Scottish Rural Development Programme was introduced and, for the first time, non-farmers and non-farming activities were eligible for support through the CAP.

These examples show that policy has sent a clear and unwavering message to farmers and landowners for most of the 20th century, that their role was to produce and that this was the way to make a living (Lowe et al. 1993, Wilson 2001). The increasing influence of environmental groups on policy decisions can also be seen towards the latter part of the 20th Century (Smout 1993), as evidenced by the campaigns to stop forestry in the Flow country and phase out the use of peat in compost (Figure 11). In Smout’s description of attitudes to nature, one can see that in the 19th and 20th century, as a greater proportion of the population live and work in urban areas, the natural
environment is increasingly seen as a recreational and spiritual resource. This can be seen in the poetry of Wordsworth, the novels of E.M. Forster, the Wainwright Lake District guide books, and the increase in protected areas.

In the latter half of the 20th century, the principles of conservation began to make their way into the policy arena (Potter & Lobley 1998, Krebs et al. 1999). In 1948 the Nature Conservancy was established, making it the world’s first statutory nature conservation body. The National Parks and Access to the Countryside Act of 1949 introduced SSSIs (Sites of Special Scientific Interest) and NNRs (National Nature Reserves). In Scotland this act was strengthened and made into The Countryside (Scotland) Act 1967, imposing a conservation duty on public bodies. Following the UKs accession to the EU, a number of European agreements and directives aimed at nature conservation, as well as a host of global treaties with the same end, came into effect.

Since the introduction of agri-environment schemes and the second pillar of the CAP, the emphasis placed on environmental stewardship has grown, and the number and range of options in this category has increased. In the UK, environmental measures such as native woodland creation and peatland restoration, which are somewhat at odds with the traditional rural land use objective are now funded through the CAP (Wilson 2001). While the public attitude to the natural environment has changed considerably in the last 200 years (Smout 1993, Swanwick 2009, Warren 2009), the expectations and responsibilities that society places on landowners and managers has also changed but arguably over a shorter time, and at a faster rate (Hall et al. 2004, Primdahl et al. 2013). This change in societies’ expectation of landowners and managers is not necessarily matched by their own view of themselves and their role (see Chapter 3).

Most of the policy creation and policy changes have occurred recently, in the 6th iteration of Smout’s evolution of attitudes to nature. Warren (2009) describes this final ‘attitude’ as the scientific or ecological perspective, and characterises it as a time when policy decisions are based on research and evidence. Within this final ‘epoch’ there
have been a number of changes in the focus and priority of environmental policy, as well as the way it is framed and communicated, as different environmental problems and solutions come to the fore. Environmental policy has focused on pollution, conservation, biodiversity, sustainable development, climate change and carbon, ecosystem services and natural capital in the last 50 years or so (Crutzen & Arnold 1986, Lélé 1991, Gladwin et al. 1995, Howarth et al. 1996, Costanza et al. 1997, Lambeck 1997, Myers et al. 2000, de Groot et al. 2002, Parmesan & Yohe 2003, Solomon et al. 2009). Each trend appears to follow hot on the heels of the previous, and influences the focus of environmental policy accordingly.

The need for pollution prevention and regulation grew in the public consciousness throughout the 20th Century as prominent environmental issues such as smog, acid rain and eutrophication emerged (Likens et al. 1996, Correll 1998). Sustainable development was first cited as a global priority in the 1980 IUCN World Conservation strategy (IUCN 1980), and was a central tenet of the 1987 Brundtland report (Bruntland 1987). At the 1992 UN Earth Summit, the United Nations Convention on Biological Diversity was signed, and the concept of ‘biodiversity’ came to prominence. The concept subsequently found its way into many environmental frameworks, strategies and policies, and was considered an essential component of achieving sustainable development (Griggs et al. 2013).

Climate change and the need to reduce emissions of greenhouse gases, especially carbon dioxide and methane has shifted the focus of environmental policy and conservation again. Importance is placed on renewable energy generation and habitats and activities the can store or sequester carbon, and this is does not always go hand in hand with biodiversity needs. The traditional mind-set of conservation as an exercise in maintaining habitats in their current state, or returning them to a previous ‘pristine’ state, has also changed to considerations of resilience and adaptation in the face of an uncertain future.

In the previous paragraphs, environmental policies were often responding to environmental issues being faced at the time. In more recent times there has been a
growing understanding that environmental issues cannot be considered in isolation from each other or from society (Reed 2008). Following on from the concept of sustainable development, there have been a number of attempts at integrating social and environmental concerns. Carbon accounting and tradable carbon credits was seen as a way of including a number of environmental benefits under the carbon banner, and incorporating them into the market value system (Lövbrand & Stripple 2011). Payment for ecosystem services, and the concept of natural capital follow a similar principle but provide a more nuanced and inclusive valuation of the environment (Gómez-Baggethun et al. 2010).

Each of the concepts or trends that have dominated environmental policy and discourse, although concerned with a similar endeavour, has had a slightly different focus or priority. Like a wobbly hand trying to home in on a point, none of them have quite hit the mark. Pollution can be fairly easily measured and regulated (Berry & Rondinelli 1998, Foulon et al. 2002), but is a blunt instrument that falls short of today’s environmental needs (Dunlap et al. 2000). Biodiversity is similarly easy to measure and monitor, and is broader in its remit (DeLong 1996, Norton 1998, Van Weelie & Wals 2002). The concept suffers when it comes to public engagement, however, and many feel unsure about why it actually matters (Pearce 2007, Warren 2009). Carbon accounting and sequestration suffers from the same problem. Although it fits into economic markets more easily, it is an intangible asset and difficult for a land manager or member of the public to appreciate (Spaargaren & Mol 2013, Whitmarsh et al. 2013). Ecosystem services and natural capital concepts are faring better in this regard as the range of ‘services’ and so habitats and sections of society affected by the environmental issues in question, is greater and so there are more opportunities for effective communication (Dempsey & Robertson 2012, Paudyal et al. 2016, Thompson et al. 2016).

These successive changes in focus of environmental policy have been reflected in changes to the CAP, the associated agri-environment schemes and the terminology used to describe and justify them. The result is that, not only is the land owning and
managing community adjusting to their new responsibilities, but they are also having to interpret these responsibilities through rapidly changing frames.

As it becomes apparent that a healthy environment is essential for economic and societal wellbeing, environmental considerations and policies have made their way into many sectors and parts of life (Warren 2009). The number of policies and regulations that landowners and managers have to consider is fairly extensive (Bonn et al. 2009, Warren 2009).

For a landowner or manager navigating these policy changes, the shift in focus and associated jargon, and the sheer number of policies might be considered at best wearisome, at worst confusing and irksome.

In peatland areas the situation is arguably worse. Peatlands do not have a policy sector of their own, but are influenced by policies relating to agriculture, biodiversity, water, forestry, planning and climate change. As mentioned previously, the activities required for good peatland management or restoration are specific, often run counter to traditional agricultural practice and popular conservation practice?? (such as forestry), and the advantage to be gained from undertaking such work can be difficult to see. This is especially significant as many peatlands are in areas of marginal land where the economic balance of many land use activities is precarious.

An analysis of policy relating to peatlands may go some way to solving some of these issues. This chapter aims to:

- Look at policies relating to peatlands and the terms in which peatlands are described or considered
- Assess how well policies are integrated across and within the different sectors
- Identify gaps, conflicts and barriers in the policy, as it relates to peatlands.
- Determine the implications of good peatland management and restoration for land owners and managers
7.2 Methods

A review of policy relating to peatland management in Scotland was conducted. In this study ‘policy’ is defined as a course of action adopted or proposed by an organisation. The review was carried out following the stages, outlined below.

1. Initial Policy Review

The ‘Topics’ sections of the Scottish Government website were used as a structure for the policy review. A brief look through each ‘Topic’ page, determined which of these were likely to be pertinent to peatland management. These topics provided the focus for the subsequent review. The policies and reports within each topic were read, and notes were written on the relevant information therein. Any links to other sources of information were followed and the information recorded in the same way.

2. SWOT Analysis and Questionnaire

The main points from the Initial Policy Review were summarised in a SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis format. A questionnaire was produced to accompany the analysis. These were to be handed out to people working in peatland policy. The aim of this questionnaire was to determine whether there were any mistakes or omissions in the policy summary and to identify which points were considered important by policy experts.

3. Peatland Policy Workshop

A workshop entitled ‘From Policy to Practice - Peatland Restoration and Integrated Land Use’ was organised by Scottish Natural Heritage. Twenty-eight delegates attended, all invited because of their experience with peatland policy. The organisations that were represented can be seen in Table 9.
### Table 9 Organisation and role associated with delegates in attendance at the SNH workshop "From Policy to Practice - Peatland Restoration and Integrated Land Use"

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Role</th>
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<tbody>
<tr>
<td>SG Directorate for Environment &amp; Forestry</td>
<td>Environmental Quality Division</td>
</tr>
<tr>
<td>SG Directorate for Environment &amp; Forestry</td>
<td>Natural Resources Division</td>
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<tr>
<td>Climate Xchange</td>
<td>Knowledge Manager</td>
</tr>
<tr>
<td>Forest Enterprise Scotland</td>
<td>Environment Manager</td>
</tr>
<tr>
<td>Forestry Commission Scotland</td>
<td>Policy Support on Soil and Water</td>
</tr>
<tr>
<td>Forestry Commission Scotland</td>
<td>Senior Operations Manager</td>
</tr>
<tr>
<td>South Lanarkshire Council</td>
<td>Countryside and Green Space Manager</td>
</tr>
<tr>
<td>Ancient Monuments</td>
<td>Senior Heritage Management Officer</td>
</tr>
<tr>
<td>Scottish Natural Heritage - Geodiversity - Uplands &amp; Peatlands</td>
<td>Group Manager</td>
</tr>
<tr>
<td>Scottish Natural Heritage</td>
<td>Land Use Policy &amp; Advice Manager</td>
</tr>
<tr>
<td>Scottish Natural Heritage - Freshwater Policy</td>
<td>Senior Advisor</td>
</tr>
<tr>
<td>Scottish Environmental Protection Agency</td>
<td>Senior Agricultural Officer</td>
</tr>
<tr>
<td>Scottish Environmental Protection Agency</td>
<td>Scientist</td>
</tr>
<tr>
<td>Scottish Land and Estates - (Environment)</td>
<td>Policy Officer</td>
</tr>
<tr>
<td>Forestry Commission Scotland</td>
<td>Open Habitats Ecologist</td>
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<tr>
<td>Forest Enterprise Scotland</td>
<td>Open Habitats Ecologist</td>
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<tr>
<td>Scottish Natural Heritage</td>
<td>Peatland Action Project Manager</td>
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<tr>
<td>Moorland Forum/Heather Trust</td>
<td>Director</td>
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<tr>
<td>Scottish Wildlife Trust - South of Scotland</td>
<td>Reserve Manager</td>
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Notes were taken during the workshop presentation and discussion. The summaries and questionnaires were distributed. Some were filled in during the workshop, some were used to initiate further discussion.

4. Semi-structured interview with policy experts

The delegate list from the workshop was used to contact participants. Although many participants had been given policy summaries and questionnaires at the workshop, copies were also sent by email. Some participants filled in the questionnaire and emailed or posted it back. Others preferred to speak over the phone. With these participants, the discussion took the form of a semi-structured interview, with the questionnaire providing a structure for the discussion. Notes were taken throughout these discussions.

5. Second Policy review
Based on the workshop, questionnaire responses and telephone conversations a second policy review was conducted. This review concentrated on gaps identified and details that needed to be checked.

6. Analysis and synthesis

The overarching strategies, frameworks and plans pertinent to peatlands were organised into a hierarchy. Each was described and discussed in terms of its consideration of peatlands. As a way to formalise this process and elucidate the results, a number of text searches were carried out to determine in what context peatlands were discussed in each of the documents. The text search was carried out, starting with more specific searches and, if those proved unfruitful, moving on to broader search terms. A flowchart describing the process can be seen in Figure 12.

The policies were also organised by sector (transport, agriculture, industry, health, etc.), and in terms of the policy instrument being used. The idea was to demonstrate which policy instruments are used often, and which are not, and whether this is related to the sector in question.
Figure 12 Flowchart showing the method used to analyse policy documents for mentions of peat
7.3 Results
7.3.1 Policy review

The National Performance Framework was established in 2007. It sets out the Scottish Government’s Purpose, Strategic Outcomes and Targets, as well as a list of Indicators by which to monitor progress. All government departments, bodies and policies, must align with the Framework. The Framework sets out a 10 year strategy, but was reviewed in 2011 and 2016.

There are a number of National and Sectoral strategies, plans, frameworks and policies which set out more detailed aims and actions geared towards achieving the outcomes set out in the Framework. Chief among these is the Economic Strategy which sets out a more detailed vision for Scotland’s economic future. The next sections will describe the various policies relating to peatlands, starting with the national, more ‘broad brush-stroke’ initiatives, through sectoral policies and specific regulations and schemes. An overview of how these policies relate to each other can be seen in Table 10

7.3.2 Scottish Government National Plans, Frameworks and Strategies

This section will describe the second row of Table 10; the national plans, frameworks and strategies. These tend to set out broad objectives and principles to guide the creation of more specific policy.

The Economic Strategy

The first economic strategy was published in 2007 (ScotGov 2007). This set out five strategic objectives, one of which was to “Improve Scotland’s natural and built environment and the sustainable use and enjoyment of it”. The natural environment is subsequently mentioned mostly with regard to sustainable economic growth and inter-generational equity. It is under the “Equity” objectives that the government’s intention to consult on a Climate Change Bill was set out. This is the most significant environmental measure in the entire strategy. The environmental focus of the 2011 Strategy is the development of a Low Carbon Economy (ScotGov 2011). There is a great deal of discussion about renewable energies and efficient use of natural
resources, but little mention of environmental protection or valuation. The latest Economic Strategy, published in 2015 (ScotGov 2015) discusses natural capital, as well as resource efficiency and a low carbon economy. Natural Capital indicators are now included in the National Performance Framework (ScotGov 2016). In this edition the quality of air, water, biodiversity, soil and geological resources are mentioned, along with their implications for agriculture, forestry, fisheries, tourism and renewable energy.

Low Carbon Scotland

‘Low Carbon Scotland: Meeting our emissions reduction targets 2013-2027’ (ScotGov 2013) is the second report on proposals and policies for meeting the country’s climate change targets. It sets out how Scotland can deliver the statutory annual greenhouse gas emissions targets, set out in the Climate Change (Scotland) Act 2009, for the period 2013-2027. The report outlines emissions reductions over six sectors: Energy, Homes and Communities, Business, Industry and the Public Sector, Waste and Resource Efficiency and Rural Land Use.

Rural Land Use refers to agriculture and related land use, forestry and peatland restoration. Woodland expansion and peatland restoration are described as ways of increasing natural carbon sequestration, while emissions are thought to arise from livestock, animal wastes, agricultural soils and certain land use changes. The policies (courses of action which have been wholly or largely agreed upon) for addressing these issues are the Farming for a Better Climate (FFBC) scheme and an increase in afforestation rate. Accelerated peatland restoration, with a target of up to 21,000 ha per year is a proposal for addressing emissions from this sector, among others. A proposal is defined as a suggested course of action, details of which might change.
### National Performance Framework

The NPF sets out the Scottish Government’s Purpose, Strategic Outcomes and Targets, as well as a list of Indicators by which to monitor progress. All government departments, bodies and policies, must align with the Framework.

### Scottish Government National Plans, Frameworks and Strategies

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<tr>
<td>Sets out a vision for the economy.</td>
<td>Aims to make land use and ownership more equitable</td>
<td>Sets out the policies and proposals that will enable Scotland to deliver the statutory annual greenhouse gas emissions targets, set out in the Climate Change (Scotland) Act 2009</td>
<td>Aims to guide decision making in a way that will lead to sustainable use of Scotland’s land resource.</td>
<td>Along with sectoral action plans and a Risk Assessment, sets out the risks and opportunities climate change presents and a strategy for sustainable adaptation</td>
<td>Puts the principles of the economic strategy into the context of development planning.</td>
</tr>
<tr>
<td>5 Strategic Objectives for the Economy.</td>
<td>A land register with information on who owns land in Scotland will be produced</td>
<td>A target of restoring 21,000 ha of degraded peatlands per year is suggested as a way of meeting these targets</td>
<td>Sets out a vision, objectives and principles for land use, along with policies and proposals for achieving them.</td>
<td>The CCA Programme, which builds on these, cites peat restoration as a priority.</td>
<td>Peatlands are described as important habitats.</td>
</tr>
<tr>
<td>The 2007 Economic Strategy</td>
<td>Targets to increase the amount of land in community ownership.</td>
<td>Deer management will be more regulated and sporting rates introduced.</td>
<td>Makes use of the ecosystems approach and discussed peatlands in these terms</td>
<td>The restoration target set out in Low Carbon Scotland is reiterated.</td>
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<td>Peatlands are mentioned as a habitat and store of carbon.</td>
<td>Natural capital is discussed in the 2015 Economic Strategy.</td>
<td>Natural capital indicators are now used in the NPI.</td>
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### Sectoral Plans, Policies and Strategies

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<td>Sets out a vision for soil protection.</td>
<td>Sets out forestry development in the next decades.</td>
<td>With the 2020 Challenge forms Scotland’s Biodiversity Strategy Response to the EU Biodiversity Strategy for 2020 and the UN ‘Aichi’ targets.</td>
<td>The National Capital Asset Index is used to monitor progress.</td>
<td>Aims to focus action on areas that need the most attention.</td>
<td>The act sets out the function and powers of local authorities in terms of flood risk management.</td>
<td>An SRUC scheme to help farmers find practical ways to reduce carbon emissions from their farms, adapt to climate change, and increase profitability.</td>
<td>Mechanism for delivering Pillar II of the Common Agricultural Policy in Scotland.</td>
<td>Outlines the vision for the future of Scottish agriculture.</td>
<td>Outlines the justification for the restoration and conservation of peatland.</td>
</tr>
<tr>
<td>Formally acknowledges the services soils provide to society.</td>
<td>Providing multiple benefits, for a wide range of people is a priority.</td>
<td>The importance of peatlands, and the threats they face are discussed.</td>
<td>SRDP is described as the means for achieving restoration targets.</td>
<td>The act stipulates the need for flood risk maps and management plans.</td>
<td>It stipulates the need for flood risk maps and management plans be produced.</td>
<td>Achieved through case studies, practical guides and focus farms.</td>
<td>An SRDP scheme.</td>
<td>Aims to encourage discussion and elicit feedback from stakeholders with a view to helping to inform future policy directions.</td>
<td></td>
</tr>
<tr>
<td>Provides an overview of policies relating to soil.</td>
<td>Peat bogs are cited as important habitats and carbon stores.</td>
<td>Peatland benefits are discussed.</td>
<td>Need for coordination stated.</td>
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<tr>
<td>Peatlands are mentioned as a habitat and store of carbon.</td>
<td>Tree removal is justifiable if forest is on peatland.</td>
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Table 10 An overview of national and sectoral policies relevant to peatlands, and how they link together
Scottish Climate Change Adaptation Framework

The Scottish Climate Change Adaptation Framework, (2009), aims to present a national, coordinated approach to ensure that Scotland understands the risks and opportunities climate change presents and is adapting in a sustainable way. The Framework is divided into three pillars:

- Pillar I: Provide the evidence base
- Pillar II: Equip decision makers with skills & tools
- Pillar III: Integrate adaptation into regulation & public policy

A series of Sectoral Action Plans were published alongside the framework, describing the current situation, aims and duties of each sector.

The UK Climate Change Risk Assessment (UKCCRA), (2012), is a key initiative highlighted in Pillar I. The Risk Assessment discusses more specifically the impacts of climate change on different sectors and the actions being taken by the UK government as well as each of the devolved governments. The sectors discussed are Agriculture & Forestry; Business; Health & Wellbeing; Buildings & Infrastructure; and Natural Environment.

Peatlands and wetlands are not mentioned specifically but many of the risks and proposals mentioned in the Agriculture and Forestry, and Natural Environment sections will have implications for peatlands. Flooding, water quality and water scarcity are considered to be risks in all sectors. Peatland management has significant implications for the water environment, but is not recognised as such.

Pillars II and III describe more broad aims to do with climate change, but do not go into specifics about particular sectors or policies.

The Scottish Climate Change Adaptation Programme (2014), builds on the evidence provided by the UKCCRA and the Sector Action Plans to lay out government aims and objectives relating to climate change, and a plan for how to achieve them.
The Adaptation Programme is also divided into three parts: Climate Ready Natural Environment, Climate Ready Buildings and Infrastructure, Climate Ready Society. The sectors described in the UKCCRA (Agriculture, Biodiversity and Ecosystem Services, Flooding and Coastal Erosion, Forestry and, Marine and Fisheries) are discussed together, in Climate Ready Natural Environment, recognising that they are inter-related.

In the introduction to that section, the risk to peat bogs from climate change is identified and protecting and enhancing Scottish peatlands is described as a key priority. The importance of maintaining the peatland carbon store, the increased resilience of a natural bog and the need to understand how to manage peatlands in a changing climate are all mentioned.

Peatlands are not mentioned in subsequent tables describing the policies that will be used to achieve the objectives set out previously. Agriculture, forestry, the marine and coastal environments, rivers and flooding are all mentioned explicitly, multiple times throughout the policy section. There are some general policies relating to research and awareness raising that are pertinent to peatlands. Policies aimed at agriculture, forestry and rivers will have a direct impact on peatlands.

**National Planning Framework 3 (NPF3)**

The NPF3 describes peatlands as important habitats for wildlife and a significant store of carbon (ScotGov 2014). The increased rate of restoration (22,000ha per year) set out in Low Carbon Scotland is re-iterated, with the National Peatland Plan tasked with guiding and planning the process.

**Land Rights and Responsibility Statement**

In November 2014, the First Minister, as part of the Programme for Government, set out the Scottish Government’s vision that Scotland’s land must be an asset that benefits the many, not the few (ScotGov 2014). An important part of the Bill is to improve the transparency of land ownership in Scotland. This will be achieved through the creation of a land register for the whole of Scotland, which is to be
completed in the next ten years. Clearer information on land ownership, and its value is predicted to help with making decisions about land management and land use. The bill aims to increase the amount of land that is managed for the common good, by placing more conditions on land ownership e.g. a duty of community engagement.

Another central tenet of the land reform bill is to increase the amount of land under community ownership through the community empowerment bill and the Scottish land fund. Measures have also been proposed to improve the relationship between tenants and landowners.

The business rate exemption that applied to sporting activities, will cease and be replaced with sporting rates. It is hoped that this will increase revenue to local councils.

Wild deer in Scotland are not owned, but the right to take or kill deer rests with the owner or occupier of the land. There is no legal obligation on landowners or occupiers to manage deer, and it is currently done on a voluntary basis. The bill proposes that extra powers be given to SNH so that landowners might be more easily obliged to manage the deer on their land.

**Land Use Strategy**

The Land Use Strategy was produced in response to a requirement set out in the Climate Change (Scotland) Act 2009. The first strategy was published in 2011 (ScotGov 2011). After a consultation and review process the second strategy was published in 2016 (ScotGov 2016).

The aim of the Land Use Strategy is to help individuals and organisations to make decisions that will lead to sustainable use of Scotland’s land resource. It sets out one vision, three objectives and ten principles to define and elucidate the strategy and follows this up with proposals and policies intended to bring the various land use sectors in line with it.

The main body of the strategy is divided into four parts: Land Use and Business; Land Use and the Environment; Land Use and Communities and a section on ‘Delivering
the Land Use Strategy’. The need for an integrated approach to land use planning and decision making is re-iterated throughout. Peatlands are mentioned in ‘Land Use and Business’ in relation to forestry and woodland expansion and renewable energy. It is noted that both of these activities should take place where appropriate and that peatlands, and the carbon they store, should be taken into account. The importance of conserving and restoring peatlands as a way of mitigating climate change is described in ‘Land Use and the Environment’ and the desire to develop methodologies to enable changes in carbon from carbon-rich soils to be included in national inventories is described. Wetlands are mentioned in relation to flood risk management. Adopting an ecosystems approach and preserving ‘natural assets’ is discussed.

The first Land Use Strategy should be thought of as a starting off point for the subsequent strategies that will guide land use until 2050. As such the section on ‘Delivery’ and ‘Proposals’ mainly describes how things will proceed over this time period i.e. action plans, progress reports, aligning sectoral policy with the strategy, encouraging partnerships and collaboration among the relevant stakeholders.

The second, and most recent, strategy has kept the vision, objectives and principles as the first, but is more specific in its descriptions of how to achieve these. The ecosystems approach to land use, viewing the landscape in terms of natural assets is mentioned throughout the document as the way to aid decision making.

Peatlands are mentioned throughout the document: in Land Use and Business as an example of ecosystem services enjoyed far from their source; as an example of a natural asset; as a land use that could benefit from the proposed regional land use framework. The strategy ends with a set of proposals for the coming five years. One of these is to produce a strategic vision for the uplands. The peatland plan is mentioned as document that will contribute to this strategy.

There have been two land use strategy consultations, one prior to each publication (ScotGov 2011, ScotGov 2016) and a land use strategy evaluation (2014), undertaken
between the two publications. The consultation was open to the public, individuals and organisations were invited to respond. The evaluation focused on eleven case studies covering a broad range of land uses and issues. A number of key themes emerged:

In the first consultation, the strategy was criticised for a lack of clarity, detail and measurable commitments. There was also a call for more cross-referencing and integration between the various strategies and policies. In the second consultation, the strategy was considered to be clear, but the hierarchy of policies and the nature of the connections between them was thought to need improvement.

In the evaluation, a number of the barriers identified were related to decision making. This is something that also came up in the second consultation. It was felt that clear priorities and guidance was needed so that land managers can navigate the inevitable instances when there are land use conflicts.

The need for education, training and awareness raising was raised in the first consultation. In the evaluation, land manager skills, awareness and training as well as public awareness of land use issues were mentioned as barriers to adopting land use strategy principles. These themes were still present in the second consultation, but related specifically to the use of GIS and spatial models, and the need for landowners and managers to understand the ecosystem approach.

The importance of a system of incentives and regulations, and the funding to support them was mentioned in all three documents.
Main Findings: National Frameworks and Strategies

- Although a number of these national frameworks and plans cite peatland restoration as a priority, peatlands are often absent in discussions of the actions and policies suggested for achieving goals.
- That said, the target of restoring 22,000 ha of degraded peatland per year is mentioned in ‘Low Carbon Scotland’ and ‘National Planning Framework 3’.
- The 2007 Economic Strategy set in motion the creation of the Climate Change Scotland Act, which in turn set out the requirement for a Land Use Strategy and the Low Carbon Scotland Report.
- The Land Use Strategy mentioned peatlands throughout, and calls for the production of a Strategy for the Uplands.
- Consultations for the first and second Land Use Strategies have described the need for increased effort in education and training for land managers and awareness raising for the public.
- The need for clear priorities to aid decision-making was also mentioned in the consultation.
7.3.3 Sectoral Plans, Policies and Strategies

Peatland management is influenced and dictated by policies in a number of different sectors. This section will describe the policies, schemes and initiatives that have an effect on peatlands. They will be discussed according to the sectors that they relate to, namely agriculture, forestry, biodiversity, fresh water and soil. Figure 13 shows how these policies fit in with the national frameworks and strategies mentioned in the previous section. The various ways in which peatlands are considered can be seen by assessing in what terms peatlands are discussed.

Agriculture

The discussion document “The Future of Scottish Agriculture” sets out the Scottish government’s vision for a more profitable, more resilient and more environmentally conscientious agricultural sector (ScotGov 2015). The document is brief and does not discuss specifics of delivery mechanisms. That Scotland should be a world leader in green farming is listed as one of the nine desired outcomes. A focus on natural assets and ecosystem services is discussed as the means of achieving this.

Farming for a Better Climate is an initiative set up by the Scottish Government and run by Scotland’s Rural Agricultural College. Its purpose is to come up with practical measures and to suggest ways for farms to reduce greenhouse gas emissions while strengthening farm businesses to make them more resilient to climate change. As part of the programme, Focus Farms have been set up which show how this best practice can work on a real farm. Most of the measures are geared towards arable, dairy and mixed beef and sheep farming.

The Monitor Farm Programme is funded by the Scottish government but is separate to the CAP and the other agri-environment schemes. Monitor Farms are normal, commercial farms that are typical for their area - this helps other farmers in the group benefit from the lessons learnt. The monitor farmer opens up the business to a local group who become involved in the decision making process for the farm. Assisted by a facilitator and a community group of farmers, the farmer sets an agenda to improve the profitability, productivity and sustainability of the farm business over the three
Figure 13 Context in which peatlands are discussed in the national and sectoral strategies, frameworks and policy
years of the project. There are few monitor farms in upland regions, and none of them deal with peatlands.

**Common Agricultural Policy**

The European Union Common Agricultural Policy is delivered through two pillars. Pillar I provides support to farmer’s incomes, in the form of direct payments and market measures. In Scotland, Basic Payments are the mechanism for providing this income supplement. In order to receive Basic Payments, a farm holding must also comply with Greening requirements and Cross Compliance regulations, as well as meeting eligibility criteria.

Pillar II provides support for the development of rural areas. In Scotland this is delivered through the Scottish Rural Development Programme. It funds economic, environmental and social measures for the benefit of rural Scotland.

**Basic Payment (Pillar I)**

Throughout the workshops and interviews there was a concern that by reducing or removing stock from certain parts of their land, farmers would no longer be eligible for Basic Payments. This is a significant portion of a farmers’ income.

Only eligible hectares can be considered for Basic Payments. An eligible hectare is defined as any agricultural area of the business that is used for an agricultural activity. The Minimum Agricultural Activity Requirement differ depending on the “Region” that the land is in. Region one is better quality agricultural land used for arable farming or permanent pasture. Regions two and three cover land used for rough grazing. In these regions, the land is considered to be ‘naturally kept in a state suitable for grazing’, and so must maintain a minimum stocking density in order to be considered eligible for payment.

The minimum stocking density is 0.05 LU/ha for 183 days in each scheme year. This equates to 1 sheep for every 3 hectares, and is calculated as an average for the area of eligible land. A lower stocking density is acceptable if there is evidence that the carrying capacity of the land is lower than the stipulated minimum stocking density.
If the land is part of an environmental management agreement with SNH, or an agri-environment scheme, which precludes a higher stocking density, this land can also be exempt from the minimum stocking requirements.

As an alternative to the minimum stocking density, a farm can undergo an annual Environmental Assessment. It is also possible to do a combination of both, as long as there is some activity occurring on all land in the application.

**Ineligible features**

Ineligible features are land types that prevent the land meeting the eligibility criteria i.e. prevent the land being used for an agricultural activity. The areas of land containing these features must be deducted from the land area submitted in the application. The following ineligible features may have implications for peatland restoration:

- Water features e.g. lochs, lochens, rivers, ponds
- Vegetation such as gorse, bracken, scrub, tall heather
- Foreshore and marsh

Activities which lead to a greater proportion of the land area being covered by ineligible features, would reduce the Basic Payment received, and so may be unattractive to landowners or managers. Peatland restoration may increase the area of standing water. This is not always the case, and the aim is often to raise the water table without creating pools as they emit methane. Many landowners and managers do, however, imagine that their land will become a swamp or lake as a result of restoration.

There are ‘hard’ and ‘soft’ ineligible features. Hard features are those that prevent the land being suitable for agriculture e.g. a building. Soft features are those where the suitability for agriculture is less certain e.g. bracken. Dense bracken might prevent sheep accessing a proportion of a field.
Ponds, rivers, streams or lochs are hard features. Scrub, bracken, trees and marsh are soft features.

With soft features, the landowner must assess to what degree that feature prevents the land being used for agriculture. There is considerable scope for variation in interpretation here. The extent to which the feature prevents the land being actively farmed, and so renders the land ineligible for basic payment, is ultimately judged by inspectors from the Scottish Government Rural Payments and Inspections Directorate (SGRPID).

It is unclear whether the stocking density is based on the land area before or after the ineligible area has been deducted. If this is calculate incorrectly a landowner or manager might find themselves to be ineligible for basic payment. The consequences of this can be quite serious:

“if land parcels are declared for payment that are found not to be eligible this will be treated as an over-declaration and all area-based payments due (Basic, Greening and Young Farmers) will be subject to penalties. In extreme cases, this will mean non-payment or recovery of all Direct Payment for the year concerned and the following year” Basic Payment Scheme Guidance, Agriculture, Food and Rural Communities Directorate

As the regulations and procedures for claiming CAP subsidies are confusing and time-consuming, it is common practice for landowners and managers to hire a consultant to carry out the work. The consultant will not necessarily be there during the inspection process, leaving the landowner or manager to defend the claims they have made in their application. Depending on how much they have been involved in the application process, they may not be well enough equipped to do this.

The actual regulations governing Basic Payment eligibility do not pose a problem for peatland restoration, as the minimum stocking density is very low and it is possible to get exemptions from the rules if SNH considers this to be appropriate. Far more damaging, to the cause of peatland restoration is the fear of inspectors, the confusing
nature of the rules and the way they are communicated, and the risk associated with making a false claim.

Scotland’s Rural Development Programme (Pillar I)

There are a number of schemes available under Scotland’s Rural Development Programme (SRDP), covering a range of farming practices and land use types. The Agri-Environment Climate Scheme contains most of the options that would be relevant for peatland management. This scheme promotes land management practices which aim to improve water quality, manage flood risk and mitigate and adapt to climate change. Funding is available for Management Options and associated Capital Items.

The Management Options relevant to peatlands are as follows:

- Moorland Management
- Wetland Management
- Lowland Bog Management
- Management of Buffer Areas for Fens and Lowland Bogs

Annual payments are received for each management option throughout the 5 years of the scheme. There are also a set of management requirements for each option. These requirements stipulate stocking regimes and burning regimes, forbid tree planting and drainage and demand a deer management plan and peatland restoration plan, among other things. In the case of lowland bog management, certain capital items must be included in the application i.e. ditch blocking and control of scrub or woody vegetation.

The capital items, pertinent to peatlands restoration and management, which are covered through SRDP are as follows:

- Ditch blocking with peat dams or plastic piling
- Moving or realigning ditches
- Matting to prevent damage to the bog
- Stock bridges
• Control of shrub or woody vegetation
  o Primary treatment for light vegetation or intermediate/heavy vegetation
  o Follow up treatment
  o Removal of the cut vegetation from the site
• Muirburn and heather cutting
• Upland habitat impact assessment for deer management
• Enhancing/modifying deer/stock fence
• Deer census

Actual costs of capital items are only paid for SSSI or Natura sites. In all other cases ‘standard’ costs are paid.

Funding is not available for the restoration of bare peat, as the techniques used and the equipment required are too variable. This means that delivering grants, and auditing projects is more complicated and time consuming. A summary of the funding options available can be seen in Box 1.

Environmental Co-operation Action Fund
Collaborative applications for the agri-environment climate scheme are viewed favourably. The Environmental Co-operation Action Fund supports the costs of planning and facilitating deer management or habitat and ecosystem restoration projects. In order to be eligible for this fund, the application must involve an existing group of land managers with a track record of working together. It is unclear how a ‘track record’ is defined or, indeed, ‘an existing group’. Requiring that applicants have undertaken project together previously, may exclude and discourage new groups or partnerships. As the eligibility description is ambiguous, it may give the impression that considerable experience is needed, when that may, in fact, not be the case.

Knowledge Transfer and Innovation Fund
The Knowledge Transfer and Innovation Fund has two aims. Firstly, to promote skills development and knowledge transfer in the primary agricultural sector. This is to be
achieved through providing funding to organisations to deliver vocational training, coaching, workshops, courses and farm visits designed to develop skills and transfer knowledge.

The second is to deliver on-the-ground improvements in agricultural competitiveness, resource efficiency, environmental performance and sustainability. This will be achieved through meeting the running costs of operational groups seeking to implement innovative projects in these areas. Operational groups can be made up of different individuals or organisations within agriculture who are working collaboratively.

**LEADER**

LEADER is a grassroots method of delivering support for rural development through implementing Local Development Strategies. Support is awarded by 21 Local Action Groups (LAGs) and is aimed at local projects with a wide community benefit that show an element of originality or experimentation, where possible, and complement other activities within the Local Development Strategy.
Box 1. Alternative funding options

**Heritage lottery fund: Landscape Partnerships Programme**

The heritage lottery fund offer grants of £100,000-£3,000,000 to schemes led by partnerships of local, regional and national interests which aim to conserve areas of distinctive landscape character throughout the UK. Not-for-profit organisations, or partnerships led by not-for-profit organisations are eligible to apply. The partnership should be made up or local, regional and national organisations as well as the local community.

**EU LIFE Programme**

There are a number of schemes through the EU LIFE programme which might be used for funding peatland restoration or related projects. These are; Climate Change Mitigation, Adaptation, Governance & Information, Environmental Governance & Information and LIFE Nature & Biodiversity. Public bodies, private commercial organisations and private non-commercial organisations, registered in the EU, are eligible to apply. There is no upper or lower limit to the amount that can be applied for, but it is noted that applications for less than 500,000 EUR are seldom granted, as the potential outputs of the project are limited. The EU LIFE programme will co-fund up to 60% of a successful project application.

**The IUCN Peatland Code**

The IUCN Peatland Code provides a mechanism? To facilitate private funding for peatland restoration projects, enabling the funder to cite the project as part of their corporate social responsibility commitments. It is hoped that, in the future, it will be possible to claim and trade carbon credits as a result of peatland restoration work.

The code provides funding for a range of project sizes and applicants, and is not prescriptive about the sort of work that can be funded. The particulars of the arrangement depend very much on the parties involved, and the carbon savings or wider environmental benefits that can be delivered.

In order to gain funding through the peatland code a fully costed peatland restoration plan must be produced. It is likely that some assistance from a consultant would be needed, and this may incur a considerable capital outlay. Although these costs can be factored into the project cost, and claimed back when the project is funded, there is no guarantee that the application will be successful.
Peatland Action

The Peatland Action project was started September 2012, with £5 million from the Scottish Government Green Stimulus Package. The remit of Peatland Action was that it should deliver:

- Restoration and management of peatlands in order to maintain carbon stores, encourage carbon sequestration and restore peatland ecosystem functions;
- Build peatland restoration capacity and understanding amongst land managers, contractors, advisors and the public.
- Disseminate knowledge and expertise on peatland restoration

Another £3 million was awarded to peatland action in June 2015. In 2016 it was decided that the money allocated for peatland restoration should be delivered through SRDP, and funding for Peatland Action was terminated. During the time that it was operational, Peatland Action was able to restore approximately 8,500 ha of degraded peatbogs across 150 sites and helped to run over 200 restoration projects.

Peatland Action employed project officers in regions around Scotland. These were often people who worked for environmental organisations in those regions already e.g. the Cairngorms National Park Authority, the Crichton Carbon Centre, the Tweed Forum, and so were known by land owners and managers in the community already.

These project officers would visit landowners and managers and discuss options for peatland restoration on their land. They also organised demonstration events in each of their regions to show what the land looked like before and after restoration, and give an idea of techniques that might be used. If there was interest in carrying out restoration work, the project officer would help with the project planning, negotiating with communities and neighbouring landowners, any funding applications, tendering for contractors, securing permits and licenses, negotiating designation regulations, and ensuring the work was done correctly. Project officers were also open to facilitating larger projects involving multiple landowners and larger grants offered through the Peatland Code, HLF and EU LIFE.
Peatland Action have said that there was no strict strategy for delivering their objectives, in terms of areas or people to target. They wanted to get as much restoration work done as possible, and so initially were ‘pushing at the open doors’, working with landowners who seemed more amenable. A variety of techniques were used in different locations, restoration work even being carried out by hand in the Shetlands, for example, as there were different requirements in different regions and landscapes. This strategy, or lack thereof, may be necessary for peatlands as they are so variable.

**Forestry**

*Forestry Grant Scheme*

The forestry grant scheme, delivered through Rural Payments and Services in conjunction with the Forestry Commission Scotland, supports new woodland creation and the sustainable management of existing woodlands.

The woodland creation grant involves a 20 year contract during which the woodland must be managed in accordance with certain rules. These rules include controlling stocking densities and protecting trees from grazing or browsing. An initial planting payment is received, followed by five years of maintenance payment. The amounts differ depending on the tree species. If the woodland is destroyed, the grants may be recovered by the forestry commission. As a result insurance is recommended.

The planting must be planned for a suitable area. This grant will not support planting on areas of deep peat i.e. with a depth greater than 50 cm, which have a contiguous area of over 0.25ha. Deep peat covering an area of less than 0.25 ha cannot be planted either and is too small to be marked on the map. If such areas comprise over 10% of the plantation area, careful assessment and discussion with the forestry commission is required. In all applications on land where there is the potential for deep peat, it must be evident that an appropriate level of assessment has been carried out to determine whether there is deep peat, and where it is.
Woodland Improvement Grant – Habitats and Species

The Habitats and Species option of the Woodland Improvement Grant supports capital work that will benefit a range of priority habitats and species. These are defined in the Scottish Biodiversity Strategy and include the restoration of non-woodland habitats, such as lowland raised bogs and blanket bogs that are present within the internal boundary of the woodland. Capital items, relevant to peatlands, which can be funded through this option are as follows:

- Woodland clearance – felling only
- Woodland clearance felling and extraction
- Removal of tree crop 3-6 metre tall
- Seedling tree removal – mechanical or by hand
- Scrub/woody vegetation eradication – light, intermediate, heavy, removal from site
- Ditch blocking – peat dams
- Ditch blocking – plastic piling dams for small, medium or large ditches

The work must be completed to an acceptable standard before submitting the funding claim. The work must be managed and maintained for 5 years from the date of payment.

Forestry co-operation grant

This grant will provide £250 per day for up to 40 days to support the cost of project facilitation and co-ordination. This support is available for certain projects, identified through FCS/SEPA opportunity mapping project. Peatland restoration projects will not be funded.

Land leasing

Forest enterprise Scotland will lease land from landowners or farmers for 10 yrs. In that time they will establish new, productive woodland before handing it back to the landowners. The landowner must pay a portion of the fees for setting up the contract.
Presumption to restock or restore

It is an offence to fell trees without a felling license, unless an exemption applies. There are normally conditions attached to the licence that secure restocking of the area. A case can be made if the landowner does not want to restock.

Forestry Commissions Scotland has published a guide to help land managers to determine whether there is a presumption to restock or restore on their land. On some afforested deep peat sites there is a presumption to restore to bog habitat. On these sites restocking should not take place, and restoration started as soon as possible. These sites may include areas with peat less than 50 cm deep, and are:

- Habitats designated as having qualifying features in the UK Biodiversity Action Plan, or on Natura sites, Ramsar sites, Sites of Special Scientific Interest (SSSIs) or National Nature Reserves (NNRs);

- Sites or parts of sites where restocking is likely to adversely affect the functional connectivity (hydrology) of an adjacent Annex 1 peatland habitat (as defined in the EU Habitats Directive), or a habitat associated with one;

- Sites where deforestation would prevent the significant net release of greenhouse gases.

For sites that do not fit into the three categories listed above, there are a number of criteria that can be used to help make the decision as to whether restocking should occur or not. These criteria are the potential for a good crop in the second rotation (yield class 8 or above), the effort require to produce such a crop in terms of fertiliser and cultivation, and the potential for peat edge woodland.

SEPA Guidance notes: Management of Forestry Waste and Use of trees cleared to facilitate development on afforested land

If trees are felled and there are no plans in place for the timber to be sold, that material is considered to be waste and a waste management license is required. It is recommended that some economic or environmental use is found for the forestry waste.
SEPA has produced guidance notes describing acceptable uses for forestry waste, when trees are removed from a peat site, and also recommending best practice in those situations. Where forestry material is intended to be used to support restoration, then a site-specific, long-term management plan for the area to receive the material must be produced. This must demonstrate how the habitat being restored will directly benefit long term from the use of this material and how the area will be monitored and managed accordingly.

**Fresh Water**

The Flood Risk Management Scotland (FRM) Act (2009) transposes the EU Floods Directive into Scottish law. The act sets out the function and powers of local authorities in terms of flood risk management and stipulates the need for flood risk maps and management plans.

Blanket and raised bogs are also important ‘natural features’ under the FRM Act. SEPA must, therefore, assess whether alteration (including enhancement) or restoration of natural features and characteristics of any river basin in a flood risk management district could contribute to the management of flood risk in that area. Natural features and characteristics are defined as those which can assist in the retention of flood water or slowing the flow of such water and those which contribute to the transporting and depositing of sediment, and the shape of rivers and coastal areas.

One of the aims, set out in the consultation document that preceded the act, was to take a catchment approach to flood risk management. As such, Flood Risk Management Strategies have been produced for each of the fourteen Local Plan Districts (SEPA 2016). In seven of these strategies peatlands and wetlands are not mentioned at all. In a further three districts (Highland & Argyle, The Outer Hebrides, Ayrshire) peatlands are mentioned in relation to protected areas where the designated feature is associated with peatlands and might be affected by flooding. In the Shetland Isles peatlands are mentioned because of the danger of peat slides during
floods. In the Tweed district wetland creation or restoration is mentioned as a potential natural flood management tool. In Orkney, Clyde & Loch Lomond and Ayrshire peatlands are mentioned as part of flood management plans.

Water Environment and Water Services Act 2003 (WEWS) is the translation of the EU Water Framework Directive into Scottish law. The act sets out the roles, responsibilities and powers of local authorities and government organisation in relation to river basin management. It also requires that river basin districts be established and river basin management plans be produced. Two plans were published in 2015: ‘The river basin management plan for the Scotland river basin district: 2015–2027’ (SEPA 2015) and ‘The river basin management plan for the Solway Tweed river basin district: 2015 update’ (SEPA 2015). Both plans talk about the positive impact that good management of river basins can have on biodiversity, climate change mitigation and sustainable land use, but not how these things can contribute to healthy river basins. Peatlands are not mentioned in either plan. In the Scotland river basin management plan, forestry and soil are mentioned only as pollutants. Wetlands are mentioned only in the introduction. In the Solway Tweed river basin management plan, there is a section describing the Countryside Stewardship Scheme, in which wetland and woodland creation are encouraged as forms of management. This scheme is available in England and has been extended to the Scottish parts of the river basin. The Water Environment and Water Services (WEWS) Act covers wetlands dependent on groundwater or surface water – not rainfall or surface water that is not a water body.

SEPA does not, therefore, regulate water related activities on blanket or raised bog directly, but manages impacts on the downstream water environment and associated wetlands through the WEWS Act. Although peatlands impact upon and are impacted by rivers and other water bodies there is little provision for them in water policy.
Biodiversity

The Scottish Biodiversity Strategy

The 2020 Challenge for Scotland’s Biodiversity document focuses on the desired outcomes for 2020 and is Scotland’s response to the European Biodiversity Strategy for 2020 and the UN ‘Aichi’ targets (ScotGov 2013). Scotland’s biodiversity strategy, Scotland’s Biodiversity: It’s in Your Hands (2004), and sets out how the government will conserve biodiversity for the health, enjoyment and wellbeing of the people of Scotland now and in the future. These two documents comprise the Scottish Biodiversity Strategy.

In ‘Scotland’s Biodiversity: It’s in Your Hands’ the pressures faced by Scotland’s bogs and moorland habitats is discussed briefly. The various benefits of healthy peatlands – carbon sequestration, water quality, reduced flood risk, biodiversity – are described. In the sections describing the delivery of the strategy’s aims, there appears to be a focus on co-ordination between governmental departments, and integrating biodiversity aims into all relevant parts of government.

The 2020 Challenge document is more detailed in its descriptions of the current state of Scotland’s habitats, the aims for their improvement and the means of achieving these aims. The document aims to provide a unified agenda that public bodies, land managers and ecosystem users can work towards, and to focus action on areas in greatest need of restoration. A landscape approach, focusing on natural assets is thought to be the best way of doing that.

The natural capital asset index provides a way of measuring and monitoring Scotland’s natural capital, and how it changes in response to pressures or policy measures. The report published in 2015 showed that raised bogs and blanket bogs had declined relative to their year 2000 state. For this reason the conservation, good management and restoration of peatlands is considered a priority and will be described as such in a forthcoming list of key habitats in need of restoration.
The SRDP is put forward as an important tool for delivering the improvements in natural capital that are desired – the 2020 Challenge providing guidance in how the funding should be targeted. There is also much discussion about integrating biodiversity interests and the ecosystems approach into fresh water and flood risk management. It is wetlands and not peatlands that are mentioned in further discussion on this topic, however.

**Biodiversity Duty**

SEPA and other public sector bodies in Scotland have a duty to further the conservation of biodiversity. Every three years, public bodies are required to produce a publicly available report on the actions they have taken to fulfil their biodiversity duty. The biodiversity duty should influence developers to avoid the best areas of blanket and raised bog.

**Sites of Special Scientific Interest**

EU and national law regarding biodiversity is mostly translated into Scottish law through Sites of Special Scientific Interest (SSSI) designations. For SSSIs, SNH has to provide the landowner with a management plan and advice about what can and cannot be done, where and when and what frequency and level of inspection can be expected. This information can be found online through a database managed by SNH.

In designated areas certain activities are forbidden at particular times of year e.g. during breeding or nesting season. When these time restrictions are added to the restrictions which might be in place to allow for the commercial activities taking place on the land, such as deer stalking, it can be difficult to find a time to carry out restoration work. Figure 14 shows the timing of typical activities in peatland areas, based on accounts given by Peatland Action project officers. Once can see that, without some negotiation and compromise – either on the part of the landowner or SNH, it would be impossible to find a suitable time to carry out restoration work.
Figure 14 Timing of typical land use activities in peatland regions. The upper rows describe the timing of commercial land management activities. The lower rows describe the timing of wildlife considerations which are protected by designations.

Soil

Few policies exist which specifically target soils. Existing policies – relating to agriculture, water quality, forestry, biodiversity – make a contribution to soil protection, but each focuses on a particular function of soil rather than the soil itself. The policy is fragmented and, therefore, limited in how effective it can be. The policies are spread across different organisations and are not coherent. They do not cover all soils, or all soil functions.

The Scottish Soil Framework

The Scottish Soil Framework sets out the vision for soil protection in Scotland, and formally acknowledges the important services soils provide to society (ScotGov 2009). It was published to raise awareness about the services provided and the pressures faced by soils, and in so doing acts as an overview of soil protection in Scotland.

The importance of soils for storing, retaining and transforming contaminants and preventing their discharge to water courses is described in relation to river basin management. It is noted that the consideration of soils is vital in managing fresh water
systems and should, therefore, form part of river basin management plans and flood risk management plans.

The importance of peatlands as a carbon store and the role they can play in mitigating climate change is discussed. Peatlands are also cited as an important habitat for wildlife and biodiversity.

*Scotland’s National Peatland Plan*

Scotland’s National Peatland Plan describes in detail the benefits that healthy peat bogs produce for climate, biodiversity, water regulation and quality as well as culture (SNH 2015). It uses the concepts of natural capital and ecosystem services as a way to frame these benefits.

It sets out the various funding options for peatlands restoration: SRDP, The Peatland Code, The Heritage Lottery Fund and the EU LIFE programme. Other policies, projects and guidance notes that assist with decision making relating to peatlands are also discussed. For example, The James Hutton Institute is developing a GIS-based decision support tool for peatland restoration in Scotland.

The need for more research and monitoring is discussed, and a list of key issues for researchers to address is set out. A Research and Monitoring Group will be set up to oversee this.

It is acknowledged that the support, co-operation and experience of land owners and managers is needed if the aims of good peatland management and restoration are to be achieved. A list of organisations well placed to facilitate this co-operation is outlined.

The efforts in place to reduce the negative impacts of developments on peatland sites are described. Scottish Planning Policy aims to seek a positive biodiversity outcome, wherever possible. This might be with a requirement to restore or improve another area, to account for the damage done through the development. The carbon balance must also be assessed and the negative impacts minimised.
The national peatland group, comprised of representatives from a broad range of interests and disciplines, and chaired by Scottish Natural Heritage, will oversee and co-ordinate the various plans described above, and the groups that will carry them out. They will also work with relevant industries to increase awareness and encourage best practice in the planning and execution of developments on peat.

SEPA’s Positions Statement on Planning and Soils

SEPA recognises the importance of peatland habitats in terms of their biodiversity and carbon storage potential. In their position statement regarding planning and soils they state the need for developers to reduce disturbance of high carbon soils such as peatlands (SEPA 2010). Wind farm developers must report the carbon balance of any developments on peatlands. It is recommended that they use SEPA’s carbon calculator to do this. SEPA validates these carbon calculations. In this document they also state their intention to raise awareness of the implications of developments on deep peat.

SEPA’s Regulatory Position Statement – Developments on Peat

It is recommended that developers reduce the potential carbon losses from work on peat, and in so doing reduce the carbon payback time for the project.

When peat is removed from the site it is regarded as waste, and so is subject to waste licensing regulations. Under paragraph 7 (treatment of land for ecological improvement) of The Waste Management Licensing (Scotland) Regulations (2011), the applicant has to provide a certificate of ecological benefit to explain how applying the waste will lead to a positive ecological outcome (SEPA 2010). Valid options include landscaping of turbine bases and access tracks, block drainage ditches as part of detailed plans for peatland restoration, borrow pit restoration, water level management and restoring degraded cut-over peat bog. These options are assessed on a case by case basis and require detailed plans.

Whilst these regulations protect peatlands sites and associated water courses from pollutions, and encourage a degree of restoration work, they can slow down restoration work that does not involve a development project. In cases where peat
and the associated vegetation is brought in from a nearby site in order to restore a particularly degraded bog, the exemption applications can be time consuming.

SEPA staff across the organisation have been kept up to date with changes to this planning guidance, and its supporting policies, through wetland and peat soil training programmes, to raise awareness of the environmental issues raised by development in wetland and deep peat soil habitats.

7.3.4 Overview of policy across sectors

Figure 15 categorises the policies relating to peatlands by the sector in which they are found, and the type of policy instrument that is used. One can see that when it comes to information dissemination, the overwhelming majority of this is in the form of passive dissemination, in the form of reports. There is little in the way of active engagement or capacity building. Grants are available through the agricultural and forestry sector, and there is the potential for funding through the peatland code. Of all sectors, ‘Water’, is the only one to have barely any policies that cater for peatlands.
<table>
<thead>
<tr>
<th>Information provision</th>
<th>Passive dissemination</th>
<th>Active engagement</th>
<th>Capacity building</th>
<th>Financial incentives</th>
<th>Regulation</th>
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</thead>
<tbody>
<tr>
<td><strong>Agriculture and game</strong></td>
<td>SRUC Technical Note: Moorland Grazing, guidance for upland grazing management.</td>
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<td></td>
<td>Peatland Action: Guidance for land managers, grazing peatland</td>
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<td>Peatland Action: Guidance for land managers, installing dams</td>
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<td>Peatland Action: peatland restoration videos and guidance</td>
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<td></td>
<td>Peatland Action posters: What does peatlands restoration look like? What benefits do peatlands provide?</td>
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<td></td>
<td>SNH Commissioned Report: ESG: An assessment and evaluation of herbivore impacts on blanket bog habitat in the Monadhliath Special Area of Conservation</td>
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<td>Code of practice for deer management</td>
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<td>IUCN/UK Peatland Programme Demonstrating Success Booklet</td>
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<td>IUCN:Conserving Bogs – management handbook</td>
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<td><strong>Forestry</strong></td>
<td>Forestry on peatland habitats: Guideline note, supplementary material and overview of scientific basis</td>
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<td>Forestry grant scheme Woodland improvement grant</td>
<td>Peatland Code Felling Licenses Forestry commission</td>
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<td><strong>Water</strong></td>
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<td>Peatland Code Scottish Water</td>
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<td><strong>Biodiversity</strong></td>
<td>Carbon rich soils, deep peat and priority peatland habitat map</td>
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<td>Peatland Code Biodiversity duty SSSI, SPA, SAC, NNR National Parks</td>
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<td></td>
<td>SNH Commissioned Report: SEZ: Managing and restoring blanket bog to benefit biodiversity and carbon balance: a scoping study</td>
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<td></td>
<td>Big Land: Scotland's Living Landscape</td>
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<td></td>
<td>Blanket Bogs (UK BAP Priority Habitats) summary</td>
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<td>IUCN/UK Peatland Programme Demonstrating Success Booklet</td>
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<td>IUCN Brief: Peatland</td>
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<td><strong>Energy</strong></td>
<td>SEPAS: Guidance for Development on Deep Peat Flooding Divides on Peat, guidance</td>
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<td>Waste management licensing</td>
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<td>SEPA's waste position statement for developments on peat</td>
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<td></td>
<td>Developments on Peat: Site survey and best practice guidance</td>
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<td></td>
<td>Carbon Calculator</td>
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</table>

Figure 15 Overview of policy instruments used in relation to peatlands, categorised by sector
Main Findings: Sectoral plans and policies

Agriculture

- Monitor farms and focus farms are popular initiatives. Emphasis tends to be placed on more productive lowland farming systems, however, and so there is little provision for farmers in peatland areas.
- There does not appear to be any conflict between Basic Payment eligibility and peatland restoration. There is, however some ambiguity in the rules and regulations.
- Unusual applications must undergo an inspection to confirm eligibility.
- Applications are often submitted by agricultural consultants as the process is long and complicated. The consultant is not often present during the inspection, and the farmer or landowner may be ill-equipped to justify their application.
- Funding is not available for the restoration of bare peat.
- There are three funds available for capacity building: KTIF, ECAF and LEADER. With these schemes the onus is very much on the landowner or farmer to organise themselves, and set up the event or project. Only the funding is provided and this is often recompense for a previous capital outlay.

Forestry

- Funding is no longer awarded for planting on peat with a depth greater than 50cm.
- Funding is available for the removal of woodland from deep peat sites.
- There is no longer a presumption to restock on deep peat sites.
- Guidance is available to guide decisions for peatland sites.

Fresh Water

- Peatlands are only mentioned in terms of their influence on flood risk management in 2 of the 14 Flood Risk Management Strategies.
- Peatland are barely mentioned at all in the River Basin Management Plans.
- The Water Environment and Water Services Act covers wetlands dependent on groundwater or surface water – not rainfall or surface water that is not a water body. SEPA does not, therefore, regulate water related activities on blanket or raised bog directly.

Biodiversity

- Most international biodiversity legislation is translated into national law through SSSI’s.
- SNH produces plans for landowners whose land is under designation, outlining recommended management and any regulations they must adhere to.
Soil

- There is no specific soil policy
- The National Peatland Plan describes the various funding options for peatlands restoration; SRDP, The Peatland Code, The Heritage Lottery Fund, and the EU LIFE programme
- The National Peatland Group will work with the relevant industries to increase awareness and encourage best practice
- A Research and Monitoring Group will be set up to oversee future research endeavours
7.3.5 Policy interviews and questionnaires

The questionnaires served as a guide for the semi-structured interviews with policy experts. The full questionnaire can be seen in Appendix B. Within the questionnaires, respondents were asked to rank a number of peatland policy issues in order of importance Table 11.

In this section, the results of the questionnaire will be presented. First the rankings, and then the main themes that emerged from the discussion.

Table 11 Frequency with which policy issues were ranked by policy workshop delegates. R1 is considered most important, R4+ is least important

<table>
<thead>
<tr>
<th>Issue</th>
<th>Frequency of ranking position</th>
<th>Total no. of rankings</th>
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<tbody>
<tr>
<td></td>
<td>R1</td>
<td>R2</td>
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<tr>
<td>Issue 1 – Better communication of policy rules and implications is needed</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Issue 2 – interpretation of rules by inspectors can be variable and increase the perception of risk among landowners and managers</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Issue 3 – only sites with SSSI status can have the actual costs of restoration work covered through SRDP.</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Issue 4 – there are few funding opportunities for bare peat restoration or more unusual projects</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Issue 5 – better integration between SRDP and the Peatland code could help fill some of the funding gaps</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Issue 6 – lessons could be learnt through greater collaboration with the forestry sector</td>
<td>1</td>
<td></td>
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<tr>
<td>Issue 7 – facilitators to assist with land ownership and tenancy issues could increase the number of successful restoration projects</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Issue 8 - facilitators to assist with community and stakeholder engagement could increase the number of successful restoration projects considered most important, R4+ is least important</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>
Ranking Issues

Thirteen of the respondents took part in the ranking exercise. Of these, only one person ranked all of the issues listed. Most people only ranked the top three or four most important issues. As a result, rankings of fourth place or lower have been put into one category.

Workshop discussion and interviews

Quotes are used to illustrate the points made in this section. The speakers are not described, in order to preserve their anonymity. In some cases those speaking are expressing opinions counter to those of their organisation.

Direction

A common theme that emerged in the workshops and the interviews was that there was a need for clear objectives and a clear “long term direction of travel”. Indeed, phrases like “what are we trying to achieve?” and “what does the government or the nation want from the land?” were repeated numerous times by different people.

The practical implications of this “lack of long term strategy” were discussed at some length. With the various designations and regulations that apply to a lot of the land in question, it was felt that a clear and meaningful indication of the ultimate goals for a piece of land, and so the activities that might be given precedence, would speed up the planning and execution of restoration work.

“Prioritising is important. You can’t move forward if you don’t know how to compromise”

It was also recognised by a few that there are, and always will be, many competing options for land use and for funding. It is therefore, important to question whether peatland restoration is always desirable, feasible and, consequently, a good use of limited funds.
At the workshop there was a general consensus that the way forward for all environmental organisations was to work together, find synergies and develop projects that benefit multiple habitats.

“There are lots of good things queuing up for money. We need to be sensible. We can’t expect funding to continue in one area. We need to look wide”

“With funding cuts, we could all focus on our own things, be insular, but it would be better, instead of pulling in different directions, to focus on synthesis and integration”

The Land Use Strategy was discussed. It was felt to be a good framework, with the potential to integrate various aspect of land use. The lack of funding to back up the ideas, and the slow pace of change, was lamented:

“The Land Use Strategy is a good document, with good ideas, but there just isn’t the money to back it up”

Funding

Three of the seven/eight issues in the ranking exercise related to funding. One of these was that, unless the land to be restored is designated as a SSSI, the funding received for capital items will be a standard cost, rather than the actual cost of carrying out the work. In some circumstances standard costs may fall short of the actual costs, and may put people off entering into the scheme. Six of the respondents considered this issue worth ranking. Three ranked it as the third most important issue, while two put it in first place. During the interviews one respondent said that in some cases standard costs were higher than actual costs, making projects more expensive than they needed to be.

Ditch blocking, tree removal and the removal of scrub or woody vegetation is covered through SRDP. Bare peat restoration and any usual projects that do not fit with SRDP regulations are not funded, and so must seek funding elsewhere. Nine respondents
considered the lack of funding for bare peat restoration to be worth ranking. None of these thought it to be the most important issue, however. Four people put it in third place. The Peatland Code is one option for filling this gap in funding, but it may need to be better integrated with the existing SRDP funding options. Better integration of public and private funding options was ranked by four people. One person thought it was the most important issue, another put it in third place and a further two put it in 6th place.

In the interviews and workshop, there were a number of comments about the lack of funding, with many people saying they had projects where the planning and discussions had already taken place and it was only the funding that was holding them back. Not only was the lack of funding an issue, but its capricious nature was also thought to be problematic.

“Money is fickle. It makes it difficult to get involved”

“Grants need to be reliable, good and attractive”

Both of these problems were thought to have wider repercussions mostly centred on trust. When funding stops it is no longer possible to keep on the staff who had been in contact with landowners and managers. It takes time to develop good relationships, and to truly understand the subject in question. Gaps in funding result in new staff for each project cycle, a degree of repetition and a waste of time as lessons must be learnt anew.

“People on the ground – once the funding goes, they move on. You lose all of that skill and experience. You lose the trust of the farmer”

Businesses need to be able to trust that investments in this area will prove fruitful. In order achieve a level of momentum in restoration work that will allow government targets to be met, contractors need to invest in training and equipment, and investment from the private sector will be necessary to fill the gaps in government
funding. Inconsistent government support for these projects will increase the risks associated with these projects and may prevent the necessary investment.

“Businesses need stability. They won’t invest otherwise”

“If there’s money, there’ll be contractors. With no money, the momentum disappears, they might have to sell their equipment and do something else”

“Get people fired up, interested, invested – then stop the funding. We can’t have this stop-start”

“People need to know what’s happening. Contractors are investing in training and equipment, and then the money runs out”

The perceived lack of funding backing up the proposals set out in the Land Use Strategy, may make people question whether the government does completely support peatland restoration. This might create doubts about future policies and funding options.

“The government needs to make up its mind. What does it want? What is it willing to pay for?”

“It’s not always about money”

Although funding was considered crucial, a comment that was made repeatedly was that “it’s not always about money”.

Demonstrating the benefits that peatlands restoration might have for the rest of the farm, estate or even the community was considered to be very important. For example, for some farms, there is not enough manpower to carry out heather burning. Re-wetting the bog, can reduce heather cover, taking it out of the system and allowing the farmer to focus their efforts on other land. Contractors coming in to do restoration work spend money in the area and can benefit the local economy.

On the other hand, changes in the way a farm is managed can have wider implications. If a farmers has to reduce their flock, they may not need to employ so
many shepherds. This may have a bearing on what they decide to do with their land, especially in small communities.

**Communication**

*Between organisations*

A significant stumbling block that emerged throughout the review of policy and the discussion with policy makers, was the interpretation and communication of CAP regulations. Landowners and farmers were concerned about becoming ineligible for Basic Payment. The rules governing eligibility appear to make this unlikely, although they can be interpreted more or less strictly. Applications are verified by an inspector and there are very real fears that inspectors will interpret the rules conservatively. If a landowner or farmer is found to have claimed payment incorrectly they can be penalised.

Seven out of thirteen respondents ranked the interpretation of rules by inspectors in the top three issues that need to be addressed. Three of those, considered this to be the most important problem to address.

> “These rules should never be subjective. They should always be clear”

It was recognised that even one negative story on this subject might be enough to put people off applying for these schemes. It was also stated that these fears were well founded.

> “This is not an issue of perception. I have heard of a number of instances like this”

There appear to be two reasons for this situation. The European Commission sets the rules for the allocation of agricultural and rural subsidies through the CAP. These are then interpreted and adapted by each nation so that they fit with the national policy landscape and the aims of that government. If a country is found to have interpreted the rules incorrectly, and their translation in to national policy is considered inaccurate, that country can be fined. There is, therefore, some incentive for EU rules
to be interpreted conservatively at a national level. Inspector and farmers may also interpret the rules conservatively, each not wanting to be found in the wrong. The result might be an exceedingly strict interpretation, not in keeping with the initial intentions of the policy.

“There are layers of caution associated with CAP payments from Brussels”

The second reason is to do with the separation between policy creation and policy enforcement. Environmental and rural policies are created by organisations such as SEPA and SNH. They are enforced by the Rural Provisions and Inspections Department, a delivery body which is not involved in policy formation and may not be fully aware of the objectives of the policy. Their level of involvement extends as far as whether or not the policy can be audited or not.

“Policy is often driven by environmental organisations. But RPID doesn’t work like that – they just deliver the EU regulations. CAP Stakeholder meetings are the only time everyone is round the same table”

There is also a lack of communication between the policy-forming environmental organisations. This is something which may have prevented the integrations and synergies that were discussed from happening already, and which may prevent them happening in the future, if the situation does not change.

“We need more time to talk, find out common ground”

“They’re restructuring at the moment. For the first time forestry, peat, water people are in the same building”

The above quote, would indicate that changes are being made and that things might improve. Scottish Water also sent a member of staff on secondment to SNH Peatland Action, and they responded in kind. This was described as a valuable experience.
Communication with the public

There was some discussion about the lack of interest and awareness of peatlands from the public. The benefits of peatland restoration are largely for public benefit. Support from the public for peatlands and their good management might affect whether or not this sort of work is funded, and might influence whether landowners and managers decided to take on this sort of project.

“There’s not enough interest from the public. Quite a big hump to get over.”

“We need education in the importance of peatlands. Not just for farmers, but for the public as well.”

“People need to understand why these areas are being protected”

Communication with landowners and managers

In the ranking exercise of the questionnaire, the issue of facilitators was divided into two parts depending on the type of problem they would be assisting with:

a) Landownership and tenancy issues, or

b) Community and stakeholder engagement.

When it came to carrying out the exercise, many did not acknowledge the two parts, and considered the issue as simply concerning facilitators. Many also assumed the question was about the need or the benefits of Peatland Action officers – so it is this sort of role that was in mind when they ranked the issues.

Eleven respondents considered issue 7 (facilitators for ownership and tenancy issues) to be important enough to rank (33% together), while nine felt that way about issue 8 (facilitators for community and stakeholder engagement). Five respondents placed issue 8 as the most important thing to address, and four did this for issue 7.

The need for facilitators was stated over and again in the interviews and workshop. During the workshop there was much praise for the Peatland Action Officers who
have been planning and executing restoration projects with landowners and NGOs for the past few years. Employing more facilitators or project officers was considered essential for the success of peatland restoration projects and schemes.

“We need more project officers”

“Having people on the ground, helping people to get involved and do it, is very important”

Demonstration events, involving a range of stakeholders, were widely considered the best way of communicating with people and getting involvement and support from landowners and managers. The need for a range of demonstration sites showing the different scales of project, as well as the different techniques and levels of initial degradation was emphasised.

“When you take people out, they can see the point”

“Demo events are the best way to communicate”

“More to be gained from getting people out on the ground to embrace principles”

Only one respondent felt that there was already a lot of direct communication with landowners through SNH. The respondent attributed any unease among landowners and farmers to “rural myths”, but did agree that there was a lot of “caution and confusion”. Apart from this, there was a general acknowledgement that communication was a serious problem, and that it had not yet been adequately addressed in the policy.

As mentioned above, there was also consensus that the best way to address this problem is through project officers or facilitators, and demonstration events. There was some anecdotal evidence that this approach could save money in the end.

“SEPA had a policy to try and reduce diffuse pollution. They did a lot of walking and talking to people, negotiating, listening and discussing. The
work was done unfunded in the end. The landowners said “well once we understood why, and the work wasn’t actually too difficult, so we just got on with it”. It was a good approach”

There was widespread agreement that in order to engage with the public and with landowners and managers, the evidence base for the benefits of peatland restoration would need to be strengthened. Forging stronger links with universities and research institutes was discussed.

Another point that was made related to changes in rural areas, and the relationship that people have with the land.

“Conservationists told farmers to get sheep off the land. In so doing they removed farmers from wetlands, and other landscapes. Now they’re not linked to it. They understand it less.”

Natural capital or Ecosystem Services approach would help

Using ecosystem services or natural capital as a framework to co-ordinate funding and policy for environmental management was discussed a lot throughout the workshop. It was felt that this approach would lead to better integration and would enable synergies to be made, and the limited funding available to be used more effectively.

“There’ll be a new contract with society, using the natural capital approach. What does society want from the land? And we’ll see landowners and managers paid for those services”

“We need more project officers, but with a wider scope, not just peat”

It was also hoped that, using the ecosystem services approach might help to adjust perceptions of land value. Historically and to a lesser degree at present, having peat on your land is thought of as something that diminishes its value.
Integrating peatlands into water policy

Peatlands are not mentioned a great deal in water policy, despite the fact that the condition of the peat bogs in a catchment can have significant impacts on water quality and water regulation. Flooding is something that the general public care a great deal about. Poor water quality increases water treatment costs and can affect fish stocks, issues that have tangible consequences for water companies as well as landowners and managers. A clearer link between water and peatlands might help raise awareness about peatland issues.

“Wetlands and peatlands are not seen enough as part of the water system, and associated policy. This should be improved”

The relationship between water quality and peatland quality is fairly clear. The same cannot be said for peatlands and flooding. More research is needed to provide evidence. Proof of reduced flooding as a result of peatland restoration, might lead to funding opportunities from insurance companies and local authorities.

Forestry

There are a number of similarities between forestry and peatland restoration. In both cases there is a considerable capital outlay and the potential for other activities taking place on the land in question may be limited for 20-30 years thereafter, depending on the tree species or the source of funding used. With both forestry commission grants, and funding through the peatland code, if the forest or peat is damaged the landowner may have to pay back the funding received. Discussions with landowners and managers would suggest that, in the case of forestry, these issues do not inhibit involvement in forestry activities. In the case of peatlands however, it was these characteristics of the peatland restoration contract that made it unattractive. Policy makers were asked what might explain this difference in attitude.

In the ranking exercise, learning from the forestry sector through greater collaboration was not considered to be terribly important. Only 4 of the 13 respondents who filled in the exercise considered it worth ranking. Of those, one
considered it to be the most important issue, a second ranked it in 3rd place and two more placed it in 6th place. In the interviews, however, there was much discussion about the difference between the two types of land use.

The product

The first point that was made is that with forestry, a commercial product is being produced and an income is received at the end. A peatland restoration project, funded through the peatland code, can produce a profit for the landowner, and this can be received at the beginning of the project, in instalments through the projects duration, or at the end, depending on how the contract is set up. The crucial difference between peatland restoration and forestry, therefore, is not necessarily to do with the income, but that a landowner can see what they are producing and can better understand its value.

“With forestry, you get something you can hug”

“Whatever happens with woodland, the trees are yours. Payments for peatlands are less certain”

“Peat is something without a defined economic product. Not sure if you can resolve that”

Peatland restoration is “largely for public benefit” and it was felt that thinking of land management in this way required a new mind-set. Some felt that peatland restoration was more analogous to conservation woodland.

A mature industry

The point was made repeatedly that forestry is a mature industry. It is, therefore, better understood by the land managing community as well as the general public.

“It’s an old industry, been going for centuries. It’s just a part of landownership”

This long history affords the forestry industry a number of benefits. One of these is the well-developed research base that underpins best practice guidance, and also
provides evidence for the benefits of forestry. The same cannot yet be said for peatlands. Peatlands are doubly unfortunate in this regard, as they are not standard landscapes. Research from one site or area, cannot easily be extrapolated to another. It is, therefore, easier to attach figures to forest; whether that be in terms of timber value or carbon, or other environmental benefits.

Forest Enterprise manages Forestry Commission land, and does so with certain aims and objectives for that land. Forest Research, carries out their research in order to support the delivery of these aims and objectives. The research is always targeted towards land management and may result in a more co-ordinated research effort.

Policy supporting forestry is also more developed. A landowner who changes agricultural land to forestry can still claim their Basic Payment. They can get a grant to support capital works and maintenance, and a small scale operation can even apply for funding to assist with the felling and processing costs. They will then receive the profit from the timber. There is also no capital gains tax on forest, making it an attractive investment for some. Investment companies are also much more used to dealing with forestry. All of these factors, among others, influence the value of the land. With forestry, the result is an increase in land value, with peatlands it is not.
A few respondents said that forestry was not, in fact, an attractive option for many landowners. The presumption to restock forestry following felling can put people off as it is a very long term commitment. Agricultural subsidies change so much and so often, a landowner or manager might want to be able to move fast to take advantage of new funding options.

<table>
<thead>
<tr>
<th>Main Findings: Questionnaire, interviews and workshop discussion</th>
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<tbody>
<tr>
<td>• There is a need for clear objectives and a long term direction of travel</td>
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<td>• Funding must be adequate, consistent and stable in order for people to invest money, time and effort</td>
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<tr>
<td>• Communication at all levels of policy creation and delivery is necessary for policies to be effective</td>
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<tr>
<td>• Face to face communication through project officers and demonstration events is ideal but under-utilised</td>
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<tr>
<td>• Raising public awareness about peatlands and the pressures they face, may help to persuade businesses, land owners and managers to get involved, and is necessary to justify spending public money</td>
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<tr>
<td>• Integration and co-operation between and within organisations will be key as funding opportunities become scarce</td>
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<td>• Natural capital and the Ecosystems Approach may be useful ways to integrate environmental policy and the various sectors, and so improve environmental management</td>
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<tr>
<td>• Peatlands are not really seen as part of the fresh water system at present and so there is little provision for them in water policy</td>
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<tr>
<td>• Although there are a number of similarities between forestry and peatland restoration, there are some fundamental differences:</td>
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<tr>
<td>o Seeing a tree grow, and producing timber is much easier to understand and even take pride in than sequestering carbon</td>
</tr>
<tr>
<td>o Forestry is a mature industry which has long been part of land management</td>
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<tr>
<td>o The research underpinning forestry is extensive and has been developing for a long time.</td>
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<tr>
<td>o It has also often been geared towards forest management through the link between Forest Research and Forest Enterprise in the Forestry Commission</td>
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7.3.6 Discussion

Peatlands were mentioned fairly often in a number of frameworks and strategies at the national and at the sectoral level. This is a positive step and documents such as the land use strategy, which take a more holistic view of land use are welcome. Delegates at the policy workshop mentioned that there was a need for clearer aims and objectives, with regard to peatlands. The first Land Use Strategy was a little vague, but the second was more focused, and hopefully this trend will continue.

There seems to be a good degree of integration of peatland issues into the forestry strategy and into forestry commission funding schemes. The conflicts that were apparent in this area before, appear to have been addressed, which is a promising sign.

Including peatland restoration in carbon inventories should increase avenues for funding peatland restoration and raise awareness of the value of peatlands in terms of their carbon sequestration potential. This is a step in the right direction, although it might take some time before there is a noticeable effect.

At this high level, peatlands appear to be well catered for and many of the aims and objectives are admirable. There is a clear mis-match between this view, and what is happening on the ground. This would imply that something is going wrong with the translation of policy into actions. In order to explore where the problems are, we will look at the barriers that a landowner or manager would have to overcome in order to restore the peat on his land.

7.3.7 Barriers to interest

Integrated policy and targeted research

There are a number of factors that might prevent a landowner or manager taking an interest in peatland restoration. As was discussed in previous Chapter 1, and the introduction to this chapter, peatlands have traditionally been seen as wasted land and efforts have been made to make them more productive and useful. Their wet and inaccessible nature also makes them less suitable for tourism. Peatlands do provide
a range of ecosystem services, but the service which has attracted most attention, and which dominates the policy discourse, is carbon storage and sequestration. In the workshop chapter we saw how, for landowners and managers, carbon is not a priority. Moreover, the carbon stored in peatlands is not visible. The discussion with policy experts, comparing peatlands with forestry, highlighted the importance of being able to see the improvements that one is making, and having something tangible to show for your efforts.

During the workshops and interviews, participants brought up the issue of water quality and regulation frequently, and in a couple of cases the improvement to water quality and associated benefits for salmonid populations was cited as an incentive for restoration. Peatlands are barely included in water policy, however. Although they are mentioned in the Flood Risk Management Act (2009), they are not considered in the subsequent Flood Risk Management Strategies. When it comes to the Water Framework Directive, the definition of wetlands excluded peatlands and so they can only indirectly benefit from the legal protection afforded to other water bodies. If peatlands were better integrated into water policy, it may help to raise awareness of the links between peatlands and the water environment, and the wider benefits that can be achieved through peatland restoration.

One possible explanation for this lack of integration is that, although peatlands are known to have positive effects on water quality and regulation, the evidence for this is not conclusive (Chapter 1). It is not yet possible to say, unequivocally, that certain management practices will lead to improvements in water flow or chemistry. In the case of flood management, the government might well be loath to prescribe actions that may have unforeseen consequences.

Indeed, much of the recent peatland research has focused on the carbon balance of peatlands. This information is useful for communicating with policy makers and commercial enterprises but goes little way to persuading land owners and managers, or assuaging their concern. There needs to be more research in to the implications of peatland restoration for estate and farm management.
Communication

There are few policy initiatives geared towards the communication of peatland issues. Most of the communication initiatives seem to take the form of reports summarising the benefits of healthy bogs and the threats they face. These reports are sometimes used by intermediary organisations such as Scottish Land & Estates and the Heather Trust, who summarise it further for their newsletters. While there is a place for this sort of communication, it is unlikely to be enough to provoke a change in management, or an investment of time and money. During the discussions with policy experts, the importance of face to face communication and practical demonstration was stated time and time again.

This more practical form of communication does take place. The Monitor Farm, Focus Farm, and LEADER initiatives work with farmers and farming communities to develop more environmentally friendly and efficient farming practice. There are very few of these in upland regions, however, and none of them deal with the management of peat bogs.

The Knowledge Transfer and Innovation Fund (KTIF), covers the costs of communication events but, while there is money available for this sort of work, there is no accompanying policy to focus this towards peatlands. The onus is very much on environmental organisations or individuals to access the funds and organise the events. Given the relatively low profile of peatlands in the public consciousness, some extra encouragement or assistance might be valuable.

Part of the remit of Peatland Action and the Peatland Action Officers was to organise demonstration events on farms and estates, showing what peatland degradation looks like and what can be achieved through restoration, as well as demonstrating techniques. They would also visit land owners and managers to talk about peatland restoration and the positive and negative implications it might have for their land. Since the Peatland Action initiative has been terminated there does not appear to be an initiative to take its place.
In the workshops and interviews, many people mentioned that they consider part of their role as managing the land for the public good. There was also a desire to improve their public image. There is relatively little public awareness of peatlands, the services they provide, or the pressure they face. There are also no policy initiatives for raising the public profile of peatlands. Without public concern for these ecosystems, there will be less incentive for land owners and managers to get involved. Public concern for these issues might also encourage more private investment, as many organisations invest in this sort of project in order to improve their image.

7.3.8 Barriers to project start

Funding to provide incentives and to pay for the work

Peatland Action, until the beginning of this year, provided funding for peatland restoration. The Peatland Action officers would plan the work, with the landowner or manager, and then source the funding for it. Funding for peatland restoration has since been moved to the SRDP and is distributed through the Agri-Environment Climate schemes. During the workshops, many of the participants voiced concerns that participation in a restoration project would render them ineligible for Basic Payments. There are numerous criteria for Basic Payment (BP) eligibility, none of which should prevent entry into a restoration project, as managing your land for environmental benefit is considered worthy of the subsidy. The number of rules, and the ambiguity with which they are described is, nonetheless, off-putting for someone who depends on BP for a large portion of their income.

Less straightforward applications, such as those involving restoration projects, must undergo an inspection to verify the amount of BP that they can claim. This is also a cause of concern for many land owners and managers. As the application process for BP and SRDP funding is rather complicated and confusing, many landowners and managers employ agricultural consultants to do this work for them. Often, the consultant is not present leaving the landowners and managers ill-equipped to justify the application. If the application is considered to be in correct, a landowners and managers might be fined for submitting a false claim. Some agricultural consultants
spoke of landowners or managers who had almost completed applications for peatland restoration, but withdrew at the last minute over BP eligibility concerns. There are anecdotes telling of inspectors who interpret the rules very conservatively, and penalise infringements harshly.

The cause of this mismatch between policy intentions, policy rules, and policy outcomes can be traced back to the way SRDP is formed and delivered. There are a number of levels of interpretation as CAP regulations and intentions filter through to national programmes and regional inspectors. Like a game of Chinese whispers, at each stage there is scope for the message to change. EU member states are also likely to interpret the rules conservatively, as they too can be fined if their interpretation leads to over-spending. In Scotland the departments responsible for and with influence over the creation of environmental policy (SNH, SEPA, FC etc.) are separate to those who inspect and deliver it (SGR PID). The aims of these organisations is different: SNH and SEPA are concerned, primarily, with delivering environmental improvements, SGR PID is concerned with effectively inspecting management so that appropriate payments can be made. It is, apparently, rare that these organisations meet. There are two important consequences of this. The first, is that although agri-environment schemes may be developed with the intention of encouraging and supporting good environmental management, the associated regulations may be enforced in a way that is not in-keeping with that sentiment. This is more likely if that sentiment, and the most important elements required to achieve it, are not communicated to the inspections and delivery body.

The second consequence is that activities that cannot easily be inspected, cannot be funded. For this reason bare peat restoration is not funded through SRDP. The work needed, techniques and equipment used, and costs incurred are too variable and so standard grants and measures of compliance or success are not possible, given the constraints on time and money. Restoring bare peat is where the biggest carbon gains can be found, and also where the least controversy is encountered. There is little agricultural gain from bare peat, and the benefits for nearby water courses are fairly
clear. Ditch-blocking is funded through SRDP, but there are fears over flooding good agricultural land, and the benefits to the landowners and managers are less clear.

Funding for bare peat must, therefore be provided through private enterprise (facilitated by the Peatland Code), Lottery funding, or EU LIFE funding. It is likely that most projects will involve a combination of ditch blocking and re-vegetating of bare peat. It is, therefore, important that the two forms of funding are integrated and compatible.

These alternative, non-governmental, funding options tend to be larger grants which may involve extensive areas of land, and possibly a number of land owners. Applying for this sort of grant, and co-ordinating a group of landowners is a daunting task. The Environmental Co-operation Action Fund can be used to pay for a facilitator who would co-ordinate landowners, resolve any conflicts with other stakeholder and nearby communities, and apply for grants. In order to be eligible for this grant, the applicants must be groups of landowners with a successful track record of working together. This criteria may exclude a number of people, and put off even more.

In order to attract private investors, they need to feel secure that this sort of work has both government and public support. As discussed earlier, the lack policy geared towards raising awareness means that there is not a great deal of public support. The changing nature of peatland restoration funding, and the difficulties with co-ordinating private and public funding, might call into question the government’s commitment to peatland restoration. At the very least, complications associated with combining different funding options, are likely to make this a less attractive investment.

Capacity building

During the workshop, a number of participants said that the thought of planning and carrying out a peatland restoration project seemed like a daunting task. Questions such as “where do I start?”, “what is it supposed to look like?”, “how is it done?” were asked frequently. Peatland Action officers used to plan, organise and execute
restoration projects with the landowner or manager. As there is no longer funding for Peatland Action, the officers are no longer payed to perform this service. There is little (or nothing) in the way of capacity building initiatives. In the absence of Peatland Action officers, demonstration events and training courses are even more important. SNH has created a number of videos showing how different sorts of restoration work is done. This is mostly targeted towards contractors and, even so, is a fairly passive form of capacity building in the absence of project officers to provide the face to face, and more tailored, support.

7.3.9 Barriers to project completion

Contractors with the skills and equipment to carry out the restoration work are needed in order to complete the project. Acquiring the equipment and skills requires an investment of time and money on the part of the contractor. With Peatland Action funding for restoration projects and the increasing demand for suitable contractors, the investment seemed worthwhile. As the funding has now changed, and restoration work has stalled, contractors may be losing money on their investment. This is particularly true in the case of bare peat restoration, which requires the most specialist skill and equipment, and where the funding situation is now uncertain. As was noted by one of the policy experts, if the “stop-start” nature of the funding continues, contractors will no longer take the risk of investing.

Finding a time to carry out the work is also difficult. Many peatland areas are under some sort of designation which restricts the timing of and type of management activities that can be undertaken. Restoration work cannot be carried out during the nesting season of certain species of bird for example. When these restrictions are combined with farm and estate management requirements such as lambing season, burning time, deer stalking season, and the weather, there are very few months left in the year. This compounds the above mentioned issue of there being too few contractors, as there are only a few months in which they must carry out all of the restoration work across the country.
The same sorts of issues arise regarding waste regulations, which are created with large construction development in mind, but which slow the restoration process. For example, one has to apply for permission to be able to use brash from one site to revegetate bare peat on another.

If clear priorities were identified through policy, it would be easier to make decisions and determine in what circumstances and over what issues it is possible to compromise. Peatland action officers were well placed to do this as they were all associated with environmental organisations such as SNH and the Cairngorms National Park. They had the contacts and the experience to negotiate for permission to ignore some of the restrictions. A landowner attempting to negotiate these issues without the experience or contacts, would find it difficult and time consuming.

As peatland restoration is unlikely to convey much of a financial advantage, it is unreasonable to expect a landowner or manager to put the effort into overcoming so many hurdles. Placing the onus so very much on the landowner, calls into question the commitment of the government when it comes to peatland restoration.

7.3.10 Conclusions

Peatlands are mostly discussed in relation to their implications for carbon and, to a lesser extent, biodiversity. When it comes to water quality and flow management, peatlands are rarely mentioned and in some cases excluded. This is a missed opportunity as it is water and issues relating to water that people seem to understand and care about most. The omission of peatlands in water policy may be due to gaps in the research.

Many of the policy barriers to peatland restoration have their root in a lack of effective communication and integration of policies and their objectives. This is something that is felt by both policy makers and landowners and managers. Policy makers and environmental management staff commented that the lack of integration made it difficult to move forward. With peatlands being subject to regulations from many
policy sectors, and with no clear idea of the order of priority given to these regulations, it is difficult to know when and how to compromise.

There are few policy initiatives geared towards communication and capacity building, especially direct communication. The communication initiatives that exist are often passive, requiring people to seek them out.

There is no conflict between basic payments and peatland restoration. The regulations and the information provided regarding basic payments and the SRDP are confusing and difficult to navigate. The repercussions for submitting a false claim are serious, and there are many stories about applications being rejected for minor mistakes. This creates a feeling of fear and mistrust when it comes to applications and inspections.

Stability in policy and staff is important for cultivating trusting relationships and reducing the perception of risk associated with new schemes.

7.3.11 Recommendations

Peatland action officers were well trusted and filled gaps in communication of policy and distribution of advice. This programme, or something similar should be re-instated.

Research into the link between peatlands and water management should be carried out in order to facilitate better integration between these policy areas.

Clear priorities regarding land management and regulations should be determined and communicated across policy areas and actors. This should allow for easier project planning, and perhaps greater synergies to be made between the different sectors.
8 Discussion

8.1 Main findings: Empirical and Theoretical

The aim of this thesis was to identify factors that support or hinder the progress of peatland restoration in Scotland. To this end workshops and interviews were carried out with stakeholder in four regions around Scotland. These focused primarily on the perspective of landowners and managers, as it is these people who own and manage a lot of the land on which peatland restoration must take place. The workshops, presented in Chapter 2, provided an overview of the issues surrounding peatland restoration, and indicated the need for a more in depth analysis of the values and priorities of landowners and managers (Chapter 3), as well as the need to greater clarity regarding the peatland policy situation (Chapter 4).

The main findings of this work will be discussed with reference to factors that support the aim of peatland restoration, namely landowners and managers with a care for the environment and some interest in restoration, and factors that are hindering the progress of restoration, namely lack of trust, differing priorities and perceptions, and the lack of a clear goal.

8.1.1 Supporting factors

Chapters 3 and 4 demonstrated that landowners and managers have a strong sense of care and responsibility for the environment. A larger proportion of those interviewed cited environmental benefit as the priority when managing the land, and considered financial gain to be a means to an end, rather than an end in itself. In many cases, the stated aims and priorities of landowners and managers were very similar to the stated objectives of many environmental organisations, namely to care for the land and to manage it in a way that increases biodiversity of flora and fauna and improves water quality.

There was also broad agreement between landowners and managers and the scientific community, and by implication, environmental organisations, regarding the causes of peatland degradation and the desirability of restoration management.
Overstocking and digging drains were fairly unanimously considered to be the main causes of peatland degradation. Blocking ditches and re-vegetating bare peat were also thought to be the best ways to solve the problem of peatland degradation.

On a personal level, many landowners and managers described good relations, and even feelings of respect and trust for members of staff in environmental organisations. Moments of realisation about the value of peat bogs or the impacts of management, often involved a walk onto the bog with a member of staff from one of these organisations. These anecdotes show that good relations are possible, and that the methods for achieving good relations and effective communication are known, and already used in some cases.

8.1.2 Hindering factors

Many of the factors hindering progress stem from a lack of effective communication between and within stakeholder groups. This leads to lack of trust, ineffective policy and an accentuation of differences in perceptions and priorities. These issues combine to prevent the identification of clear goals, and the creation of suitable strategies for reaching them.

A lack of trust in policy makers and scientists was indicated by landowners as a barrier to peatland restoration in Chapter 2, and was confirmed as a significant obstacle in Chapter 3. The reasons for this lack of trust, or active distrust, in many governmental and non-governmental organisations were associated with trustee characteristics (in this case landowners and managers are the trustees) and the dominant types of trust which had developed. The characteristics required to engender trust are commonly described in terms of three features: ability, integrity and benevolence (Mayer et al. 1995). Policy makers were thought to fall short in terms of these characteristics due to a combination of a history of damaging policies and advice, doubts over the scientific research underpinning restoration predictions, negative experiences with staff from environmental organisations, and the impacts of land reform, which led to a feeling, on the part of landowners and managers, of being ‘despised’. The type of trust present in the exchanges between landowners and
managers and environmental organisations could be described as ‘procedural trust’ or a combination of ‘deterrence-based’ and ‘calculus’ trust (Dietz & Hartog 2006, Stern & Coleman 2015). These terms describe trust which is cultivated through systems of regulation, punishment and reward and are contrasted with real trust which depends on an understanding of the other party’s motivations, abilities and values.

Chapter 4 described the history of policy interventions in these areas, the repercussions of which are still felt now, and were often mentioned in the workshops and interviews as reasons for not trusting the current wave of advice and policy. This chapter also demonstrated that policy relating to peatlands was dominated by financial and regulatory schemes, while there was little in the way of active engagement and capacity building. Such a policy emphasis is unlikely to facilitate a move beyond procedural trust towards more knowledge-based or affinity trust. On over-reliance on procedural trust means that the systems of regulation and reward need to be maintained and enforced, which is costly (Sutinen & Kuperan 1999, Idrissou et al. 2013). It can also lead to antagonistic relationships where people feel resentful and will do the bare minimum to comply (Stern 2008). Knowledge-based relationships can be difficult to establish, but are likely to be more effective and cost-efficient in the long run (Ostrom 2003, Newig & Fritsch 2009).

When systems of regulation and reward are poorly executed, they can prevent the changes in behaviour that they were designed to encourage (Prager et al. 2015). In this case, agri-environment schemes were found to be confusing and had complicated application procedures. In the workshops of chapter 2, and the policy workshop in chapter 4, there was even confusion among policy makers and governmental staff as to what situations and management practices did not comply with regulations. Although there was found to be no conflict between Basic Payment regulations, and the required management for peatland restoration, the uncertainty surrounding this issue was enough to deter people from entering into these schemes. The penalties for submitting a false application are severe and for farms with marginal incomes could
jeopardise the viability of the business. Anecdotes describing unfair treatment and dire consequences increased the sense of fear and mistrust.

Indeed, there were comments from landowners and managers in Chapter 3, and environmental and policy staff in Chapter 4, stating that certain aspects of the policy situation prevented them from being able carry out environmental projects. Attendees at the policy workshop described how attempts to carry out restoration projects were often held up by the need to navigate the various designations and regulations associated with either the land itself or the practice in question. One example of this was the difficulty in finding a time to do restoration work that did not coincide with nesting seasons, stalking seasons or poor weather seasons. The discord in policies is thought to be due to a lack of communication between different government departments, with that result the schemes and regulations are created which pull in slightly different directions, although their overarching aims may align.

Similarly, landowners and managers mentioned that, in many cases, they were more than willing to get involved and to carry out environmental management practices, but that the complicated regulations and application procedures made it prohibitively difficult. In some cases landowners and managers felt that the entire situation (policy and poor relations) was actively preventing them from achieving their overall aims of social, environmental and economic sustainability.

Although there was agreement on general principles of peatland management and environmental values, the interviews, workshops and the policy analysis highlighted some differences in the details underpinning these views. Landowners and managers were primarily concerned with improvements in water flow, water chemistry, and biodiversity. There was little interest shown in the carbon sequestration potential of peatlands, although many recognised that this aspect was of interest to policy-makers and businesses. The policy analysis revealed a strong focus on the carbon aspects of peatlands, while the potential benefits for water management were often omitted. Peatlands were almost entirely absent from fresh water policy. This is a missed opportunity for raising awareness and gaining support for peatland restoration.
Landowners and managers, and indeed the public, may feel more positively about peatland restoration if they knew more about its impacts on fresh water systems.

Concerns over the effects that peatland restoration would have on existing land uses and management practices were mentioned frequently. The main concerns were for sheep welfare and grouse productivity. These topics were conspicuously absent in the scientific literature, although there have been a few preliminary studies, and some grant proposals were found on this subject, indicating that this gap in the research is starting to be addressed. This gap in the literature may be due to a preoccupation with carbon in order to influence policy and attract funding. It also indicates a failure to understand the concerns of those who own and manage the land.

Chapters 2 and 3 also indicated some difference in opinion regarding the use of prescribed burning and grazing as management practices. This was hinted at in the workshops of Chapter 2, but was stated quite strongly and by a number of interviewees in Chapter 3. As well as the implications for grouse and sheep productivity, landowners and managers were concerned that with no grazing and no burning, the vegetation composition of these areas would change and biodiversity would be reduced. They also feared that if the heather were not controlled in some way, the risk of wildfires and subsequent loss of peat and vegetation cover would increase. The scientific literature on this subject is not clear-cut, but the general consensus is that in most cases burning and grazing should be reduced. There are calls from environmental organisations to have burning banned and to drastically reduce the number of deer and sheep in these areas. It is clear that greater communication is required to reach a productive compromise.

These disagreements on management practices contribute to an ideological difference regarding these landscapes. Although all groups declare a care for the environment and ambitions of stewardship and sustainability, the definitions of these terms may be quite different. In chapters 2 and 3, a number of landowners said that the land needed to be managed, that is should look as though ‘it’s been worked on’ and should not be left to go wild or ‘feral’. There was also a sense that the human aspect of these
lands, the sheep and deer and associated features, is part of its identity, that the land should be functional as well as natural. Along with this, there was a sense from many landowners and managers that the landscape, and their role as its managers or custodians was part of their identity. The interviews indicated that, for many landowners and managers, their primary objective was to be able to remain living and working on the land.

There is a perception, among landowners and managers that environmental organisations want to remove the human part of the landscape and manage it purely for nature. This study did not consult enough environmental organisations to determine whether that is the case. There does, however, seem to be a mismatch in the degree of human intervention that is considered acceptable in these landscapes.

This difference in opinion is likely to be true within the different groups of stakeholders, as well as between them. An important finding from this work is that there does not appear to be a clear idea of how these landscapes should be managed and to what end. In all three chapters, interviewees and workshop participants from policy, conservation and land manager groups asked the same sorts of questions: “what are we trying to achieve?”, “what is the end point?”, “what is the overall aim”. This question was asked in relation to national initiatives and peatland restoration schemes. There was a general understanding of reversing the impacts of poor management practices, but the details of what point to restore to and what people want these landscapes to deliver had not been established.

This question is particularly difficult to answer when one considers that peatlands are, historically, managed landscapes and developed in the UK as a result of human intervention. It is, therefore, difficult to determine an objective point which restoration should aim for. It is also quite probable that some form of management will be required in order to maintain peatland landscapes in the way that many perceive to be natural. In order to gain clarity in peatland policy, this question of what we are trying to achieve and what we want these landscapes to deliver, needs to be addressed. These questions should be answered with the involvement of landowners
and managers, in particular, as well as a range of other stakeholders. In this way it might be possible to build the trust that is presently lacking in stakeholder relations in these areas. Effective communication between and within all of the relevant groups is essential to achieve these aims.

8.2 Reflection on methodology

Before entering into a discussion of the results of this study, it is important to recognise the limitations of the data used. Especially in socio-economic work, the variability in small, rural communities can make normal statistical analysis senseless. A case study approach is the only one available, but it brings with it problems that have to be recognised.

8.2.1 Sampling bias

Stakeholders were contacted through a mixture of snowball sampling (or an approximation of snowball sampling) and cold-calling. This introduced two biases. It is much easier to find contact details for estates, particularly large estates, and so this type of landownership may be over-represented. Farmers and crofters were mostly contacted through referrals, and so they may be under-represented. Efforts were made to acquire contact details from organisations such as the National Farmers Union for Scotland, Scottish Land and Estates and the Crofters Commission, but due to data protection laws this was not always possible. These organisations agreed to send an email with a description of the work and an invitation to an interview or workshop, but there was little response.

When making referrals, people often made comments suggesting that they were only referring people who may have pro-environment or pro-peatland views. The workshop participants are also likely to consist of those with an existing interest in peatlands and the environment. Workshop attendance was voluntary, and so it is unlikely that people would attend, if they did not have an interest in the topic. Some studies have included a financial incentive for workshop attendance. There is some
debate about whether this may skew results, however, as participants try to please the workshop organisers (Angelsen et al. 2011), and so this option was not pursued.

8.2.2 Workshop time constraints

The fair price deliberation session was carried during a two-hour session in the afternoon. This was not enough time to fully explain all of the components of the feasibility tool and the project plan, and for participants to experiment with different options and consider the implications. It was not possible, however to persuade participants (who were voluntarily taking time away from their paying work) to commit to this exercise what would have amounted to another day. Default values were used for a number of the project components, in order to save time. The profit margin and price of carbon associated with the project are, therefore, indicative but not especially meaningful, as the decisions leading up to those values were not based on complete information, nor on full consideration of the options.

There was also not enough time to hear from all participants during the story-telling session. It is likely that only the particularly confident or vocal participants were heard. Although there were nods of assent, and the stories often sparked further discussion, it is not possible to say for certain that the values and themes demonstrated in the stories heard were representative.

The subsequent interviews of individuals represent one way of compensating for these short-comings in the workshop, by allowing people the time to enter into more detail on topics that concern them.

It is unlikely that as many people would have been able to attended longer workshops, as it was already difficult for participants to spare the time to attend. The sparsely populated nature of these regions meant that many participants travelled some distance to attend. The workshop could not, therefore, start at 0900 and finish at 1700 and if the workshop were spread over two days, participants would have needed to take two days off, and make the journey twice. The Cairngorms workshop indicated that it was too much to ask of most people.
All of the workshop sessions had value and were important in providing the necessary information and understanding of the topic for the fair price deliberation to succeed. As it was, the fair price deliberation was important for encouraging discussion and giving participants an indication of the factors that need to be taken into consideration when planning a restoration project, particularly through the Peatland Code. In order to obtain a more meaningful indication of incentives required to get landowners and managers involved in restoration, and to understand the project planning decisions they might make, further workshops would be required. Subsequent conversations with participants indicated that there is some appetite for follow-up workshops.

8.2.3 A wider range of stakeholders

This study mainly focused on the views of landowners and managers, and those working in environmental policy. At the policy workshop those working in the agricultural policy sector, particularly SGRPID, were not represented. This group is instrumental in enforcing the regulations associated with agricultural policy. It would have been interesting to hear their views.

Although people were interviewed from environmental NGOs, and other public and private organisations were interviewed, they were not many, as organisations tended to send only one representative. It was difficult to obtain more nuanced views, beyond that which is publicly stated by the organisation. It would be interesting to explore the views of this group of stakeholders in more detail.

8.3 Recommendations and future work

A more in depth look at the choices made by landowners and managers when planning a project would be of value. Using the feasibility tool as a base, it could be possible to add information about the potential consequence for land management and farm income. In this way landowners and managers would be more aware of the implications of their choices. A more meaningful profit margin and fair price could
be elicited. The choices made through the project planning could also be used to better understand the preferences and values of landowners and managers.

This work focused on the perspective of landowners and managers. It would be helpful to explore the values and priorities of environmental organisations – both governmental and non-governmental – from the perspectives of individuals within these organisations, and from the perspective of the organisation itself.

Many landowners and managers stated that creating public benefit, and improving their public image were incentives for involvement with peatland restoration and other environmental schemes. Public interest in peatland restoration may also encourage businesses to invest in these projects as part of their CSR commitments. More research is needed in order to assess public attitudes to peatland restoration.

For the same reasons outlined above, efforts should be made to raise awareness of the importance of peatlands and the need for restoration, in the public mind.

Discussions with policy makers and NGOs indicated that forest-to-bog restoration had been carried out in the past 30 years on various holdings around Scotland. On some of this land there has been some basic monitoring. These datasets could be used to build up a picture of the carbon dynamics of forest-to-bog restoration in the 30 years following felling. This may go some way to filling in some of the research gaps in this area.

Communication and lack of trust was a big barrier to peatland restoration, and potentially other land management issues. Further workshops with a wider range of stakeholders and a focus on communication may help to solve this problem. Narrative techniques may be a useful technique for such workshops.

Once trust has been established a series of workshops is probably required in order to establish a clear set of aims and objectives for these landscapes, and to identify clear roles for landowners and managers in efforts to achieve these aims.
A natural capital or ecosystems approach to environmental management, and potentially agri-environment schemes, was suggested in the policy workshop. Such an approach may encourage a more holistic approach to land management, and still enable landowners and managers to play a role in this management. In order for this sort of scheme to work, indicators of environmental health would need to be developed, so that monitoring could be carried out in a quick and cost-effective way. Research is required to develop these indicators.
8.4 Conclusions

There is a good deal of overlap in the environmental outlook of landowners and managers, and environmental organisations. These groups share a desire to improve the environment, restore peatlands, and manage them sustainably. Many landowners and managers considered these aims to be a priority.

Throughout the interviews it became apparent that these environmental values are due, at least in part, to a strong sense of identity associated with the landscape and their role as its custodians. There was a strong sense that their personal identity, and that of the landscape were linked: they needed to be on that landscape, and that landscape need to have them on it. Their identity was often linked to their heritage, and a concern for the legacy they would leave often influenced management decisions. These factors combine to create the strong sense of environmental care that was evident in the workshops and interviews, but also a high perception of risk associated with new environmental schemes and policies.

This perception of risk is exacerbated by the many changes in policy and management advice which have been a feature of peatland areas for the last century or so, and which have caused a lot of the degradation that current environmental schemes are trying to reverse. These issues were hinted at in the workshops of Chapter 2, mentioned often in the interviews of Chapter 3, and described fully in the policy analysis of Chapter 4. This policy analysis showed that some feature of the current policy situation also served to increase the perception of risk related with peatland management schemes. A number of anecdotes described poor treatment by policy officers, and erratic enforcement of regulations. Many of the funding schemes were complicated, involved onerous application processes, and were mostly geared towards larger land holdings or organisations. A lack of integration between policy sectors was said to slow the progress of restoration projects and reduced opportunities for raising awareness, improving communication, and encouraging holistic management.
Among landowners and managers there was some scepticism about the research underpinning peatland restoration management advice. This scepticism centred on two points: whether restoration is possible, and what forms of management are most appropriate for peatlands. The first point arose in relation to the Peatland Code PES scheme. While landowners and managers may agree that restoration is the right thing to do, they did not want to commit to the delivery of a certain amount of carbon, as they did not completely trust the science upon which it was based. When it came to recommended management practices, many landowners felt strongly that grazing and burning are important management practices for maintaining these landscapes, their productivity, their character, and their biodiversity.

This disagreement over management practices highlights an issue which emerged in Chapters 2 and 3. Although there was broad agreement between landowners and managers, and scientists and conservationists, about the value of peatlands and the need to restore them and manage them well, there was some disagreement regarding how this should be defined. This appeared to centre on the degree to which these landscapes should be influenced by people. Landowners and managers see the human aspects of these landscapes as an essential part of their character and heritage. They perceive the intentions of conservationists as attempts to remove that human aspect, and return the land to the wild.

The strong sense of identity that landowners feel in relation to these landscapes, the poor current and historical interactions with policy makers and environmental advisors, and the strong disagreement over how these areas should look, combine to produce feelings of distrust between landowners and managers, and policy makers and conservationists. This leads to a reliance on regulatory systems and the need for penalties and rewards to change behaviour. It also increased the perception of risk associated with new schemes or changes in management.

Many of the barriers to restoration described in this thesis stem from a lack of effective communication. During this research a number of successful methods of communication were identified. The storytelling technique used in the workshops
enabled participants to communicate deeply held or intangible values, and encouraged bonding over shared values and shared experiences. This method may be useful for improving relations between different stakeholder groups. The feasibility tool and fair price deliberation facilitated a structured discussion of the factors to consider when planning a restoration project, and the implications that these might have for the land holding or business. Where communication between landowners and managers and environmental officers has been successful, it involved repeated face-to-face communication, site visits and long term stability.

A number of individuals from all groups; landowners and managers, policy makers, environmental officers, commented that there was not a clear goal regarding what should be achieved through peatland restoration and what these landscapes should deliver. It is, therefore, very difficult to determine coherent policies and research strategies. With this in mind a set of principles were developed for working through social-ecological problems. These were: initial appraisal of the different forms of capital present in the system, communication of, between and within the forms of capital, defining the problem, establishing a goal and creating solutions through a long-term iterative process, involving all relevant stakeholders.


255


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Apendix A

Copy of email sent to landowners and managers

“While analysing the interviews I realised that I didn't quite get to the bottom of what drives landowners and managers to make the decisions that they make.

If I can understand what someone is trying to achieve - how s/he defines success within their "system" - their system might be life, community, family, job etc - then this should help explain their actions and maybe give insight into how to orientate government programmes, to support those aims.

I would define the system as those people who depend on or work with the land. If you want to offer another definition of your system, please do. I would like to get an idea of what you are ultimately trying to achieve, living where you do.

With that in mind could you please answer the following question, in as much or as little detail as you would like. The answers will be confidential and only directly quoted with your permission.

Please describe what life would look like e.g. what you would have achieved, what the land would look like, where you would be, what you would have - in order to feel that you have succeeded in life.”
Appendix B

Understanding policy barriers to peatland restoration: questionnaire

Research by the University of Edinburgh and the International Union for the Conservation of Nature’s UK Peatland Programme is investigating policy and regulatory barriers that may prevent landowners re-vegetating bare and eroding peat or blocking drainage ditches. A series of workshops across Scotland identified a number of concerns from the landowning community that engaging in restoration could affect their eligibility for the basic payment and restrict other payments on their landholdings. After an extensive policy review and interviews with key members of the policy community, there is conflicting evidence about whether peatland restoration would lead to the problems that were suggested by landowners during workshops.

We would therefore like to invite you to review a summary of the evidence we have found that suggests peatland restoration would not lead to the loss of payments, and tell us if we have missed anything or got anything wrong. Given the conflicting evidence, it is important that we check these findings before making them public and advising landowners.

Note: all answers will remain anonymous and you do not need to give us your name or contact details. If however you have important information to provide us, it would be great if you could share your contact details so we can follow this up with you in more depth if necessary. If you provide us with your contact details we will not pass these onto any third party under any circumstance, and your details will only be used for the purposes of this research.

Kathleen Allen

PhD candidate, University of Edinburgh

Prof Mark Reed
Research Manager, IUCN UK Peatland Programme
Professor of Socio-technical Innovation, Newcastle University

Consent to use information
I consent to the answers given in this questionnaire to be used for the purposes of this research in the ways detailed above.

Signature:.................................................................

Optional contact information (so we can contact you for further information linked to your answers)
Name:.................................................................
Email:.................................................................
Phone number:.................................................................
# Policy Review SWOT Analysis

## Strengths

### Policy surrounding peatland management and restoration appears to be fairly well integrated.

There appears to be no conflict with minimum stocking density requirements for Basic Payments.

An active farmer must have:

- a stocking density of 0.05 livestock units per hectare, or
- a stocking density of less than 0.05 livestock units per hectare where the farmer can demonstrate that such a stocking density is appropriate for the land by reference to the historic records kept in respect of the carrying capacity of the holding, or
- an environmental management agreement with Scottish Natural Heritage or an agri-environment commitment to which the farmer is subject the regulations for rural development support

Drain blocking and scrub/woody vegetation removal are fairly well covered in Pillar II.

Peatland are well catered for in Forestry Commission policy and funding options.

## Weaknesses

### Communication and capacity building

There is the perception among many in the landowning and land managing community that entering into a peatland restoration scheme will negatively affect them financially.

There is limited information about the implications of restoring peatland on eligibility for future payments under relevant schemes.

The policy and funding regulations are confusing with different webpages appearing to give different conflicting information.

Provision of information, support from trained experts/facilitators, and training for certain groups and issues, may help reduce perceived risks associated with restoring peatlands.

There is no funding for re-vegetating bare peat.

Unusual projects may struggle to fit into the confines of funding regulations.

## Opportunities

The IUCN Peatland Code could provide funding for restoring bare peat or for larger or more unusual projects.

Clear and well communicated integration between the two funding options is needed.

There are many similarities between forestry and peatland management e.g. capital outlay, contract length, risk, land use restrictions. These factors impede involvement with peatland restoration but not forestry.

Forestry has a good research base, well communicated policy and information, and has gained the trust of land owners and managers. Could peatland management learn from forestry? Could there be stronger collaboration?

Forestry Co-operation Grant – provides a facilitator to assist with communication between interested parties, engagement with stakeholders and communities, identifying and resolving issues around tenancy, landownership, eligibility.

Assistance with all of the issues listed above would greatly help with peatland restoration projects.

## Threats

Payments are often subject to inspection. The lack of clarity in the rules means that they might be open to interpretation. Farmers may opt for the least risky option.

Management Options with annual payments often require specific capital items to also be taken on. The actual costs of these are only covered in SSSI or Natura sites. “Standard costs”, paid in all other situations, may fall short of actual costs. This is likely to be a factor reducing uptake of peatland restoration options under SRDP. It need not technically prevent restoration work being done.

An area of peatland which is not in an agri-environment scheme, but is not being utilised much anyway, may start to have ineligible areas. For example, becoming too marshy or infested with rushes to be grazed much. In which case, farmers may face a (pervasive) incentive to mow/burn/flail a site to retain BPS eligibility and in so doing will damage the peatland value (making any subsequent restoration harder). Is there guidance for inspectors or advisors on this issue?
Questions

Occupation: ............................................................................................................................................................
Organisation: .............................................................................................................................................................

1. Are there any regulatory or policy issues that you know of, that we have not identified, which may discourage peatland restoration e.g. by affecting eligibility for future payments from statutory bodies after restoring peatlands?

2. Do you disagree with any of the statements we have derived on the previous page from our policy review?

3. Which (if any) of the issues identified in our policy review remain significant concerns that need to be investigated further (please rank in order of importance)

<table>
<thead>
<tr>
<th>Issue</th>
<th>There are still significant concerns? (tick)</th>
<th>Rank (1= most important)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better communication of policy rules and implications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpretation of rules by inspectors</td>
<td></td>
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<td>Standard vs Actual costs</td>
<td></td>
<td></td>
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<tr>
<td>Funding for bare peat restoration and unusual projects</td>
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<td></td>
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<tr>
<td>Better integration with Peatland Code</td>
<td></td>
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<tr>
<td>Collaboration with forestry sector</td>
<td></td>
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<tr>
<td>Facilitator to resolve:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Landownership and tenancy issues</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Community and stakeholder engagement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. What do you believe are the most relevant ways in which information arising from our policy review (and these questionnaires) should be communicated to the landowning community?

5. Any other comments?

271