PUBLIC VIEWS AND VALUES OF PEATLAND RESTORATION IN SCOTLAND

RESULTS OF A QUANTITATIVE STUDY

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April 2017

SRUC

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Snipe bog silver flowe, Dumfries & Galloway © Emma Goodyer - IUCN UK

ANDREW MCBRIDE'S FOREWORD

In your mind picture Scotland's peatlands. No doubt a vision of a large, expansive, remote brown coloured landscape soon unfolds. The image of peatlands as vast wastelands waiting to become productive or to be avoided as bottomless dangerous pits is strongly ingrained in our culture. So culturally we start with a bit of a downer on peatlands. However in the last few years in Scotland there has been the start of a cultural revolution in the perception of peatlands. A realisation that peatlands are closer than we think; literally on our doorsteps, even in cities, a peatland within 5 miles of us all and more to the point, not looking after our uplands, the consequences will literally end up on our doorsteps. Part of this cultural change is the acknowledgement in Scotland by the Government, its agencies, researchers and NGO's that peatlands have so much more to offer when in a good condition and working for us rather than against.

Like any change, it is imperceptible at first and only becomes apparent as this interest becomes wider. It never ceases to amaze me to see the wonderment of childhood discovery of all ages when a peat core containing 1000 years of history is pulled from the bog or fascination with the specialised plants that inhabit peatlands. Understanding the link between our peatlands and people is paramount to the role peatlands have in our society and their management. So as peatland restoration manager I was delighted when approached by the research team to collaborate on this project that would give an insight into public attitudes to our peatlands. This report has helped shape my thinking on the importance of having strong public support and the complexity of that support.

Andrew McBride
Peatland Action Project Manager

EXECUTIVE SUMMARY

- Peatlands cover more than 20% of the Scottish land surface and are the largest terrestrial carbon store in the UK. In addition to carbon storage, peatlands provide multiple benefits such as clean water and support for wildlife.
- Peatlands have been historically used for fuel and peatland landscapes have been affected by burning, drainage and forest plantation. This has resulted in a large share of Scottish peatlands being degraded, causing the release of greenhouse emissions contributing to climate change as well as problems with soil erosion and water regulation.
- Scotland's National Peatland Plan emphasises the need for an improved understanding of peatland benefits by the wider public.
- This report summarizes the findings of research aimed at investigating the public's views and values regarding peatland restoration. It is based on a survey implemented in spring 2016 with a representative sample of the Scottish population. The purpose of this research is to inform environmental practice and decision-making regarding peatland restoration.
- Survey results indicate that the general public's perception of peatland restoration is predominantly positive. The majority of respondents agreed that restoration will benefit them and future generations and consider that peatland restoration is not a waste of public money and will not damagethe rural economy. People recognize the importance of peatlands as part of Scotland's identity.
- The vast majority of respondents selected a restoration option over business as usual even if it involves a financial sacrifice to make it happen. Reasons for supporting restoration include the opportunity to contribute to climate change mitigation, recreational purposes, opportunities to improve the rural economy, as well as responsibility for future generations and a sense of Scottish identity.
- We did not find that peatland restoration is more likely to be supported by those more environmentally concerned. Rather, cultural issues associated with Scotland's heritage and identity seem to be more important factors explaining the support for peatland restoration.
- A minority of respondents did not support any restoration alternative - either because they feel restoration is not important to them or because they assign other priorities to the use of the land.
- The average monetary value that people attach to the benefits associated with peatland restoration (in terms of carbon storage, water quality and wildlife habitat) range from £127 to £414 per hectare and year, depending on the degree of improvement and where restoration takes place.
- In general, respondents prefer peatlands to be restored in wild-land areas, where they can remain undisturbed compared to areas that are less remote and that can be easily accessed. They also prefer peatlands to be restored in areas of high peat concentration rather than where there is little left.
- Despite this general support, it is important to note that there is significant variation and ambivalence in preferences and values amongst the population.

In conclusion, the results of this study offer an optimistic view for the development of a peatland restoration agenda in Scotland in terms of public support. However, it also shows that it is important to ensure that such an agenda recognizes the need to provide appropriate and sufficient information that the public can understand and relate to. The restoration agenda needs to acknowledge the multifaceted views that the public has about peatlands to ensure that restoration targets and people's preferences can be well aligned.

As part of this research, a framework was developed to represent the different conditions of Scottish peatlands and associated benefits. This framework is open access under the Creative Commons copyright and can be used freely by anyone who is interested. To download, please follow the links provided at the end of this report.

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WHAT IS IN THIS REPORT AND WHO IS IT AIMED AT?

Peatlands, also known as bogs, quags, or mires, cover over 3% of the Earth's surface. Peatlands cover more than 20% of the Scottish land surface, and more than three quarters of all peatlands in the UK are found in Scotland. This makes Scotland a peat-rich country (see Figure 1) and peatlands the largest terrestrial carbon store in the UK. Apart from carbon storage, peatlands provide multiple benefits such as clean water and support for wildlife.

Peat is dead, partially decayed remains of vegetation. Permanently water-logged conditions create an oxygen-free environment that prevents organic matter from completely decomposing, making peat an effective carbon store which can be preserved for millennia.

Scottish peatlands mainly consist of blanket bog which is a globally rare habitat type. Blanket bogs are different from the most frequent type raised bog in that while the former refers to peats that are formed across a hilly landscape, the latter refers to peats that are formed in lowlands.

Raised bogs often rise up slightly above the surrounding landscape. Both raised and blanket bogs refer to peatlands whose water source comes from precipitation. There is also another group of peatlands known as fens, whose formation is influenced by the supply of water from ground and/or surface waters.

In the past, peatlands in Scotland were mainly seen as either a source of peat for fuel or as wastelands to be converted to other productive uses such as forestry or agriculture. As a consequence, a large proportion of Scottish peatland has been degraded to some extent. This has led to habitat degradation, release of greenhouse gas emissions contributing to climate change and problems with soil erosion and water regulation. The main causes of degradation include drainage and managed burning.

According to Scottish Natural Heritage it is estimated that 70% of the Scottish blanket bog and 90% of raised bog areas have been damaged to some degree and further degradation is projected to continue if no action is taken. Consequently, the potential for these peatlands to produce benefits is compromised. How peatlands are managed therefore affects both the present and future benefits obtained from them.

Scotland has been developing policies that recognize the need to reverse peatland degradation and restore degraded peatlands. A large initiative aimed at reversing degradation, the Peatland Action, was initiated providing financial support to land managers for effective management and restoration of peatlands.

To facilitate sustainable peatland management and uptake of restoration, the National Peatland Plan, published in 2015, emphasises the need for an improved understanding of peatland restoration and management by all stakeholders. Also, the Plan highlights that the future of peatlands should not only be a concern for special interest groups such as the scientific community, policy makers, developers and land managers, but also for the wider public.

For that purpose, researchers and policy-makers need a better insight of people's views on the current and future condition of Scottish peatlands and the benefits that can be achieved through peatland restoration. Understanding people's views provides useful information on whether or not they would support a restoration policy agenda and why

This report summarises the findings of research aimed at investigating the public's views and values regarding peatland restoration in Scotland. It draws on results of a Scotland-wide survey carried out in spring 2016. The information on the public's perceptions of the benefits provided by peatland restoration can inform environmental practice and decision-making. Therefore, we expect this report to be of interest to a wide range of stakeholders including policy-makers, practitioners and conservation groups, as well as to the general public concerned about Scotland's environment and rural affairs.

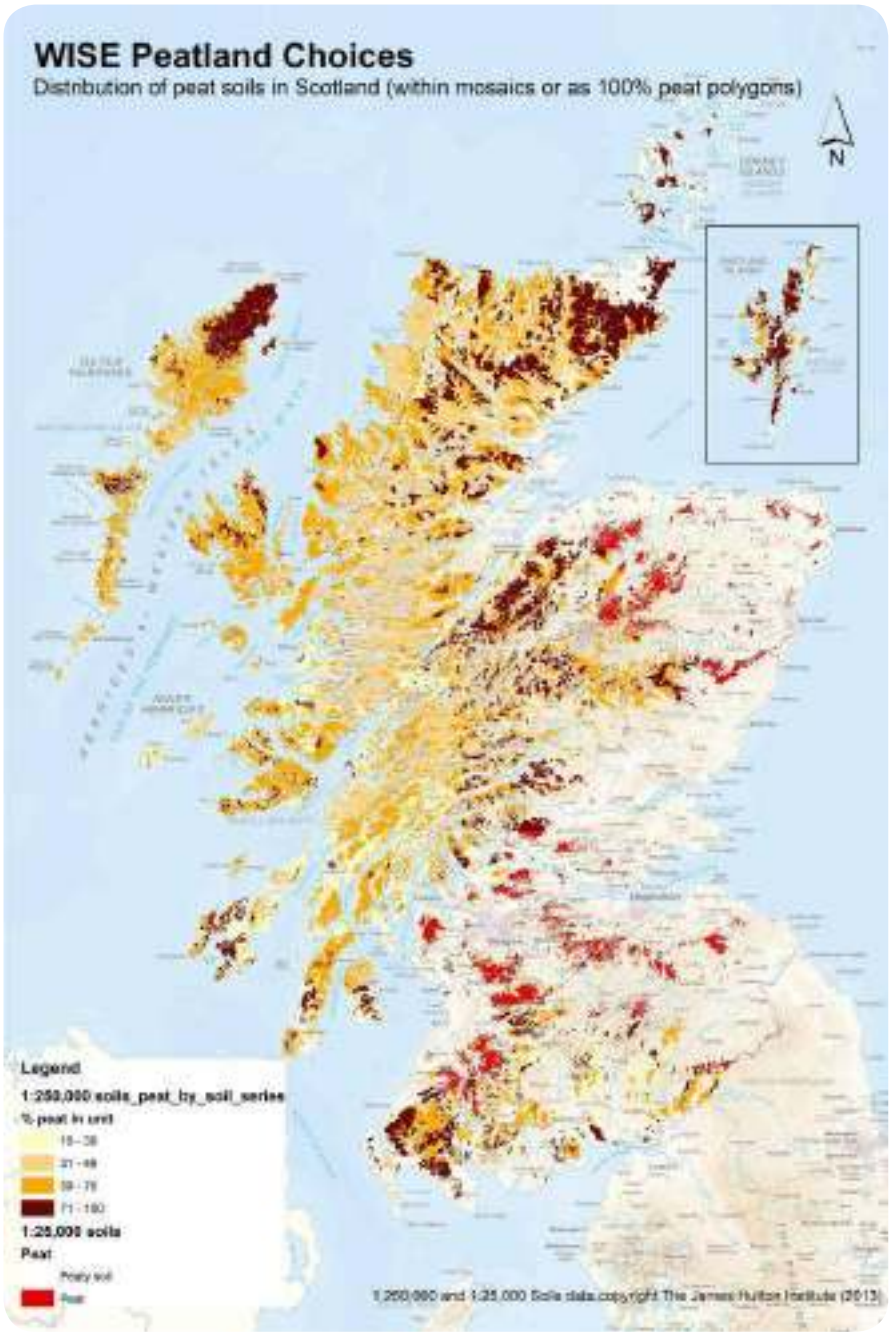
"By 2020 we expect to see improvements in the protection and condition of peatlands. They will be valued by government policies, developers, land managers and the wider public and no longer seen just as special interest habitats. The public will embrace peat-free composts".

Scotland National Peatland Plan (SNH, 2015)

The content of this report is part of a broader programme of work carried out by the authors looking at several aspects in relation to public perceptions, views and values of peatlands and restoration. This programme of work also includes qualitative analysis, information for which can be found at the end of this report.

Fire damaged hummocks in degraded blanket bogs, © Rebekka Artz, The James Hutton Institute

Figure 1: Location and extent of peat in Scotland, WISE Peatland Choices Initiative. © The James Hutton Institute.



2

ECOLOGICAL CONDITION OF PEATLANDS AND ASSOCIATED BENEFITS

Peatlands are very complex ecosystems in which different bio-chemical processes interact and are influenced by many factors such as carbon content in the soil, rainfall, terrain, etc. Also, climate change and human actions such as draining and burning affect peatland conditions.
It is therefore difficult to obtain precise estimates of how much peatland is in which condition in Scotland. It is also difficult to quantify the effects in terms of the benefits derived from peatlands, which include carbon sequestration, clean water and habitat for wildlife.

As part of this research, a framework was developed to represent the different conditions of Scottish peatlands and the associated benefits (Table 1 and Figure 2). This framework condenses ecosystem complexity and variation across peatlands into three broad categories of peatlands ecological condition (good, intermediate and bad ecological condition), although it should be noted that changes often occur gradually rather than as discrete shifts from one category to another.

In a workshop with peatland specialists it was estimated that currently 30% of the peatland area in Scotland is in good ecological condition, 40% is in intermediate condition and the remaining 30% in bad ecological condition as defined by this framework. If no action is taken, the proportion of peatland area in good ecological condition is projected to decrease to 20% while the area of peatlands in bad ecological condition is expected to increase to 40%. These figures are not exact but rather projections based on expert opinion. Nevertheless, they can serve as a guidance to understanding the current situation and future trends in the ecological condition of peatlands.

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Table 1: Categories of eological condition of peatlands and associated characteristics and benefits

CATEGORIES OF PEATLAND CONDITION	CHARACTERISTICS AND BENEFITS
 Good Ecological Condition	In good condition, there is plenty of water, so it is visible on the surface, slowly flowing through larger and smaller pools. You will see small grasses and especially the peat moss that grows well in wet conditions. The moss stores lots of water and makes the peatland appear in a typical red-green-brown mosaic. Peatlands in good condition continue to grow by adding more and more layers of peat. While growing, carbon is taken up from the atmosphere as carbon dioxide (CO_2) and stored as peat. Water that flows from peatlands in good condition is usually clear and of good quality. This means less need for water treatment. The water quality is also good for fish living downstream, especially of salmon and trout. Peatlands in good condition are home to various birds and wildlife species. This includes waterfowl and wading birds such as Curlew, and predators such as hen harrier and red kite.
 Intermediate Ecological Condition	In peatlands in intermediate condition, water has been taken off the land by creating channels for drainage. This allows activities such as livestock grazing. Surface water is rarely visible. With less water on the land, taller plants can grow, like cotton grass, or small bushes like heather. Peatlands in this condition are not very colourful. However, if heather grows in the area and is in bloom, its purple colour stands out. Signs of bare peat start to appear as dark patches. Sometimes peatland in intermediate condition is burned regularly, to create conditions for grouse shooting. This leaves a characteristic mosaic of burned and unburned land in the landscape. Peatlands in intermediate condition have stopped growing. No additional peat layers are added. Instead, peat layers gradually shrink, releasing a moderate amount of carbon to the atmosphere, where it contributes to climate change. Water flowing from such peatlands can be of lower quality. Water can be slightly murky, especially after a heavy rainfall. This can affect the fish population downstream and increase the need for water treatment. Peatlands in intermediate condition may still harbour some of the wildlife that is present in peatlands in good condition. However, it is likely to be less abundant. It is also more likely that you will see managed species such as deer,sheep and grouse.
 Bad Ecological Condition	Peatlands in bad condition have been drained for a longer time. The forces of water and wind (erosion) have now exposed larger areas of bare peat. Deep gullies and trenches are formed. Few plants grow on the exposed areas. Patches of grasses or heather are still found on 'islands' between exposed bare peat. The exposed areas will continue to grow, leaving less plant cover as protection on the surface. Peat will continue to be lost until the solid rock below emerges. Peatlands in bad condition lose carbon at a high rate. They have turned into a severe 'source' of carbon to the atmosphere, where it contributes to climate change. Water that flows downstream is of bad quality. It is often murky and can be dark brown from soil components, especially after heavy rainfall events. The bad water quality will affect fish downstream. It is not suitable for human consumption and therefore needs a lot of treatment. Peatlands in this condition are home to little wildlife. Not many plant and animal species can be found.

Figure 2: Summary of peatland ecological conditions and their effect on carbon emissions, water quality and wildlife

	GOOD ECOLOGICAL CONDITION	INTERMEDIATE ECOLOGICAL CONDITION	BAD ECOLOGICAL CONDITION
			
Carbon emissions			
Water quality			
Wild life			

3

SURVEY DESCRIPTION

A Scotland-wide survey was implemented in spring 2016 to gather the views and perceptions of the Scottish population on peatland restoration and the associated benefits in terms of carbon storage, water quality and wildlife habitat. The survey included the following aspects:

- Information on peatlands, ecological conditions, restoration and associated benefits
- Reasons for supporting (or not) restoration
- Views on where to restore
- People's values in monetary terms for benefits resulting from peatland restoration
- Perceptions of peatlands including links to cultural identity
- General attitudes towards the environment
- Socio-demographic information about the respondents

The sample was fairly representative of the Scottish population in relation to key socio-demographic characteristics, such as gender, education and income (see Table 2), as well as geographical spread.

SURVEY KEY FACTS

WHAT?
A survey to collect information on people's perceptions, views and values of peatlands, peatland restoration and associated benefits.

HOW?
The survey was implemented using an online self-completion questionnaire. The process was guided by a learning module developed by the research team and simple language was used to ensure that respondents understood each step and question.

WHEN?
The survey was implemented between March and May 2016.

WHO?
A sample of 1795 persons from the general public participated in the survey.

WHERE?
Scotland (national level).

Table 2: Socio-demographic characteristics of the sample compared to the overall Scotland's population

VARIABLE	SAMPLE	POPULATION (SCOTLAND)*
Gender distribution		
Female	50.10%	51%
Male	49.90%	49%
Age distribution (years old)		
18-24	8.0%	11.9%
25-44	36.8%	33.0%
45-64	34.2%	34.2%
≥ 65	21.0%	20.9%
Yearly household income		
GBP per year	£40,155	£38,337
Educational attainment (highest achieved Scotland census level)**		
Level 0	12.3%	26.8%
Level 1	18.1%	23.1%
Level 2	18.5%	14.3%
Level 3 and above	48.1%	36.0%
Prefer not to tell	2.3%	-
Social grade (employment-based)		
Higher and intermediate	22.1%	19.0%
Supervisory, clerical, junior	40.1%	32.0%
Skilled manual	9.7%	22.0%
Semi-skilled, un-skilled	18.9%	28.0%
Prefer not to tell	9.1%	-
Average household size		
Persons per household	2.34	2.25

Sample's figures are based on 1,795 respondents, expected household income (629), educational attainment (1,793) and employment levels (1,791).
*Scotland Census (2011) by National Records of Scotland
**it should be noted that population figures include population 16 years old or older while our survey includes respondents 18 years old or older. Part of the under-representation of lower education levels is explained by this different lower age bound.

Peatland Action, © Scottish Natural Heritage

Choice experiments to estimate monetary values of peatland restoration

The method used to derive estimates of the benefits of peatland restoration in monetary terms is called *choice experiment*. Choice experiments are an environmental valuation technique that uses questionnaires to estimate how much people are willing to pay for improvements in the quality of the environment. The technique is particularly useful for environmental goods and services that are not traded in markets; and for which therefore no monetary values can be directly identified, such is the case for carbon storage, water quality and wildlife habitat. In this study, respondents were offered a series of choices between different restoration alternatives and a 'business as usual' (no restoration) alternative.

The alternatives presented information on the amount of peatlands in good and bad ecological condition and respondents were asked to choose their preferred alternative in each choice situation. The restoration alternatives included a monetary trade-off in the form of a cost to the tax payer towards a hypothetical Peatland Trust fund responsible for implementing a restoration programme that would deliver the proposed improvements. Each respondent was presented with 8 choice situations in which they were asked to choose between the 'business as usual scenario' (at no additional cost) and two scenarios of improved peatland condition in exchange for that cost.

Through a statistical analysis of the choices made by respondents, we can estimate annual monetary values for peatland restoration in terms of willingness to pay in £ per hectare.

Choice experiments are a well-established valuation technique rooted in economic theory. This technique was applied here according to best practice standards, validated by the scientific literature. It should be noted, however, that they are not uncontested. Critics are for example concerned with the use of a single monetary metric to represent the value of nature or with the hypothetical nature of the choices survey respondents make.

4

SURVEY RESULTS

This section presents the results of the survey. For readability purposes, statistical details have been omitted. They can be provided by the authors upon request.

4.1 Views regarding peatland restoration

Understanding people's views regarding peatland restoration provides useful information on whether or not they would support a restoration policy agenda and why they would do so. Survey respondents were asked how far they agree or disagree with various statements regarding peatland restoration. These statements covered a number of themes such as the benefits of restoration (e.g, what are the gains and who will benefit), who should be responsible for restoration, beliefs about negative impact of restoration (e.g. whether restoration will negatively affect the rural economy), and attitudes towards restoration (e.g. whether people feel a moral obligation about it). Figure 4 summarises the results on respondents' perceptions and views about peatland restoration in general.

Peatland Action, © Scottish Natural Heritage

Tthe majority of respondents agreed with the statements in support of restoration highlighting that restoration will benefit them and others they care about, including future generations. Similarly, they tended to disagree with statements that were not supportive of the idea of restoration. For example, the majority of respondents disagreed that restoration is a waste of money or that restoration will hurt the rural economy.

Figure 3: Respondents' views about restoration
(numbers in bracket indicate number of respondents)

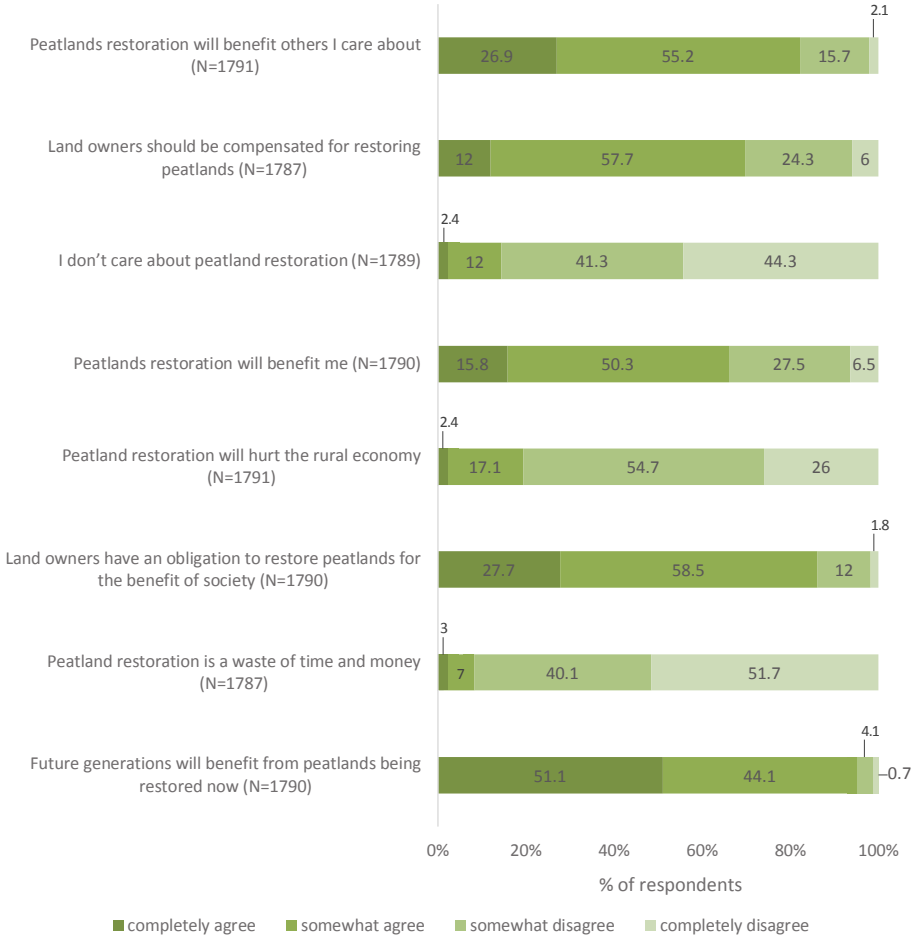
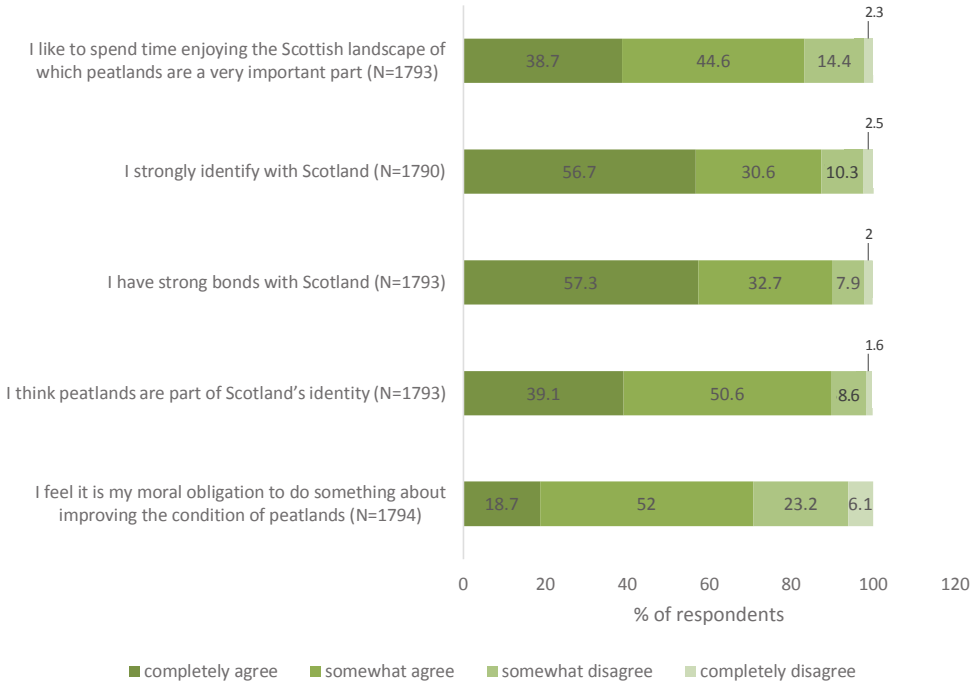


Figure 4 reports views that are specific to Scotland. Most respondents agreed that they enjoy spending time in a landscape which is shaped by peatlands, and most people also identify with Scotland and the peat rich landscape. The majority also feels that they personally have a moral obligation to do something to support improving the condition of peatlands.

Figure 4: Respondents' views about Scotland's peatlands
(numbers in bracket indicate number of respondents)

Overall, the results suggest that the general public's views regarding peatland restoration are predominantly positive and that this support is connected to Scotland's identity.



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Support for peatland restoration

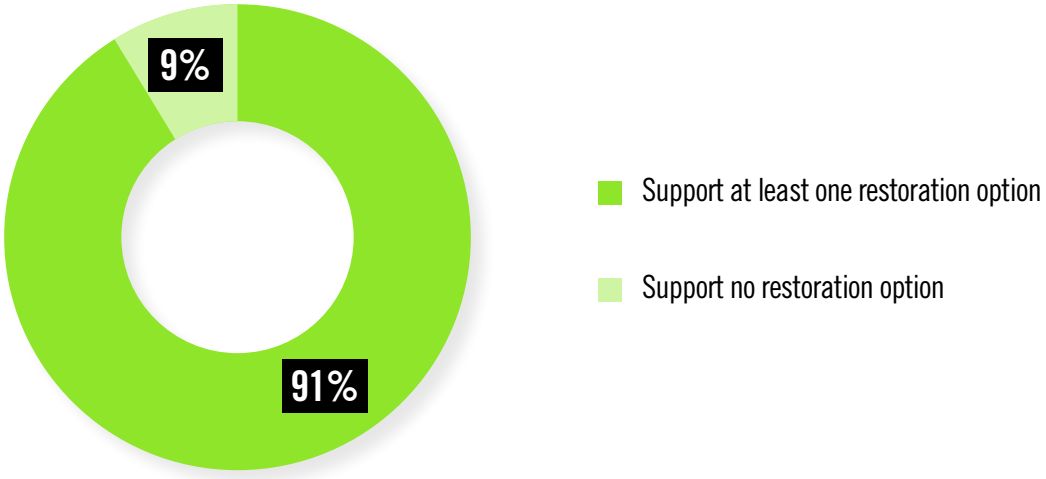


Figure 5: Percentage of respondents choosing at least one restoration option

After expressing their views regarding peatland restoration, respondents were presented with eight different choice situations. In each of the eight situations, respondents had a choice between three options: two restoration options available at a cost to them and a business as usual option (no restoration, no costs to them). As illustrated in Figure 6, 91% of respondents selected a restoration option at least once, while 9% always chose the business as usual option (no restoration).

This indicates considerable support for restoration, even if it involves a financial sacrifice to make it happen.The survey asked respondents for their reasons for supporting peatland restoration. The results are presented in Figure 7.

The reasons cover a number of themes such as environmental benefits (e.g. opportunity to reduce climate change impacts, improve water quality, etc.), cultural identity, recreational purposes (e.g. enjoy wildlife on restored peatlands), economic gains (e.g. improving income generation in rural economies), responsibility towards future generations and personal satisfaction associated with peatlands being in good ecological condition.

The results show that all potential reasons offered to respondents were seen to be similarly important. Respondents therefore endorse restoration for a variety of reasons that are frequently referred to in restoration agendas.

Figure 6: Reasons for supporting restoration
(numbers in bracket indicate number of respondents)

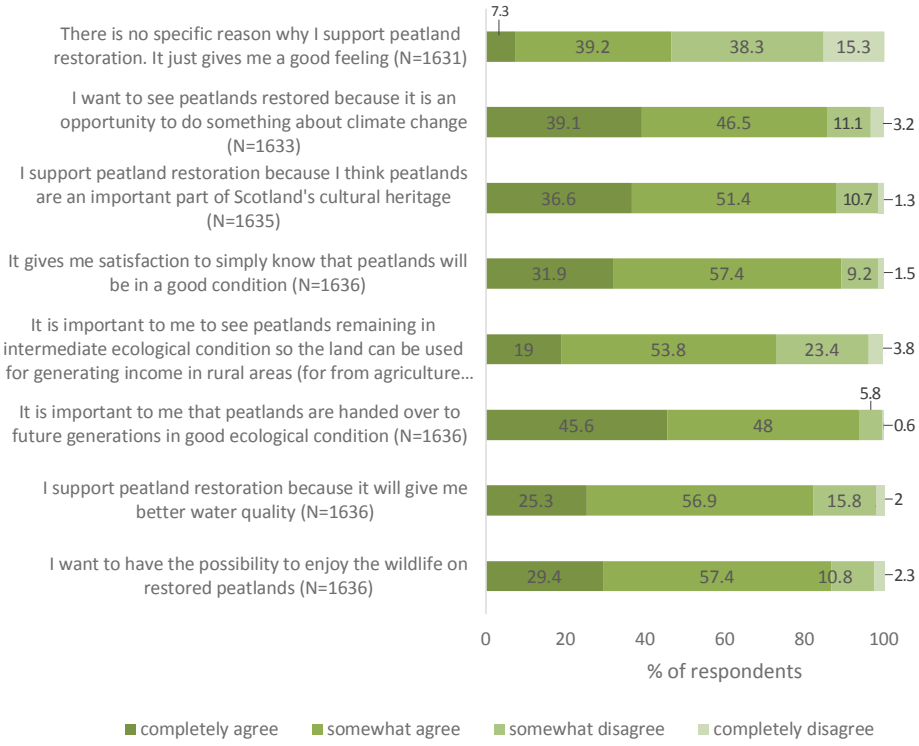
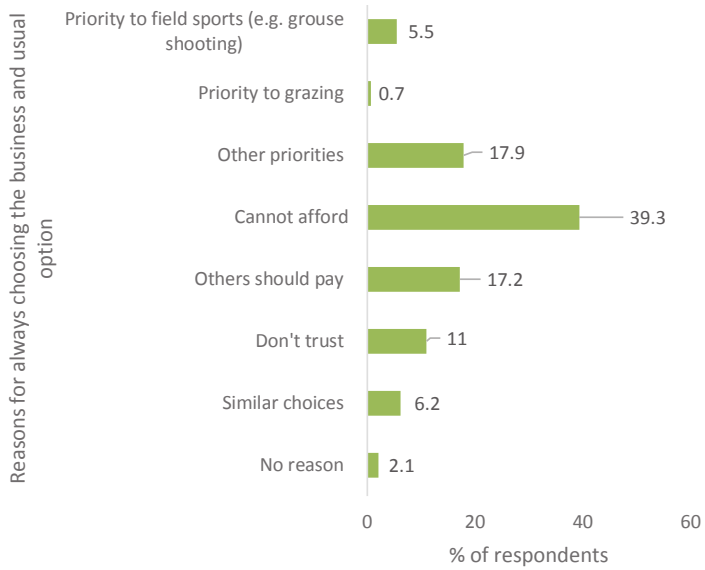


Figure 8 shows the main reason selected by the 9% of respondents who did not indicate support for restoration in the choice experiment.

Out of the people who did not support any restoration option, 39% stated they cannot afford an extra payment, and they may or may not be supportive of restoration. About a third of these expressed reasons that we can consider 'protest motives' (for example, "others should pay" or "I don't trust the money would be used for peatland restoration"). Others expressed reasons that clearly suggest that they were not supportive of restoration (for example, "it is not important to restore peatlands" or "there should be other priorities, such as field sports or grazing").

Figure 7: Reasons for not choosing any restoration option
(numbers in bracket indicate number of respondents)



EXAMPLES OF REASONS FOR NOT SUPPORTING RESTORATION

"A large amount of this land is owned by the "Landed Gentry" who make a fortune out of the shooting parties etc. they host for the rich and famous. I believe they should be made to restore the damage they have done to Scotland due to their own greed"

"Scotland is already investing money into restoration of peatland. I believe that preserving the nature and the integrity of the Scottish territory is important however I think that Scotland is already doing very good"

"The research is flawed. Having lived in Peat land areas for 70 years I understand that peat lands change over time. Some are eroded but recover some have been "farmed" mechanically but will recover over time or will be reclaimed for farming."

"I am not convinced of the assessment that the natural course of peatlands is another artificial management regime"

"Many peat lands are a result of human intervention over the years. Try restoring the forest on the grouse moors"

4.2 Variation across respondents

In this section, we explore associations between socio-economic characteristics and individual responses to survey questions.

Restoration Mats © Chricton Centre

Do male and female respondents have the same views regarding peatland restoration?

There was a gender dimension to some of the views regarding peatland restoration. More women were likely to completely agree with the statement that "peatland restoration will benefit future generations" than men. Also, more women were likely to completely disagree that "peatland restoration is a waste of time and money".

Does income influence views regarding restoration?

We checked whether different income groups reported different views. We noticed a weak positive association between higher income groups and statements regarding the fact that "peatland restoration will hurt the rural economy" or that "peatland restoration is a waste of time and money". Also, we found that people with low and medium income were likely to disagree with the statement "I don't care about peatland restoration". So, generally, people in mid to low income groups show more support for restoration.

Does the amount of peatland areas located in the vicinity of respondents' place of residence influence their views regarding restoration?

A positive relationship was found between the amount of peatland respondents report to be located close to their place of residence (25 mile radius) and views regarding restoration. Respondents who reported more peatlands near their vicinity were more likely to agree with the statements "future generations will benefit from peatlands being restored now", "peatland restoration will benefit others I care about", and "peatlands restoration will benefit me".

Does the amount of peatland areas located in the vicinity of respondents' place of residence influence choice regarding where to restore peatlands?

The analysis revealed a strong positive association between the stated amount of peatland near people's home and their choice of location for restoring peatland. Respondents who report to have 'a lot' of peatlands in the vicinity of their homes are more likely to prefer peatland restoration to be implemented in areas that are 'high in peat'. This may be due to perceptions of being more likely to directly benefit from restoration, and the possibility that respondents living close to peatland areas may be more knowledgeable about peatlands compared to respondents living further away from peatlands.

We did not find any significant association between level of education, size of the settlement where respondents live and their views on peatland restoration. We also did not find any association between membership of environmental organizations and views on peatland restoration.

4.3 The (monetary) value of peatland restoration

The methodology applied allows us to elicit the value that the public gives to benefits of peatland restoration measured in monetary terms.

Specifically, we are able to measure the value that people place on improving peatland from bad condition to good condition and from intermediate condition to good condition, as defined in this framework. We also asked respondents where they preferred restoration to take place using two criteria: whether respondents would like to see peatlands to be restored in wild-land areas (relatively remote and inaccessible areas where restored peatlands are likely to remain undisturbed) versus non-wild-land areas (relatively accessible areas where peatlands can be easily enjoyed); and whether restoration should focus on areas with higher 'concentration' of peat (covering more than 30% of an agricultural parish area) or lower concentration of peat (less than 30% land cover in a parish). Figure 9 shows where these areas are placed on the map.

Table 3 shows the annual values for restoring peatland in bad or intermediate status to good ecological status. These are presented in £ per hectare and year for restoring one percent of the peatland area (we refer to this as 'marginal' values). These figures show that people see more value in restoring peatlands from bad condition to good condition than from intermediate condition to good condition. That is, people place more value on larger improvements as could be expected. The results also show a value 'premium' associated with undertaking restoration in wild-land areas and areas of high peat concentration. That is, on average, people prefer restoration to take place in wild-land areas where they can remain undisturbed, and in areas of high peat concentration, rather than in areas where 'there is little left'.

Figure 8: Wild-land areas (left) and areas low and high (right) in peat restoration

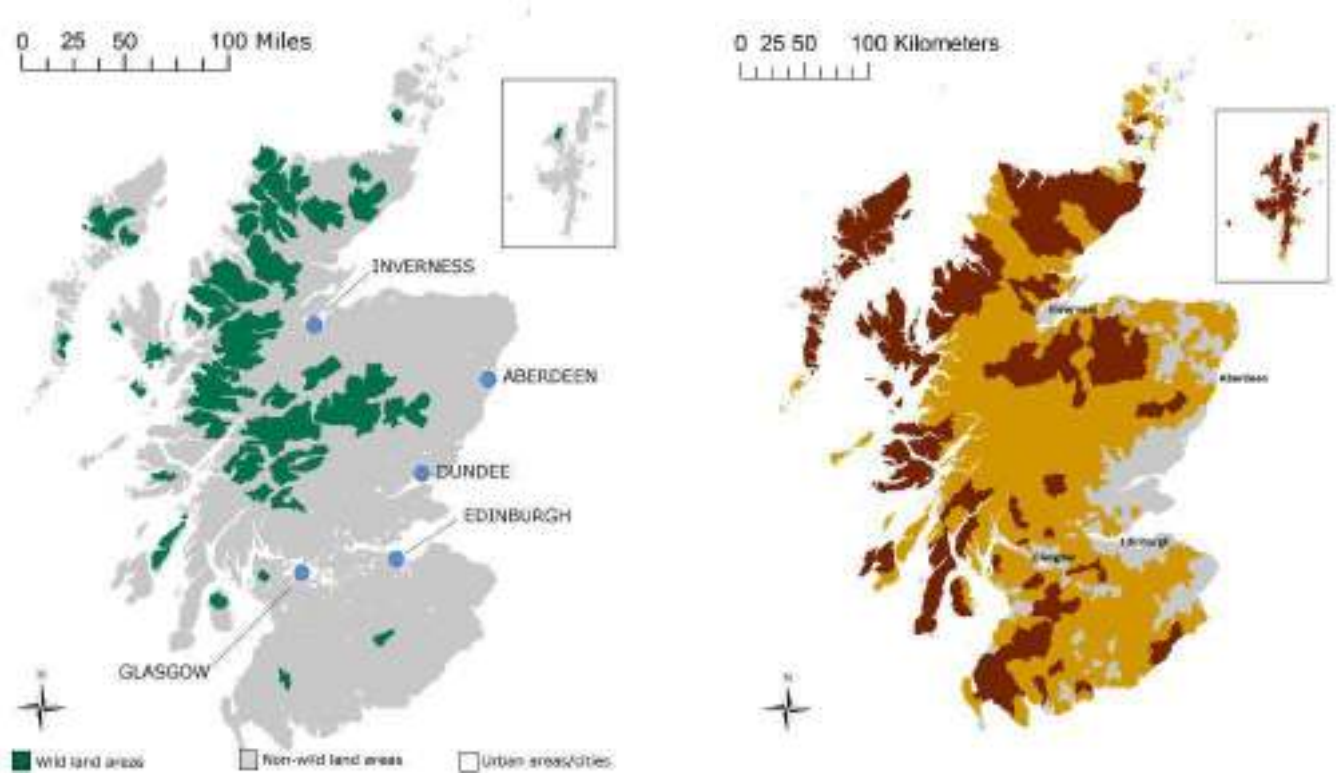
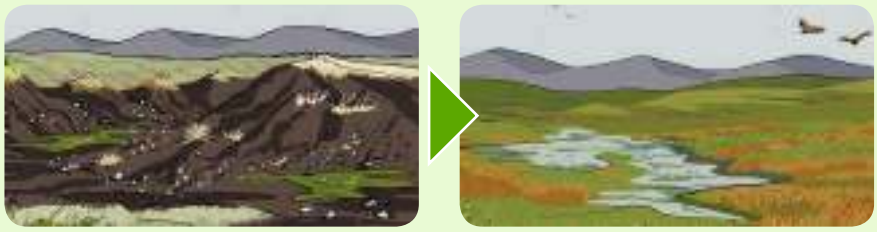


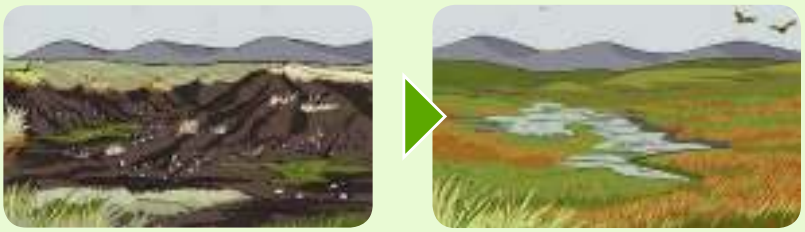
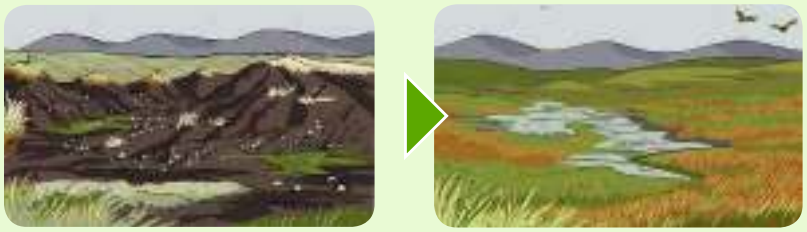
Table 3: Monetary values of the benefits of peatland restoration (marginal willingness to pay)

CONDITION CHANGE BEING VALUED	MEAN VALUES (annual £ per % shift, per household)
Shift from poor to good condition	
	2.1
Shift from intermediate to good condition	
	1.4
Restoration taking place in wild-land area	32.2
Restoration taking place in area of high peat concentration	12.7

The marginal values allow us to estimate benefits for different restoration scenarios depending on whether they happen in areas of bad or intermediate condition, wild-land areas or not, and areas of high or low peatland concentration. Table 4 shows some examples of these scenarios and their associated monetary benefits. **Overall, monetary yearly values range from £127 to £414 per hectare and year.**

Multiple scenarios are possible depending on various combinations of peatland condition and areas of restoration focus. The table shows just a few of these for illustration purposes. It should be noted that the value for improvement from intermediate condition to good condition in non-wild-land areas of low peat concentration is not significantly different from zero (i.e. the public does not see any value in that particular change).

Table 4:Monetary values of the benefits of restoration (per hectare)

RESTORATION CHARACTERISTICS BEING VALUED	WILD-LAND	PEAT SHARE	VALUES (£ per hectare and year until 2030)
Shift from poor to good condition			
	Yes	Low	297
Shift from intermediate to good condition			
	No	High	248
Shift from intermediate to good condition			
	No	High	127
Shift from intermediate to good condition			
	Yes	High	414

4.4 Views on general environmental issues

We were also interested in understanding the general level of environmental concern amongst the population. The *New Ecological Paradigm Scale* was employed to assess the extent to which the general public are concerned about the environment.

The survey results demonstrate a higher level of concern for environmental issues than earlier surveys such as the Scottish Government's Environmental Attitudes and Behaviours Survey 2008. Figure 10 shows that a substantial proportion of respondents agreed to statements regarding the extent of environmental degradation and the need to act pro-environmentally. For example, the majority of respondents agreed that humans are severely abusing the environment, and that continuing on the present course may result in a major ecological catastrophe.

Similarly, the majority of respondents disagreed with 'reverse' statements, i.e. statements for which agreement suggests less environmental concern. The statement "The so-called 'ecological crisis' facing humankind has been greatly exaggerated" also featured in the Scottish Government's Environmental Attitudes and Behaviours Survey 2008. In the 2008 attitudes survey, 55% are reported to have disagreed with this statement compared to almost three-quarters (69.1%) of respondents in our survey. Caution should be applied when comparing outcomes for a single question from two surveys, which used different survey modes and did not apply the same sampling frame for identifying respondents to be surveyed.

Nevertheless, this may suggest that with time, attitudes to environmental concerns are growing in Scotland. This is a positive signal for peatland restoration and management, because peatland restoration addresses a number of key environmental concerns including climate change, water quality regulation and biodiversity conservation.

Support for some statements was not unanimous, however. For example, more than a quarter of respondents disagreed that "the earth has limited resources" (28.4%). Respondents were divided on whether "humans will eventually learn to know how the Earth works and control it" (45.5% agreed and 54.5% disagreed).

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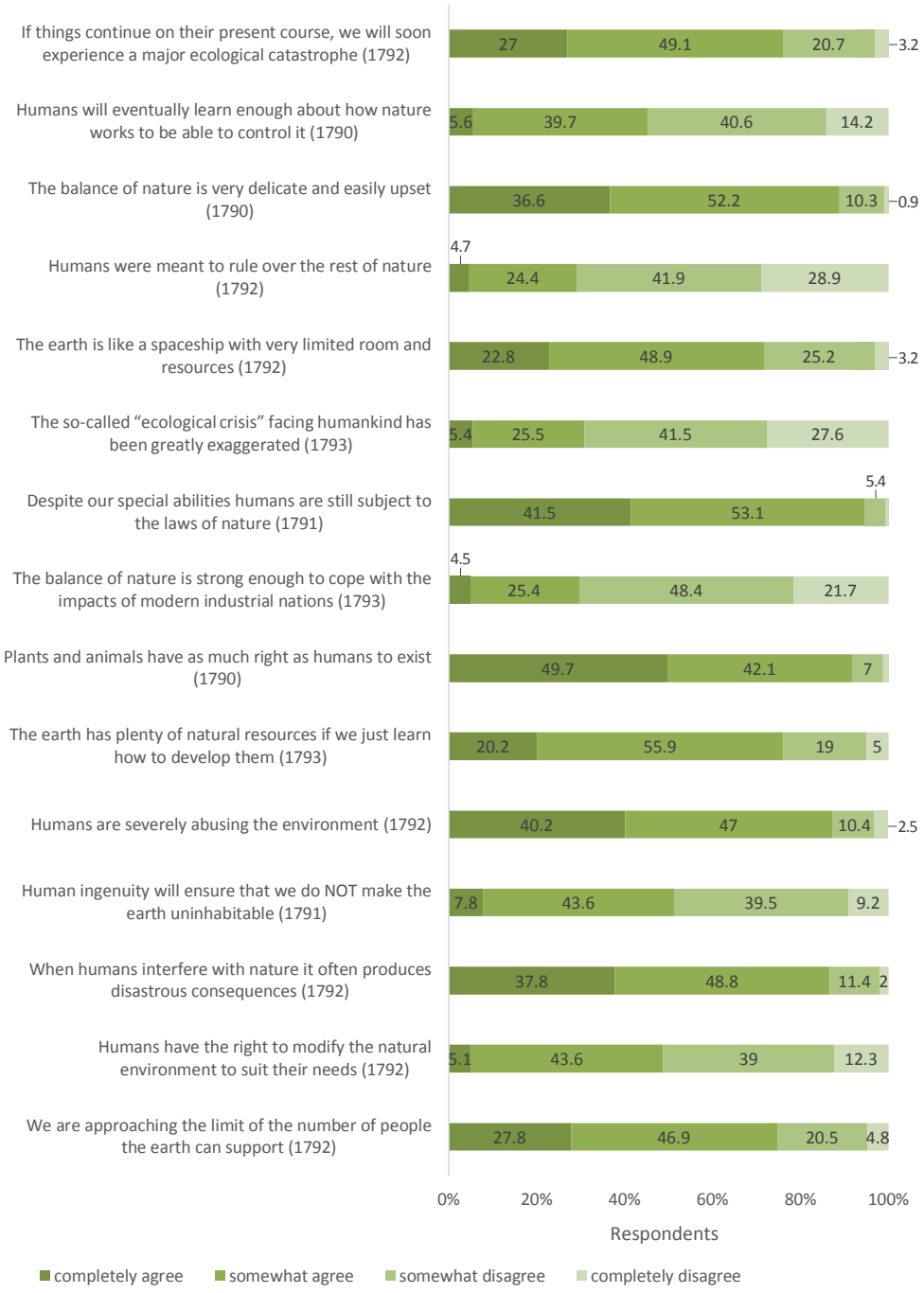
The New Ecological Paradigm Scale is rooted in social psychology. It measures the environmental concern of a population, by asking people whether they agree or disagree with around a dozen of specific statements of views about the environment (see Figure 10).

VARIATION AND AMBIVALENCE IN VALUES

The monetary figures in this report are average values across the whole sample, but it should be noted that there is significant variation across people. This means that different people hold different values for the different restoration options and areas of restoration. For example, certain groups might hold higher or lower values for improvements from bad to good ecological condition, or people from different locations might value restoration in non-wild-land areas or areas of low peat differently than the average. Moreover, we know from complementary qualitative research that people also hold ambivalent feelings about peatlands. For example, the same person sees peatlands both as 'wastelands' and as valuable wild places.

Figure 9: Views regarding general environmental issues
(numbers in bracket indicate number of respondents)



We then explored whether people's general environmental attitude is likely to affect the extent to which they are willing to support restoration, but we did not obtain a clear picture. In some cases, people supporting statements of environmental concern did support restoration. For example, those agreeing with the fact that "We are approaching the limit of the number of people the earth can support" or "Plants and animals have as much right as humans to exist", were more likely to choose one of the restoration options. However, people disagreeing with statements expressing environmental concern (for example, "The balance of nature is very delicate and easily upset" or "Humans are severely abusing the environment") were also likely to choose a restoration alternative.

On the contrary, respondents supporting statements of environmental concern such as "If things continue on their present course, we will soon experience a major ecological catastrophe" were more likely to choose no restoration option.

From our survey data we do not have conclusive evidence that more environmentally concerned people are more likely to support peatland restoration than those less concerned about the environment.

4.5 Respondents' views on the survey

Several survey questions allowed us to assess whether the information provided in the survey about peatlands and their restoration was effective and useful in supporting respondents to develop informed views on peatlands and peatland restoration.

The majority (84.2%) of respondents reported that the information provided helped them to understand the three ecological conditions of peatlands, which formed the basis for explaining the process of degradation and restoration.

Also, the survey outcome was perceived to be of some consequence to real world decision making.

Almost 80% of respondents agreed that the results of surveys of this kind can influence future decisions regarding peatland restoration in Scotland.

Several respondents left comments stating that they found the survey to be very informative/ educational, relevant and were hopeful that a restoration policy will follow (Figure 11).

There were some negative comments such as "this survey was very biased toward conservationism, very little was said about the other economic or ecological impact of other use of the Peatland" and "would it have been better spending the money spent on surveys on dealing with the problems?". However, these represented the minority.

Figure 10: Other positive feedback on the survey

The way we introduced peatlands and peatland restoration to respondents in the survey has been integrated into a communication tool aimed at explaining the different possible ecological conditions of peatlands and their characteristics and benefits to the wider public and land managers interested in peatland restoration.

These communication tools are open access and free to be used by anyone. They can be downloaded following the links provided at the end of this document.

5

CONCLUSIONS AND KEY MESSAGES

This report has summarized the main findings of a survey aimed at investigating the public's current views and values regarding peatland restoration in Scotland. The information gathered is expected to be of relevance for informing policy decisions regarding peatland restoration in Scotland, as established by the National Peatland Plan.

By using this information to develop public awareness of the benefits of peatlands the vision of the Peatland Plan can be realised.

Peatlands are very complex ecosystems, which have the potential to provide multiple benefits in the form of carbon storage, water quality and wildlife habitat. Peatlands have been historically used for fuel and peatland landscapes and have been affected by burning, drainage and forest plantation. This has resulted in very large parts of Scottish peatlands being damaged and their benefits being undermined or threatened. Prior to this survey, a comprehensive view of the public's opinion on peatlands and people's degree of support for peatland restoration was lacking.

An online survey encompassing almost two thousand Scottish residents forming a representative sample of the overall population was carried out in spring 2016. This survey includes monetary estimates of the values that people assign to peatland restoration. Monetary estimates of peatland values can inform public and private investment decisions on peatland restoration (for example, for comparing the costs of restorations with its monetized benefits) as well as informing decisions on where to prioritize restoration.

The study shows that there is clear support for peatland restoration in Scotland. The associated monetary values range, on average, from over £100 to over £400 per hectare and year. People place a clear value on improvements in peatland condition from bad and intermediate ecological condition to good ecological condition, and express a preference for peatland restoration to take place in wild-land areas and areas of high concentration of peat. Reasons for supporting restoration relate to a number of themes, such as having the opportunity to mitigate climate change impacts, improve water quality and improving income generation in rural communities. We did not find that peatland restoration is more likely to be supported by those more environmentally concerned. Rather, cultural issues associated with Scotland's heritage and identity seem to be more important factors explaining the support for peatland restoration.

It should also be noted that there is significant variation in preferences and values. We also know from a previous qualitative study that people can hold ambivalent feelings about peatlands, with sometimes the same individual feeling that peatlands are "wastelands" but that at the same time provide benefits such as "sense of space" or have a symbolic value associated with Scotland's identity. Furthermore, people from different areas in Scotland may hold different views on traditional uses such as peat cutting and what benefits or impacts are associated with these, and what constitutes 'peatlands in good condition'.

In conclusion, the results of this study offer an optimistic view for the development of a peatland restoration agenda in Scotland in terms of public support. However, it also shows that is important that such an agenda recognizes the need to provide appropriate and sufficient information that the public can understand and relate to. The restoration agenda needs to acknowledge the multifaceted views the public holds about peatlands to ensure that restoration targets and people's preferences can be well aligned.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ADDITIONAL KEY READINGS

The work presented here has been produced based on the most up to date scientific literature. For readability purposes, specific references have not been included in the text. Below we list some additional key readings, which have informed this work.

Basic information on peatlands in Scotland

Scottish Natural Heritage, 2015. Scotland's National Peatland Plan: Working for our future http://www.snh.gov.uk/.

Artz, R.R.E., Donnelly, D., Andersen, R., Mitchell, R., Chapman, S.J., Smith, J., Smith, P., Cummins, R., Balana, B. and Cuthbert, A. 2014. Managing and restoring blanket bog to benefit biodiversity and carbon balance – a scoping study. Scottish Natural Heritage Commissioned Report No. 562.
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Bain, C.G., Bonn, A., Stoneman, R., Chapman, S., Coupar, A., Evans, M., Gearey, B., Howat, M., Joosten, H., Keenleyside, C., Labadz, J., Lindsay, R., Littlewood, N., Lunt, P., Miller, C.J., Moxey, A., Orr, H., Reed, M., Smith, P., Swales, V., Thompson, D.B.A., Thompson, P.S., Van de Noort, R., Wilson, J.D., and Worrall, F. (2011) IUCN UK Commission of Inquiry on Peatlands. IUCN UK. Peatland Programme, Edinburgh.

Bruneau, P.M.C and Johnson, S.M. 2014. Scotland's peatland - definitions & information resources. Scottish Natural Heritage Commissioned Report No 701. Available from: www.snh.org.uk/pdfs/publications/commissioned_reports/701.pdf.

Lindsay, R.A., and Immirzi, C.P. 1996. An inventory of Lowland raised bogs in Great Britain. Scottish Natural Heritage Research, Survey and monitoring report, No. 78. www.snh.org.uk/pdfs/publications/research/78.pdf.

Related work from the research team

Byg, A., Martin-Ortega, J., Glenk, K., and Novo, P. (2017). Conservation in the face of ambivalent public perceptions–The case of peatlands as 'the good, the bad and the ugly. Biological Conservation. 206: 181–189.

Byg, A., Glenk, K., Novo, P., and Kyle, C. (2015). Report on the workshop: Scotland's peat bogs - rural community perceptions on Lewis. SRUC and The James Hutton report.

Glenk, K., Schaafsma, M., Moxey, A., Martin-Ortega, J., and Hanley, N. (2014) A framework for valuing spatially targeted peatland restoration. Ecosystem Services 9, 20-33.

Martin-Ortega, J., Allott, T. E., Glenk, K., and Schaafsma, M. (2014a) Valuing water quality improvements from peatland restoration: Evidence and challenges. Ecosystem Services 9, 34-43.

Martin-Ortega, J., Glenk, K., Byg, A., and Kyle, C. (2014b). Scotland's peat bogs, what do you think about them? – I. SRUC and The James Hutton report.

Martin-Ortega, J., Glenk, K., Byg, A., and Kyle, C. (2014c). Scotland's peat bogs, what do you think about them? – II. SRUC and The James Hutton report.

Scottish statistics and survey on environmental attitudes

Davidson, S., Martin, C., and Treanor, S. 2009. Scottish Environmental Attitudes And Behaviours Survey 2008. Scottish Government: Edinburgh.

Office for National Statistics (ONS 2015a), Annual Survey of Hours and Earnings, 2015 Provisional Results.

Scottish Government (Office for National Statistics), 2015. Household composition for specific groups of people in Scotland: Scotland's Census 2011. Office for National Statistics: Edinburgh.

Information on General Environmental Attitudes

Dunlap, R.E., Van Liere, K.D., Mertig, A.G., Jones, R.E. 2000. Measuring of the endorsement of the New Ecological Paradigm: a Revised NEP scale. Journal of Social Issues, 56(3), 00.425-442.

Helicopter View © Richard Lindsay

Who produced this report?

This report has been produced by Dr Julia Martin-Ortega (University of Leeds), Dr Klaus Glenk (Scotland's Rural College), Dr Anja Byg (The James Hutton Institute) and Murat Okumah (University of Leeds). The background research reported was carried out independently by the named researchers with funds from the Scottish Government's Strategic Research Programme (2011-2016). The production of this report has been funded by the University of Leeds Impact Acceleration Account in association with the Economic and Social Research Council and has been supported by Scottish Natural Heritage. The results reported here are the sole responsibility of the named authors. The authors are grateful to all those who participated in the survey and helped design it.

How to cite this report?

Martin-Ortega, J., Glenk, K., Byg, A., Okumah, M. (2017). Public's views and values on peatland restoration in Scotland: results from a quantitative study. The James Hutton Institute, Scotland's Rural College and The University of Leeds joint report.
www.see.leeds.ac.uk/research/sri/peatlands-and-the-public

Want to know more?

This report is accompanied by two online tools:

- A learning module aimed to the general public:
  www.see.leeds.ac.uk/peatland-modules/?type=learning

- A condition assessment support tool for land managers:
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To find out more you can email **peatlndsandpublic@leeds.ac.uk**

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