

## Commission of Inquiry on Peatlands

### Open Inquiry Event

3 November 2010, University of Edinburgh

#### Transcript of evidence and Q&A

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	Aletta Bonn	IUCN UK Peatland Programme
	Des Thompson	Scottish Natural Heritage, JNCC
	Andrew Coupar	Scottish Natural Heritage
	Martin Evans	University of Manchester
	Richard Lindsay	University of East London
	Pete Smith	University of Aberdeen
	Vicki Swales	RSPB Scotland
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## **Section One**

### **Peatland Restoration - A Land Management Perspective**

#### **1.1 Simon Thorp, Heather Trust and Tim Baynes, SRPBA<sup>1</sup>**

##### **1.1.1 Oral evidence**

###### **Simon Thorp**

I want to pick up the highlights from the Heather Trust paper, with help from Tim Baynes. Scotland's Moorland Forum and Martin Gillibrand from the Moorland Association also contributed to the paper. I want to highlight the linkage between research and policy and those who manage the land. The key point is that there is a lot of experience out there within the land management community but this needs to be harnessed to ensure that their views and needs are included in the debate.

Land managers can make a difference but they will want to know 'what's in it for me', they are part of the uplands solution but they appear to have a lack of understanding about carbon and peat issues. The Moorland Forum experience was that we sat down with landowners and asked questions about carbon and were met with blank stares. It was an eye opener to discover how little they knew about the subject. There is a general assumption that they should have known about these issues.

There needs to be further debate about burning/swaling issues and dry blanket bog (more of a Peak District issue) - how do we deal with areas that have been lost? There needs to be a balance between income and finding funding. Landowners know about this - they feel they are doing things properly and managing things properly.

What can they bring to this discussion? Can we afford to put resources into the whole of the peatland areas at the same rate? We need to engage with the land manager community to bring them on board. Land managers in England are beginning to take on board the message and Tim has examples of this happening in England. Until we harness that ability, those techniques and the enthusiasm, we will not make much progress.

###### **Tim Baynes**

There is a difference between England and Scotland. The Moorland Association did a survey and uncovered that in the last decade 1,250 miles of drainage ditches have been blocked up. In Northern England the problem is more acute. There is a lot of partnership working so we should not feel that nothing is happening.

In Scotland, the grip blocking problem is not so well known and not really appreciated by the land managers as it not a problem they have come across. But once they do understand it, they will have the same attitude as the moorland owners in the north of England.

Another figure that has come up is that there has been 4, 445 mini-ponds created to rewet moorlands in the north of England. This is also happening in Scotland where people are cutting using contour drains to create waterways. So things are happening but when you ask people about carbon you get met with blank stares.

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<sup>1</sup> Scottish Rural Property and Business Association

### **1.1.2 Question & answer session**

#### **Des Thompson**

Can you reassure us that across the peatland of the UK there is a commitment to restore peatland habitats?

#### **Simon Thorp**

This is something we are working on and need to work harder at. The work in the Peak District is spreading north through the Moorland Association and the work in the Flow country is also very important. We need to look for opportunities to spread the message and to involve more people and more partnership working. In Scotland, the Moorland Forum is doing a good job and has more work to do. This is a topic of conversation - they want to know how they can help further.

#### **Des Thomson**

There are some superb pieces of work but it is very patchy. How do we move forward from that and how do we share that concern to get peatland managed and how do we go about it? Do you have any views on that?

#### **Simon Thorp**

We need to look at techniques. We have the publicity, the articles, the conferences, the media but we have to get our wellies on and go out to the sites to get more people involved. There is scope for demonstration sites on the ground - a picture tells a thousand words.

#### **Des Thompson**

Do we have a one-stop-shop? Do we have a place where landowners and others can go to get the advice and guidance and the hint as to where funding might be available?

#### **Simon Thorp**

In Scotland, The Moorland Forum can do that.

#### **Tim Baynes**

The problem in Scotland is there is not a collected gathering of information about where the problems are. In Scotland, where is the problem? We have to have that information first before anything can happen. Then it would be possible to talk to the land managers responsible.

#### **Vicky Swales**

You mentioned the importance of funding and communicating with land managers. What do you think of grant and funding sources and their adequacies? Where should the money come from to deliver peatland restoration on a much wider scale than we've seen at the moment?

#### **Simon Thorp**

The public sector cannot do it. The private sector has to do it but needs to generate income from this - existing enterprises have to continue. They have to be able to continue to shoot deer and produce grouse and these income areas have to continue. We cannot expect to wrap things up in cotton wool. We have to accept that we may not be able to do everything in all areas and we may have to prioritise a bit.

#### **Tim Baynes**

In England, agri-environment payments have helped with grip blocking. In Scotland, the situation is different so there aren't the same incentives.

**Simon Thorp**

SRPBA is providing funding and the Glastir Scheme in Wales will also provide money for grip blocking . It's a start. It would be nice to have lots of money to pay for it all but we have to be realistic and focus on areas of high risk. We have to rely on people seeing the benefits if anything is to be done.

**Tim Baynes**

In the long term, carbon credits could be the key and could be good incentive. This could be very important and could be the key to the problem.

**Clifton Bain**

There are question marks over burning and its effect on peatland. What are your views on alternative methods of managing heather? A grouse moors manager's objective is to get large quantities of 2 and 3-year-old heather as a protein source for red grouse. What are the other ways this can be achieved, not burning and being sustainable to the peatland?

**Simon Thorp**

You have three management choices for heather - the 3 Ms (match, mouth and machine). It is not all about burning, grazing and cutting, it is a combination of the three. Every bit of ground is different and we have to apply the right methods to the right ground. We cannot rely on cutting the whole country. There are lots of areas of Scotland where there is broken ground and you cannot get a machine on to the land. If you are using grazing, there has to be the right number of stock at the right time of year to make it sustainable. If you graze heather, then it does not need to be cut or burnt as often. There needs to be a balance between issues and we need to use the right tool in the right place.

**Clifton Bain**

Do we know enough about cutting and grazing of heather as we do about burning?

**Simon Thorp**

There is a lot of scope for improving the knowledge of land managers. There are areas where you are told that you cannot cut. We have to get the balance right. There is the balance of summer vs. winter grazing, for example. If we take off all the incremental growth with grazing in the winter, the heather is going to suffer. If we graze it more lightly or not at all in the winter, the heather will come in more strongly. We need the right balance of more information, better guidance and management. We cannot just say we do not want burning because if we do not have burning then we have to use something else.

**Clifton Bain**

What if the government turned around after this Inquiry and said there will be no more burning on heather moorland? What would the effect be?

**Simon Thorp**

The effect would have to be looked at in different ways. There would be wildfire risk with fuel loading increasing if you are not doing managed burning. It is not a question of *if* it burns, it is *when* it burns. There was a bleak scenario when this happened on Easter Sunday in 2003 when there were lots of fires burning.

The second problem is with biodiversity. Will we end up with a monoculture, either of grasses and heather, if we do not manage these areas? And there is the big problem associated with a lack of production and income and the risk to the sporting interests and grazing if we are not allowed to burn. The end result would be the loss of

management, which would lead back to the earlier case of neglect, lack of inward investment from people not pumping the money into sporting enterprises, (which is particularly relevant to large areas of Scotland). I think we would see a downward spiral, which I would wish to avoid.

### **Tim Baynes**

This is a controversial topic. As a non-scientist, I have a view on this issue. Burning keeps coming up in these discussions as a problem - but is it? Is there enough known? It seems to me that well managed burning of the cool burn type is probably on the plus side for conserving peatland. It does not damage the peat. It helps the problem of wildfire. Where bad burning dries out the peat and exposes it, it is a problem. Plea - at the end of the Inquiry there should be clear guidance on the risks of burning. It should not be lumped together as a problem that has to be dealt with.

### **Simon Thorp**

We need to look at the different habitats where burning takes place. It is not all about deep blanket bog pools that people are trying to burn. There is a lot more sensitivity in those areas than on a hard dry hill with lots of heather on it where burning is rather more appropriate.

### **Richard Lindsay**

What are your views where there is layering of heather with vigorous sphagnum growth to keep the heather in check?

### **Simon Thorp**

This issue needs to be looked at area by area. In some areas it works very well and keeps heather young and vigorous. We have to consider: what are we trying to achieve by burning? We don't want to torch the whole place, we just need to achieve production and balance. Good burning is good and bad burning is bloody awful. We just need good burning practice. We do not have to burn everywhere – there is no benefit in that. The management prescription needs to be tailored to the ground and there should not be a 'one size fits all' approach to it.

## **1.2 Jonathan Hall, NFU Scotland**

### **1.2.1 Oral evidence**

#### **Jonathan Hall**

I will focus on Scotland and farming interests in peatlands (particularly uplands). There has been a lot of peer research, but there has been little to date on drivers in terms of actual management of peatland. That is what our organisation is interested in. What are the influences on grazing/ grazing management?

(Holds up maps to audience):

Map of organic rich soils.

Land cover of Scotland map,

Land capability for agriculture map.

There is a lot of correlation between the three maps.

The maps demonstrate that land use is driven by physical capability for grazing. Less decision making is about physical capability. Less is about what the market place actually desires from the production process on this land, whether its peatland or

mineral soils, producing arable crops. Increasingly, over the last 30-40 years, it is about the policy framework in which those particular individuals operate: whether through incentive, regulation or advice. Particularly through incentive, this has triggered responses through farmers, foresters and managers who are managing carbon rich peatland. We have to strip things back. Those policy drivers have coerced individuals to do, and are why they continue to do, certain things.

I'd also like to relate some of the maps to Scotland's landscapes. 67% of Scotland is under agricultural management. 50% of that is of Class 6 or worse. Less than 10% is Class 1-2, 3.1 producing profitable enterprises. We have to think of what agriculture's role in the whole management of uplands and peatland is. Far too often it is assumed that agriculture just plods on. If I were to give any advice to this Inquiry it would be to say that there is a lot of scope to influence agriculture and agricultural practice through policy. To try to mesh in some of the outcomes that you would like to see in terms of restoration and conservation of the bigger areas of peatland areas that don't need to be restored as such, but do need to be managed carefully. Tim's comment on what is the actual area of Scotland that is damaged and needs to be restored should be what is the actual area of land that should not get damaged in the first place.

We should start to look closely at the way public support is channelled through agriculture- particularly through upland farming. And we could start to look at building in a more reasonable croft compliance approach to single farm payment that actually explicitly recognises peatland and the management of grazing on those peatland. Importantly, if we are talking about restoration, as picked up by the first witness, in terms of rural/agri- environment measures for actual restoration projects, there is next to nothing in a Scottish context. More importantly, where there are things it is on a more competitive nature. There is a huge opportunity to say to the Scottish Government that if climate change, water quality and upland habitats are the priorities that they claim them to be, therefore focussing on managing the peatland, which was the point made here, rather than habitat and species and water quality downstream, do that through a whole manner of means but make it pretty simple, pretty straightforward for farmers to actually buy into and do.

## **1.2.2 Questions & answer session**

### **Vicky Swales, Commission of Inquiry**

On broad policy issues, we've come through a period of policy where there has been a strong emphasis on supporting productive activities on uplands in terms of agriculture and forestry and to some extent seeing them as primary. Given the limitation on production in the uplands that you've highlighted, is there an argument that we should shift policy objectives away from that focus on production *per se*, to recognising the value of all the upland areas in terms of carbon storage, biodiversity? Should we be designing our policies accordingly?

### **Jonathan Hall**

We are not good at putting value on these other things. We can market the value of the production, and therefore we can build in things that would be appropriate rates of payment for direct support, Pillar 1 and the rest of it. We are not very good at putting values on those co-products like agricultural systems which I think is increasingly where the public purse will be directed. If farming is clever about it then that is where we can create a sustainable argument about why public support is vital to retain livestock systems. In particular to deliver not only food production, and the

whole stratification for things like the sheep industry, but also to deliver all of the other public benefits that go alongside that.

We talk about land use in Scotland but hopefully this will become absolutely clear to all as part of the Government's emerging land use strategy. It's not about exclusive land use but multiple land use. Multiple land use doesn't mean you try to maximise all the benefits all of the time on any one piece of land. It's about optimising land use. This means you prioritise on economic activity or environmental management. It's not exclusive. When we do do that, we have to hold our hands up and expect that there are opportunity costs to whatever decisions we make. If we are making decisions about land use, then the hill farmer, Scottish Government, some planner, forestry commission or some planning authority will have to accept that there is a cost for everything we do. Therefore it is not the income that is forgone, it is also what else we are giving up as well. That has to be built into any aspect of peatland management that might be taken forward just in the same way as we do now maximise our flood plains, for example, few have to say that there may be a trade off between that and food production.

### **Vicky Swales**

You are right that putting values on outcomes are not always straightforward. But we are able to work out the costs in order to produce those outcomes. That is where we clearly need to be supporting land managers to do that. In terms of thinking about the current system of agricultural support and thinking about upland farmers in particular where the UK peatland are they currently receive the lowest levels of support and are the most economically vulnerable farmers and marginal as you've highlighted. Would the NFUS support a fairly fundamental distribution of support to the most disadvantaged farming areas recognising all these other outputs that they produce and in order to maintain the farming to secure those public goods?

### **Jonathan Hall**

I don't think NFUS would support that. We are a membership organisation and that would mean a significant redistribution of existing (and probably shrinking) support payments. But from a personal point of view, I can see a lot of merit in that, in terms of the justification for public support going forward. The reason why the minority of direct support payment goes to the bulk of the land area in Scotland and those farmers being the most vulnerable economically is entirely a product of the system we currently operate, it's based on production and historic. We do have an opportunity, as mentioned this morning from Mr Pack from Aberdeen, and in the next two years to shape Pillar 1 support, the make-up and architecture of Pillar 2 support which I think is more important to upland and more extensive farming systems and will increasingly become more important. So we shouldn't get too drawn into the direct support payment issue. I don't see the problem for things equivalent to EIA<sup>2</sup> regulations should be part of that to safeguard existing peatland. More importantly, if you are talking about restoration and specific actions, to improve peatland in certain areas, I think you need a very strong and robust Pillar 2 with proper measures that farmers can actually use for land management in a peatland context. We have very prescriptive environment schemes, which don't necessarily fit farming systems particularly well and vice versa.

### **Vicky Swales**

One more comment from me. Following on from that, the things we need to do are best done through the Pillar 2 measures and agri-environment schemes and the more targeted prescriptions. But we have the ongoing problem of limited funding in

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<sup>2</sup> Environmental Impact Assessment

Pillar 2. Either we get more out of Pillar 1 and we don't just straighten cross compliance but we add a lot more things in there or we move money from Pillar 1 into Pillar 2 in order to get the restoration of peatland habitat that we need. So the question is, you can't have it both ways. Where does the NFUS sit on that?

**Jonathan Hall**

I'm not going to sign up to modulation. As an argument we've had it many times. If you are under-pinning the agricultural business and you are insulating it against risk and volatility that's a job for single farm payments. There's a quite clear role there. I think that the bigger the size of the pot for the CAP and the proportions that go between Pillar 1 and Pillar 2 we can still utilise it far better than we currently do. Let's face it, budgets are only going to go in one direction. The relative share of Pillar 2 is likely to increase but it's still going to be a part of a smaller piece of cake in the first place. That's got to be a worry for all of us because then we will go back to what I said before. There's going to have to be some serious choices and prioritisation as to what we want to achieve from budgets that we will direct to line managers who are ultimately the right people who can actually do the job for us on the scale of what we are talking about. We have 5.5 million ha of land under agricultural management of which an awful lot is peat (plus 3 million ha?). If we don't have the land managers on the ground, to do the sort of things we want them to do in a positive sense, then ultimately, where will we be?

**Andrew Coupar**

One of the things I think we should have done is to overlay a map of crofting areas with a map of peatland. We are not very good at engaging with the crofting community. I'm wondering if you have any ideas on how we might do this effectively.

**Jonathan Hall**

I would put farming and crofting in the same category. I think you're right. There are an awful lot of farmers and crofters out there who are aware of their agri-environment obligations and have been actively involved in agri-environment measures but have made absolutely no connection with peatland because we haven't asked them to make that connection. That thought was put to the fore earlier on. Do we then have to look at the design of the measures that we do have in place which are all about species and habitats and not about the actual peatland that they find themselves flourishing upon? Again, how do you design measures in that sense? I don't know, but it is something that we have not done today. I'll need to think long and hard about that. I would put crofters and hill farmers in the same category. They live close to the grindstone for an awful amount of time. A bit like climate change and water management issues: it's a very, very difficult job to persuade farmers and crofters to accept how important those issues are as peatland management as they are waking up in the morning thinking 'how on earth am I going to keep the bank manager off my back. I'm in debt up to here, I'm waiting for my LFA cheque to come in the New Year' and so on and so forth. Farmers and crofters don't wake up and think, 'what can I do for peatland' as they don't wake up thinking they can tackle climate change. But if we start to make it clear that the right management is in their interest in terms of their returns and their bottom line then that's how you crack it. And that's where the Scottish Government is right now in terms of in things like diffuse pollution, water quality and looking at input efficiency rather than saying you must stop all the emissions into the water and the atmosphere you are creating. So if we can change management practices in the interest of the farmer and the crofter then I think you'll crack that particular nut.

**Des Thompson**

I'm interested to hear you say that you want to focus on restoration of landscapes rather than restoration of species as I was taught that that is something that you can be shot at if you say it in the wrong company! If you're going to do that, presumably through agricultural subsidy, do you think that there is a willingness and interest in the farming community to effectively become a land manager rather than a farmer. Perhaps that's not a reasonable distinction. It's not a good time necessarily to be moving into the public sector, it's a different thing from production. If you are an upland farmer is upland land management compatible with running a farm?

**Jonathan Hall**

It can be. I'm about to commit heresy again by saying that I think ultimately it's not a good time to be in the public sector. Crofts are all private businesses and they are privately driven. Effectively, in upland Scottish context, they are paid by the public purse. So it is not a good time to be a farmer either. We are talking about budget cuts of all shapes and sizes. It will have an impact on agriculture. Agriculture is going to have to become smarter if it is going to survive. But above all farming has to adapt and change. Give the right signals to farmers and they will respond. If you want farmers to do more, in terms of peat management, at the same time producing what they feel is quality livestock off these hills that can attract a reasonable market return, then we've got to start looking very closely at the policy signals that will change that behaviour. For a century or more, we've done it and farmers have responded. If you look at why we have some of the restoration problems we have now it's because of the sins of the past. That has driven land-use decision-making and so on. If over-grazing was the problem of the 1990s that was driven by CAP. If under-grazing and abandonment is now the problem of the last 3,4,5, years, particularly in Scotland, that's a product of the CAP. So we've got to find that balance somewhere instead of lurching from one thing to another. In defence of farmers and crofters, this lurching, and this uncertainty about where the policy drivers are going to come from, and what they are going to ask us to do, actually encourages more and more to sit on their hands and not take risks and not do what we would really, really like them to do. So they are staying in their comfort zone more and more because of the uncertainty, not for the market, and volatility of the marketplace, but uncertainty of the policy framework.

**Vicky Swales**

Moving on to training and advice issues. If we are asking farmers to do these slightly more complicated things and not just do production, which they responded to very well in the past. Are we doing enough to help farmers understand what land management practices are required?

**Jonathan Hall**

No. We are in exactly the same place as water management, diffuse pollution issues, climate change. We have initiatives here and there and there are some rules but creating the right awareness and education is absolutely fundamental to the adoption of change practice. It's exactly the same with peatland management. Absolutely 100%. If you are going to change behaviour you've got to explain to people how, and why, and what the opportunities are for them doing so. It's got to be something in it for them as well. Farmers are not that altruistic.

**Des Thompson**

Can I touch on what Vicky has just said? Some of the evidence we are getting is that there are concerns about uncontrolled burning on some crofting lands. In Scotland, because there is a low level of shepherds on the ground, a fire might be lit and

instead of 2 or 3 guys to control it, it just seems to spread up the hill. I wonder if you have any reflections or comments on this?

### **Jonathan Hall**

There's clearly anecdotal evidence and so forth...and probably some real cases (DT-we'd like real cases). In terms of manpower and skills there's been a real decline in the labour force in agriculture and particularly hill farming. Not that long ago 500 ewes would cover the cost of a shepherd, now we are looking at 2,000. It's simply the economics of the situation. And increasingly, there are difficulties where stock have come off certain farms. The hill flocks have drifted and gathering issues and proper management of hill sheep flocks has become harder and harder to do so we are not able to manage grazing as well.

### **Des Thompson**

This is obviously affecting the labour force. If there is a reduced labour force and people are struggling on the ground then we may collectively have to revise our guidance.

### **Jonathan Hall**

Yes, collectively think about this.

## **1.3 Tim Thom, Yorkshire Peat Partnership and Norrie Russell, RSPB**

### **1.3.1 Oral evidence**

#### **Tim Thom**

I'm from Yorkshire Peat Partnership (YPP) which is a relatively new peat restoration partnership working in the Yorkshire region. We have a range of techniques that have been well developed by others like Moors for the Future or Peatscapes doing practical work on the ground and we have a range of contractors who are perfectly capable of adapting to our needs. If we want a particular gadget, they'll go away and get the bits needed and weld them together to make something to do the job. I think we are almost at a place where most of our restoration can work. We have the techniques to do it. So once we've got to the state where a contract has been signed with the landowner, we're into the easy bit. The hard bit is getting to that stage, as we've alluded to so far.

My evidence really is a synthesis of our experience of what the views and opinions are of the land owning community, the game-keeping community and the farming community as we've witnessed it, through back rooms of pubs, gamekeepers' kitchens, walking across moorland with the landowners. There's no science here; it's just observations. Me listening and recording what those people have said. And it's not comprehensive. I've not met every landowner or gamekeeper in our area yet, I've met quite a few but not all of them. It's based on a restricted sample. What I've put forward is really a combination of the views that I've heard and I've broken them down into positive and negative. On top of that, I've also added in the experience the YPP has had of working alongside Natural England and trying to adapt their processes to help us deliver what we are trying to achieve. On the positive, the first point to make in England regarding funding is that the Higher Level Stewardship (HLS) scheme provided us with a massive opportunity to deliver peat restoration work on the ground. At the time we started, it was probably the biggest source of

funding available in order for us to deliver that work. It's hard to see where you would have got an alternative source of funding without a lot of legwork and fundraising. HLS provided us with a great opportunity. It also provided us with a great opportunity to deal with the issues we have already talked about around landowner engagement. We have to talk to the landowners. We have to talk to the farmers. We have to get their approval to do the work on the ground. There's a lot of debate, description and compromise in getting a restoration plan through HLS. That's a positive side of funding that was available through HLS when we first started.

The second point in my evidence is landowner attitude. I have to say that we've been pleasantly surprised that we really haven't had any major problems in getting to speak to the landowners and talking about peat restoration and other issues in England. They are willing to listen and willing to allow us to progress with our work. Why might that be? The messages I've had are:

Some landowners and grouse moor owners think they made a mistake putting the grips in for the benefit of grouse. They now see an opportunity to redress the balance.

A second view is that where you have heavily eroding gullies and large areas of bare peat, there are landowners that feel that that is beyond their ability to deal with at the moment. They are happy that there are organisations out there that can assist with the techniques and skills they need to try and restore those areas on their land.

The third is an interesting one that is coming up fairly regularly in our meetings. As grips are classed as watercourses in England, the burning regulations means that landowners are not allowed to burn within 5 metres of a watercourse which effectively means that if you have a heavily gripped moor, you can't burn it. So some landowners are basically looking at grip blocking as a mechanism for them to draw up a burning plan at a later stage. Interesting view- one that we didn't really calculate at the start but there we have it.

In a small, but reasonable number of cases we have grouse moor owners and farmers and other landowners who have a genuine desire to support the conservation of blanket bog in its own right - for their own interest, they live in and they like the landscape and that's why they are interested.

The other positive is that the three North of England projects Peatscapes, YPP and Moors for the Future have been working closely. We network informally, exchange techniques and I think there is already some discussion about this informal network being expanded more widely. I think we certainly found it very useful to piggyback on the skills of other organisations that have gone before us.

On the negative side:

The restoration season provides a big problem for us; particularly last winter and we are restricted on when we can do our work. We can't do much work on the ground during the bird breeding season and we also find it quite difficult to get on to sites during the main shooting season, even on moors where the number of shoots might be quite small and infrequent. This means that most of our restoration work is largely restricted to December to mid March. As you can imagine, last winter was an interesting period for us. We would like to look at further ways of working with landowners, particularly in the shoot season where we can actually get access to the land and do works fitting in with their needs during the shoots.

Funding: I've said how wonderful HLS is but we have no capital works under HLS at the moment. I've got a £10 million programme on Natural England's books and we are still awaiting a decision on that. Everything I said about HLS can be completely thrown out of the window if we don't get that decision. HLS itself has some very peculiar administrative requirements, which we've been battling with for some time and actually get in the way of some good quality logistics of doing work on the ground. Sometimes you can be working on one site and we can't do work on the neighbouring site purely for administrative reasons. This makes no sense logistically particularly if you've got helicopters flying around and you try to combine sites.

We had a lot of discussion about burning. It's not part of YPP's remit but when I've been at meetings with Natural England staff to agree burning rotations on blanket bogs it's been undermined by a lack of consistency. This is hard when we are in the front line communicating with landowners.

The final one is with practitioners and the ambiguity in research. When we are speaking to landowners, we need to get them to understand why we are doing this work and get the carbon message across properly. I'm a scientist, with a PhD and a scientific background, I can interpret the science, but even for me, it is contradictory. I think we need to get to that synthesis as soon as we can.

### **Norrie Russell**

I'll talk about the Forsinard Reserve in the Flow Country. There are still a lot of questions about the scale of forestry, peat gripping, etc. Some of those things still haven't been tied down and addressed so there is a big job to do there.

Some general points to be made; people talk about peatland restoration being a slow process, it costs a lot of money, but in reality the payback on peatland restoration is probably as fast or faster than you'll get from planting trees. Woodlands, once you get onto peat soil, you've just got to look at the amount of peat you've taken out of the ground, to make a mound to plant a tree on and you've probably talking 30 years before you ever get any payback. I'm not having a go at woodland, even though I do chop a lot of trees down, but sometimes we're too hard on ourselves with timescales for peatland restoration. As we saw from the talk from YPP, it can be rapid and long-term. That restoration will last a long time. It's not a cyclical process, once it's locked up there you can keep it there.

Another thing is we see a lot of public money being put into renewable technologies. We clearly need those renewable technologies but I would say that the cost of one medium sized windfarm would pay for all of the restoration of the Flows and would be a lasting legacy. That's obviously something for Government to address. As land managers, we tend to think in small amounts of money but in terms of climate change and proper injections of public money we need to change the way we think about that. Something that costs £2 million a year isn't something we should be scared of. I'll leave the mechanism of how we get there to the policy makers around us. The overall costs are not huge.

Forsinard is RSPB's largest reserve. It's just under 20,000 ha at the moment, smaller than many of the peatland project areas that they are working on down south. We have blocked a couple of km of drains, we felled 2,300 ha of forestry, and we are now carrying out a harvesting trial to remove some of the timber. We are getting actively involved in trialling methods and moving things forward. Forestry- there's still many questions to answer. On Friday, we were fire fighting, trying to keep the harvesting contractor on site because he was 'losing his shirt' on the trial. If there's a loss per tonne, it means he'll lose money very rapidly but, I'm glad to say that

potentially, things like SRDP funding can make the economics work. We're still learning the costs. If we want to take the timber off: what's it going to cost, who is going to pay for it?

The reserve itself contains two farms and two crofts. We manage our deer through four neighbouring estates through reciprocal agreements. We manage one through John Thurso, MSP, who is the largest landowner in Caithness and manage 18 fishing lochs so we do a bit of everything and have a fairly broad overview of peatland land management. I think Stuart Gibb at the Environmental Research Institute (ERI) in Thurso, which is part of the proposed UHI<sup>3</sup>, made a very good point recently in saying that we have to turn the whole peatland research on its head and say where (looking at that UK carbon/peatland map) should we be centring our expertise and research activity. We've been quite out of it in terms of the Flows in the UK peatland discussions because we are so far away from where research is happening in the Peaks and the Pennines. And we really need to see if we can at least set up a secondary centre in the North of Scotland where we base our research and where we have some of the highest quality peatland in the UK.

### **1.3.2 Question and answer session**

#### **Aletta Bonn**

On the scale of works, in the north there are relatively pristine peatland and in the south where they are more degraded, how has restoration been monitored so you can be sure that it is having an effect? How well are you connected to the academic community and how well are they working with you?

#### **Norrie Russell**

In Forsinard, we have not been well connected to the research community. A lot of it is the distance thing. A lot of the peatland research is led by Universities which are a long way away from us. Pure logistics I think is the reality, but thankfully that's changing. There's a huge interest amongst the research community to do work at Forsinard to give the range of site type across the UK to provide the whole cline from south to north and east to west. Because these are amongst the most pristine peatlands that we have, I think there are still logistical issues that we need to resolve to make it easier for people to work in the north from many of these institutes. We need a research platform, a base up there. Forsinard is obviously a key place for it because of the amount of management restoration that is going on, but it's not the only one. The ERI in Thurso is also keen to expand its research programme. One of the big issues is funding. We can manage and carry out the restoration works but actually getting good quality research, particularly on carbon (which is what most people are interested in at the moment) has been difficult. There have been a number of proposals, which haven't got through (NERC) funding rounds and haven't happened as a result. A number of institutes are still keen to do what they can, including Universities of St. Andrews, Stirling and UHI. Ultimately, it comes down to funding. RSPB as an organisation is stretched to carry out the restoration management work and unable to physically find money for research on topics, which are not necessarily our mainstream interests. We do a huge amount of bird monitoring, surveys and research because that is our core interest. Once you get into carbon management, greenhouse gas effects, then I think we need to look to others to come up with that funding.

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<sup>3</sup> University of the Highlands and Islands

**Martin Evans**

The RSPB reserve is essentially in the centre of the Flow country and we've got the Plantlife reserve in the east, we are doing some fairly detailed monitoring on that. We haven't got anything further west as a potential research site. I wondered if you had any thoughts on suitable areas for potential development of restoration research centres? For the west as well as including the Flow country.

**Norrie Russell**

That's an interesting one. I can't claim to know the peatland there that well to talk about that but I know of obvious places where the logistics would be easier. In the Geopark there are areas of scattered peatland. There is infrastructure there and potentially I think that SNH could answer that question fairly well in terms of going west. There are certainly no obvious ones that jump to mind.

**Robert Van de Noort**

What about the landscapes: can you reflect on whether the abstractions of carbon storage and biodiversity are too narrow to talk about to local landowners? Instead of talking about the cultural side, they would identify themselves very much with the landscapes.

They see themselves as the 'curators' of the landscapes. Maybe we should think more broadly about the reasons why we restore peatland.

**Tim Thom**

Yes. If you can imagine yourself sitting in a gamekeeper's kitchen or walking on a moor with a landowner, I don't generally talk much about carbon! We talk about a range of issues and benefits and, depending on their response will follow a particular route with them. Even to the extent where I've had gamekeepers say that they have no topography on a particular moor so we said we'd build our peat dams higher to get some topography. That's a message we put across. I would say we are very pragmatic, we put a whole series of messages across. If we have a landowner who's showing a great deal of enthusiasm for his landscape and for the history of that area then that is a path we will follow. We don't pick on one particular issue. We have to respond to the views of the people we are talking to.

**Des Thompson**

What's coming across is this issue for a research base and you are almost expressing surprise that we don't have a focal point for research in one of the great global peatland resources. Is there a commitment from RSPB to try and establish or contribute towards some kind of focal point for research?

**Norrie Russell**

The answer to that is 'yes'. We've got a number of people working on the reserve already doing research on water quality.

**Des Thompson**

You mentioned wind farms. Do I understand you saying that one way of paying for research management might be to have one or two wind turbines to generate some resources or have I misunderstood what you said?

**Norrie Russell**

I wasn't saying that. They could, but it depends where they were.

**Aletta Bonn**

I wondered about research on restoration projects. Do we have a wider role to play? My question is about the wider economic benefits restoration projects can provide. How many job benefits and green jobs can restoration projects provide?

**Tim Thom**

I don't have a direct answer for that and I was hoping the ecosystem services pilot would provide some key data on that. The bulk of the £10 million that we have allocated to peat restoration will go to contractors. There's a small amount to cover our costs but the majority goes to the contractor community. Those contractors are looking to us at the moment, they are laying people off. They see peat restoration as one of their biggest economic ventures; that, and supporting local economy.

**Norrie Russell**

Chipping in with some figures from Forsinard where we have obviously been doing it for a number of years. We started out with the two EU Life funded nature projects and we've carried on with the restoration work. The rough figure is that Forsinard, the reserve and the neighbouring ground, used to support just 5 jobs between gamekeeping, managing forestry blocks, etc. Now, the same area supports about 16½ jobs. There is direct employment (like RSPB staff) and a big chunk is contractors. There are visitor jobs through tourism, a B&B that wasn't there 10 years ago. The visitor centre, (even though we only get 5,000 people through the door), even in 1997, was pumping £190,000 a year into the local economy. That's another 5 full time job equivalents.

We are hoping to take on another 1,200 ha of forestry this spring that is being disposed of by the Forestry Commission. If we find the funding for that we will be taking on another warden.

Basically, we are talking three to four times more employment in the Forsinard area, as there would be if the reserve didn't exist. The harvesting trial just now, cutting down the trees with the harvester and extracting them is creating exactly the same amount of employment as it would if they were felled in 15 years. When they reach full rotation, it takes exactly the same amount of time and effort.

## **1.4 Roger Mitchell, Corroul Estate**

### **1.4.1 Oral evidence**

**Roger Mitchell**

Corroul is a private estate in the West Highlands consisting of 23,000 ha, of blanket bog, heath and forest woodlands and watercourses. The present owner acquired the estate in 1995 and started managing it as a sporting estate. In 2005 it was decided to focus on environmental management. A management plan was developed and since 2007 the estate's management has followed more environmental objectives. There are two SSSIs: the lochs for the black throated diver (which is also an SPA<sup>4</sup>) and a geomorphological SSSI. There are no SACs, but Corroul is between the Ben Nevis and Ben Alder SACs and we share much of the same habitats. We are creating employment, since becoming more environmental, we've increased staff from 12-17.

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<sup>4</sup> Special Protection Area

I would like to mention some of the potential impacts. About 15,000 people come on to the estate each year, putting money into the local economy. Most are walkers and Munro baggers. We also host part of the 6-day motorcycle trials programme. We are also taking steps to reduce the habitat impact and visual impact of ATV tracks. Our plan is to have a core series of firm tracks which do not go above 600m. Undoubtedly the biggest impact is the deer – more about those later.

Even though we don't have a SAC, we employed the same contractor who worked on the nearby SACs to undertake Site Condition Monitoring on the appropriate habitats as if we were a SAC. The blanket bog outside the forests was largely in favourable condition although there was some local peat haggling and deer impacts. We've also greatly extended our forests and woodlands with two big acquisitions. One of the reasons for buying these forests is because we recognised their environmental restoration potential. We also welcome the income from timber, some of which we can utilise to restoring the lochans and the blanket bog in the forests. Some of these bogs are not in good condition, mainly because from the 1970s the Forestry Commission did the then usual thing of planting on deep peat as they did in the Flow Country. We have a lot of stunted lodgepole pine on the deep peat. One of our challenges is to determine the best techniques to remove these trees; I really ought to go to Forsinard to see how it is done there.

Another thing I would like to emphasise is that this is a private estate with some consequent expectation of tidy management, so I don't think that 'cut to waste' is going to be an acceptable activity over some of the more visual parts of the estate. So the challenge is how to manage nature conservation in a relatively neat way, and to manage expectations.

One of the most resource intensive pieces of management that we do is controlling the deer population to a level where they don't damage the peatland and the native tree regeneration areas. Over the past three years we've had a reduction cull which brought deer down to about 8 deer per square km. However, we consider we need to get numbers down to what appears the magic 5 deer per square km, being the level where it is considered natural woodland restoration and regeneration can be achieved without fencing. We believe it will take us two more years to reach that level. Understandably, this doesn't necessarily suit our neighbours where higher deer numbers are preferred for sporting purposes; and estates are still valued on the number of sporting stags. However, our 3-year reduction cull has only possibly affected one neighbour, although this is by no means certain. I really hope that in the future these large estates are valued more for their other ecosystem services, particularly linked to carbon storage and hydropower than they are now. Then we would probably see a different approach to management.

To turn to sustainability and habitat restoration. As part of our push towards economic sustainability, we have plans to develop more hydropower. We have one small 50 KW set but we would ideally like to go to about 5.5 MW. Obviously, this is going to have an impact on some of the estate, although hydro engineers don't like to put their pipelines through deep peat because they might float to the surface and restoration can be more difficult. We will therefore try to keep these pipelines on the morainic soils. Like many large estates, Corrour loses money, but hydro-power would turn it around to a point where we could invest more in management and still break even. However, we have just come up against a problem as SEPA suddenly tightened the guidelines on hydro installation last March and two of our schemes were deemed unacceptable. This was partly based on the premise that we have pristine streams, and that they would be degraded. However, we consider these streams are hardly pristine when they flow through a deer-chewed landscape with

virtually no riparian trees and some peat haggling in the catchment. Our belief is that account should be taken of the management of the whole estate where all the streams will eventually be in a much better condition than now. In effect, we'll be taking water from very small percentage of the total length of these streams. On estates such as ours, where we have an environmental management focus, I consider there will have to be balances so we can help supply low carbon energy whilst getting some income to maintain and enhance the estate.

Finally, another challenge is where to get the best evidence based advice on the management intervention necessary to restore the peatland? I use the phrase 'evidence based' in the sense of the work by Bill Sutherland at Cambridge University, which relies on evidence of the effects of planned conservation management interventions from peer reviewed scientific publications. Otherwise management can be a bit trial and error. However, when we are investing considerable sums of money over large areas, we need to be close to certain that what we plan to do is the right approach with a reasonably assured outcome. We are certainly prepared to do some experimentation. Nevertheless, I don't think the estate's Directors and Trustees would be best pleased if we undertook a massive and expensive habitat management intervention which failed to produce the result sought.

#### **1.4.2 Question & answer session**

##### **Andrew Coupar, Commission of Inquiry**

You've outlined the objectives for good, healthy natural environment which is a good place to live, to work and to visit. That's what you are striving for but you've come across constraints and identified funding, regulation and the advice side of things- what's best to do? Can you expand a bit more on that? On the advice side, is it because of conflicting advice or is it just hard to get the advice?

##### **Roger Mitchell**

I think I'm getting closer to the advice on what to do with trees planted on deep peat. It is not instantaneous and as I said, I need to take our forester to go and visit Forsinard and other such areas. I think it will help if I can see what's done elsewhere, but I would want to be reasonably sure that if I applied the management techniques on the estate that I observe elsewhere, that they are going to work. There is also conflicting advice. People naturally want to see results on a very short time scale and want to do things quickly and make them look nice and neat. Some have advised that the tidiest outcome would be to macerate the trees and spread the mulch evenly over the area. But then, what's going to happen to the peat bog surface? Will it kill it? Could the sphagnum grow through it? What will it look like? It is partly about knowing what to do to get a outcome for, not only nature conservation, but for people's perception about what the landscape should look like. Albeit, not necessarily a natural landscape.

##### **Andrew Coupar**

I wonder why other estates don't have the same objectives to your own. Is it just because they prefer the traditional routes or because they think it is expensive?

##### **Roger Mitchell**

It's probably the expense. Though tradition is ingrained too.

**Andrew Coupar**

You welcome visitors on the estate to see what is going on there, I also wondered whether your estate also invites, welcomes other estate owners to see what's going on and to encourage them to follow your model.

**Roger Mitchell**

We do. We are part of the Mid West Association of Highland Estates Deer Group and many of the owners and managers of those estates have been on our estate and we've been on theirs. And we have swapped visits with others too like Glenfeshie and Alladale. We're also members of the SRPBA and, with them, would like to set up some sort of association of like-minded environmental estates.

**Robert Van de Noort**

You mentioned your increase in staff and the increase in visitors which brings a lot more to the economy. I wondered if you'd like to reflect on the gross value of what you are trying to do for the Highland economy. What would it mean to the Highland economy and the tourist economy?

**Roger Mitchell**

We make relatively little financially out of all these visitors. We do host the SYHA and they have two hostels and a restaurant on our estate so they make some money out of visitors. We have a few holiday cottages but it is not 15,000 people using these, just a few hundred a year. And of course, all the surrounding villages take some income from the visitors. There must be a way to calculate this. It is said that the six days trials bring a million pounds each year into the local economy. But this goes into the district of Lochaber but not directly to us.

**Robert Van de Noort**

If you were to put a figure on the economic value of peatland restoration projects, through the tourism industry, it would be a high value.

**Roger Mitchell**

It would be quite tricky to link that directly to peatland restoration. We will, obviously, be employing local contractors to do the work and we can put a value on that. But calculating the increased value of people coming to see and enjoy the result is a different matter. We hope that what are now pretty impenetrable, dark commercial forests will be much nicer places to walk in the future once we start our restructuring, so we hope there will be some increase in recreational use.

**Aletta Bonn**

Maybe if you can't put a £ sign on it, you can just monitor any increase in visitors. How much support do you get on monitoring the effects of restoration? It was suggested that your estate be a demonstration site. Do you get any support for that and would it be needed?

**Roger Mitchell**

Financial Support? (Aletta: any support for monitoring and research?) At the moment, it is all our own money. We are associated with the John Muir Trust and pay for advice from their chief scientist. We also host workshops of experts on our estate and get advice through that route too. We have links to several universities and research institutes, through workshops and individual visits so there's a lot of support building up. We could do more, but again, it is not simply a big research exercise; there has to be a pragmatic balance between the monitoring effort and the land management.

**Aletta Bonn**

Do you need more support? Would you welcome more and what would be the avenues for that?

**Roger Mitchell**

I'd like to have more expert groups come and look over areas and tell us what they think should be done. Most of the archaeology has been looked at and we have had several biodiversity surveys, some associated with hydro development. I am acutely aware that there are a range of management options. So, I should like to expose the results from our environmental investigations and the management advice received, to more expert workshops. Basically this would be to seek confirmation, as far as is possible, that the management interventions proposed will produce the outcomes we seek.

## Section Two

### Peatland Restoration for Climate Change

#### 2.1 Mike Billet and Peter Levy, CEH

##### 2.1.1 Oral evidence

###### **Mike Billett**

The Centre for Ecology and Hydrology (CEH) is a UK government research centre. We study many aspects of atmospheric and terrestrial science and we are core funded about 50% by UK government and the rest comes from contract research. Two of our biggest contract research providers are DECC and DEFRA. We work quite closely to policy delivery, which is quite different from the many in the university sector. We have 4 research sites. Pete & I work in Edinburgh, but we have sites in Bangor, Wallingford in Oxfordshire and Lancaster. We were asked to provide written response to 3 major issues:

1. The approach that is currently being used for accounting for greenhouse gases from peatland in the national inventory and the new use for the LULUCF proposals
2. Evidence from Auchencorth Moss, a major peatland research site and other CEH sites on greenhouse gas fluxes and carbon
3. Views on steps needed to secure our peatland research for use in policy delivery.

In regard to the greenhouse gas reporting, CEH reports emissions and removal of CO<sub>2</sub> from LULUCF for the UK and DAs (Devolved Administrations).

##### 2.1.2 Question and answer session

###### **Pete Smith, Commission of Inquiry**

My understanding is that we capture fairly well changes in peatland if we have active land-use change or extraction. We probably pick up less well changes in carbon and greenhouse gas emissions from peats that have gradually degraded. Is that correct?

###### **Peter Levy**

Yes. Just to be clear, we account separately for peat which is extracted for energy use (relatively simple) and that which is extracted for horticultural use (which is less straightforward). The numbers are clear. Degrading peatlands are very hard to capture in terms of the LULUCF inventory; and the effects of peatland restoration are even more difficult.

###### **Pete Smith**

Is that difficult because the methodology is not there or because the activity data isn't there?

###### **Peter Levy**

Both of them.

###### **Pete Smith**

So if you were to attempt to improve the capture of peatland degradation from restoration in the LULUCF inventory, what would you recommend?

**Peter Levy**

What you really need is the activity data. It is straightforward. You need the area restored each year in a time sequence from 1990 onwards, ideally. And then, akin to the way we do forestry, each year you model the growth of each cohort of forested area planted. You'd want something analogous to that for peat restoration. For the area restored each year, you would model how the greenhouse gas balance changes over time.

**Mike Billett**

My understanding is that we don't have good UK records of the percentage of peatland that have been drained or, when they were drained. So in terms of what you may be able to draw down and store by restoration in terms of carbon and greenhouse gases is a real issue. The definition of peat also varies across international and national boundaries. GIS based information is needed to identify exactly what percentage of UK peats are actually drained. That data are key to answering this question.

**Pete Smith**

Given the activity you suggest, maybe we can get that from imagery or GIS, but are there any surrogates that you can use for activity data that can give us an indication whether peatland is restoring? Are there any vegetative indices that we can use that would be more feasible?

**Peter Levy**

Probably not in my opinion. It will probably happen on a very small scale. It is a linear feature a few metres wide, not something you pick up from imagery easily. The best data is from the bodies that are doing the restoration themselves. The bigger uncertainty is what the effect on greenhouse gases is, and what the emission factor would be.

**Richard Lindsay**

This is directly related to Pete's question. When you are doing the greenhouse gas balance, in effect you are doing an indirect measure of accumulation and (growth) of peat. There used to be a lot more measurements using cranked wire techniques back in the 70s and early 60s where you actually measure the increase in the surface peat. That doesn't seem to be used anymore. We don't actually seem to be measuring the actual increase in peat growth anymore. Would you like to comment?

**Peter Levy**

I know of cases where they have been used to measure soil erosion including peat erosion.

**Mike Billett**

There are a number of peatland sites which Martin Evans knows well where erosion pins have been used to measure degradation/accumulation, for example, at Moorhouse in the Pennines. But you are right, Richard, the simple systems you mention seem to have fallen out of use.

**Des Thompson**

In your evidence you talked about the lack in your research in Scotland and Northern Ireland and say quite clearly that most of the research evidence comes from the Pennines. We'd like to hear from you, wearing your CEH hats, what you think we should do about that.

**Mike Billett**

If you look at the scientific literature you find this is true. It is, inevitable, because many of the big peatland research groups, are based around the Pennines and the north of England. Norrie Russell and a number of people today have alluded to the importance of the Flow country. I strongly feel that our research is skewed towards impacted systems. If I were to be given the money to invest in a site, I would locate it in the Flow country. I'd locate it in a site that was intact so we could actually start to make measurements and understand the greenhouse gas and carbon budgets of a fully functioning UK peatland system so we could understand better how far away we are now from the "natural state" in other degraded peatland systems. The biggest greenhouse gas and carbon exchange term in any peatland budget is land-atmosphere exchange and I can probably count on one hand, or maybe 1 ½ hands, the number of flux towers which are currently making these measurements in UK peatlands. That involves investment and specific research skills.

**Pete Smith**

As you alluded to, you guys have some of the best monitoring catchments in terms of the total carbon flux and in terms of the total greenhouse flux anywhere in the UK. There is still a little confusion, or rather a lot of confusion, over the total greenhouse balance of restoration - the fact that when you restore, you rewet the system and you get a spike in the methane. In the long term, in your expert opinion, what is the balance between the short term spike in the methane emissions compared to the change in the total global warming, and the total greenhouse gas balance given that a peatland may be losing carbon before it is restored, and when you restore it you might actually be gaining carbon? So over a time period of 100 years or so, what would you say the relative balance would be for that restoration?

**Peter Levy**

That's the problem. We don't know. The jury is out. There have been lots of reviews of the same topic over the last few years and they all come to the same conclusion - we don't know. There's not the data there.

**Pete Smith**

There are areas where you only need a little bit of doubt to prevent any action. There are some areas where we may be scientifically uncertain. So, that's what you're saying, you really don't know? Are we really that uncertain, or is there anything that we can say to allow policymakers to take action?

**Mike Billett**

Most of the famous ecosystem experiments that have been conducted and that involve intervention of the landscape, e.g. chopping down trees, killing the vegetation, draining, etc., show that when you are making such an intervention, you initially can have a negative impact. So, for example, when you restore peatland, you physically go in and make an intervention (e.g. drain blocking), so you are likely to take a greenhouse gas hit or carbon loss for a period of time. In my mind, the key question is: what is the long-term response? We need to recognise that if we make measurements in restored landscapes, we will see quite a lot of variability in the short term. In the long-term restorative benefits are positive and this is supported by the national and international scientific literature. A lot of the confusion exists because intensive measurements are being made in this interim period when new equilibrium conditions have not been established.

**Pete Smith**

We've got some good data on it and we've got some models. You mentioned targeting the quickest gains you can get; would this be from very degraded peat

which is losing a lot of carbon every year, and to target that and get a very quick turnaround?

**Mike Billett**

We've heard in the Inquiry about cash constraints and the importance of targeting money more effectively. You may be right, you may be wrong. The most degraded systems may be too degraded to recover. So I think there is a role that scientists can play in terms of working with land practitioners in analysing the hydrology and topography of the peatland. In that respect, I think you would see how cost effective your restorative programmes are likely to be. Maybe in some cases it isn't really worth going for the most degraded systems in terms of the cost effectiveness of restoration.

**Rob Stoneman**

You asked the question of the methane spike, which is quite important as it is definitely government policy anyway. Can I ask a question of you: is this a big issue or in the long term have we just confused ourselves?

**Pete Smith**

There is some uncertainty as most of the research that has been carried out has been on limited timescales; you can't monitor things for 100 years, generally speaking - that is fairly rare. Pete (Levy) gave examples as to where you can close the carbon budget and (there is) Fred's review on climate change, but there are very few studies where you have everything you need to close the carbon budget. So getting a complete balance is one of those areas where there is scientific uncertainty.

My feeling is that it partly depends on the timescales in which you look. If you look at a time period of one or two years, when you rewet and you increase your methane emissions, because it is about 25 times more potent per molecule than CO<sub>2</sub> in terms of its global warming potential, then it will have a significant impact. If we have longer timescales of 100 years or so - and again, we need a much stronger evidence base than just me saying it's true - if we take account of the carbon that's being lost from a degraded peatland - in a badly degraded peatland that could be 7 or 10 times the carbon per hectare a year so quite significant losses - you take that into account plus the small sink that we get from an intact peat if we look over 100 years, then the GHG signal that we get from the initial methane spike looks very small. Even if you get a fairly low level emission of methane continuing into the future, it might be that we are better off with those quasi-pristine peats in the future than allow the degraded ones to continue losing carbon over 100 years. That would be my argument.

But the total balance depends on how badly degraded the peatlands are. If they are only losing a small amount of carbon, and I just had a chat with Pete (Levy) in the break there, if they are degrading very slowly, then that influence of the methane spike will last longer than you think because of its high level warming potential. But there are some obvious, clear cases where you've got a badly degraded bog where it can only do good. Rather than say we don't know, perhaps what we can do is we can say, in one case it is questionable, in another case we've got some definite wins, and other cases we really don't know because we don't have enough data. Instead of looking at the question of whether restoration reduced GHG emissions overall as a whole, we may need to break it into a series of questions targeted at specific cases and say where can we do restoration with a "no regrets" policy, where we are most likely to have a significant GHG benefit.

**Mike Billett**

One of the really exciting things that has happened relatively recently scientifically is that we now have instruments for the first time that can make continuous measurements of methane in the same way that we've been able to make continuous measurements of CO<sub>2</sub> in the past. Methane is a very noisy gas in terms of variability in peatlands. It tends to be released in bubbles and when we actually do the measurements it often produces highly variable data. I think the capacity to measure methane continuously will significantly enhance understanding of many of the issues we have been discussing in relation to this greenhouse gas.

**XXXXXX**

My question is about monitoring data and providing data and what we, as a literary project can do. To give an example: where we responded to peat depth records. Is there a shopping list that scientists have that a group of less experienced scientists and volunteers can go out into the moors while doing other things and collect very useful data for you? Listening to Richard's comment about piece of wire, it's probably more complicated than that but if there are mechanisms we can use to measure the length of heather or depth of peat growth while we are out then we are more than willing to do that.

**Steve Chapman**

I was going to add a little bit to Pete's answer on the same question. There is quite a lot of data on peatland in general across the world. Natural peatland does produce methane and that is a fact. The whole thing is that the restoration of peatland will eventually lead to a state, which is pristine, so they will produce methane. If you do the calculations you find that on a short-term time horizon (short term is 100 years) you could be global warmer. If you take 500 years, you could be global cooler. The reason for that is that methane has a limited life in the atmosphere while CO<sub>2</sub> lasts for a much longer time. So we are really in this for a long term. And I'm talking about 500-1000 years that the peatland have been around. So you really have to look for the long-term contribution to global cooling. That's the long-term message.

## Section Three

### Peatland Restoration for Water

#### 3.1 Andrew Walker, Yorkshire Water and Robert Stewart, Scottish Water

##### 3.1.1 Oral evidence

###### Andrew Walker

As Yorkshire Water, we provide water to about 4.7 million customers. We are also a fairly significant landowner in our own right. We own about 25,000 ha of land, half of that is SSSI so we work closely with Natural England and other conservation bodies to get our SSSI into favourable condition without scoring an own goal on water quality which is obviously quite important. My philosophy in working with our tenants is to be open and honest. I want them to trust us as a landlord to promote and identify best practice so that we can take that and share that with the wider community. It's great to see people like Simon here, who I have worked with for a number of years. It's got to be a partnership and it's got to be open partnership if we are going to change things.

Why do we need upland water? Generally, it doesn't have much pollutant in it, apart from colour. It doesn't have things like pesticides, nitrates and *Cryptosporidium*. But it is discoloured. It is clear when it comes out of the sky but something happens when it goes into the reservoir and I don't think all of it is natural.

Moving water around the region is very expensive. A cubic metre weighs a ton. If you try shifting a ton of water you know it is heavy stuff. Our electricity bill is enormous. My job is to work with landowners on our own land and private land to try and make a difference and improve water quality at the source. I've actually got the best job in Yorkshire Water, trying to make a difference but it seems to make sense. Trying to address the symptoms rather than sticking a plaster on the causes.

The scale of the problem is we are investing about £9 million over the next five years in catchment management. The alternative is developing new processes such as MIEX which generally cost anywhere from £5 million per treatment plant. We have 17 treatment plants that could be affected by colour so it doesn't take a genius to work out the maths of that.

The current treatment process that we have is different from Scottish Water. The best technology in the world struggles with the colour. It may not really matter, but it is a serious issue. We have to do something to stabilise the colour because if we don't, we haven't got the luxury of advanced technologies to buy us that time. We need to act now.

If you look at the Peak District, the lower threshold (for upland peatlands) it is really dry. I'd look at the Peak District and learn from that so that Scotland doesn't end up the same way. Act now. What happens if you don't? With colour, if you chlorinate it, it becomes (allegedly) carcinogenic, you end up with Tri-Halo methanes (THM) and it is not a good idea to try to poison your customers! We also have the best drinking water in the world. We take it for granted that it is perfectly safe to drink 24 hours a day. The water industry will not allow water quality to deteriorate. This is not going to happen.

The industry perspective from our regulator point of view, interestingly, has changed. The drinking water Inspectorate and Ofwat, our main regulators, are now obliged to

have a sustainability duty so it is up to us to demonstrate to them that a catchment solution won't work for water quality problems. Historically, all we've ever done is look at the water quality that comes through and build a new treatment plant accordingly. This is a shift in regulation as is also the Water Framework Directive and specifically, Article 7. This now protects all drinking water sources and drinking water protected areas, and we are working with the Environment Agency to identify safeguards where you will implement voluntary measures to try to sort water quality problems out. There is the ultimate stick in terms of statutory water protection zones so if people won't play ball, ultimately an activity that is causing pollution could be banned. I personally don't think legislation works when you try to hit people. They are going to fight you all the way and there's no point doing it. It is hard work and it is not very rewarding. I think if we can just have reasoned debates, put the evidence on the table, and suggest to people that this is the problem, they are probably more inclined to work with you.

It is so obvious, Richard talking about 'invisible peatland'. You go out into the moors and they are purple and look fine. But they are absolutely riddled with peat pipes underneath. I was out on one of our moors and the moor was akin to osteoporosis. Absolutely riddled. Looked fine on the top but it is eroding hugely underneath. I said to the landowner that if he wanted a business in ten years time why don't you just back off a bit and build some resilience into your moorland? If you don't, you are not going to be here in 50 years' time.

I don't have a problem with people being paid to manage water on the land, but what we have to ensure is that there is a quality element to that so that they don't just take all the money, block all the grips, take all the supplements and then produce discoloured water. That's not playing ball.

### **Robert Stewart**

Interesting presentation as we have not compared notes! A bit of context about Scottish Water. Publicly owned as opposed to private industry in England, we supply 5 million domestic customers in Scotland. We answer to Ministers and customers and we are heavily regulated. We abstract from 450-500 sources of water, including lochs, reservoirs, rivers and groundwater. Water is treated at 280 water works across Scotland. Due to the remote geography and dispersal of our communities, we have got a very high number of very small water treatment works and small catchments and supply systems. One of the stats is that 75% of our treatment works produces only 5% of the treated water. So there are tiny communities and lots of individual catchments and treatment works.

Scottish Water isn't a large landowner, It owns about 70,000 acres, typically in large catchments and central belt based. We are not the land managers on them. We tend to lease them out to tenants. That tends to be for agriculture and forestry use. We are very heavily regulated and SEPA licence and manage our abstraction regime through the Controlled Activity Regulations (CAR). The Water Framework Directive (WFD) is a main piece of environmental legislation we are currently working with SEPA on. Birds and Habitats Directives have been in place for a significant time and there has been more focus on them over the years in England and Wales whereas our recent focus has been on WFD.

Peaty catchments have been discussed by Andrew. The impacts on our drinking water in the form of higher organics and colour and humic acid, can challenge our existing treatment processes, depending on the state (level of degradation) of that particular peatland. Andrew has mentioned the disinfection by-products of THM. The major effects on the raw water quality envelope are extreme weather events and any

activity in the catchment, be it the land use, agricultural activity, developments (particularly around forestry management activities and change of land use such as wind farm developments) etc. Climate change is likely to lead to more variable weather patterns and we are therefore likely to see an increase or more frequent peaks in poor raw water quality.

Over the years, European legislation has driven very tight water quality standards. It is very prescriptive and, as an industry, we are relatively risk averse in terms of supplying public water. As customer expectations increase, we all do expect to get crystal clear water. These 2 elements drive us to ensure we put in more sophisticated processes like membrane technology, for some of the smaller systems. However, I also take the point from Andrew that the water envelopes may get so extreme that they become untreatable.

We've been directed more towards *Cryptosporidium* and other known raw water parameters rather than just what happens because of the peatland. Article 7 was mentioned, we are working with SEPA to understand how those activities should be undertaken so there is no deterioration in the water quality such that we have to put on a higher level of treatment as that would be considered a failure of that particular water body.

We are the largest electricity user in Scotland because of pumping water and the treatment processes for water and waste water services. In terms of benefits of having improved raw water quality from good stable, restored peatlands, we agree in principle that there could be some carbon and cost opportunities, through reduction in the power and chemical costs in terms of treatment, and extend the length between the different cleaning cycles. The quantification of the exact costs and benefits is the area we aren't clear about and that is the area we would like more information on. Water quality benefits are about stabilisation of trends of deteriorating raw water quality and potential improvement.

What are we doing?

Support and promotion of the peatland restoration - we are keen to be part of whatever groups are happening in different catchments - we are already part of approx 7 catchment specific groups.

Investigating the costs of peatland restorations, we are part of a WRC<sup>5</sup> portfolio research project. This project is in terms of quantifying benefits of catchment management, we are definitely trying to push the peatland element of that in the scope of work. There's also the UK Water Industry Research looking at that too (these two elements have been merged into single UKWIR project).

We are also looking at sustainable land management for the benefit of drinking water quality, in our final determination of 2010-2015. We are looking at sustainable land management techniques in five water catchments. These are actually tending more towards nutrient and pesticide loading in some of our lowland catchments but there are still some catchments that need to be defined. We are interested in synergies and how we might use that in the peatland restoration as well.

In summary, there are few downsides in restoration. We see this work has the potential to prevent and offset any further deterioration in raw water quality. It is unlikely we can remove our technology barriers as we need the protection for the

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<sup>5</sup> Water Research Centre

public water supply but we are keen to further understand the cost benefit of peatland restoration.

### 3.1.2 Question and answer session

#### **Martin Evans, Commission of Inquiry on Peatlands**

If we had been talking about this five years ago, the discussion would have been around carbon, but now we are moving towards considering multiple benefits. That is coming through more evidence. I think potentially, the water companies are in a very unique situation in that quite a lot of those potential benefits actually have a real value to it. Obviously, the economics of treatment costs, potentially carbon markets, particularly Northwater started to require that you consider carbon management. So you have a sense as to whether your future plans are actually moving you towards carbon management or peatland restoration? Are you able to make an economic case here?

#### **Robert Stewart**

Scottish Water is at the start of its latest 5 year investment period but we have also been tasked with a number of study areas to influence future plans. We've got different regulators from E&W. We have the Drinking Water Quality Regulator, SEPA and the Water Industry Commission for Scotland. They are similarly tasked with the sustainability mantra as well and they did put in (quite late in our process of our last business plan) this idea of a sustainable land management for five catchments. They want us to study it so we understand what the relative cost benefits are. I think E&W are possibly one cycle ahead of us. E&W are all ready getting in there and doing it. Our regulators definitely want us to start being able to do that benefit analysis so that you do consider catchment management rather than further treatment.

#### **Andrew Walker**

I think we are in a slightly different position in that the water quality on occasions is so bad that you can't treat it. It is not like you have the luxury of additional technology. In terms of the future, we run in asset management periods in 5-year blocks. We are already beginning to plan for AMP6<sup>6</sup> and I'm planning another similar level of investment in catchments again because we have to do something. We have to stabilise the systems. We have to do something now. It is no use waiting until the end of the Inquiry to see what comes out of it. Let's act now because, like Robert says, there are very few downsides to doing it even for the grouse moor industry. Protect your assets now and we will see where we are in 2 to 5 years' time. If you don't like it, you can always go back. If you've lost your moor, you can't.

#### **Martin Evans**

One of the things I think the water industry has done very well is, where it has done restoration, the monitoring has been built in a relatively serious way. To what extent do you think the industry is able to share those findings? Is there an issue of commercial confidentiality?

#### **Andrew Walker**

If you look at the work that Kate's done with SCaMP<sup>7</sup>, all of that data will be freely available to any university that wants to look at it. We are early doors if you like, for catchment management for colour but we have done a lot on pesticides and nitrates, and my view is, if it helps to get the ball rolling and builds trust, so that people realise

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<sup>6</sup> Asset Management Plan 6

<sup>7</sup> Sustainable Catchment Management Programme

that it really is a big issue, we can move forward. I don't have a problem with sharing data.

**Robert Stewart**

Similarly, we are a public body so anything we are funded for should be publicly available.

**Martin Evans**

It would appear that there are significant differences between what you are experiencing for Yorkshire Water and Scottish Water. What do you see is the main differences between the levels of DOC and carbon that you are getting in your waters in Yorkshire compared to Scotland? What are the reasons behind those differences?

**Andrew Walker**

From our perspective, look at the Pennines, in a number of cases, they are absolutely shot. Some of that is climatic, some of it is lack of acid rain and the pH, and some of it is lack of management and inappropriate management. I think that there is a perception that you can continue to manage a moor because it is there and you can continue to burn off, develop your heather, without taking into account the wider factors. We can't do anything about it but we can re-saturate them. The other difference is the scale of our works. We have lesser number of works that treat volumes of water and you can't get those volumes of water through the sort of membrane plants that Robert uses.

**Robert Stewart**

75% of our assets, 200 of our treatment works only produce 5% of the water. We do have some plants, obviously central belt and right through that area, would be on an equivalent scale to Yorkshire Water. But they tend not to necessarily be in peaty catchment areas. So in some areas of the central belt, the catchments have relatively rocky outcrops. Down towards Ayrshire, we do have quite considerable peat issues and colour issues so it is akin to Yorkshire. But then, we've been driven through other legislative requirements to meet other treated water parameters *eg Cryptosporidium* and for us, membrane technology did work. So you are talking about scale as one of the key factors and differences in what technology we can use. Another example is in lowland at the River Ugie. We were involved in the Voluntary Initiative in terms of trying to do that catchment management element. It wasn't a particularly peatland issue, it is much more about pesticide. We were dealing with 270 farmers in that one abstraction site. There were enormous challenges in getting everybody on board in terms of catchment management. The peatland issue is down to scale – we have the ability to deal with poor raw water quality by the use of membranes which we had to employ for other reasons anyway and therefore, it is a different challenge. So I think we need to compare notes with Yorkshire Water on comparable scales of catchment which we haven't done yet.

## **3.2 Simon Drew, CLAD<sup>8</sup>**

### **3.2.1 Oral evidence**

**Simon Drew**

I represent CLAD, we are a knowledge exchange programme which exists to facilitate communication and learning about carbon loss from carbon landscapes (i.e.

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<sup>8</sup> Carbon Landscapes and Drainage

peatland). As the principle investigators of the programme are also based at Stirling and Glasgow University, we have been involved in some primary research in that area as well. We are funded by NERC and represent a broad church of stakeholders, including academics, conservationists, regulators, developers and environmental consultants.

The main reason CLAD was funded was because of concerns over expansions by wind farm companies developing on peat and worries about the effect on carbon losses and the hydrology. Wind farms are our main areas of concern (but not exclusively).

As many of you know, the planning system does not allow developments to go completely unchecked and there is oversight regarding these types of developments. With respect to wind farms, as far as we are aware, there are no statutory requirements to carbon directly or indirectly through the hydrology. There is a requirement for Environmental Impact Assessments and in some cases, habitat management plans that may include restoration. There's also the opportunity for statutory regulators to require the use of recently developed carbon pay-back calculator for wind farms on peatland which was developed at Aberdeen University.

The industry has worked with regulators to produce a document, which was recently released called 'Good Practice', which addresses some aspects of carbon management on peatland.

One of the key areas which CLAD would like to highlight to the commission is concerns about the extent to which development on peatland has outstripped our understanding of its effects. In our written submission, we flagged up several areas we think from our experience are extremely important and require evidence before we can regulate and manage them properly. The four areas are:

- Disposal of excavated peat- peat dug out to provide space for the base of the turbine or excavated for roads and drainage. At the moment, a lot of the peat gets put into borrow pits. Some rehabilitation work will go on in those back filled areas but the consequences for the carbon stocks in that peat are completely unknown.
- A lot of trenching goes in for cabling to connect the turbines to the grid. Our observations so far are that the material for these trenches is put on the side of the ditches, possibly for several weeks. The cables are laid and back filled. Again, the consequences for the carbon stock in that peat is unknown.
- Road building- a lot has been made of engineers making 'floating roads' but the consequences, again for hydrology and hydrological activity and carbon losses are unknown.
- We wanted to flag up a new area of concern, which is the effect of wind reduction by wind farms. There is some anecdotal evidence from one of our members that reduction in wind speeds leads to a reduction in transpiration which can result in a rise in the water table leading to the growth of stagnant beds and the same effect as grip blocking. At the moment, there is not really an understanding of the areas that this may or may not happen and how widespread it might be within any single development. It is actually the focus of a three-year research project, which is just starting. Glasgow University is partially involved in that, with groups such as CEH Lancaster, Reading and a group at Leeds as well.

The point I am trying to make is we have no idea of the individual contribution that each of these components to development makes to net carbon loss or gain. If we are really worried about the consequences for carbon balance and hydrology, it is something we need to get a handle on fairly quickly. The industry does not have the

methodology, the funding structure or the compulsion to gather this kind of information.

In health and in education, evidence based practice is important. In this respect, environmental management should be no different. Lots of people today talked about the uncertainty of peat research base for how we need to proceed. I guess what I am trying to say is there are things going on in peatland which we really have not yet begun to consider yet- and we need to.

I put a short section on the end as to how we might achieve this. I'm not sure if it has been flagged up anywhere else but we had the idea of emulating the aggregate levy fund. This could be a fund which all wind farm developers make some sort of contribution to fund this kind of research to enable evidence based management to proceed. This has the benefits of spreading the risk associated with these types of projects across the industry and allowing some sort of independence between the funders and the people who are carrying out the research.

### **3.2.2 Question and answer session**

#### **Steve Chapman**

You mentioned that you have a three-year programme. Although this is very welcome, do you feel that it is long enough to get the answers you are looking for? Is that a weakness in our current funding system for this kind of research?

#### **Simon Drew**

Yes, I feel I should be funded in perpetuity! It is not something that we are too worried about at the moment, because this is obviously a high profile area so we feel fairly confident of extending the project and there's plans to do that already. We have various applications in the pipeline to do that. Obviously, it is not going to carry on forever and I guess it would really depend on how successful we feel. So far, in terms of communication and knowledge exchange, we feel we have been fairly successful. We have various aims on how we are going to proceed with that. As yet, there is no natural end point we've identified for it so it is going to be around for a few years yet.

#### **Steve Chapman**

You spoke about the Aggregates Levy and whether something similar could be done with the wind power companies- have a levy raised from them. At the moment, most wind power developments have a certain amount of subsidy. Could another stream perhaps be another portion of that subsidy actually going into monitoring or research?

#### **Simon Drew**

Effectively, that is what would be happening anyway. And there would be a lot of profitability. It almost wouldn't matter where that came from. Unfortunately, we would still be hitting our bottom line. But we are ecstatic about the suggestion. Having said that, there are potential benefits to it. The industry is already locked up in all sorts of regulatory snarl-ups regarding some of these issues and if they could be ironed out, certainly... (SC-it would make the way clear to do what they want to do).

#### **Steve Chapman**

Can I ask what CLAD would find useful out of this Inquiry?

**Simon Drew**

We have limited scope for the kind of advocacy that it is able to achieve. So pushing the aggregate levy, which we are going to do, can be done in concert, which would be excellent. Flagging up some of these known/unknowns that I mentioned earlier would also be important. The ability to get the message through to the industry in concert with you would be important as well.

**Robert Van de Noort**

Mine is a suggestion rather than question. I think it would be very interesting, as value for money, and would add to the socio-cultural impact if there is immediate feedback to the wind farm companies who often come on to huge local opposition to wind farms. For us, it is important that the landscapes we are trying to protect are actually landscapes we are trying to protect and not something different.

**Simon Drew**

I think that is important. It would be an extension of the work on carbon loss and drainage and we definitely require more resources. It is something that I've thought a lot about. I feel bad when I don't mention the general public in our list of stakeholders but there are probably very good reasons, and I don't want to go there! I haven't been involved in the wind industry from the environmental consultancy side before I came into this job.

**Richard Lindsay**

It was interesting to see in your outstanding research questions, given the big bog slide at Derry in Ireland has been identified as partly caused by water management by the developers, that you haven't got water management on the site as one of the issues that still needs research. Hydrological instability is potentially one of the most pressing issues.

**Simon Drew**

You're right.

### **3.3 David Gorman and Johan Schutten, SEPA**

#### **3.3.1 Oral evidence**

**Johan Schutten**

We have been asked on behalf of SEPA to give you some further evidence on how SEPA is helping to protect peatland and what we do to add restoration of peatland. First of all, I'd like to bring across that what when we are looking at peatland and restoration we've got to look at all eco-system services as we've heard earlier today. It is not only carbon storage but it is also the carbon sequestration that is important and agriculture is important, biodiversity is important, recreation and shooting is important, water quality and quantity management is important. Then we look at long-term management of these systems, which incorporate the lot.

I think what needs to be clear from SEPA's perspective is that SEPA aims to protect Scottish peatland using the statutory instruments we have available while optimising the ecosystem services they deliver. So it is a balanced approach. This is often delivered in partnership. Looking at peatland, we need to go slightly wider and thinking about what we see in the scientific evidence introduced so far. I think we want to go wider than just the blanket bogs that we've touch on so far. I think there are four major categories of peatland that we need to look at where SEPA has a regulatory role. First, the organo-mineral soils, which we haven't heard a lot about

today, which are important components of the peatland landscape. The Scottish Landuse Strategy, which is available for consultation now, recognises the importance of multiple functions of land and recognises the strategic approach. The SRDP supports some of these functions. SEPA's specific locus is on how the specific land use influences the water quality, the diffuse pollution and we do that by our statutory role in the water environment and water services act coming from the Water Directive. So we've got a regulatory role there, coming from statute. I think it needs to be clear- why we do things. Fens and reed beds and woodlands are another category we haven't spoken an awful lot about today which are important peatland as well. What do we do there? Fens/ reedbeds/ woodlands adjoining or adjacent to rivers are also fulfilling hydromorphological functions within the landscape. I haven't touched on so far which are very important for the management of our rivers. These wetlands can purify moderately enriched water, regulate water flow and temporary store flood water, and fens are obviously used for grazing as the agriculture sector highlighted today as well. So it is important that flood risk management is brought into that package as well in how we manage things. Not only water framework directive, not only carbon, but flood management as well.

Blanket bog - we don't regulate water activity directly. What we do regulate is the impact that it has on the downstream water environment and we do that by using the Water Environment and Services Act. Blanket bogs do, however contain quite often a mosaic of various habitats including groundwater and surface water dependent wetlands. In particular, the groundwater and surface water dependent wetlands have a role to protect them from significant damage by the Water Environment and Water Services Act. We also provide technical advice to the Scottish Government in the Carbon Savings Calculator used for wind farms covered by Section 36 Act of the Electricity Act- i.e. the big ones. We are moving on to the smaller ones but at this moment in time we are focussed on the big ones.

Excess peat material has already been mentioned earlier- excess peat material being generated during developments on peat. If this cannot be used for good ecological purposes on site, then it is determined as waste and is governed by the PPC (Pollution, Prevention and Control) So we have our locus on that to manage it via waste PPC so the idea of putting it into borrow pits and then have it gone and forgotten is not going to happen anymore. We now see that as waste and it is going to be regulated. Raised bogs: we do not regulate water activities on raised bogs directly but measure the impact on the downstream water environment. Again, the same issue about waste generated. Waste generated that cannot be used for good ecological purposes on site has been considered as waste. This is all on our website as well so it is quite good to look at.

I think what we did not pick up and what was quite important for us at this moment in Scotland is the link between the management of the upland areas and flood generation. I think we really need to highlight in the hydrology report as it stands. We would like to see the idea of sponges in the peat because there is evidence out there in water management that the peat within the upland catchments can be used to fine tune flood peaks. This is an important vehicle for us in water management in Scotland and I think this needs to be picked up.

So what do we do for the protection of peatland? As I said, we are statutory consultees for planning and regulation. That's an important vehicle. We manage directly via our regulatory role via the Water Environment and Water Services Act. We are influential in the biodiversity agenda, for example in the Scottish Biodiversity Forum, we chair groups on there, so we do a fair bit. What is very important for us is to work together with this industry and to work with developers so that if there is a

wind farm agreed sitting on a peatland, we minimise the impact that it has. That needs to begin very early on and working with the wind farm industry. For example, the good practice guide can greatly reduce the impact of developments on peatland.

Going down a bit further down the catchment, in the management of fens, working with a range of organisations across the UK, we've developed a fen management handbook which touches on hydrology management, touches on nutrients, and also touches on the whole management of that. So we are working on development best-practice guidance to give the organisations and the landowners on the ground the tools they need to do it. Not only the policy, but also the tools on the ground, how to deal with it. SEPA is working with the Scottish Government and relevant partners to ensure that carbon assessment of wind farms in peat is properly understood and assessed. It's work in progress. We are working on there and advising on there. I mentioned the Flood Risk Management Act and we really feel that peatlands are an important component in catchment wide flood generation and storage. And the storage state and management of them are an important tool in sustainable and natural flood management which is key to the implementation of the Flood Risk Management Act in Scotland. We are also doing work on catchment based incentives and participate in there and try to drive the agenda forward.

What can be done to protect peatland from damage? I think that SEPA advises that soil carbon is assessed and regulated by the planning and environmental protection systems in a co-ordinated way. So it first needs to be better understood but it needs to be in a co-ordinated way. Across Scotland, that co-ordination in soil carbon isn't there. It doesn't matter if it is SEPA or another organisation. It needs better co-ordination. Co-ordination of regulation is important. We believe that there is a clear need for further practical guidance on the management of peatland systems, grazing and burning have already been mentioned, we really need practical advice on the ground for people to get on. If there is a current state of play lets grab that and use that at this moment in time and not wait for 5 years in the future because what's happening now is important.

Finally, along with sustainable restoration of peatland, there is a need to implement and optimise all system services. There needs to be a trade off. It's environmental, societal and economical. I think all of these need to come in there, not only the carbon. What that needs to include is the actual area and the functioning in the wider catchment. And the agriculture and other land management subsidies could be adjusted to optimise peatland management for all ecosystem services but that needs countrywide strategic approach. Bit by bit might not work. Let us go and see where the hot spots are where we could work on and don't do it bit by bit. We need a strategic agenda.

Finally, what is already coming out of this Inquiry is the peatland protection agenda needs to be synergistic for the climate change agenda. I think that is clear.

### **3.3.2 Question and answer session**

#### **Robert Van de Noort**

I think the most obvious question, which reflects many of the witness statements is- who is going to take a country-wide strategic approach to peatland management?

#### **Johan Schutten**

As I said, I think there is no decision yet on who is going to do that. This platform is an important vehicle to advocate that to Scottish Government and UK Government

but there needs to be a co-ordinated approach and there needs to be one organisation driving this. Whether it is SEPA or another organisation, we have no direct view on.

**Robert Van de Noort**

You use your water advisory services to as the main tool to advise and implement planning but you don't have anything to say about the raised bogs.

**Johan Schutten**

Yes, that's the way the water environment and services act has been phrased. Purely rain water dependent wetlands are not being considered. It's the surface water and groundwater dependent wetlands, which are part of the Water Environment and Services Act.

**Dave Gorman**

I'm an environmentalist that's why I joined SEPA. It is always interesting for us. When you are an un-elected body you have follow the powers you are given by Parliament and that is right and proper. We would say that we are more than happy to pick out areas where we think Government and Parliament should consider additions to our powers or to someone else's powers. But if you think about it, take an individual site. You sometimes have members of the public saying they want you to go further because they think there is particular damage. We will do our best within the powers we have. At the same time, we are not elected to so it is not for us to say, well actually, there is a funny gap here in the rules here and we should have done something. It is worth bearing in mind when you come to regulation. It is right and proper that we sit within the powers we have. If we then think there are gaps in the powers, we are more than happy to go back to government to say we think there is a gap. I think that is what we are trying to say with peatland in general, and soils. There are things happening, it is not as if nothing is happening. What I've heard today, from my point of view is that there is not a complete understanding in terms of research. There is not a complete understanding in terms of state and condition. There is not an overall monitoring system for that. When you move into the planning system there isn't a complete picture, nor when you move into regulation. Across the piece is where we are saying we can do more. One quick thing- I'd be more than happy if you wanted us to respond to some of the calls from Simon about wind farms because I agree with a lot of them but not all.

**Vicky Swales**

You mentioned the Land Use Strategy in Scotland which comes out of the Climate Change Act and that that recognises multiple benefits in land. The draft that is out mentions carbon soils but it doesn't say huge amounts about peatland in particular and their role and the benefits that can come with restoration and management. Would a commitment with the Land Use Strategy towards peatland restoration programme in Scotland be something that SEPA would welcome and see within that strategy given that it is all about delivering climate change targets and sustainable development more generally?

**Dave Gorman**

I often represent SEPA on the steering group for the Land Use Strategy in Campbell's absence. I think yes, we'd also be saying what other people are saying today. We don't have a clear picture over where the balance should lie between the two. That is why from an organisational view, we want to be reassured we have a case where we are not putting money into restoring sites and at the same time we are losing sites and we don't understand the condition of them. That might be where we are coming from.

**Aletta Bonn**

This is about the sponge argument. In the hydrology review it was obvious that we shouldn't use the sponge analogy or metaphor. Maybe wet sponge is better. With a wet sponge it is more easily understood. (Note- question was indistinct).

**Johan Schutten**

I think if we moved the whole sponge analogy out of that document that might work. There is a clear difference between retainment and storage of water in the peat soils then as an aquifer behaving and contributing to low flow contribution to rivers. This is different than the short term retainment in terms of hours or half days during a rainfall event which then would help in fingerprinting and fine-tuning management of water from various sub-catchments. There's a huge difference in terms of time and in terms of scale. I think if we separated those two out, I think that would help. I think there is a clear role for peatland and for the lower peatland, the fens and the reed beds to act in a very important way for water management and flood management. I think we need to include this, otherwise, we'll miss a trick.

**Martin Evans**

To follow up on the sponge discussion, you are right. We should back away from the sponge completely. The distinction is in the ability of the bogs to slow down water that is flowing across them as opposed to hold water.

## Section Four

### Open Audience Discussion

#### **Richard Luxmoore, National Trust Scotland**

I'm interested to see that people are greatly coming down against burning because of the potential damage it does do to carbon stores. I think that would be useful guidance to make clear assuming that that, or something like it, is the outcome of this Inquiry. Simon Thorp indicated that in practice, the managers, who are managing grouse, will need to take a decision or prioritise their moorland. They may carry on burning because grouse are more important than carbon storage essentially. Presumably, what that will boil down to is money. How much money can you make managing a grouse moor per hectare against the value of additional carbon sequestration? Which begs the question as to how much you need to pay people to stop burning their moors? There are two mechanisms to achieve the same result. One would be to use financial incentives not to burn your moor and the other would be to provide protection money! The alternative is prohibition. I wonder if any of the members of the panel have a view as to which would be the preferable mechanism.

#### **Pete Smith**

In the international climate negotiations, as we know, that is what's currently going through at the moment. There will be agreement in Mexico in December on the reduced emissions from deforestation and degradation. That's exactly the same thing, that's one of these things where instead of being paid for new trees you're paid for protecting trees that would otherwise disappear through other economic drivers. It's driven by countries that still have significant forestry that may be deforesting at quite a rate. For example, Brazil, business as usual, will lose 20% of their forest for X amount of years, if you put a whole number of policies in place, we can protect a large proportion of that and that would save a massive amount of the carbon stock. What you get from that is far more than you can get by planting trees elsewhere. You're better keeping the marbles in the jar than trying to pick them all up again. I think you can make exactly the same argument that peatland fall into that category. But if you've got 'business as usual' management that is degrading peatland, if you can demonstrate you are making a change, that will protect the carbon in those peatland, you should be able to attract some of that climate change finance through carbon credits or something similar. What you can't do is put a gun to their heads and say- 'if you don't give us the money we are going to degrade it. You'd have to show that there is a trend that's ongoing, from, say, the 90s or 2000s. You can then attract those sorts of carbon finances.

#### **Richard Luxmoore, NTS**

That's all very good if you have been burning your peat in the past but the people who have been good boys and haven't been burning their peat won't qualify for anything.

#### **Pete Smith**

That's always the case. If you look at anything from the Kyoto Protocol, there's a 1990 baseline against where you judge things. You judge either the amount of forest that you had but it is much easier for the UK to reforest because we got rid of all of our trees. We've got 5% tree cover or something. It's easier for us to reforest because we've already committed our forestry sins in the past so that's always going to be the case. There's always going to be some winners and losers. It depends on where the baseline is. And, as I understand it, the current negotiations have a relatively flexible baseline.

### **Vicky Swales**

I think it is clearly important that we protect our most important peatland areas as they exist. But I think most outcomes are better achieved by a combination of measures. And we talk about carrots and sticks and actually there is a role for everything. There is a role for regulation protecting the most important areas and preventing damaging activity. It's very clear that we are going to need to incentivise some of that activity, particularly for some of the restoration work and positive management and we already do that. We've heard a lot today about the need for advice and persuasion in helping people to understand the techniques of that restoration and management. So actually, what I think we need is a combination of all those different approaches and measures in order to actually deliver the scale of things that we need to do.

### **Richard Lindsay**

I just wanted to respond to Tim's request about guidance on what can be done to measure stuff easily. Actually, what we have been recommending for peat depth measurement is ½ m threaded studding from Wickes. You get two ½ m lengths in a pack. They make two connectors. You can have a complete peat depth system that fits into your daypack. We've got the Moorlife team and there's Leeds University and various other people who have now got these and they just measure everything. That's the first thing. The second thing in terms of the cranked wire- we've been doing detailed monitoring in bogs in Caithness. We've got permanent markers which are metal discs and a metre of threaded studding and the discs are placed on the bog surface with the rod going down into the peat, holding it firmly. We were astonished to find that in 7 years some of those had been buried by up to 15cm of growth. The average has been 6cm. We are getting about 1-2 cm per year so it does strike me if a lot of people went out and put these markers across their sites, we've got potential to get actual measurements of peat accumulation over a wide area of Britain. Very, very simple measurements but they could be really, really useful.

### **Peter Levy**

Just to respond to that, we use volunteers through wildlife trusts, particularly now that the employment climate is so low, some of those volunteers are extremely well qualified as well.

### **Pete Smith**

Just on Richard's comment about moor burning. I think that with moor burning and carbon we need to be very careful in the way that we have been talking about the methane issue in terms of the evidence base. This Commission of Inquiry will have to be very, very careful, at the end of this forum. There is a lot of emotiveness in there, there's a lot of confusion between the seasonality and the actual practice of moor burn. For what it is worth, I struggle sometimes with some of the arguments that are presented to me against moor burn. If we can challenge some of the arguments that are put to you against the evidence base. So it just to reassure you that that is something we will want to look at very critically.

### **Ruth Robinson, University of St Andrews**

St Andrews researchers have a project going in Forsinard at the moment and in a peatland site in Wales. My comment relates to funding for research for the functioning of both undisturbed sites and restored sites. I think there's been really large proposals that have been submitted to NERC, particularly over the last 2 or 3 years that some people have been involved with. They haven't been successful. I think these big grants cause a sort of inertia in moving forward in terms of just getting basic research done. However, some of the smaller amounts of money targeted have also been unsuccessful. And some of that is to do with people in the room.

Can the Inquiry focus on a layered approach to try to get a science base filled in? In other words, universities are actually quite good (and desperate) to do projects and it is good value for money so things can get done for small amounts of investment. Obviously, larger things, like the centre at Forsinard, would take more resourcing.

**Ben Geary, University of Birmingham**

This is a comment/question. How useful is the data? There's been a lot of hand wringing about the use of data. How useful is the data? Is it used in the right way?

**Martin Evans**

From the point of view of thinking about planning restoration and restoration targets, paleo-ecological data is incredibly valuable and it is right to say that it probably hasn't been sufficiently incorporated into some of those debates. I think in terms of what the paleo-ecological community can do to make it more useful, the key thing is about spatial representativeness. Single core studies tell you something about a particular point in space and time, whereas you probably need to know something about the vegetative trajectory across the landscape if you are planning a large-scale restoration project. Point taken. It is something we have to think much harder about and come at it from both ends.

**Break**

**Tim Thom**

Climate change is one of the UK's biggest threats to prosperity and quality of life. We have the UK Climate Act, different countries, different acts, the targets are pretty eye watering (and need to be) so we are going to have to use absolutely every tool in the box. Renewable energy is absolutely essential and peatland restoration is absolutely essential. Given 80% of the UK is not peat, I cannot see why we have to have a trade-off between wind farm development and peat. Surely, putting wind farms on peat is simply bonkers. I'd be interested in your views.

**Dave Gorman**

We have this difficult balance. The issue when you try to solve global problems with local impacts. Part of our job is to make sure that impacts are not unacceptable- we are managing the risks. If you take any particular site, process or activity that SEPA regulates, it has an impact. The question is: is that an acceptable impact or is the risk controlled and understood? Are we willing to live with that balance? Is there an environmental trade off or an environmental economic one? I'd say no, you should put wind farms in those places but at the same time there are serious issues around things like borrow pits to be aware of.

**Chris Miller, Lancashire Wildlife Trust**

I was pleased to hear the SEPA presenters talking about fens and raised bogs. Touching on wind turbines, and aggregates levy style funding, LWT would like to see that apply to peat extraction. On the funding, we are trialling at the moment, a corporate social responsibility payment scheme where people pay and carbon is the 'hook' for it. It is not official trading but we are trialling this scheme as a form of funding for peatland and we have already received about £55,000 for that. This is another stream. Re proxies for monitoring, we already monitor water table levels and sphagnum coverage for looking out the carbon release.

**Jonny Hughes, Scottish Wildlife Trust**

We touched on multiple benefits, I was pleased to see SEPA bring it all together in the end in terms of water quality, hydromorphological functions, enhanced biodiversity, landscape aesthetics, increased socio-economic benefits (in terms of

jobs), feeding grounds for grouse, and educational resources. It seems to me the research interests are still very sectoral and there is not a great deal going on in terms of trying to bring together the environment value and the socio-economic benefits in one package. There are actions in the Scottish Forestry Strategy and the Climate Change Adaptation Framework to do some ecosystem pilots in Scotland – similar to those happening down south with DEFRA. I'd like to see these pilots considering the multiple benefits of peatland. Add up the value of the multiple benefits and the synergies between these benefits as well. Would the panel like to comment on this? Is there any work going on in terms of trying to bring these benefits together?

**Martyn Howat**

DEFRA pilots are good examples of what needs to happen. I hope this Inquiry actually is taking a step in that direction, trying to bring science and practice together in a way which hasn't happened and looks at all the elements which are important to peat and peatland. There is clearly an awful lot that needs to be done. We still have a big job to do to make the public aware of what is important. Once you've got that constituency support, then it will run but until we've got that, it won't.

**Jonny Hughes, SWT**

One of the things missing from today's discussions is that we haven't talked about climate change adaptation. We need to think about building resilience in peatland systems as a matter of course. That is a tremendously powerful argument in terms of the precautionary principle - what might the results be if we don't build that resilience in, in terms of the costs in the future? The research hasn't grappled with this yet but it is something that needs to be considered.

**Tim Thom**

I'd like to make a comment about peatland research and the needs between the research and the stakeholders. I feel that a number of times today, we have called, effectively, to unite the UK community. One of the issues is that we all come from different academic backgrounds and we publish in different journals. We've also heard a lot that stakeholders would have liked to consult an authoritative group and get the right kind of information. I think that partly because our science has originated in different areas: geology, physics, chemistry. But peatland is obviously an area that crosscuts so many different disciplines. We all go into our little comfort zones and talk to people. It's only in rooms like this that you get such cross-cutting interface so I hope the IUCN committee peatland programme is a good start. But I would like to see some sort of analysis and some sort of approach to how we take peatland research and make it a much more joined-up approach in the future so (even though scientists will never speak with a united voice!).

**Dave Gorman**

I want to ask the panel, would you agree that if you take traditional funding sources like agri-environment, that you are not going to get to where we need to be? We need to think about two things: one is about the whole apparatus. We said in our evidence that this is synergistic with the climate agenda. The apparatus that now exists in government to allocate targets and litigation opportunities. Things like fixing the inventory to make it visible and then approaching government to remind them that is important. Also what about retailers and others sources of funding like that? Making a big request at the minute in the situation we are in will not really get us where we need to be.

**Fred Worrall, Durham University**

People talk about GHG and carbon balance. By virtue of the combination of people here we tend to focus on uplands and focus on Scotland. An important perspective- over half the GHG coming from UK peatland doesn't come from Scotland, doesn't come from the uplands, it comes from 3 areas of England- the Lancashire Mossland, the Somerset Levels and East Anglia: ie. those areas converted from lowlands intensive agriculture. So if we are stop the GHG coming from our peatland, it may not be issues of burning, sheep or heather or forests, it may be- are we actually prepared to do without arable or dairy farming?

**Aletta Bonn**

Coming back to what Mike Billet said, the co-ordination of research exchange and the link between policy advice and research. The IUCN hopes we can move this Inquiry forward, so this is not going to end in February. We do want to have a report from here and we do want something bigger and we hope that we can continue this collaborative effort of not only exchanging information but identifying the different areas where government guidance is needed on different areas and work towards that. We'll have a one-stop shop.

**Karen Dobbie, Scottish Environment Protection Agency**

I agree with Fred. In the case of farmed organic soils (N fertilised either by addition of inorganic or organic materials), or in the restoration of previously fertilised organic soils, we need to take into consideration the whole GHG budget (i.e. including N<sub>2</sub>O emissions) and not just carbon containing gases and carbon.

**Vicky Swales**

Responding to comments about the axe to public spending and budget cuts; some of the traditional funds we've seen in the common agricultural budget are going to be cut and there is going to be less in the pot. There's already a number of ideas come through this Inquiry and this process in terms of public private partnerships making private sector see what they can generate in terms of funding some of this activity. We've already heard about the water companies and ideas for peat levies for wind farm development putting funds into habitat banking and paying for all sorts of things. I think there are some ideas there to explore and to look at. The obvious is the whole carbon markets issue, which I know that definitely, this Inquiry is going to be saying something about.

**Richard Lindsay**

To respond to Fred's comment, I agree entirely with him about this. We've got a very good example of that already happening in terms of the Great Fen Project where we are doing exactly what Fred described.

