THORNE & HATFIELD MOORS CONSERVATION FORUM

"Peat – the way forward, a future for the UK's peatlands?"

Papers from the conference held at the Wortley House Hotel, Scunthorpe on

July 3rd and 4th 2002

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Background

In July 2002 the Thorne and Hatfield Moors Conservation Forum held a conference with the above title at the Wortley House Hotel, Scunthorpe. The conference included 15 presentations from various persons and organisations with involvements in all sides of the peat debate.

This volume contains the substance of the presentations. For the most part the papers included in this volume are transcribed from an audio recording taken at the conference.

In all cases the authors of the presentations were given the opportunity to read the transcription and correct or amend it. In some cases this has resulted in the preparation of formal papers. Some presenters did not take the opportunity to revise the transcripts and where this is the case the transcripts have been reproduced. In reading these it must be remembered that the transcripts are the words spoken to accompany visual presentations shown on a screen to the audience.

In a few cases the transcription process has provided incomplete renderings of the presentation with gaps in the narrative. Where this has occurred for the sake of readability the papers have been edited and, if possible, an educated guess has been made as to the missed words.

"Peat the way forward
a future for the UK's peatlands"

Conference Programme

The aim of this conference is to bring together all stakeholders involved in the peat issue, to present facts in an endeavour to educate and inform the wider audience of the value and importance of peatlands and from this debate attempt to draw conclusions as to the future for the UK's peatlands.

Wednesday 3rd July

10.30	**Registration**	Tea and coffee available upon arrival
11.00	**Welcome by**	Caroline Flint MP
11.10	**Introduction**	Richard Lindsay University of East London The history of peatlands and their conservation.
12.00		Michael Meacher Minister for the Environment
12.20	**English Nature**	David Arnold-Forster Chief Executive
12.40	**Lunch**	
13.30	**Site visit to Hatfield Moor**	Coach trip will include presentations on the ecology and natural History of the sites, their palaeoecological interest, the plans for Rehabilitation and the future for the sites.
14.30	**Estimated arrival on Hatfield Moor**	Delegates will be guided by couriers (small parties of c.12) to points on the site where they will be appraised of archaeological, ecological, peat extraction and the future of the site interests by "specialists" in their field.
17.30	**Depart from Hatfield Moor**	Returning to Wortley House Hotel, Scunthorpe

Thursday 4th July

09.30	**Registration**	Tea and coffee upon arrival
10.00	**Welcome by Richard Lindsay, Chairman**	Remind delegates why we are here and opening address.
10.30	**Ian Goldthorpe**	Chartered Town Planner. To outline the planning perspective, mechanisms and relevance to the peat issue and how it can be used to conserve peat or encourage wise use
10.50	**Richard Buxton Solicitor Environmental and Public Law**	*"Peat and the Law"* Legal framework, how EU legislation applies to peatlands as habitats etc.
11.10	**Martin Harper Conservation Director, Plantlife.**	Peat and peat alternatives
11.30	**Refreshments**	
11.45	**Craig Bennett**	Did campaigning help, do we need to continue? If so what direction should the campaigning take?
12.05	**Stewart Henchie Royal Botanic Gardens, Kew**	Growing medium requirements from horticultural perspective.
12.25	**Adrian Oliver English Heritage**	*"Great Expectations"* - the English Heritage approach to the conservation and management of the historic environments in England's wetlands.
12.45	**Lunch**	
13.45	**Mark Lewington Terra Eco Systems**	*"Producing a Peat Free Media"*
14.05	**Paul Waller Representing Scotts Co. (UK) Ltd**	*"Scotts Research and Development of Peat Alternatives for UK Growing Media."*

14.25	**Sally Ockenden B&Q Growing Media Buyer**	*"Towards a Peat –Free future? B & Q a retailers perspective*
14.45	**Dr Dan Charman**	*"Peatlands and Environmental Change"*
15.05	**Keith Stanfield**	Peatland Park, NI their experi*ence and potential for communities of the Humberhead peatlands.*
15.25	**Dr Rob Stoneman**	Where from here?
15.45	**Refreshments**	
16.00	**Panel Speakers**	Pre-submitted questions read out and panel response. Opportunity for questions from the "floor".
17.00	**Richard Lindsay**	Reconvene for conclusion and summary. What future for the peatlands?
17.20	**Forum Exec. Committee**	Vote of thanks etc.
17.30	**Finish**	

Welcome

Caroline Flint MP
Member of Parliament for Doncaster, Don Valley

The Thorne & Hatfield Moors Conservation Forum was formed in the late1980s to provide a scientific forum for discussion and dissemination of conservation issues in the Humberhead Levels and latterly to provide a campaigning focus for groups, from individuals to local and national societies, who were concerned at the wanton destruction of the last great areas of degraded lowland raised mires in Eastern England. Falling largely within my constituency, I have followed with interest the progress of the group, from a local pressure group to a body with national if not international standing. In the series *Thorne and Hatfield Moors Papers*, under the capable editorship of Martin Limbert, the Forum has produced a series of publications which have served to highlight the importance of the Moors, both in terms of its surviving biota and in terms of its past, a past which also encapsulates the history of the surrounding region through the fossil record preserved in the peat. The Forum has also taken on the publication of much important material which might otherwise languish unread in doctoral and other theses within university libraries, and by a series of meetings, both public and academic, made the importance of the sites apparent to a much wider audience. Its members have given papers on wetland conservation as far afield as British Columbia and Edinburgh, as well as arranging local meetings. The meeting in the Wortley Hotel at Scunthorpe during July 2002, organised by the Forum's redoubtable secretary Helen Kirk, brought together both conservationists and producers to discuss the way forward after the announcement by the Government that peat production on Thorne Moors would cease immediately and on Hatfield Moors by 2004, as a result of a state buy out of the interests of Scotts (UK) plc. The Government buy out has enabled both its own conservation body, English Nature, and the various NGO's, like the Forum, to redirect their energies towards the future of degraded peatlands in the UK, and the Scunthorpe meeting not only included a series of academic papers but also a presentation by the Minister, Rt Hon Michael Meacher, in which the future of peatlands and the future of peat alternatives in horticulture was discussed from the Government's standpoint.

I am very pleased to place on record my appreciation for Helen's efforts, and on a personal note, I am very grateful for the Forum's contribution to my own learning curve on the issue of peat. Having spent some 20 years as a political activist in London before representing Don Valley as the MP, I must report honestly that the threat to our peatlands never penetrated many of the political discussions of the metropolitan urban scene that I inhabited. But six years ago, when I was unaware that at least 7% of the UK's landmass was originally peatland, and that the vast majority of this remaining is a shallow blanket bog that we see when we cross the Pennines or visit the Uplands of Scotland or Wales, I did not realise that only one twentieth of the peatlands is lowland raised mire and that this rare and rich habitat of deep peat was found on Thorne and Hatfield Moors. Lowland peat, is exploited by an industry which I hope is moving rapidly into alternatives, and treasured by conservationists and ecologists nationwide. In my political evolution never did I foresee that as I walked the corridors of parliament, MPs of all parties would nudge me with the aside, "How are your peat bogs?" Such has been the success of the peatland campaign that as well as being a learning curve for me, the conservation of our precious peatlands is

firmly on the political agenda and worthy of comment by Tony Blair at Prime Minister's Question Time.

A few years ago I challenged the TV production company behind Ground Force to obtain the endorsement of Charlie Dimmock for our campaign and one of my local newspapers ran the rather dubious headline of "Flint versus Dimmock". My efforts never solicited a written reply, yet the peat campaign clearly had an impact, when about 18 months later Alan Titchmarsh made a point of plugging peat alternatives on the programme. A sustainable future for peat is our agenda today, and representatives of the - newly re-named I understand - Growing Medium Industry, formerly the Peat Producers, Association, took part in the meeting, alongside conservation scientists, English Nature, English Heritage, the retail sector, horticulturalists, campaigners and legal minds, to share and to learn from each others' perspectives. In past decades, the campaign to save these rapidly disappearing precious habitats, these rare archaeological resources has grown, and indeed has reached a high watermark in recent months. Although Hatfield Moors is within my own Don Valley constituency, it is not a parochial point to stress that the agreement with Scots UK to end peat working on Thorne and Hatfield Moors and on Wedholme Flow in Cumbria, is a historic moment in the campaign. It is a transformation from the days in 1997 when much of Thorne and Hatfield Moors was threatened with the loss of SSSI status. Without being unduly party political, I think it is fair to say that this watershed moment in the peatland campaign would not have occurred had we not had a Government that was prepared to listen and put some money behind the rhetoric.

The history of peatlands and their conservation.

Richard Lindsay
University of London

Introduction

I remember reading somewhere how psychologists have discovered that if people are deprived of their sense of past events, they rapidly become psychotic, so perhaps a historical review of events in the peatland conservation story is long overdue. Today is an opportunity to look at both the past and the future of peatlands, to see what they once were and to look where they may be going.

One hundred years ago, peatlands were of interest mainly to an emerging breed of scientists known as ecologists. Peatlands attracted interest because they did what apparently what no other ecosystem did. Thanks to this remarkable group of mosses, the S*phagnum* bog mosses, peatlands broke the cycle of life, death and decay. They simply left out the stage of decay and instead accumulated layer upon layer of ecosystem history in the form of dead plant material, or as it is known, peat. One hundred years ago, many of the most active peatland scientists were either German or wrote in German, and considerable advances in understanding of the dynamics of peat bogs were made in the early 1900s. In Britain, ecologists built on this, and began to recognise that Britain and Ireland had something rather unusual. Because bogs are controlled above all by rainfall, a very special sort of bog was able to form in the British Isles, one that draped itself across hills and valleys alike, and was consequently called 'blanket bog'. The remarkable stability of the bog water table was also of considerable interest, and much work was carried out into the process of ecological succession and competition associated with the characteristic hummock and hollow texture of the bog surface. Much confusion reigned over this issue because of a misunderstanding in translation from German, and this was only resolved much later by Keith Barber (1981) of Southampton University. This may seem a somewhat arcane point but Barber's work (e.g. 1994; Barber *et al.* 1999) has since highlighted a key role for peatlands in global environmental monitoring over precisely this seemingly small issue.

Every now and again yet another remarkable characteristic of peatland's preservative power propels them into the public spotlight. The discovery of Iron Age Tollund Man in a bog in Denmark in1950 and a series of other famous bog bodies (Turner & Scaife 1995) has given rise to huge public interest, but of course these events were only possible because bogs were quietly and steadily being dug up for domestic purposes or by commercial industries. As places to visit and cherish, the general opinion of the public remained that bogs were wet, dangerous and infested with mosquitoes. On two counts at least, this was true. They are also inherently unproductive and thus they did not have the economic value of woodland or grassland. Bogs had slipped from the public consciousness, to be either drained and reclaimed for agriculture or cut for their peat. Peatlands vanished into the landscape and became largely invisible. Anyone however, who has smelled the sharp wreak of a peat fire will be aware that peat plays a central part in the cultures of northern and western Britain (e.g. Owen 1969) and of course, Ireland (cf. Evans 1957), whilst all drinkers of Scotch whisky know that peat and whisky are

inseparable. But peat has even more exotic properties. Bathing in it – balneology - is a long established practice in eastern Europe, and closer to home, there has never been a shortage of ideas for this natural product. Indeed, in the 1960s the nation's favourite hobby – gardening, underwent a profound transformation weaning itself away from loam and onto the new miracle horticultural medium – peat compost. During post war decades, in the face of enthusiastic peatland development, there were one or two voices that could be heard above the jingling of cash registers. The late William Bunting of Thorne was one, of course – and ironically considering his subsequent rather acrimonious relations with Bunting, there was also David Bellamy, who had been making the case for boglands through our TV screens and bookshop shelves for much of the 1970s (e.g. Rogers & Bellamy 1972, concerning Thorne). Despite Bellamy's slightly larger than life television image and advocacy of wetland conservation, the general public still did not appreciate bogs.

Rarely visited, and seen only as wasteland, bogs existed on the fringes of society, good only as a dumping ground for other useless by-products. Thorne, for example, was seen as a suitable place for the disposal of power station fly ash (Bunting *et al.* 1969), or under concrete as the third London airport! Things were about to change, and the next 25 years became a roller coaster ride of highs and lows for peatland conservation. In 1972, within the Nature Conservancy Council, David Good, now the Chief Ecologist for the Greater London Authority began a research project to look at the state of peatlands in Britain. What became evident fairly quickly from a desk study was that in the uplands of Britain there was a great deal of peat so eventually the work focussed on the four areas of lowland Britain containing distinct concentrations of lowland raised mires. The work examined maps from 1840, 1890 and aerial photos from 1949 and 1970. In 1978, I took a team including the future director of Plant Life, Jane Smart, to survey these areas. The results were presented to the winter meeting of the British Ecological Society in 1979, and they represented the first of what was to become a series of alarm calls for peatlands.

Put simply, the scale of loss was devastating. Almost the entire expanse of the Lancashire lowland mosses was gone. Agriculture had claimed them in the 1800s. Further north in the Forth Valley, almost all had been lost for agriculture, and then in the 1970s to forestry. Around Morgan Bay on the Solway shores losses arose from agriculture, forestry on the Scottish shore and commercial peat cutting. At Glassen Moss National Nature Reserve and around the margin on the Solway Firth, there was domestic peat cutting for moss litter in stables, the fate of much Thorne peat until the middle of the last century (Limbert 1998). Overall, in the sample areas, loss of natural bog amounted to around 95%. This was the point of the survey and it was not very hard to extend that line and to begin talking about extinction dates!

When the NCC published these figures in its review of habitat loss, dismay was expressed, even alarm in some quarters, but nothing tangible happened immediately. The next alarm arose from something that occurred in 1979. In that year, the UK Government signed up to the EU Birds Directive. Traditionally, international legislation had been taken with a pinch of salt, more a kind of option than a directive, so when a Whisky distillery on Islay announced plans to dig up a peat bog which was a Birds' Directive site, wheels began slowly to turn. The Directive looks innocuous enough – really quite boring, but then so does a stick of dynamite until you notice the fizzing fuse! To cut a very long and complicated story short, the Government wavered, a big public meeting was held on the island at which David Bellamy, Jonathan Porrit and several others made the case for protecting the bog. Suffice it to say, that it hit the national TV evening news, and Bellamy

and company needed police protection before, as it was said, being sent packing from Islay! The case was all but lost, but national newspapers had cartoons of people agonising between their evening whisky and their sense that perhaps peat bogs needed our attention and protection. In fact, after even more behind the scenes sparks, and EU muscle flexing, the case was won, and it was won because of a major development factor of utterly fundamental importance that happened in 1982, but which really went unnoticed for a year or two. Its significance only eventually emerged because of another important event in 1983.

In the autumn of that year a number of peatland scientists attended a symposium in Finland to discuss progress in peatland science. One evening in the sauna, Klaus Dearson explained to everyone the absolutely profound implications of a paper by Hugh Ingram (1982) published in *Nature* the previous year. The paper set out a theory now known as the groundwater mound theory, which said that bogs were really just large droplets of water sitting on the landscape, fed by rain, shaped by the climate and perched on top of the mineral soil water table. The importance of this model was generally agreed upon, but then he went on to explain the implications. The group knew that a bog formed a dome, that when one stood on the top of a dome it was completely saturated, so clearly the bog water table itself was a dome. Ingram's model proposed that this half ellipse reflected the local climate, and tended always to the same form of ellipse in any given climate zone. Dearson's insight was to see the implications of this for the way in which bog conservation had been conducted. Often parts of a bog had been accepted as the best compromise in the face of development. He showed that the groundwater mound theory indicated changes far beyond the immediate effect of any development. Damage to any part of a bog would almost certainly affect the entire site. The groundwater mound was supported by the lag fen, a stream either side of the bog recharged by the mineral water table. The bog lives within this mound with only a thin layer of vegetation rising above the water table. On the margins, the vegetation is of a wet heath type and over the crown, over the main expanse of the bog, there is true bog vegetation. Remove part of the bog, and the groundwater mound will then steadily adjust in response to this unstable shape. The bog surface is left somewhat higher and drier, so the peat oxidises and vanishes as carbon dioxide and water. This causes the entire bog surface to sink and over a period of hundreds, possibly thousands of years, eventually a new smaller bog is created. In other words, in the short to medium term, protection of part of a bog was no longer an option. It was this argument that enabled the European Commission to persuade the UK Government that all of Dewig Moss on Islay required protection, and that small parts were not enough.

Several scientists from the 1980s peatlands symposium then met in Austria in 1984 and formed what was to become the International Mire Conservation Group (IMCG). This has become the foremost network of peatland conservation scientists around the globe, and one of the first issues it tackled was the next major alarm call for peatlands in Britain, namely the Flow Country. Occupying most of Caithness and Sutherland in the far north of Scotland, the area had been acknowledged from time to time as a remarkable expanse of blanket bog or flows. Its very size was taken to mean that it was immune from anything but peripheral damage, but the forestry industry had other ideas. Particularly after the introduction of the forestry grant scheme in 1980, commercial forestry expanded through the area with astonishing speed. Even in 1979, the NCC had been negotiating with forest interests to retain just the pool systems allowing some forestry on the fringes of important sites. By the early 1980s, we knew that this was no longer an option besides the sheer scale of habitat change after the 1980 planting was destroying the whole character of this

peatland landscape. The trouble was that it was in the far north of Scotland; it had been dismissed as a featureless wet desert by more than one politician, and people still did not really like peatlands – or did they?

To give some idea of how far peatlands were still off the environmental agenda, David Attenborough's mammoth TV series 'Life on Earth' and 'Living Planet' celebrated just about everything about the planet, yet devoted only 30 seconds to a peatland landscape during one of the end credits. The Observer magazine even ran an issue all about the destruction of the countryside, but on the first page inside was an article positively urging people to buy bogs and dig them up! Despite all expectations, the Flow Country became a cause célèbre. It brought together all the environmental NGOs in a chorus of highly effective protests. The story had everything. Tax dodges, greedy commerce, Cliff Richards, and Terry Wogan, Genesis, and of course, peatlands. Major colour features appeared in prestigious magazines in America, and the Financial Times took up the cause. The IMCG spoke to Margaret Thatcher, and his Royal Highness the Prince of Wales deplored the situation on television. Meanwhile the scientific case was being put together to persuade Government that almost the whole of two entire areas should be protected. The scale of the exercise meant that we had to resort to the emerging technology of computer mapping or GIS. In so doing, the NCC took its first tentative steps into what was in effect landscape ecology and conservation. Eventually, with publication of two reports by the Nature Conservancy Council, the case was won. At the end of it the general public was surprised to find itself rather knowledgeable about peatlands and their wildlife values. In the NCC and the subsequent devolved agencies, officers also found themselves in possession of a rather powerful tool for collecting and collating environmental data. The information base established for the Flow Country was expanded, and the National Peatland Resource Inventory (NPRI) was established. Through this it was possible for the first time to establish just how much peat there was in Britain, and what type it was. It could be classified into blanket bog, or lowland raised bog, and it was also possible to indicate what sort of condition it was in. The entire lowland resource could now be catalogued, not just a few samples, and when it was done, it confirmed our worst fears. Of the 70,000 or so hectares of lowland bog that had once existed in Britain, only about 5% remained in a reasonably natural condition. It is also worth noting that in England there were a number of large bogs, like Thorne and Hatfield, whereas in Scotland there were many more small bogs, including a large number of sites in the central belt of Scotland. In summary, large amounts have been lost to agriculture, largely in the 19th Century, large areas had then gone to forestry, and commercial peat extraction was taking nearly a quarter of the remainder, leaving about 6.4% which could be called natural. Not a single bog was undamaged, with of course all the implications of this from the groundwater mound theory.

In particular, the results indicated that one of the most dramatic changes currently affecting raised bogs was a rapid shift from the more traditional block cutting of commercial sites, which created a mobile mosaic of conditions and refugia for wildlife, to the wholesale adoption of the high impact method of peat milling for horticultural peat. This combination of factors acted as an alarm call to almost the whole environmental NGO body. In 1990, a substantial alliance of these NGOs published "The Peat Report". In effect, this was the launch of a major new campaign to stop people using peat in horticulture. I will not catalogue the huge number of actions, publications and negotiations by the various members of the Peatland Campaign Consortium (PCC), but merely use these to highlight the types of approaches adopted. Thanks to the passion of the late and much lamented Geoff Hamilton, fed by information from the PCC, TV viewers found themselves

experiencing a shift in culture from the standard use of peat compost for everything in gardening programmes, to a powerfully put argument for the use of non-peat composts. Such was his impact that now no TV gardener would dare to suggest the use of peat for fear of sackfulls of angry letters. In the face of this onslaught, the peat industry first of all fought a rearguard action about the resource statistics. They argued that there was a lot more raised bog than the NPRI suggested. When the Government declared itself satisfied that the NPRI figures were the best available, the peat industry responded by publishing a Code of Practice, and announced that henceforth it would no longer seek to develop any new sites that were of conservation value. This was a major victory, because until that point any site, no matter what its protection status, had been fair game. The problem, of course, was that the industry was already established on some of the most important remaining lowland bogs in Britain.

Meanwhile events were taking an interesting turn in Europe. Throughout Western Europe members of the IMCG were reporting losses of peatlands as dramatic as those recorded for Britain. France, the Netherlands, and Germany all reported dramatic losses of peatlands, and even Finland, the country with the highest proportion of peat to land surface in the World, acknowledged that in the south of the country losses of natural bog were running at anything up to 90%. Similar problems were encountered with a range of other habitat types across Europe, and so the European Union decided to act. Late in the night at Maastricht in 1992, John Major's government was faced with a stark choice. Sign up to the Habitats Directive and a raft of other EU directives OR sign up to European Monetary Union. Politically I suspect that the choice was not hard, but the consequences were far reaching. In addition, during this same year the UK Government had also signed up to the Convention on Biological Diversity and Agenda 21 at the Rio summit, and of course, it was already a contracting party to the Ramsar Convention. Identification of raised bogs as a priority habitat within the EU Habitat Directive has subsequently brushed aside a series of seemingly immovable barriers, and suddenly all things seemed possible. Indeed, in terms of peatlands, the issues just got bigger and bigger!

The Climate Change Convention focussed people's minds on carbon dioxide levels, and then through research funded by Friends of the Earth, it was revealed that the world's bogs contained three times more carbon than the world's tropical rain forests. Those monitoring global pollution levels identified bogs as a vital store of historic and prehistoric pollution data. Keith Barber's (1983) work on the hummock hollow patterns of bogs revealed that they are extraordinarily sensitive as indicators of climate change. The function of peatlands in regulating water quality is becoming an increasingly hot issue. In a particular case, the issue concerns peatlands that supply fresh water to key mangrove systems that are fish nursery grounds in subtropical Australia. In Britain, water quality from damaged peat catchments is currently an issue of great concern to the water companies. Archaeologists have also wholeheartedly embraced peatland conservation as a vital way of preserving the untapped record stored within the peatland archive (cf. Cox *et al.* 1995). Whereas in former times the archaeologist was keen to see what was exposed by peat extraction, now the emphasis leans towards non-destructive approaches (Coles 1995).

As for the future, although peatlands are thought to be concentrated in temperate latitudes, as already indicated, peatlands actually occur on all continents of the Earth, except perhaps Antarctica, and at all latitudes. As such, one would have expected them to have featured heavily in the programmes of the Ramsar Convention. During the Sixth Conference of parties of the Ramsar Convention in Brisbane in 1996, the contracting parties learnt that Ramsar had so far substantially overlooked the global peatland

resource, although more than 50% of the world's terrestrial wetlands were actually peatlands. The parties, lead by amongst others the United Kingdom, agreed recommendation 6.1 which committed all parties to making greater efforts to conserve peatland ecosystems. At the Seventh Conference held in Costa Rica in 1999, recommendation 7.1 further committed contracting parties to review a draft global action plan for peatlands – now known as GAP, with a view to possible adoption at the next conference. This GAP is now ready to go forward to the Eighth Conference in Spain in autumn 2001, and it commits the contracting parties to improving the scientific knowledge of peatlands, improving our understanding of the resource globally, improving awareness of peatlands and their importance, and then improving wise use and conservation, particularly through the development of wise use guidelines. Meanwhile, the IMCG is actually working with the industry through the International Peat Society, to establish an agreement over these wise use guidelines for peatlands. Its fair to say that its been a steep learning process for the industry, and the final outcome will be extremely interesting.

At the same time there has been a prodigious amount of effort put into peatland restoration following commercial extraction. Brian Wheeler's team at Sheffield University have produced much valuable guidance for the industry (cf. Wheeler & Shaw 1995), and work is on-going on sites as far apart as in Bavaria, New Zealand and Quebec. In the city of Quebec in 2000, the Millennium Wetlands Event looked at the range of wetland conservation issues around the world, but particularly those that were effecting Canada (Rochefort & Daygle 2000), Some of the regeneration restoration developments that are being worked on by researchers at the University of Laval in Quebec in association with the peat industry are very interesting and exciting (cf. Ferland & Rochefort 1997; Rochefort 2000. These are definitely going to be worth watching for the outcome of the final results, and possibly then their adoption by the industry and conservation bodies in the rest of the world.

The fruits of some of this research can already be seen at Thorne where a range of restoration conditions can be seen in various compartments of the site. But, with much of this there is still a more fundamental problem. Returning to the groundwater mound model, the dome is supported by the lag stream that surrounds the bog. In a natural bog, one needs waders to cross a typical lag stream and no raised bog in Britain enjoys such conditions. Every raised bog in Britain has had its marginal stream drained. The condition that most bogs are in is that the lag fen has been drained and is now part of an agricultural system; by lowering the mineral groundwater table, the whole groundwater mound is lowered. This is the condition that all British bogs are in and it does not matter how good the restoration techniques on the bog itself are, this fundamental hydrological issue has to be dealt with. Only by raising water tables in the surrounding marginal land, in some case by re-establishing fenland water tables and conditions, can true restoration be achieved. This has major implications for the use of agricultural land that adjoins peatlands. Already in the Netherlands farmers, are being bought out as much as three or four kilometres away from a remnant raised bog with a view to re-establishing the necessary hydrological regime in the land that surrounds the remnant of raised bog.

Such lands however are already facing problems. The Holme Fen post, driven through the peat south east of Peterborough in the Fens in 1851 and now wholly exposed, indicates that the peat soils have shrunk and oxidised by 5 metres in 150 years. Similar situations pertain in all drained peatlands, and they are still shrinking. Much is now below sea level and only substantial pumping and sea defences keep this land free from flooding. With

sea levels rising and south east England sinking, how much longer can the Government justify funding such sea defences? Meanwhile the Ouse washes, running through the heart of Fenland, have already been returned to a more natural flood regime. Our lowland bogs will need to be sufficiently natural and robust to survive in a face of future full of uncertainty and change. Is this a fore taste of the landscapes that we wish to have, indeed may need to have, if our lowland bogs are truly, to paraphrase the words of the Habitats Directive, 'going to possess all the structure and function necessary for the long term maintenance of their very special interest'. Is this the future for lowland raised bogs landscapes?

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Michael Meacher
Minister for the Environment

The Minister thanked the participants and speakers and gave his apologies for not being there sooner: "I am sorry that I was not able to get here before the end of Richard Lindsay's talk, the slides that I saw I thought were extremely interesting in showing the intricate mosaic of our peatlands and I think this illustrates very well the importance as well as the difficulties of conservation, but I would like to begin with the question he ended with, which is 'where do we take the conservation programme from here?' I think we've made a major step forward, but of course, that is not the end of it.

It is a great pleasure to be here today. I am well aware that you at the Thorne and Hatfield Conservation Forum together with your colleagues in the conservation movement are a considerable force with which to be reckoned. I am always in favour of impetus provided by considerable forces out there. I think Ministers and Departments can do rather little unless they link in very closely with strong and well prepared movements within the public at large and your organisation is certainly one of those. I think you had put the vital message across pretty firmly and pretty consistently and persistently over the years of how important it is for us to conserve and value our national peatland heritage. I strongly underline that. Now peatlands represent, as has been presented by other speakers - I think very evocatively - an extraordinarily complex ecosystem. Some people call it the UK's rain forests in terms of the distinctive range and diversity of the wild flora and fauna that they host. Particular climactic, topographical and hydrological conditions have combined to create, over many hundreds of years, a habitat which has a special mystery and quality as I think we are all going to see this afternoon. Although it has become degraded in so many respects, the dome of the raised bog in its natural state is sometimes raised many metres, as Richard's slides were indicating, above the surrounding area, rising and falling according to the rainfall and the season. This preserves within it, of course, a historical record of plant and animal remains that can give us clues to human history and climatic patterns of previous ages. It is, in other words, unique. The carbon locked up in peat bogs is particularly important now as we strive to meet our targets for CO2 reductions.

The science of bogs and fens can appear particularly complex to the lay person but the habitat action plan for lowland raised bogs contains a phrase, I think, that nicely evokes the bog landscape: '*The raised bog surface may support a patterned mosaic of pools, parks and lawns, a micro-topography created in part by the growth of the plants themselves.*' I think that it is a remarkable quotation. The species that the bogs and fens support: the cotton grass, the carnivorous sundew, the bog rosemary and the cranberry have a very special appeal for people, and I am sure that includes all of you and it includes me, because I passionately care about their survival.

We have not in recent decades valued these habitats for their ecological qualities. sometimes think human history, far from improving the environment, is a rather persistent pattern of going down hill. However, I hope that, in terms of our concern about the ecology, about the environment, about sustainable development, that the last few decades have seen us begin to make major attitude changes in valuing the diversity, the critical importance of so many parts of this rich and beautiful landscape that is ours. In fact we have seen them used as a cheap source of material to improve our garden soil, as a rich and stable growing medium for seeds and plants and as low value land that can be drained for agriculture and forestry production. Peat has also been, and of course still is in

some countries, a source of fuel and these combined impacts have meant that since the 19th century, very sadly, over 90% of these habitats have been lost. Now less than 6,000 hectares remain in a near natural condition in the UK. Our concern now, of course, is to conserve the habitat that remains and to restore, which is just as important if not even more so, those areas that are degraded. In recognition of its rarity and the importance to biodiversity the EU Habitats Directive lists active and degraded raised bogs as habitat types requiring designation as special areas of conservation and part of Natura 2000 and we have worked hard to ensure that our list of sites represents both the geographical and ecological range of these habitats. Now the inclusion of the term 'degraded raised bogs capable of natural regeneration as degraded sites' being listed on the Habitats Directive has caused, of course, a lot of debate in the UK and elsewhere. The case for some sites was pretty obvious and clear, and these have already been submitted to the Commission, but a scientific debate has continued in relation to five sites including Thorne & Hatfield Moor and I am pleased to say that I have just received English Nature's conclusion. I am now only awaiting advice from the Joint Nature Conservation Committee and as soon as it comes, I shall consider what further submissions to make to the Commission. Following a recent meeting of Atlantic EU states, I think I can say I am confident that subject to completing our consideration of the remaining sites, we shall have satisfied the site identification requirements of the Directive. However, submitting the sites to Europe will not be enough to protect a site if it is not backed up by action to remove or control damaging activities. Peat extraction on the five sites still under consideration is subject to consents going back 40 or 50 years with extraction permitted for another 30 or more years. To bring to an end an activity that was removing the very fabric of the habitat that we are trying to conserve I was pleased to announce on the 27 February of this year, the buy out of these consents operated by the Scots company on Thorne, Hatfield and Wedholme Flow at a cost of £17.3 m. This has resulted in the cessation of peat extraction on nearly 470 hectares at Wedholme Flow in Cumbria and Thorne Moor and the rapid phasing out of extraction on nearly 700 hectares at Hatfield Moor by 2004. This phasing of Hatfield and there are forces being obstinate on that, will enable employment to be maintained and it will guard against immediate, and - this is important - import substitution from other unspoilt bogs elsewhere in Europe, whether Ireland, Lithuania, Estonia or wherever and it will still allow, the crucial consideration of the long term restoration of the site.

This initiative saves three very important wildlife sites and as part of the buy out agreement, a thorough restoration programme will help create the right conditions for the new peat to be formed and for the new flora and fauna to grow back. English Nature will be liaising with Scots to agree a management plan for the restoration. But, of course, as I said at the beginning that is not the end of the story. In many ways your conference comes at an important moment in the continuing development of policy for the conservation of peatlands. Under the UK Biodiversity Action Plan the Habitat Action Plan for Lowland Raised Bogs sets demanding targets for the reduction of peat use for horticulture during this decade. To try to meet those targets is tough and demanding, but will be the other key aspect of securing the major policy objective. It aims to achieve a reduction in peat consumption so that a minimum of 40% of total market requirements is based on non-peat materials by 2005, and it also recognises that it is a lot more difficult and that further research and development of sustainable alternatives is needed, with a longer term aim of 90% of the market being peat free by 2010. Meeting that is very important, but I do not want to under-estimate the difficulties of achieving it.

It is generally accepted that the 2005 target is virtually achieved. I suppose Government always likes having targets which are virtually achieved before they are ever set, but

certainly we are going to continue that momentum and that is quite testing. Peat has all but disappeared from use as a soil improver for Local Authority and professional use. It is also used far less as a growing medium by Local Authorities and professional landscapers, however, - and this is the problem - it is you and I if you like, although it is not actually you and it is not actually I, but it is ordinary members of the public, amateur gardeners and professional growers who still rely on peat for this purpose and it supplies around 95% of their needs, so hardly any change there yet so far. Indeed, one does have to record that there was actually an increase in peat consumption between 1993 and 1996, although this has since stabilised. It is clear, therefore, that if we are to reach the 90% target by the end of the decade, it will require a great deal of effort and determination and perhaps ingenuity. I know that there are substantial doubts in the industry that it is even possible without ceding the market to competitors and obviously we do not want to do that. That is not in the interests, not only of the industry, but of the environment. I know and I believe we can only make progress through the collective weight of the industry, Government and the conservation movement working in partnership to achieve this substantial transformation of the market. That is really, I think, the next major objective and it is not easy – there is no ready or obvious answer but we have got to tackle it very seriously. Already we have seen important leaders in the field take up the challenge, I am glad to say that the National Trust which is a very large and very important body (following a decisive vote from its membership), will require growers to supply its plants peat free by next year. B&Q aims for peat alternatives to provide 85% of its customer requirements by 2006, and of course, no speech can be complete without mention of the amazingly successful Eden Project. This Millennium project in Cornwall that has created lush habitats and complex ecosystems out of a barren claypit that is peat free. A very, very good indication of what can be achieved. More resonant and more symbolic and more influential I think, than any number of Ministerial speeches. We have been encouraged by the positive response from growers to the DEFRA funded seminars which we have been supporting since 1997 in order to increase awareness and to examine the potential for peat alternatives: Coir, bark, or organic wastes, for example. But it is not just a question of declaring a target, - that is easy - and making the necessary substitution, although excellent results can be achieved from certain peat alternatives. Again I think the evidence for that is pretty clear, there remains substantial technical, commercial and psychological barriers to be overcome, both amongst professionals and particularly amateur gardeners. Britain's horticultural industry is successful, it is growing in an internationally competitive market place, but this growth must not be at the expense of our own precious natural habitats. Nor should we shift the pressure to similar habitats overseas. The environment does not abide by national boundaries, it is not just the UK environment, it is the global environment that all of us are concerned about. We must also recognise that too rapid a move toward alternatives which perform poorly, and of course that is more or less what happened in the early 1990s, could actually be counter-productive, leading to a backlash in favour of peat use, which of course would be even more damaging.

So I do think we have a great opportunity now to move forward positively. Our target for the recycling or composting (and I have made them statutory targets, and I intend to ensure that they are adhered to) of at least 25% of household waste by 2005. The level at the moment is about 11%. So it is more than doubling within the next three years and the requirements of the EU Landfill Directive to reduce the landfill of biodegradable municipal waste to no more than 75% of 95 levels by 2010, that is a reduction of a quarter, ultimately reaching no more than 35% by 2016. Although as a fallback I know it is 2020, but that is a huge two thirds being shifted away from landfill. If we did nothing it would mean that at the end we would have to shift probably over 30m tonnes a year. That is a huge shift so those

are very powerful drivers and they are pushing in the same direction as are peat reduction targets. In 1999-2000, over 80% of all municipal waste went to landfill and I think that is one of the worst records probably in the EU. I have to say we are struggling in Government to increase the momentum of this reduction as rapidly as we want to, I understand that in 1992 it was 2% so we are making some progress. So these are demanding targets and I make no bones about that. But the composting of organic waste represents one of the most promising possibilities for replacing peat. Composting is also a more sustainable way of managing the waste that we do generate. The first requirement must be to reduce waste and that is often not mentioned as much, it is not just more recycling and less landfilling or less incineration, it is reducing the waste in the first place. We must reduce reliance on landfill and the methane that it produces, which of course is a powerful greenhouse gas. The quality of compost must be good and reliable and the Government funded Waste and Resources Action Programme (WRAP) – (one of those wonderful Whitehall acronyms) are currently working with the Composting Association to develop the industry standard for composting in order to achieve BSI accreditation. The first stage is the development, of course there has been a lot of discussion about this, particularly 'Why isn't the Government doing a lot more to encourage composting?' The answer is, we are strongly encouraging composting. The first stage is the development of a BSI, a publicly available specification that WRAP (which is a fairly arms length part of Government) expects to be available in the autumn and the delivery of industry standards we believe, will certainly increase its attractiveness and potential as a replacement for peat. That is why we are so keen to pursue that route.

Finally DEFRA brings together expertise in biodiversity, the horticultural industry and in waste management. There was a lot of discussion about the formation of the Ministry, (and I supported it at the time, I still strongly support it), this is an area where the creation of that particular new Department is very well suited to try and assist in the solution of these problems. The Department also has considerable experience in the greening market – I spend a lot of my time on that, I want all those parts of the Department to work with you and let me again very warmly thank all of you, very sincerely and very strongly, the stakeholders in the conservation movement, industry and users. You are absolutely essential to the achievement of this enterprise. I think we need you, together with us, to develop an agreed way forward. We are also setting up a new stakeholder forum as a successor to the old peat working group, again to work with us and all the relevant interests. I expect this group to identify current initiatives in the development of peat alternatives, to share experience of good practice, to consider the obstacles to achieving our objectives and to agree how we can all work towards removing them. I firmly expect, and unfortunately there is always a sting in the tail, your conference over these two days to make a start in that dialogue. This is what we will need to take things forward. For our part, let me say the Government is planning a seminar in the Autumn specifically to set the scene and plan the work of the new stakeholder forum. So, I conclude by saying that over the coming years I think we have the opportunity – the best opportunity, because if one is trying to counter economic pressures with conservation interests it is difficult, but in this case we have a win-win-win situation. We can conserve some of the most precious habitats and the species that depend on them, we can meet our landfill reduction targets and contribute to the reduction of greenhouse gases that cause climate change and we can develop a world class green horticultural industry based on the sustainable use of resources. That's not a bad combination. I tell you the stakes are high but I think the prize is priceless and we must certainly not fail, and with your help I do not think we will".

Andy Brown
Chief Executive - English Nature

(Note – Andy Brown presented this paper for David Arnold-Forster who was unfortunately unable to attend the conference due to ill health)

This paper outlines English Nature's hopes and aspirations for peatlands and focuses particularly on the very special sites of Thorne and Hatfield Moors. It does seem that in an ever more hectic and busy schedule, people often forget to take some time out to reflect on where the conservation movement has come from, how it got to where it is now, and then to look ahead and share thinking about the future. This conference provided an opportune moment to do just that.

As the Minister and Richard Lindsay have indicated, peatlands are a truly fascinating, rare, and unfortunately rapidly disappearing and damaged resource. As a freshwater ecologist, I am inevitably attracted to very wet places, but I am absolutely fascinated by the vast range of different kinds of peatlands. The vast tracts of blanket bogs in the uplands, lowland raised mires, and some very fascinating small sites around the lowland, the valley mires and one of my own favourites, quaking bogs. Just looking at some of the plants and animals that occur on these sites, I think tells us just how special these places are. The insectivorous butterwort and sundew get all of their nutrients from the insects that they gobble up. Bog asphodel, bog rosemary, swamp spider, bog bush cricket – their names themselves tell you how connected these plants and animals are with peatland systems and how utterly dependent they are on this habitat type. Breeding birds are also of immense importance on many peatland sites throughout the UK, dunlin, greenshank, red-throated diver in the north, nightjar, and snipe more locally. So many of these areas are now regarded as nationally and internationally important that actually we have quite a high proportion designated as special protection areas for birds, and special areas for conservation under the Habitats Directive, and as the Minister said, we are still hoping for a few more to receive the designation under the Habitats Directive. So much of this area has been adversely affected over the years, but I would just like pick it up from the 1950s, because it was from then on that there was an awful lot happening around peatland sites. Tremendous areas were planted up for forestry; 'improved' as part of agricultural intensification and tragically a number of sites were used for waste disposal. Burning has damaged many upland blanket bogs and overgrazing is still a big issue in many of these upland sites. In the lowlands, even today there are sites being adversely affected by nutrient enrichment, sometimes from sewage effluent, sometimes from diffuse sources of fertilizers in the surrounding agricultural land. I recall very well, one of the first major bits of case work I had to deal with in Cheshire was a little quaking bog site called Wybunbury Moss, a tiny little site in a steep sided valley in the middle of intensively managed dairy country. It is possible to walk within 100 metres of the site and not know that it is there, but it is a wonderful quaking bog, In the 1980s it was being affected by nutrient enrichment, but it could not be worked out where it was coming from. We started by looking at the steep slopes surrounding the site and seeing if the fertilizer on those slopes was the cause – it was not. We turned our attention to a big dairy operation with hundreds of milk floats moving in and out of the yard every day delivering milk, and we wondered whether something was going on there that was affecting this site. It took a lot of detailed research and investigation to track it down, over about 10 years. What it turned out to be

was just over the top of the hill, a row of houses along the road, all of which had septic tanks. Somebody in the past had connected up all the overflows and outlets from the septic tanks, put them into one pipe, leading it over the hill straight down into Wybunbury Moss. As soon as the source of eutrophication was pinpointed, it was possible to do something about it, but at that time it was necessary to bring a group of organisations together to actually solve that problem, and no one wanted to own; it cost £100,000 just to fix that one problem on that one site.

Since the 1950s there has been a lot of conservation activity on peatland sites. The first designation for Thorne and Hatfield Moors was in 1954, when the first part of Hatfield was designated as an SSSI. From the 1950s through to the present day, there has been a fascinating series of struggles and battles to conserve peatland sites all over the country. Some battles were won, some were lost, but what is really impressive is that there has always been a group of people in the background who have never wavered in their belief that these peatland sites were worth conserving. Its perhaps not surprising that some of these sites were damaged and lost, given that initially there were precious few resources, some pretty weak legislation and a society that really did not value these sites. Since then, things have turned round quite fundamentally; there are now many more resources than there once was. There is now much more effective legislation, including the Countryside and Rights of Way Act, as well as EU directives, and a lot more people actually recognise the true value of these sites. One of the turning points was during the late 1980s and early 1990s. A number of restoration schemes, quite small scale and on fragments of once much more extensive sites, were begun around that time, and I remember very well, again from Cheshire, the first work on Risley Moss and Danes Moss. It was also in 1989 that the Thorne & Hatfield Moors Conservation Forum was established with the explicit objectives of promoting the moors as a natural habitat, cultural resource and ensuring the conservation, not just of their biodiversity, but also their geological and palaeoecological interest, and their archaeological and historical value. The Forum brought together a range of organisations, a number of trusts, natural history societies, several ornithological societies, the Council for the Preservation of Rural England, the Council for British Archaeology and other local organisations. This formed a very effective partnership, put together to make a difference.

In 1990, the peat report (Lindsay 1990) highlighted the problems of the loss of peatland habitats, and the Peat Campaign Consortium was established with the objective of raising awareness of the damaging effects of peat extraction. The campaign did make a real difference, and won the support of the television gardening presenter Geoff Hamilton. I was particularly struck at that time by all sorts of people who came up to me, who had no connection at all with the environmental movement, but who had seen Geoff on television talking about peat alternatives, and they wanted to know where they could get hold of them; his was indeed a tragically short life. Although Geoff I think would have continued to make a difference, it has been a little disappointing to note that peat consumption through part of the 1990s has actually gone up, not down. I was deeply disappointed to hear a radio interview a few weeks ago, where they were talking to people who had just been into garden centres buying their peat and their compost. A range of people were interviewed, and not one of them knew what peat was or where it had come from; it was just a bag of compost, something that was good for the garden. We still have a big job to do to properly inform and educate society more widely. This brings me up to the present day, and the Minister has mentioned the historic negotiation of agreements between the Scotts Company and English Nature over their peat extraction operations in England. This deal provides immediate cessation of peat extraction on Thorne Moors and at Wedholme Flow

in Cumbria, and has provided for the development of the peat alternatives business. It will also harness the people and the equipment on site to help with what are actually truly massive restoration projects. If the three sites are taken together, you are talking about something like 12 square miles of peatland to be restored. It is the largest habitat restoration project in the UK ever. At both Thorne and Hatfield Moors, it provides opportunities for a lot of really creative work. This is only possible because of the tireless efforts of many people, and I would like to express a few very personal thanks. Perhaps first to Nick Kirkbride and his staff at Scotts and the English Nature staff for what was actually a very tough negotiation, and they have put together a great deal of quite complex legal paperwork – over 600 pages - in a pretty short space of time between signing the heads of terms in February and concluding it in April. I would also like to thank officials in the Department – they often go unnoticed in these sorts of things, but actually without their contribution they would not happen, and they did work hard on our behalf. And a very special thanks to the Minister himself. Without his personal support and commitment, this simply would not have happened.

So, what of the future? What are English Nature's thoughts, particularly about Thorne and Hatfield Moors? Where do we go, having signed up this historic deal with Scotts? The intention is properly functioning fully restored raised bog systems at Thorne and Hatfield. These are great challenges, and it needs thought beyond the sites. I would like to see this area as a national, or international centre for peatland conservation. I want to see these areas recognised locally and regionally with great pride and a flagship for the really imaginative integration of environmental, social and economic objectives. I would like to see as many people as possible come to visit these sites, and experience them in a safe and informative way, which does not detract from their special values, qualities and interests. We need to collectively develop these ideas, and we intend to do this through a partnership approach. English Nature has already proposed and invited a number of organisations to join a restoration advisory group. This is a huge restoration project, and there is much to be learned from experience elsewhere in the UK and abroad, and we need to get the experts together and to network, to draw upon all of that experience in order to do the very best job possible on these sites. We also need to be prepared to experiment a little – be prepared to try things out and learn, to make sure that we monitor and record the restoration as we go along, so that we are in a good position to share and act with others whom we hope will follow with some of the big restoration projects - both in the UK and throughout Europe. EN is keen to use organisations like the International Mires Group and Eurosite, a network of site managers in Europe, who actually look after peatlands, and to exchange experience, particularly with some of our Eastern European colleagues, who also have some of these challenges in front of them.

English Nature has also invited people to join a reserves development group, to look at the longer term potential of the moors and seek to build links with both the regional economic strategy and the regional sustainability strategy. We need to build these links with the local community and to think about how people can really benefit from these sites. How they can access them, how we can include currently socially excluded groups. I am excited by ideas like trying to use the rail network on these sites for management purposes. Why not have a bit of it upgraded – you couldn't possibly use it in its current state for moving people around the site, but why not upgrade a bit of it for actually transporting people around the site and having some stations around where they can get off, have a short walk, view particular features, visit a hide, or whatever? I'd like to see really top quality interpretation and education facilities on these sites. In comparison, at the wetlands centre in London at Barn Elms, near Hammersmith, £15 m investment has already attracted hundreds of thousands of visitors, and it is only a few years old. This is a

tremendous educational interpretive resource opportunity for people to relieve some of the stresses and strains of urban life, and get out and experience a bit of nature. We should be a bit inventive; if we have got pumps to run, why not use a bit of wind energy or solar energy? If we have some on site then they should be as green as possible, and if there are waste products from the scrub clearance, then they should be used for composting and not be burnt. I think that we have often under estimated the contributions that sites make to local areas not only in the sense of their social importance, but also in terms of their economic importance. If tiny little sites like Cly Salthouse out on the Norfolk coast – a very attractive little reserve, can bring in £1.5 m a year into the local economy through bird watchers alone, just think what can be done with Thorne and Hatfield Moors.

To conclude, peatlands are a fantastic heritage asset, now much more widely understood and appreciated than ever before. The vision, energy and determination of many people that have got us to this point will sustain us in the future, and lead to major improvements on many sites.

"Peat – the way forward,
a future for the UK's peatlands?"
Thursday 4th July 2002

Richard Lindsay

Good morning. I would like to begin by welcoming everybody here to the second day of this very stimulating and exciting series of meetings. Yesterday we were very fortunate to have Michael Meacher, the Minister for the Environment, coming and giving us what was really a very open and honest opinion of the peat issue as he sees it. He was open to questions from the floor and there was no pre-planning only having pre-organised questions, he was ready to take ideas. It was his idea to take questions and he answered those questions openly and honestly. Out on site he was able to see a number of the issues for himself and again he was asking a range of really quite penetrating questions and was clearly keen to ensure that he was informed, as well informed, as he could be about the issue. So I am sure, if nothing else, this conference will have made sure that an understanding of the peat issue is now right at the heart of Government. So there has been a very 'proof lack' already. However, today we have a number of speakers who promise to give important stimulating thought provoking talks. One or two have already warned me that they are planning to stir things up a bit so I'm not quite sure what's going to happen there, but the idea is that we need really to start considering where we go next in terms of peatlands, their conservation and wise use. There have been major gains recently, the whole process of the hand over of the Scotts' sites to English Nature representing major success in terms of nature conservation. The implementation of the habitats directive has had, well, has really opened a whole series of doors that up to now have seemed firmly locked. We really need to consider how to maximise the opportunities that lie before us at the moment and so the talks we are going to hear today are all designed to stimulate thought and help us to work out precisely where we go.

Now although I was down for 30 minutes today, I did my main talk yesterday so you don't really want to hear much more from me today, so all I'm going to do is to summarise a few points from yesterday to get you thinking about some of the issues and then I'm going to invite our first speaker, Ian Goldthorpe, to talk to us from the planning perspective so just to begin with a few challenges that have already emerged from yesterday's session.

One of the issues I raised was re-wetting of the lag fen regions. The regions round these peatland sites that we're working so hard to restore. Hydrologically, unless you can do something about re-wetting the marginal land as well, then there's a real danger that many of the restoration programmes that we adopt will not really be as successful as they should be. This has major implications for adjoining land and adjoining landowners. I mentioned yesterday that in the Netherlands already they are buying out farmers up to 4 kilometres away from the site. This has already stimulated thought amongst a number of actors in this whole issue. There were some interesting comments from the Environment Agency yesterday over lunch for example. Ultimately, I guess, what we are looking for is to conserve and manage all these peatland sites particularly given that all our lowland raised bogs have been damaged, we are looking to restore them to a state of health, a state of favourable condition, but how do we measure that? How do we know when we've

achieved our target? Under issues of the EUs definition of 'active raised bog' which should presumably be used as some sort of benchmark. But we really need to clarify what is our role? What is our input? When do we know we have succeeded? If you don't know where you're going, how do you know when you've got there?

Andy Brown outlined English Nature's vision for the Humberhead Levels, one of the key things he was talking about was the idea of turning the Levels into a flagship educational site for peatland conservationists. Now that can be done at various levels. There is a number of good examples certainly within the European Union of sites to be used as educational sites. A very good example in Northern Ireland which I think we'll be hearing about later, but how exactly would something like this work? What sort of infrastructure are we working at having to establish? What sort of partnerships are necessary to establish what could be a world leader in terms of flagship educational sites? We need to look at some of the hard nuts and bolts of the practice? We need to start forging partnerships and developing partnerships that already exist.

When Michael Meacher threw himself open to questions he found himself being tackled on a number of issues that related to the whole peat compost question and one of the views that he thought was well worth exploring was the idea of labelling of compost bags as to contents and source. Nick Kirkbride mentioned that Scotts were already doing this and at the moment within the market he couldn't detect a real impact of that, but there was a very strong sense that this was an important thing to do so that the public can make its own choice as to which products it wished to use and to enable the public to make an informed choice about what sort of impact they are going to have when they carry out garden or whatever.

There are obviously real issues still about the price and availability of non-peat composts and that people are just not finding the materials available. The pricing isn't right and from the general public's point of view, until this issue is tackled then really the tendency is going to be to buy peat because that's what we have always done. So there are issues there at a commercial level and of course at a Governmental level but in terms of campaigning there is a need for pressure there and we need to work out what is going to be the best route of addressing what is quite clearly a fundamental problem in terms of shifting the market. At the moment a fundamental blockage from shifting the market from peat based to non peat based.

There was an interesting issue that Michael Meacher was tackled on in terms of well you know we have lots of green waste. Is this going to be used to help develop non-peat compost, or is it in fact simply going to incineration and Michael Meacher was very strong on the point of recycling targets, using targets to avoid some of these anomalous problems that arise; making the most of an opportunity, making positive use of an opportunity rather than simply trying to get rid of a problem, a waste problem by burning it. So there's a whole issue there of recycling from local levels through to Government incentives. We're all living in communities that are committed to Local Agenda 21, recycling targets are a central part of Local Agenda 21. We all have ways of stimulating recycling done in the correct way at a local level but equally we can work at all levels of decision making to ensure that recycling is actually carried out in a sensible way rather than a perverse way.

So those are some of the issues that I thought came out of yesterday. I'm sure that other people will be able to recall other points but what I'd like you to do during the talks today, is to be thinking about how we address some of these and identifying other key issues that

we need to address and I would dearly wish to encourage you please try to think of a solution. Try to think of a way forward because later we will have a panel discussion and we will be wanting to air a number of these points.

So on that note, what I would like to do now is invite Ian Goldthorpe to come up and give us an outline of the planning perspective, mechanisms and relevance to the peat issue. Ian is a Chartered Town Planner who's spent over 20 years dealing with planning applications of one form or another contributing towards development and policy development.

Peatlands and Planning
The problems of Crowle and Thorne Moors

Ian Goldthorpe – Chartered Town Planner

In the early post-War years, planning came to be regarded as a positive activity, capable of bringing about change and improvement in society. From the 1960s, however, it was no longer the new panacea for all society's ills that would save us from the worst excesses of industrialisation and create a brave new world after the Second World War. Instead town planning and the activity planning became associated in the nation's mind with state control, totalitarianism and the propensity of Russian footwear factories to produce millions of left boots.
North Lincolnshire Council is a unitary authority and therefore a mineral planning authority; it is also a local planning authority and is responsible for local highway policy for the area. As part of the local authority, the environment team provides professional advice to North Lincolnshire in these guises of land management and land use issues. It is also active in habitat `re-creation' and conservation, and has been the council's lead on town planning and other matters relating to Crowle Moors, part of the Humberhead Levels peatlands, which lies within its area of responsibility. Through the informal peatland management group, it is also working in partnership with other the local mineral planning authorities, East Yorkshire and Doncaster, to regularise outstanding planning and habitat regulations relating to what remains of the moors. North Lincolnshire has a developed environmental policy, does not use peat in its day to day horticultural activities, and in its local plan it is committed to the concept of sustainable development.

If the practice of planning is no longer regarded as sexy, then the specialism known as town and country planning is considered by many as a pariah; whichever side of the debate one is on, town planning is usually a disappointment. Generally, it does not appear to have a very good track record in conserving habitat, endangered or otherwise. This is rather a strange set of circumstances for a discipline whose primary intention is to secure, through planning constraints, better environmental conditions for all, safe, well planned spaces, diverse, and green. What went wrong? Why is planning in general, town planning in particular, looked upon by many as a flawed or indeed failed approach to conserving the natural environment?

The reasons for this are complex. On many occasions, perhaps town planning has got it wrong - out of town shopping centres for example are a particular concern where many decisions have been wrong, leading to the further decay of older established centres. In addition, in the past, particularly in the immediately post-War years, mineral consents were given for working fragile habitats, and the expansion of county towns was seemingly unco-ordinated and competitive. The consequences are obvious in the proliferation of tower blocks estates and urban motorways. But if such failures in planning have contributed to the demise of the perception of planning as relevant and legitimate activities of the state, that failure has also been compounded by a lack of public understanding about what planning is, and about what town planning is actually involved with. There is in society a general misconception, which equates planning with town planning, and an expectation that town planning should, and a general concern that it does not, conserve things. By this, it is often meant that planning should not allow development. Town planning is primarily the means by which the State, through a system of delegation down through the various tiers of government organisation, and subject to complex regulation by various means,

seeks to achieve certain discrete land use planning objectives. It deals with a limited set of matters relating to the State's interest in physical land use matters. The State, for example, retains to itself powers of decision on things such as major road construction through the Highways Act, pipelines through Pipelines Act, ports and harbours through Harbours Act, etc., rather than delegating these important matters down to the local level. Town planning is, therefore, primarily concerned with allowing development and dealing with proper control and management of this process, primarily at a local level. The principle of the facilitating role, which town planning undertakes with respect to development, and despite the claims of some in industry for example, the land use planning system in this country regularly returns figures in excess of 90% approval rates for all planning applications. Within this role of facilitator of development, in the local authority, the notion of conservation is still high on the planning agenda. Mechanisms exist which allow both planning and mineral planning authorities to seek to enhance proposed development in the public interest by the use of planning conditions and agreements. Within the planning framework, the intention is to enhance public amenity.

With respect to all development powers awarded to local and mineral planning authorities by the administrative discretion of the Secretary of State, the use of conditional approvals is encouraged. This is particularly so with mineral planning applications, which following primary legislation in 1995, are required to be reviewed in order to allow for the development of modern standards and modern standards of control to be applied. The mechanisms of control, the administration and the legal requirements are operationalised through the provision of development plan frameworks. Through these, and the policies which are contained within them, town planning seeks to conserve the openness of most of our rural areas, and of course the designation of our national parks and areas of outstanding natural beauty are primarily planning functions. Town planning can also add to the identification of important nature conservation sites through local designation of lands, such as local nature reserves and sites of nature conservation interest. Having said this, it is also fair to say that the conservation measures which town planning can effect are constrained by the need to receive proposals for developments and other uses of land by means of planning applications. Again, town planning is primarily concerned with facilitating development, with providing through development plans, or whatever planning regime the government of the day favours, land for development, and to give legitimacy to development and other uses of land. Conservation is one of the issues, and only one, which our reactive land use planning system considers to be material to the determination of planning applications. The breadth and range of materials for consideration, and the weight which must be attached to them by practitioners in making assessment of proposals to develop land, means that in all but the most straight forward cases, the practitioners must rely upon expert assessment from other sources. Thus the application of mechanisms of control is a collaborative exercise in which the practitioners must weigh the outcomes of various, often competing perspectives in order to reach a conclusion as to the acceptability or otherwise of the proposed development. The practitioner's life is made much simpler if she or he, has a clear assessment of what relative weight to attribute to various material considerations; in other words, what is important. The way in which England, as a nation, defines what is important in land use planning terms, is of considerable interest to all involved in peatland conservation. In addition, the relative level of importance, which is attached to the material considerations, or the same consideration in different circumstances, is also important. Each application, or development to be decided upon, merits some consideration of the provisions of the development plan for the area, and any other material considerations. In reality, this is very significant because it refers to the fact that the decision parameters of the land use planning system - the plans and other considerations - are arrived at through a process of political debate. Whilst the outcome of the debate is rarely complete agreement amongst the stakeholders, or more often

antagonists, land use planning policy can be seen as one method by which some level of consensus on land use planning can be applied to local circumstances, in mineral extraction terms to both regional and national circumstances.
The outcome of the peatland debate, which has raged to and fro for over 20 years, and the way in which a consensus of opinion regarding the best way forward on the basis of what we currently know, has to be translated into land use planning policy. It also provides a fine example of the fact that any such policy is the distillation of political debate, an expression in land use planning terms of the concerns of society as to what forms of land development should be allowed. This can be seen as a truly democratic outcome, and those who have been engaged in the debate, from whichever perspective they come, should be truly proud of having done so, because at the end of the day they have achieved a considerable contribution towards the sustainability of `natural' habitats.

Consideration of what as a nation England has done to its peatlands in the fifty or so years since the introduction of the Planning Act reveals another misconception about town planning, that it can control all land management issues. In reality, it is only concerned with the control of development on land. Much damage to peatland systems has been done by practices, which do not, for the purpose of the Town and Country Planning Act, amount to development, and are not therefore controlled by the legislation. For example, land drainage, ploughing, and processes leading to nutrient enrichment cannot be controlled via the planning process. In addition, the action, which prompted increased concern about the future of lowland mires and their sustainability, the change in the preferred extraction methods from block cutting to milling, could not be controlled under planning permissions.

Very soon after its introduction, Town and Country Planning came to be seen, and has increasingly become, a form of administering the `green' national objectives in land use and planning issues. In addition, town planners and mineral planners alike have become increasingly swamped in recent years, not simply by the rise in the number of planning applications, but also by the plethora of additional `bolt on' legislative provision and the complexity of information, which is now required in the process of assessment of mineral and other applications. It could be said that the passion has gone out of town planning. Instead of being seen as an important political expression of a nation's aspirations and objectives about the way in which it will use land, it is too often seen as being grey and uninteresting, a negative and rather meddlesome activity preventing rather than allowing development. It has also to some extent been left behind by the environmental aspects of the sustainability agenda, because it is regarded as just another form of administration. These perspectives on town planning are very real, and they are also very real dangers to the proposition which has been clearly and powerfully demonstrated by the apparent resolution of the peatland debate. That proposition is that investigating environmental impacts, analysing them, planning for the expected outcome, and on a regular basis, reviewing those outcomes, is good for society.

It looks as if some vestige of lowland mire in the Humberhead Levels has been saved, as a basis for wetland regeneration, which is a good outcome within the context of the land use planning system. This has as its basic tenet the achievement of sustainable development. From a practitioner's perspective, the real achievement of the debate is the clear and closely argued guidance on peat extraction and the development of alternatives contained in Mineral Planning Guidance Note 13. The working of any mineral is a fundamentally unsustainable activity, and the role of the mineral planner is to mitigate the effects of mineral working and conserve resources through proper planning. Planning decisions on mineral extraction should seek to obtain a balance between the national and regional need for the resource, and the resultant environmental impacts. Mineral extraction therefore, can have a

high political profile. The way in which MPG 13 has panned out in the North Lincolnshire minerals chapter of its local plan means that basically permission for peat extraction is not obtainable. Now that may differ elsewhere because the planning guidance note also allows, as always with land use planning issues, the abstraction of the balance of previous permissions, and there is always a clear and important consideration for central government with respect to the continued liability (or viability) of the peat extraction industry. The general tenor of MPG13 is to say look, sustainability means various things to various people, and the outcome really is a balance, because people's jobs and livelihoods may depend upon it. There are different circumstances in different areas. For example, the Somerset minerals plan, unlike that for North Lincolnshire, has completed its authorisation, having gone through the whole due process, and it is now a statutory plan, which actually speaks in terms of restoration of peatlands specifically, as distinct from other wetland habitats.
Currently the mechanisms of control over mineral and peat extraction exist within what is termed a plan lead system. This system, which requires national coverage of land use planning by development plans, is under review. Various changes to the mechanics of control are proposed, and as with previous attempts to reform the planning system, they are described as radical proposals for fundamental change. The way in which the land use planning system is administered is a very important element of delivery of the effective and efficient land use planning in this country. This is composed of a hierarchic series of interlocking plans, which acts as transmission belts for planning regional and mineral extraction guidance issued by central government. As always, it seems that the Government will seek to streamline the systems, in an attempt to speed up the decision making process. As in the past, it is unlikely that any reforms will have any additional funding associated with them. Issues like peat, the way in which the debate developed on the back of careful analysis into an international concern, tell us that, if as a nation we are committed with other nations, to attaining sustainable development, to saving the planet if you want, the last thing we should do is under fund and under resource our land use planning system.

Perhaps in closing its time to learn from what concerted action, properly researched and informed debate can achieve on a single issue like peat. Perhaps we should apply this experience to our existing land use planning system, perhaps its time to re-visit that very vexed question which has never really been resolved in this country - the question of who owns land and to what extent they should benefit by it? We are already moving in this direction. The Countryside Rights of Way Act addresses land management issues, and the environmental impact regulations allow the impasse of change in land management practice and cultivation to be considered. The EU Habitat Regulations speak of any plan or project, and therefore the extent to which some control over potentially damaging effects on designated sites in terms of land management as distinct from land use can be taken into consideration. At the end of the day, sustainability and the achievement of sustainable forms of development require this debate to occur and be resolved. Fundamentally sustainability is about the way in which as a nation we both use and manage land, the economic, social and environmental capital that is generated by so doing. The mechanics of control of peat extraction and the use in land are in place. The minerals and local plans, which are either in place, or getting there, will refer to mineral planning policy, in particular, MPG13. These matters will have been vetted through the appropriate regional office, and agreed through an enquiry in public. Would it be more honest, however, to make planning sexy again by allowing for positive planning by changing the perspective, not simply tinkering with the mechanics of control?

One pathway which was missed in 1947 when the Town and Country Planning Act was introduced, by the then Labour Government was the introduction of a full system of national land development. It is clear from the experience of New Zealand that a habitat and national land use strategy is a significant way of ordering any nation's priorities with respect to what is after all its most vital asset, its land. Everything we do springs from the land, and yet what we do is to allow people to own land, but the value in land is not really in its ownership, but in its location. If one is talking about differences in location and different activities being moved around, then if you have not got land use planning, a national land use plan, then you end up with a series of ad hoc interventions, which may be cumulatively ineffective if not downright damaging. Is it not time for the planning acts to be repealed and replaced with a proper sustainable development strategy?

Peat and the Law

Richard Buxton
Solicitor specialising in Environmental and Public Law

(Note – this is a précis of Richard Buxton's paper compiled from notes taken at the time)

This paper seeks to look at the broad points about peat extraction and environmental law and the progress of the Habitats Directive (92/43/EEC)

The relevance of environmental law is sometimes questioned by 'authority' and may not always be as effective as conservation bodies would wish. However, persistence does pay, as several cases have shown relating to quarrying.

The Environmental Impact Assessment principles were established by hard won battles such as that over Preston under Scar, and economic considerations through Lappet Bank. Another case, Huddleston, was lost in the first instance, as judges ruled against it, but was won on appeal.

There are different laws relating to the environment in England and Europe but the main driver is the Conservation (Natural Habitats &c.) Regulations 1994, more commonly known as the Habitats Directive. This protects habitats and species by controlling development, and by imposing obligations to prevent deterioration of habitats. Sites protected under this legislation must be Sites of Special Scientific Interest (SSSIs) and are then designated as Special Areas for Conservation (SACs). There are also Special Protection Areas (SPAs) under the Birds Directive of 1979.

The majority of Thorne and Hatfield Moors are protected as SSSIs, SACs and SPAs.

In addition to the requirements under the Habitats Directive in relation to planning issues the UK Planning Guidance PPG9 covers the extraction of minerals, which includes peat. Both Thorne and Hatfield Moors will be subject to the time scale laid down for the review of conditions relating to authorisations affecting the site.

The main message is –

Use the appropriate legislation and persevere with the Authorities

Peat and Alternatives

Martin Harper
Conservation Director – Plantlife

INTRODUCTION

Peat bogs are wonderful places – just ask anyone who has wobbled on a *Sphagnum* mound or somebody who has rather surprisingly found themselves up to their waist in peat. And the statistics suggest we have a lot of peat bogs. Worldwide peatlands cover about 500 million hectares of land, some 3% of the world's surface. The global area is equivalent to the area of India and Pakistan combined (Brooks and Stoneman, 1997).

Plantlife likes them so much that we bought one (well a bit of one). This slide show the Dubh Lochans of our Munsary Peatlands reserve in the Scottish Flow Country – a magical place where you can convince yourself that wilderness does still exist in the UK. Peat bogs are home to some fantastic species such as:

- Oblong leaved sundew – *Drosera intermedia*
- Great sundew - *Drosera anglica*
- Bog aspodel – *Narthecium ossifragum*
- Bog rosemary – *Andromeda polifolia*
- Small cranberry *Vaccinium microcarpum*

So it is not surprising that we get a little upset when these places and plants get destroyed to help grow plants in gardens.

I thought that it would be useful during this talk to spend a little time looking backwards and a little time looking forwards. I will give a snapshot of the history of Plantlife's involvement in the peat campaign, consider the trends in the growing media market and suggest a few actions for us to get involved in both in the UK and further afield.

PLANTLIFE'S INVOLVEMENT IN THE PEAT CAMPAIGN

Plantlife

Firstly, just as a reminder for some of you, I thought I should introduce you to Plantlife. Plantlife is Britain's only national membership charity dedicated exclusively to conserving all forms of plant life in their natural habitats: the nation's champions of wild plants. It has 12,500 members and owns 22 nature reserves with a total land holding of 3,900 acres. Plantlife is 'Lead Partner' for 77 species under the Government's Biodiversity Initiative. Conservation of these is delivered through a recovery programme called *Back from the Brink*. The programme implements Species Action Plans for plants through survey, research, practical action and advice, in partnership with other key players. Plantlife involves its members as volunteers (called *Flora Guardians*) in delivering many aspects of this work; at present over 200 people contribute towards *Back from the Brink* in this way. Plantlife also acts as the secretariat for *Planta Europa*, the European network of organisations and individuals working for plant conservation and botanical research.

Dr Jane Smart

Plantlife's involvement really began before the organisation was even born. Dr Jane Smart, our Executive Director, first became involved in the story of Thorne Moors in the late 1970s when doing her PhD at Sheffield University. On one of her first visits William

Bunting did his best to put her off but she came back, and Bunting offered her his assistance and agreed to take her out on the moors on condition she prove that she can fire a pistol, which she did (Caufield, 1991).

She studied the plant ecology of re-vegetated peat cuttings, and peat bogs clearly got under her skin. When the devastation at Thorne was taking place, a simple campaign message was developing i.e. get the peat extractors off peat SSSIs – West Germany did the equivalent without compensating extractors in 1972. It seemed a clear and focused message and was one which Jane Smart took into the newly formed Plantlife, which she joined as the first Director in 1989.

With the ex-Chairman of the NCC, Sir William Wilkinson, as Plantlife's first Chairman, another great fan of peat bogs, Jane established a peat commission – to look into the status and use of peat and peatlands. The decision to establish this independent inquiry was made in the absence of Government action. The threats to peatlands from agriculture, forestry and peat extraction were clearly articulated and the Commission developed a set of recommendations which today make bleak but fascinating reading. For example one of the recommendations suggested:

> "Where planning permission is revoked, compensation should be paid to peat extraction only on the basis of what has already been spent on this land, not what might have been earned from it" (Plantlife, 1992)

Over the years Plantlife has written or contributed to countless publications tracking the future for lowland peatlands. For example Out of the Mire was produced in 1993 – three years after the PCC had formed. This joint Plantlife/RSPB publication charted the status of the dwindling resource and again called for the end of peat extraction on our finest wildlife sites.

20 out of 33 issues of the Plantlife magazine over the past 13 years have had an article or reference to the peat campaign – it has been so core to its agenda. More recently, as Plantlife's species recovery programme developed to try to save our most threatened plants, the full extent of the impact of peat destruction became clearer. Yes conservation is about places, but it also about species which together make up our biodiversity which we have signed up to internationally to try to save. A host of species have been lost from Thorne Moors such as the fen violent and the long-leaved sundew. And in the last couple of years, Plantlife surveys have confirmed that some of the more obscure species such as *Sphagnum balticum*, Baltic bog moss, has also been lost from Thorne Moors.

It's not an easy moss to find, and there appears to be only two remaining sites in the UK, including Muckle Moss in Northumberland, but the key question on everybody's lips is whether it could return to Thorne Moors as restoration work kicks in. It will all depend on the speed at which the bog gets wetter and on the persistence of its spores (Tuner, 2000).

Nationally the decline in our carnivorous plants because of our treatment of wet places has been dramatic and the consequences are grave. A trawl through recent county floras by Peter Marren for Plantlife reveals that sundews have become extinct in Northamptonshire, Leicestershire, Oxfordshire, Cambridgeshire, Bedfordshire, Nottinghamshire and Gloucestershire. Leicestershire, indeed, has lost *all* its insectivorous plants - sundews, butterwort, bladderworts, the lot. In Somerset, Essex, Lincolnshire, Suffolk and Kent they teeter on the brink (Marrent, 2000). If we are to lose one of our most charismatic groups, then we limit our ability to attract the next generation of botanists.

MARKET TRENDS

I now want to look at market trends and to a certain extent set the scene for subsequent talks. Capitalism works on the basis of supply and demand. In terms of supply, the peat resource is dwindling in many parts of Europe. Peatlands cover an area of approximately 956,949 km² in Europe. European peatlands are most extensive in Finland, Sweden and Norway where almost 75% of the remaining area occurs. Much of the European peat resource has vanished as technology and development have advanced. All natural peatlands in the Netherlands have been lost, Switzerland and Germany each have only 500 ha remaining. The UK has seen a 90% loss of blanket bog and a 98% loss of raised bog. While, Ireland has only 18% of its original peatland area left.

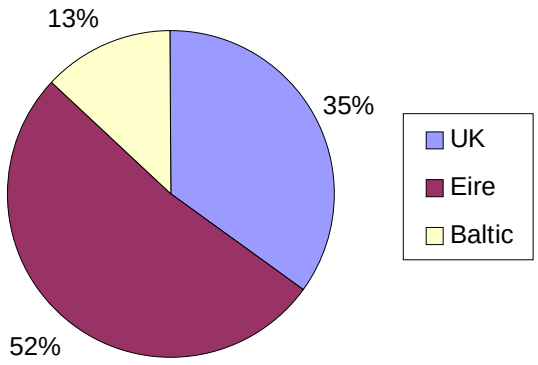
To quote from the 1991 Commission Inquiry into peat again:

> "Peat extraction must be seen as the unsustainable, destructive exploitation of a finite resources, which cannot be replaced within any commercially realistic timescale and whose scientific archive cannot be replaced at all" (Caufield, 1991)

In recent years the land-use planning bit of Whitehall which has metamorphosed from DoE to DETR and into its current incarnation DEFRA, has addressed the issue of peat through a peat working group. The focus of the group seemed initially to be focussed on sustaining the industry, but gradually the emphasis changed, particularly when the BAP targets for lowland peatlands were agreed in the mid-1990s, i.e. 40% of the total market requirements to be peat free by 2005 and 90% by 2010.

In 1999 it published a report of peat extraction and related matters which, on re-reading, is still very focused on sustaining the industry (DETR, 1999). Yet this was the precursor to studies of the use of peat in the growing media and soil improvers market (DETR, 2000). It showed that a substantial proportion of the peat used in UK horticultural markets has traditionally come from the UK. In 1999 however, information from producers of soil improvers and growing media products showed that only 35% of peat used was sourced domestically, 52% coming from Eire and 13% from the Baltic region (see figure 1).

Figure 1 Sources of peat supplied to all horticultural markets in the UK in 1999 (DETR, 2000)



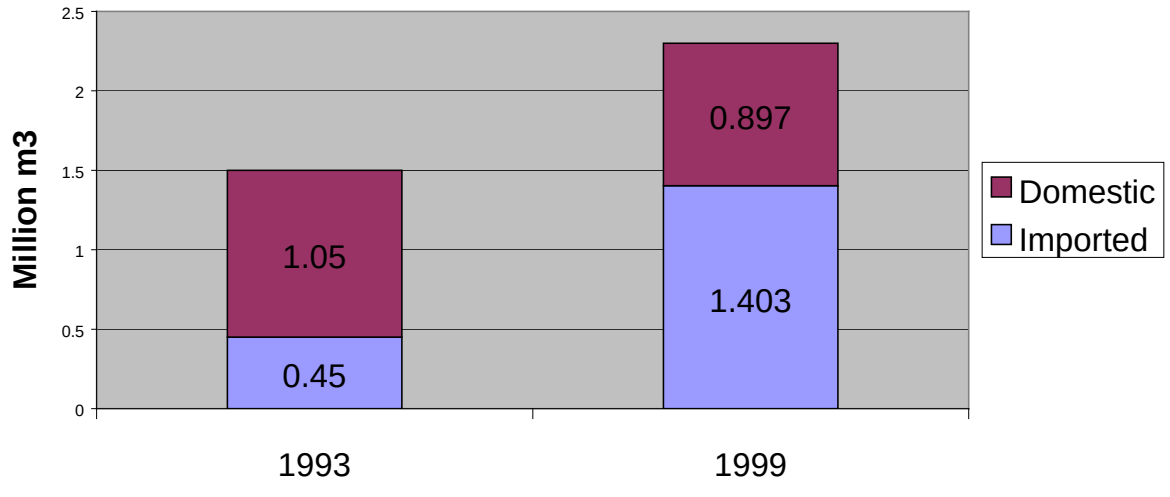
For those markets which have been tracked in detail between 1993 and 1999 i.e. amateur gardening, local authority and private sector landscaping markets, the proportion of peat sourced from the UK has fallen steadily, from around 70% in 1993 to around 40% in 1999. Yet there has been an increase in consumption over recent years and this demand has been met by an increase in imports (see figure 2).
So if the trend continues and we continue to use more peat and continue to clamp down on use of peat from the UK, we shall be exporting the problem, and our environmental footprint abroad will grow rather than diminish.

Let us have a quick look at some of the countries we are digging up to fill our gardens with growing media.

- ***Estonia*** - Estonia is considered to be among the countries that are richest in peatlands. Peatlands occupy 10,091 km² or 22% of Estonia. Three peatland types have been identified; fens, transitional bogs and raised bogs. About 2,580 km² of Estonia's peatlands have been drained for peat production. A peatland area of 565 km² is protected for environmental and scientific investigation.
- ***Latvia*** - Nida Bog, Latvia is an example of a raised bog being developed for peat production by a number of German companies.
- ***Ireland*** - Peatlands cover 13,470 km² or 16.2% of Ireland. There are three main types of peatland in Ireland - fens, raised bogs and blanket bogs. Two main types of blanket bogs occur - those at elevations of less than 200 m called Atlantic blanket bogs, and those found in the mountains above 200 m called Mountain blanket bogs. 80% of these bogs and fens have been destroyed (for forestry, agriculture, peat extraction for energy production and horticulture), and have lost their wildlife and conservation value.

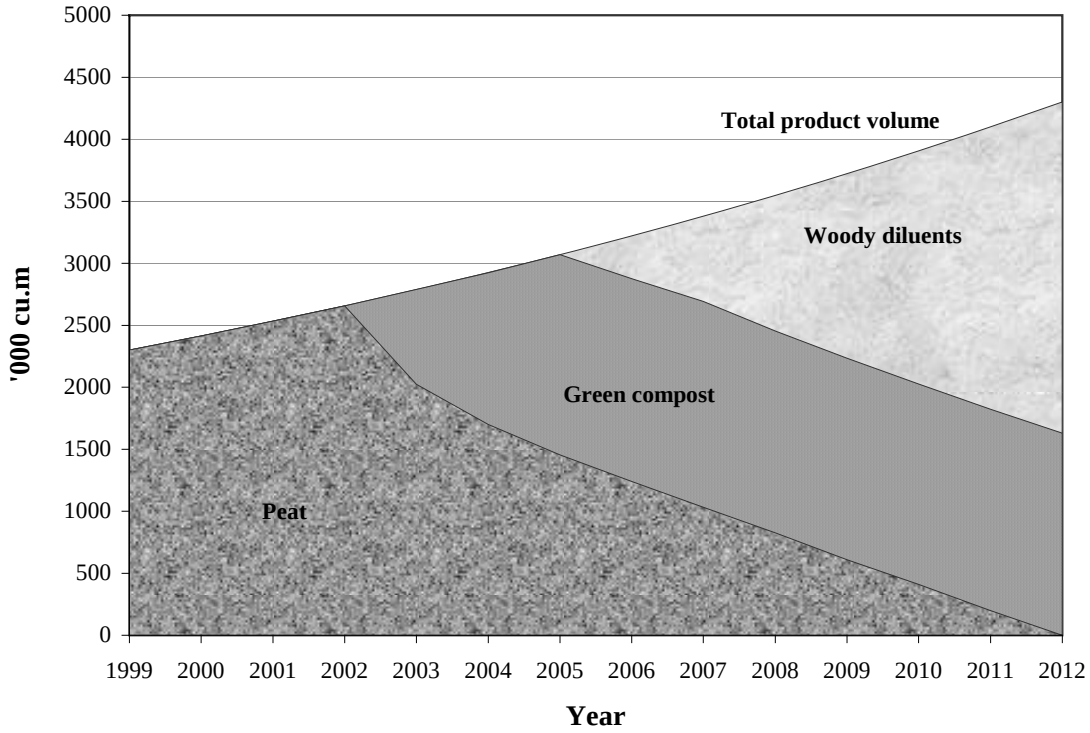
We have a duty as a nation to minimise our environmental impact abroad and recent work suggests that peat use could end in 10 years. This is the conclusion of a joint EN and RSPB report "Peatering Out" based on research conducted by Rainbow Wilson Associates (English Nature and RSPB, 2002). They have presented a scenario that would end the commercial interest in lowland raised bogs and remove any future threat of habitat destruction (see figure 3). They argue that green compost would form the basis of replacement materials mixed with dilutents such as woody residues from the forestry and

Figure 2 Proportion of domestic and imported peat supply into the UK 1993-1999 (DETR, 2000)



related industries. Peat replacement would be achieved by a period progressive dilution. To turn this dream into a reality a relatively small investment of £500,000 per annum is needed to encourage the necessary trials, and Government is urged to come up with the cash. Over ten years this still represents one third of the money that Scotts received as compensation for ending extraction on Thorne, Hatfield and Wedholme. £100 million was invested over 30-40 years to enable peat to dominate the growing market and at least a third of this has come from the public purse.

Figure 3 Replacement of Peat in all retail products (RSPB and EN, 2001)



Ultimately the RSPB and EN argue that replacing peat with peat alternatives based on green compost will provide jobs in a sustainable UK growing media industry. This in turn will decrease our reliance on imports, and minimise our environmental footprint abroad.

This would, rather conveniently for Government, help to go a long way to deliver the BAP targets set for lowland peatlands. It would also help meat the EU Landfill Directive recycling targets for biodegradable waste.[1]

And at last it appears that the Government plans to be more proactive on the peat issue. In a recent response to a Parliamentary Question, Lord Whitty said "The UK Biodiversity Action Plan commits the Government to undertake and promote research and development into sustainable alternatives to peat and provide advice on the development and marketing of peat alternatives. The aim of the plan is for 40% of the total market

[1] 5 million tonnes of compostable biodegradable municipal solid waste will need to be composted by 2010.

requirements to be peat free by 2005 and 90% by 2010. We have decided to build on the work of the Peat Working Group by establishing a new group, under the chairmanship of DEFRA, which will bring together all this Department's policies that affect the production and use of peat and peat alternatives, and provide a forum for consideration of the various factors in working towards the targets for peat substitution."

The main constraints to achieving the 10 year plan are not technical or economic, but are to do with attitudes and accustomed practice. This has been the challenge over the past decade and, with a few notable exceptions such as Kew Gardens, the Eden Project and the National Trust, the gardening public has failed to be convinced by the alternatives. The key challenges facing the alternatives market are:

- Can growers reduce their dependence on peat in growing media progressively without compromising profitability?
- Can retailers maintain their profitability and customer satisfaction?
- Can we ensure gardeners have good value for money and will the growing media be reliable and pleasant to use?

The work of this new Government-led group must be seen as a way of minimising our environmental footprint abroad by encouraging the phasing out of use of peat completely.

THE INTERNATIONAL IMPERATIVE

The RSPB/EN research, however, suggests that this is not going to happen overnight, so we shall need to work to ensure that the peat that is imported is not coming from our finest remaining peatlands and this is an area which the PCC will need to continue to address. Existing nature conservation tools must be made to work to protect our finest peatland sites. The site protection tools are many and varied and include Ramsar, Natura 2000, as well as domestic designations. The good news is that the nations of the world now have a target to work towards. In April this year, the sixth meeting of the conference of the parties to the Convention on Biological Diversity agreed a global plant conservation strategy which includes 16 outcome-oriented targets to be achieved by 2010 (see http://www.biodiv.org/decisions/default.asp?lg=0&m=cop-06&d=09). These targets include the need to protect 50% of areas important for plant diversity and 60% of threatened species by 2010. If ever there was a motivation to get cracking on peat protection, this is it. To help assess the performance of governments in meeting these targets, identification of important plant areas (IPAs) will be needed. Guidance for selection of IPAs in Europe has been developed, and Plantlife, working with its European partners, is currently involved in identifying IPAs for seven CEE countries, and this includes Estonia. The idea is that the list of sites will then be used as an objective assessment of the best places for plants using standardised criteria. IPAs should support, inform and underpin protected area mechanisms.

And just because here in the UK we are beginning to look at the restoration agenda, we must not be deluded into thinking that the battle to save our finest sites is over. The IPA project will act as a health check of our finest sites, and we will without a doubt be forced to roll up our sleeves for some of these places. And so it is worth remembering the words of that great conservationist, William Bunting, "Say NO, mean NO and fight to retain the places we have." (Caufield, 1991)

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Did campaigning help, do we need to continue ?

Craig Bennett – Friends of the Earth

Friends of the Earth is the world's largest grass roots environmental network, with member groups in over 70 countries. A key point is that groups set themselves up. NGOs already established in countries applied to join Friends of the Earth International, and they retain their autonomy. Groups just agree to a set of guidelines about using the Friends of the Earth name, and what they can and cannot do with it. This is a huge strength. It means that in each country those organisations already well established can agree on an international policy, like that agreed for the Earth Summit in Johannesburg; it is then something that has been approved in 70 countries, rather like a mini United Nations. Across the world, we have now over a million members. Friends of the Earth is also a unique network of local groups campaigning in over 200 local communities across England, Wales and Northern Ireland. Friends of the Earth Scotland has always been a separate organisation, although of course working very closely with the rest of the UK. The group is funded pretty much entirely by ordinary individuals, and it does not take money from large corporations. Ninety per cent of funds come from ordinary people contributing £3.00 a month, and the other 10% comes from trusts and foundations.

What does Friends of the Earth do? Well, it supplies solutions to environmental problems and those solutions make life better for people. How does it work?
Three main ways :

1. Information and ideas, in other words, dedicated research into environmental problems and finding solutions.
2. Inspiring, empowering and mobilising people to campaign on their own behalf. Friends of the Earth do not go out there and take over campaigns for other people, but it tries to persuade people locally, factor people, and give them the tools to campaign on their own issues. At the end of the day, this is the strongest way of campaigning.
and
3. It carries on political and corporate campaigning democratically, showing politicians and corporations the power, the strength of feeling amongst the public over an issue and changing positions that way.

Friends of the Earth Peat Campaign.

The Peat Campaign started in the 1980s, originally as a wildlife habitat campaign, always worked in close cooperation with the Peatlands Campaign Consortium (PCC). It has to be stressed that Friends of the Earth are not the only people who have campaigned, and continue to campaign on this issue. All the groups in the PCC have done a lot of work, a lot of campaigning work on this issue, and it is the way in which they have all worked together that has been fantastic over the years. Friends of the Earth has always worked in close coalition with local campaigners and local communities because they are absolutely essential in knowing how to operate, and the campaign has always enjoyed a very high level of interest and participation among local groups. This has been the key to success. There have been various elements to peat campaigns. Some people will only know about the work done on Thorne and Hatfield Moors, but actually these are just two examples. The Friends did a lot of work at Holy Bog in Northern Ireland, and on Red Moss, a bog in

Greater Manchester, as well as many other sites, and there have been many different approaches to the campaign. Back in the early 1990s Friends of the Earth did extensive research on peat free gardening and produced reports on it. Much research and lobbying was done on fiscal measures, looking at the options that Government might have to promote peat free gardening. It has campaigned very strongly for tough new wildlife legislation for the Countryside and Rights of Way Act, and again in coalition with other wildlife organisations the peat campaign always formed a key part of that. The European Habitats Directive was worked on, in particular Friends of the Earth had a key project with the Worldwide Fund for Nature, and Friends of the Earth also made a lot of fuss over the threat of de-notification by English Nature for much of Thorne and Hatfield Moors.

It is another thing to stress that there is a lot more than just a wildlife organisation to Friends of the Earth, and the organisation has a range of perspectives on the peat issue, actually going about it in a holistic way.

In 1999, Friends of the Earth took the strategic decision to turn the peat issue from what might be termed a wildlife campaign, to a corporates campaign. Now in doing that, of course, it does not mean that one suddenly stopped thinking about the wildlife aspects, but it means strategically that the organisation started to go after the corporations that are digging up the peat bogs, rather than after English Nature and the Government for their failure to act, as had happened in the past. The Scots company was selected as the main campaign target. There were strategic reasons for this, mainly because it was the largest peat extractor in the UK, but also because of the fact that it was a US company, a very large corporation, thus broadening the options from Friends of the Earth's perspective. The USA was quite handy for gearing up people to think badly about Scots! Working with Friends of the Earth US, it was possible to make it a real issue with the management of the company in America. This was absolutely key because even if Friends of the Earth could persuade everyone in Scots UK to 'bog off', it would not necessarily change anything, unless the management over in Ohio actually appreciated what had happened. A number of things happened in the States, which never really got much publicity in Britain. In the US, there was lots of press coverage, including the front page of the *Wall Street Journal*. Friends of the Earth also briefed analysts for Scots in New York, something which Scots probably never knew about, and they also submitted a complaint to the Security and Exchanges Commission. In the UK, Friends of the Earth also did a lot like appearing outside the Chelsea Flower Show and lobbying gardeners about Scots, obtaining press coverage as a result.

In 2001, however, the campaign against Scots entered a new level because in September 2000, a news item appeared in *Horticultural Weekly* saying that the company was going to launch a new product the following Easter Bank Holiday weekend, which was their Miracle Grow Compost. The article also said that the Company was going to launch a TV advertising campaign for the product. After years of working with the PCC trying to persuade people not to use peat, the prospect of a major TV advertising campaign, and a major in-store marketing for peat products caused some concern, with the possibility that this would set back the peat-free gardening campaign for years. One thing known about Scots was that they were excellent at marketing their products, and so this had to be addressed. The first thing was to brief major retailers of peat products, since Friends of the Earth have an on-going relationship with the DIY and gardening sector and with supermarkets on a whole range of issues, not only peat. Staff at Friends of the Earth know people from many retailers, having discussed issues such as the use of tropical timber, chemicals in products and GM foods, and a whole range of other issues. So they

said to the retailers, “Look, Friends of the Earth are going to campaign against this and we just want to warn you and give you the opportunity to take action in advance”. Local group materials were prepared and groups were notified that Friends of the Earth were keen to have a big action on Easter Bank Holiday weekend 2001. The organisation also set up a special dedicated website, and bought about 10-20 domain names that really Scots should have bought a while back. Friends of the Earth started setting up a website so it looked like it was Scots Miracle Grow website, but actually when you started reading it more closely you realised it was not. They contacted Des Lynham, who did a lot of the advertising promotion for Scots and specifically the Miracle Grow brand, presuming that he would be asked to do the TV advertising for the new compost, Friends of the Earth wrote to him in January 2001. Then they contacted colleagues in the PCC and in the space of a week, Des Lynham’s agent got letters from the Chief Executives of the Wildlife Trust, RSPB, and Plantlife.

As to the results, and a lot of these things are supposition, but it is evident that some of the national chains that were briefed decided not to stock Miracle Grow compost. Des Lineham in the end did not feature in the TV advertising. The Miracle Grow website when launched by Friends of the Earth received 2000 hits in three weeks. Put in perspective, the <> site gets around 5000 a week, so it did not do badly. One hundred Friends of the Earth local groups actually took part in the action. Up and down the country, groups were outside DIY and garden retailers stocking this product, making the point about the destruction of peatlands. At least a hundred press cuttings were obtained from across the country – local, regional and national newspapers - about the campaign and coverage of actions by local groups. Tens of thousands of potential customers were made aware of this issue through interaction with local groups outside the stores, and it is estimated - and these are the ones known about – around 1,500 to 2,500 letters went to Homebase in the first month of the Miracle Grow campaign. Similar volumes went to other retailers, particularly Wyevales, although it is not known precisely how many. Friends of the Earth like to imagine that perhaps that bit of work had some impact on helping Scots to think about adopting a more constructive approach to Thorne and Hatfield Moors, and the organisation certainly feels that whether or not it had any impact on the company, the local groups and press coverage did get the message out about peat to the UK public.

Where do Friends of the Earth go from here? Well first of all, it should stressed that Friends of the Earth is actually run by local groups –the body was set up originally by a few groups working on environmental issues as a national body to provide information and back-up to their campaigns and so actually the board is appointed by the local groups, and they can have a very key part in the decision making processes of what work is done. At the 2001 annual group conference a motion was proposed and unanimously adopted that Friends of the Earth should continue to work on the peat issue, but more to the point, that it should look at it from both a peat and green issues perspective. So Friends of the Earth has the mandate to carry on campaigning, but how is the organisation going to do it?

Should it act through confrontation – the route chosen in the past, or are there other options? It is very clear that there is an extremely strong stomach in the local groups, as well as nationally, to go down the confrontation route, but it is only fair to look at other options. It has to be admitted of course that the situation is very different to what it was even two years ago, let alone five. There are now NGOs, the UK Government, and retailers such as B&Q and Homebase, who both have a very clear policy on phasing out peat, and other companies are committed to the Biodiversity Action Plan – 90% of growing media to be peat free by 2010. This is a pretty good starting point to move forward from.

Amongst all these stakeholders, it is fair to say that there is a widespread preference for peat to be diluted and replaced by locally sourced recycled materials. So what is really needed is for the stakeholders, if they are sincere about meeting that target, to work together to identify what needs to be done, and to tell the Government to do it. It is apparent that the Minister, Michael Meacher, is looking for ideas of what is to happen next. So if the conservation bodies and the retailers can come up with ideas that can be agreed together on what will actually help stimulate the peat free market and remove any problems, then they can go jointly to the Government with that suggestion, it is likely that the Government will say yes. So, for example, if we thought that there should be 0% VAT on peat free materials, and if you had the industry, the NGOs and others suggesting that all together, it is probable that the Government would say yes.

One other issue, where it would be good to work together, is on labelling. Friends of the Earth gets around 30,000 enquiries from members of the public every year, and a lot of people were saying last year, "this thing called multi purpose compost, does it contain peat?" The reply was, well, of course, you have to assume it does, unless it says clearly peat free. Friends of the Earth would like to see very clear labelling across the industry as to whether the product contains peat or not and what percentage do they contain. A peat free product should say very clearly 100% peat free, and it should be clearly shown what percentages of other materials the product is made up from, and crucially what is the source. A lot of people would consider that it might be great to have recycled green waste, but the fact that it came from New Zealand, for example, would not actually make much sense from an environmental perspective For peat products it should clearly say that this product contains peat, and also it should show where it comes from, so that the buyer knows whether the material comes from Estonia, Ireland, or the UK, and again showing how it is intermixed. Thus people can decide if they are faced with a situation where they cannot find peat free compost, or even for their specific purposes they still are not persuaded to go for 100% peat free, at least they can decide to go for 65 or 45% peat free rather than 100%. For those manufacturers that are committed to a similar sort of timescale and targets that B&Q and Homebase have decided upon, why not have it clear what the ideal dilution policy is going to be. So at the bottom why not state, 'Manufacturers committed to make this product 100% peat-free by 2010'.

As a final thought, everyone has to stop thinking peat and start thinking growing media. This is crucially important, and people in the industry say this just as much as NGOs. There are water companies who are increasingly looking at what they can do with the waste from the water industry. Waste industries have huge assets that they can invest in projects, and soon they get wind of this and really understand the opportunities that exist in the growing media sector to phase in new products. Of course the agriculture sector is always looking for an extra bit of income by raising money from its waste products. The PCC also needs to export the campaign. This is something again that Friends of the Earth have been meaning to do for years, and never have had time. Now perhaps would be a good time. Plantlife is connecting with Plant Europa, and Friends of the Earth International has very strong groups in the Netherlands, in Estonia and in the US.

The Conservation Movement has now moved from a situation where, now that the issue of peat extraction from the vast majority of sites in this country has been solved, there are vast opportunities. There are opportunities for NGO s to be positive about this issue, to worry about how to 'restore' peat bogs, how to people excited about peat bogs. There is an opportunity for the industry, massive opportunities, because if the PCC successfully exports this campaign to the Netherlands and Estonia and the rest of the world, then the

rest of the world is going to be after the expertise of peat free growing media. There are also opportunities for Government and for organisations like English Nature to really take forward conservation and not just continue with the usual sort of fire fighting, but really to be strategic and forward thinking on this. This is already happening with the plans that have been drawn up for Thorne and Hatfield Moors.

Growing medium requirements for the horticultural perspective.

Stewart Henchie - Royal Botanic Gardens, Kew

Well I have been asked by Kaptain Kirk to come here and been given the title so I wondered if I was going to meet a bunch of 'Trekkies' but anyway. I'm sorry, you'll have to excuse me while I speak in one minute or one minute 45second bursts, because if you work at Kew you have to get used to the planes, and when you're outside during the day doing a talk like this, you speak like this quickly and then wait a minute. But it is a lovely place.

Mission statements – some people don't like them, some people think they are great – but they do focus the mind and our mission statement is '*To enable the better management of the earth's environment by increasing knowledge and understanding of the plant, the basis of life on earth'.* We are out to save the world! But one of the things in our mission statement, which is very important, is supporting the conservation and sustainable use of plant resources in the UK and Overseas, which obviously applies to peat and many other sorts of things. But it would be rather hypocritical of our organisation to talk about not using peat or whatever if we were going to encourage the rest of the world to look after their areas of land. Anyway – just to re-state – Kew as an organisation helps other countries in working out sort of the base state of plant species in Brazil, Borneo, Madagascar, the countries of East Africa and whatever, and we are telling them how to look after all their plants, or trying to tell them what they have actually got. So in the context of looking after peat, it did seem rather hypocritical that we actually should use peat as a growing medium, when in a way, it is sort of the northern temperate region of a tropical rain forest. Keep that in mind.

What are the most important elements of a successful growing medium?
There are lots of them, but anyway

- it should be free from pests and diseases – that goes without saying
- it should be capable of supporting a plant in a container but not too heavy to handle
- it should be well drained but capable of holding water and essential nutrients

and this is where the sort of peat bit comes in because peat as you all know, holds plenty of moisture; and also for us growing lots of plants under high temperatures, especially in our large glass houses, we want a material that is going to retain its structure, especially in high temperatures. One of the biggest problems with many of the fibrous type materials is that they slump.

So what did we use as our growing media 12 years ago?
Guess what? We used good old *Sphagnum* peat. But if we look all the way back in our organisation, we have used peat, quoir, leaf mould, all these sort of more fibrous, moisture retaining materials. You all know about them but peat of course, was easy to get, and probably if you look back when the John Innes composts came into being, then that was put down as a major component of peat and from about the mid 30s up to, certainly up to thirteen years back, we used peat as a main constituent in our compost. If any of you have ever unloaded a container load of peat - hands up anybody in this audience who has actually unloaded a container load of peat - one? So we are not talking about many people who have really done it. Right, if you have unloaded a container load of peat, you

will know all about it, and I shall tell you, you want to try to get out of doing that job. But anyway it' is pretty obvious that you should not use peat because you're actually destroying an environment. Its simple – it is not complicated. But we need to find an alternative.

So why did we change?
Our organisation's mission statement and our use of the materials in the gardens did not go hand in hand. Here we are telling people to save the world, blah, blah, blah, on plants, but here we are using a product in our composts. So what do we do?

Well way back there was an international plant conservation conference in 1975 at Kew, and somebody casually said that we had talked about all these other exotic places and somebody casually said to me, because I was responsible for producing growing medias at that time, "Well, you use peat, I notice". That's all, that's all that was said, nothing more, and so then that triggered. Not all the other things, we have had all the other agendas, documents and legal documents about how to conserve areas, but we did not really, to be truthful, start looking properly until about 15 years ago. So we looked very seriously at all the materials that were on the market. Sustainable materials – bark, all sorts of what we call waste products. I do not think you should use the word waste, because all waste, they are all resources, so I think you kill out the word waste in all your terminology and use 'resource' you would be on a better line. So we looked at all these things: bark, quoir, leaves, sewage, you name it – anything really that we could use. And finally we came to the conclusion, - we compared and contrasted them, we had our trials, not very complicated difficult trials, just internally within our site. Remember many of the plants that we grow, we keep for a long time in containers, or keep for a long time in beds, and we also have some plants that we keep for a short period such as bedding plants. So we wanted materials that would keep their structure to replace peat. We still carried on using loam and still carried out using grit or sand. I shall not bore you with all those materials, but we stopped buying peat when we found an alternative.

What decisions did we arrive at?
A separate subject, but important. We would recycle all our plant material from horticultural operations, and we would process and compost it on a large scale at Kew. To get that took a lot of doing. We were a part of NAF, and a part of DEFRA funded by them so we got ring fenced money for the equipment to actually process in-house. What we did before, we burnt our woody material, or chipped or shredded some of it, and all the softer material, softer green waste we composted, but not in an organised way so it could be used as a proper product. That is a composting issue and separate from today's talk. We also only used plant based sustainable materials as a substitute for peat in our growing media; we use quoire and pine bark and pine wood materials as fibre in our composts and as a substitute.

So how did this work out in practice?
Well all composted plant materials are now used externally outside in the gardens as mulches and incorporation to our soils outside. We do not use them at this moment in time as growing media in containers, or in beds. But of course by using all that sort of material like that, which is a resource, which would otherwise have been burnt or gone to landfill, or composted in a poor way, we have reduced the amount of water that we use for outside use and we can increase the organic matter in the soil. They are all obvious things to horticulturalists. Our growing medium mixes now have composted wood fibre and quoire so we have mixtures – the two together, and we have been using these for the last

thirteen years, instead of peat. So you can do it and I know there are other products but you will just have to find them out for yourselves.

In conclusion – there was pain before we succeeded and I won't deny it. Horticulturalists, growers, gardeners are conservative (with a small 'c'), they do not want to change. Why should we do that – we can just go and buy peat? And then you tell them the reason why, explain the habitat to staff working and that is probably something that has to be put over in a more clear way to people, the public – the people who are going to sell the products. Some staff were initially reluctant to change, there was anger, then reluctance and then acceptance. And then to paraphrase – if I can use it, it's a bit clumsy, - Its not a particular mix that gives the best results, it is the particular system of growing medium, and managing them that counts; put more simply, you can use anything really to grow anything – you just have to work out the management system for it. You could use sawdust, if you wanted to. You could use pure sand. So I think that is an important point. Where there's a will, there's a way.

We specify, just to close, to contractors making up our four main mixes, and I have a list of what we use internally - there's no secret about it. If some of you want to see it, we use materials from composted wood fibres, from sustainable resources. That's the key. We grow all our plants without using peat. It sounds desperately simple doesn't it? We're not a big organisation in comparison to other places and we use about 700 cubic metres, and then when we do really large areas we might use a few thousand cubic metres, of which not all of course is the peat replacement. That is the scale we are on, but as an organisation we cannot, or we could not carry on using *Sphagnum* peat, and explain and help other organisations to conserve their areas – it just didn't work.

Great Expectations

The English Heritage approach to the conservation and management of the historic environment in England's wetlands

Adrian Olivier – English Heritage

> 'The dark flat wilderness beyond the churchyard, intersected with dykes and mounds and gates with scattered cattle feeding on it, was the marshes; and the low leaden line beyond was the river; and the distant savage layer from which the wind was rushing was the sea; and that the small bundle of shivers growing afraid of it all and beginning to cry was Pip.'
>
> Charles Dickens – the opening to Great Expectations – describing the marshlands near Cliffe on the Thames Estuary (Rochester, Kent)

THE HISTORIC ENVIRONMENT

Wetlands are a key component of the historic environment. In many minds, peatlands have come to be almost synonymous with wetlands, and we are all familiar with a wide range of rural peatland environments. However, wetlands also exist in a wide range of other contexts: in the rural landscape; in an urban context; on the coast; and underwater.

Wetlands are an important source of raw materials including peat, aggregates (coast and sea); and a very significant agricultural resource. They are also a focus for leisure and recreation. They provide inspiration and enjoyment for visitors, and a source of livelihood, generating income for those who live and work near wetlands.

Conserving the historic environment is not about preventing change, but managing it. Decisions about the future of the historic environment depend largely upon value judgements which are consistent, transparent, widely accepted and understood, and made openly, tested and refined by continuing debate.

We must balance the need to care for the historic environment with the need for change. To succeed, our approach to its conservation must change focus away from the preservation of individual monuments. The most significant elements of the historic environment will always need individual designation, combined with careful and detailed control, but as in the natural environment, we now recognise that the overall health of the habitat is as important as that of individual species. To do this we need to understand better the character of places, and their value and significance, so that the whole spatial planning system can be made a better and more effective process.

Before we can manage the historic environment sympathetically, we need knowledge about how it developed, and we need to understand what it tells us about the past. Without understanding what exists today, its value and condition, we cannot take sound decisions about its future. We need access to proper and integrated research to help identify priorities and provide the basis for informed decisions.

Archaeology is one of the main tools for understanding the historic environment. It provides the essential techniques to study the past through its surviving structures, artefacts, and environmental data, and it reveals the story of human activity from the earliest hunter-gatherers to the present day.

THE ARCHAEOLOGICAL POTENTIAL AND SIGNIFICANCE OF WETLANDS

As well as their unique nature conservation values, wetlands are also a critical component of the historic environment and a unique archaeological resource. In most undisturbed wetlands, the anoxic environment inhibits the activity of certain microbes thus impeding the natural process of breakdown of organic remains. A high water table also excludes the disturbing activities of burrowing animals, and limits the rooting activity of trees and other plants. Unlike free-draining soils, saturation of the ground and the exclusion of oxygen results in the preservation of organic archaeological remains (especially wood) as well as natural and palaeoenvironmental material.

The particular significance of wetland archaeology therefore lies in two main areas. The excellent survival of organic materials within waterlogged deposits preserves much more evidence of the material culture of past societies than that surviving on dry-land sites. Wetlands also contain enormously valuable palaeoenvironmental information, which provides indications of the impact of past climate changes and human impact on the environment. All this evidence can be placed within a firmly dated framework providing detailed context for the past, whilst informing research into future environmental change.

PRINCIPLES OF CONSERVATION AND MANAGEMENT OF THE CULTURAL HERITAGE

The significance of wetlands for the historic environment and the cultural heritage has recently been summarised by Professor Bryony Coles in four archaeology-based fact sheets recently produced for the Ramsar pack on *the cultural values of wetlands*. There is no time to repeat that information here, or to detail any of the wealth of wetland archaeology from this country. The recent special issue of *Current Archaeology*, sponsored by English Heritage, which has been distributed to delegates, celebrates 30 years of wetland archaeology in England, and provides a useful introduction to the subject

It is important to re-emphasise the fact that all physical remains of past cultures, the source material of the historic environment, are finite and non-renewable. Each loss cannot be replaced, and each loss ultimately diminishes the whole. This is especially true of the inherently fragile and vulnerable material contained in England's wetlands

Of course, as managers of the historic environment, we recognise that not everything is of equal significance. We must be prepared to make real judgements about the value, character, and significance of what should survive, and these judgements need to be made in a context that looks beyond the interests of a single discipline or a single set of values. Such judgements must be based on sound knowledge. However, this is always difficult because of the hidden nature of archaeological deposits, and the difficulties of anticipating archaeological material, especially in wetlands.

As a first principle, it is generally acknowledged that it is preferable to preserve buried archaeological remains *in situ* where possible. If sufficient information is available, loss may be acceptable or even inevitable, but if so, it must always be properly accountable and justifiable, and recorded in an appropriate fashion.

We have made enormous advances in our understanding of the historic environment of wetlands in recent decades, but if we are to manage this environment properly, we must link our activities more directly with other disciplines working to similar objectives, especially in the world of nature conservation.

PRESSURES ON THE CULTURAL HERITAGE OF WETLANDS

Wetland landscapes, and the features and sites they contain, are a critical natural and cultural resource under increasingly severe threat of erosion and destruction. When wetlands are drained, or otherwise exploited (e.g. by peat cutting), oxygen is reintroduced into the buried environment and microbial activity recommences. This will result in the degradation and decay of material that may have survived intact for thousands of years. The draining of wetlands is usually then followed by changes in land use, most often to agriculture, which will have a further damaging impact on the buried archaeological evidence. The rate of loss is staggering, and unless we take positive action to develop practical conservation and management strategies, the cultural heritage component of wetlands will disappear largely unseen and unrecorded.

The biodiversity and historic environment of wetlands have much in common. Both depend on maintaining these special places, since their destruction removes both the natural and the cultural heritage. However, even though some wetlands can be created or rehabilitated to 'restore', at least in part, their ecological values and features, once a wetland is drained or destroyed, its unique cultural and historical features are lost forever.

We must make common ground with Nature Conservation within the broad framework of existing instruments and conventions (e.g. Water Framework Directive; Ramsar Convention, etc.). We must integrate our data sources and develop integrated management approaches.

A FUTURE FOR ENGLAND'S WETLANDS – THE ENGLISH HERITAGE STRATEGY

The English Heritage strategy for wetlands follows three broad principles: *collaborative partnerships*, *extended management* (whole wetlands, not sites), and the *promotion of better conservation and access.*

The strategy has four main components:

- Management strategies
- Education and outreach
- Policy and procedures
- Research and understanding

Management strategies:

We will promote practical mechanisms to integrate cultural heritage and nature conservation values in wetland management. These include:

- an inventory of the most important wetland monuments in England;
- development and implementation of a conservation management strategies for the most important wetland monuments at risk;
- development of pilot 'beacon sites' as platforms for inter-agency co-operation;
- development of conservation management strategies for wetland landscapes (with other agencies);
- contributing to Ramsar Convention best practice guidelines for the inclusion of cultural heritage in the conservation and wise use of wetlands;
- development of procedures to monitor and maintain environmental status of wetlands and to monitor illegal or accidental damage to the wetland cultural heritage; and
- contributing to the development of a manual for the conservation and enhancement of the cultural heritage of wetlands.

Education and outreach:
We shall raise awareness of the values of wetland archaeology by promoting and disseminating an understanding and appreciation of wetland heritage and by making the results of wetland research easily accessible to the general public, to landowners and managers, and to professional interests. This includes:

- development of educational mechanisms which promote the interdependence of cultural and natural values in wetland landscapes.
- participation in the next Conference of Parties to the Ramsar Convention (Valencia 2002), which will include a major technical session that will focus attention on cultural issues;
- broadening public access to wetland archaeology by disseminating information through the popular media, including television, radio and web-based resources;
- playing an active part in the annual World Wetlands Day (February 2);
- encouraging public participation in wetland research through 'fieldwork open days' and appropriate publicity; and
- developing (with European partners) a major travelling exhibition on cultural heritage and wetlands.

Policy and Procedures:
We shall promote the cultural heritage interests of wetlands in the work of local authorities, national, international, and intergovernmental agencies by:

- continuing to press for changes in legislation, policy, and planning regulations to ensure that appropriate mechanisms exist to conserve and protect our most significant wetland sites, monuments, and landscapes;
- developing, in consultation with the Association of Local Government Archaeological Officers (ALGAO), a GIS-based resource for curatorial authorities to be used in the planning process;
- holding joint discussions with ALGAO and the Peat Producers Association (PPA) to agree a consistent policy where peat is being extracted commercially;
- developing with ALGAO, PPA and other interested parties, draft planning conditions and supplementary planning guidance related to wetland archaeology;
- developing training opportunities in wetland archaeology aimed particularly at development control archaeologists and nature conservation managers;and
- producing 'best practice' guidance for use by the peat industry, conservation bodies, landowners, and farming and wildlife groups.

Research and understanding:
We shall develop a coherent research strategy to enhance the understanding of monuments at risk in England's wetlands and the pressures upon them. This will include:

- continuation of support for field research (an essential pre-condition for the development of management practices) and applied research to underpin good wetland management and to inform future policy development;
- continuation of the programme to identify monuments at risk in England's wetlands, and to understand and quantify related threats (including qualitative assessment of the archaeological potential of deep peat and alluvial deposits);
- commissioning pilot surveys of upland peats (linked to an assessment of erosion);
- assessing waterlogged urban deposits and inter-tidal deposits, and developing a complementary strategy for these environments which can be integrated with the current urban and coastal survey programmes;
- investigating wetland-specific prospection techniques and advance studies on in-situ preservation in wetlands and research into the causes of peat wastage; and
- developing research into the impact of statutory designations on the conservation of archaeological sites and monuments in wetlands.
-

Priorities and implementation
Our current priorities are to:

- identify the most important wetland monuments at risk and develop site specific conservation management strategies;
- work with national and international agencies active in wetland management to develop joint policies for the conservation and preservation of wetlands;
- help local authorities address the issue of wetland archaeology in the planning process more effectively;
- work with other bodies to address wetland cultural heritage issues that fall outside the planning process;
- enhance our understanding of monuments at risk in England's wetlands and the threats to wetland landscapes (focussing in particular on upland peatlands and lowland landscapes deeply buried beneath peat and alluvium); and
- build a coherent research strategy to develop wetland-specific prospection techniques and to advance studies on *in-situ* preservation in wetlands.

English Heritage has already committed considerable resources to recording England's main lowland wetlands, and we have also commissioned the research to enable the development of this strategy. English Heritage will continue to support work that directly relates to the objectives of the strategy. We are also developing a number of new initiatives:

- an inventory of the most important wetland monuments in England will be compiled as a pre-cursor to the development of site specific conservation strategies;
- we are participating in a European-wide project (EVALUWET) which is developing procedures and tools for the monitoring and assessment of wetland functions. This will ensure that the historic environment is fully incorporated into wetlands management systems;
- we will continue to play an active part in World Wetlands Day (2nd February each year) to raise the profile of the wetland cultural heritage amongst the general public and nature conservation world;

- we are exploring how to support public participation in wetland research during fieldwork;
- we have commissioned a project to create GIS-enabled wetland archaeological resource information to support local authority planning curators; and
- we will begin a pilot project to explore the archaeological potential of upland peats, and to assess the extent and causes of upland peat erosion.

CONCLUSION

The English Heritage strategy for Wetlands provides a framework to help us establish, with our various partners, more effective co-operation to safeguard all the different elements of these physically fragile but emotionally powerful cultural and natural landscapes.

'What would the world be, once bereft
of wet and wildness? Let them be left
O let them be left, wildness and wet;
Long live the weeds and the wilderness yet'

(Gerard Manly Hopkins: Inversnaid, 1881)

Producing a Peat Free Media

Terra Eco Systems and the peat free growing media.

Mark Lewington – Terra Eco Systems

First a bit of potted history of who Terra Eco Systems are, and where we come from. We were formed in 1989 as the recycling arm of Thames Water and one question that a lot of people might ask is what water companies have to recycle. It is water - either abstraction or putting it back into the main water courses, but once the water goes back into a water course, probably the subject that most people don't actually like to discuss is what happens to the organic matter, afterwards referred to as either sewage sludge bio-solid residuals and 'other' sludges; these are a by-product of the sewage treatment process. These bio-solids are very rich in organic matter, and for a number of years Terra Eco Systems have been focused on providing the most environmentally sustainable options for the recycling of these bio-solids, which primarily focused around recycling for agriculture.

We recognised a number of years ago through some research and development work that there were other markets apart from agriculture - fertilisers that were used for ground mediation, soil rebuilding and also the possibility of development into a horticultural growing media operation. We have recycled in England alone something like 25% of all bio-solids produced and in Scotland it is actually a figure of nearer 75% which is equivalent to about £ 1.6m.

So moving onto the history of our growing media, Thames Water have done a lot of R&D work into finding methods, apart from the traditional anaerobic digestion, or thermal treatment of bio-solids, as to how we get the alternatives which can be cost effective and more environmentally sustainable in actually getting these products and recycling them and composting more to developed as a method. After a number of years work, it was found that the product was suitable as a soil improver and with some further processing as a growing medium, and so we started to sell the products, largely in the South East, as that is where we mainly operate, and very much as a cottage industry, before we started to bring in a specialist to actually market and sell the product. Even as a cottage industry things went rather better than most people expected, and we had to pull out of the market in February 2000 because we could not meet the demand from the consumers. So we spent the time formulating new products, designing new packages, making sure we actually had the stock to meet the demand, and then re-launched in November 2000 with the new packaging, which was much more aimed at the retail environment and much more attractive to the consumers. Since then we have found that we have had something like 200% year on year growth rate.

Well how do you take bio-solids and make them into a growing media? Well it is like any good recipe, and it has its series of ingredients and the easiest comparison is that it is like making bread but rather than taking a few hours, it takes quite a few months. So to the ingredients, well, to bio-solids in cake form, which means that they have been through the de-watering process so they are in the region of 28-30% dry solids, we add some wood chips to give some structure to the materials so that you can get the right consistency, These are mostly big chips, not the small ones that are used in chipboard, and the remainder is of course a little help from Mother Nature. The method,

as in all recipes is that you mix well, place into a covered container, and let the micro-organisms do their work for a while -they are like yeast in bread, and we leave it for a minimum of 28 days, rather than 4-5 hours if it were bread. So since it is on a much larger scale, we need much larger cooking utensils. We take the woodchip and bio-solids, chuck it in one end and it comes out the other end all mixed together. We then take one empty composting bag, fill with the mix, close the doors, leave them, and let the magic begin. Once they have been in the bay for something like 28 days, and we make sure that we have had the right temperatures for the right periods of times. Next, we take the product out of the bay, and allow it to settle for a day or so. This allows any moisture to drain out before we put it through a screening process. This allows the composted materials and the smaller elements of woodchip to be taken out, and any of the larger elements of woodchip we recycle back into the process. So from commissioning we are using large amounts of woodchip, which actually produces something like 20% of the product because of the recycling.

Just to give you an idea of the size of the building used, the dimensions are something like 120 m long by 40 m wide.

Well how does the method work?

Once we have got the material into the bay, we allow it to settle for 2-3 days so that the micro-organisms can do their work and then it is a question of making sure that we get sufficient air through the pile and that we actually extract as much moisture as possible. We do this in bays where we suck the air out of the bottom on a timed regime and that draws fresh air through the heap and sucks down any moisture; typically this is on a cycle of 3-4 times a day. If we find that if for any reason the top of the mix is getting too dry, then we have an irrigation system where we can re-wet the composting material.

Well the technical bit - as I said the minimum time for composting the whole is 28 days - The temperatures ranges are a minimum of 55° for 3 days and then 45° for the remainder of the time; occasionally we do find temperatures up in the region of 70°. This is another reason for the aeration regime because that temperature is not really conducive to composting, and we have to use that to bring the temperatures back down to the control zone to maximise the effects. It is a cheap and necessary packaging to provide a safe, sanitised base material for the range of horticultural products that we have developed from it. The temperature is constantly monitored throughout the process, normally 2-3 times per week, and before the mixture leaves the building, we send it away for the first of many analyses to make sure we know exactly what the pathogen levels are, in order to understand what the nutrients are developing, and to give us some idea as to how much more maturation the compost will take. After this, we send it away for maturing. Rather than put it in a van and send it away somewhere, we just take it to the other end of the composting operation, and we have to treat it a little bit like a fine wine, which means we have to lay it down for a while, which is typically a 10-12 month period. Now throughout this time rather than just leaving it static, which would cause some temperature elevation again, we constantly turn the product and this assists in getting the air in, reducing excess heat and excess moisture, and also aids in the product actually breaking up; again sampling and analysis is used to monitor development.

At the bottom of the maturation heaps, with what looks like the Loch Ness monster poking out the top, is actually the compost conditioner, where we just load the compost from the back end and it throws it up in the air where it is broken up into smaller pieces.

So how do we get to the finished product? Well as in all recipes, you just need a few more ingredients. Composted green waste is then added to the composted bio-solids to help dilute some of the nutrient levels and to actually make the product go a little bit further. We then leave this for approximately another month. This is to allow the green composts into the bio-solids, and we then analyse the material for nutrient levels and to check that there is no *E. coli* or *Salmonella* present. We then take the product and screen it yet again to remove any of the large elements, which are then diverted back into the maturation process and then we add some coir, not the normal highly compressed form that most people purchase, and this has the ability to reduce density and improve the flow characteristics so that the product is much more like a traditional peat based medium.

Once all that is done, we send it away for bagging and then it is s h i p p e d o u t to retail outlets. We produce three different types of product, all clearly labelled as a multi-purpose compost with a strong peat free message across the front. We also give the amount of coir into the product. We also market growbags. We have the basic green waste and composted bio-solids together, and then we have got a very nutritious soil improver.

What other suitable alternatives to peat are possible? Well, we have already found that we can compost bio-solids and produce a product, but we have had to add elements of composted green waste, and we have to ensure that the quality of the green waste that we put in is going to match the quality of the final product. We would like to move away from relying on coir, so we are investigating other materials such as aged bark, which can be used at to improve the flow characteristics and reduce by-products. Also from the point of view of sustainability, it means that we can be more sustainable from a UK point of view without relying on bringing chip and coir half way across the world.

A huge issue is product development. The timescales are really quite horrific with the R&D. The new product has taken us 12 months to make a compost with varied processes and varied mix. It is going to take another 12 months for us to end up with something that we can then use to go into growth trials. Growth trials can take 6-12 months, so we are looking at potentially a two year time lag before we can bring a product to market. The other thing that we are always aware of is that whereas peat is a very uniform product, which delivers very consistent results, you might find that dependent upon which stock goes into the compost, the end product is a growing medium that is suitable for a certain class of plant, and therefore we can start to develop into niche markets.

Supply and demand - a huge issue at the moment because with having a 200% year on year growth in sales, we have got to try to second guess what is going to happen a year and 18 months down the line. With more and more consumers being aware of the peat free message, then this is putting more pressure on us to try and second guess what is going to happen to make sure that we have got a product ready. Because manufacturers of peat free growing media cannot meet the demand from consumers, there is a very real danger that unless we can manage their expectations, we will turn them off the message. That would be disastrous at this stage, when we are beginning to make some headwav.

As in all marketing, you have got to have the product in the right place at the right time, so it is vital that the distribution, garden centres, and other retail outlets continue to promote the peat free growing media. The other big issue, which is probably more

unique to the UK than other countries around the world, is because a lot of the process happens outdoors, if we have a particularly wet year, then it can actually lengthen production time by 2-3 months, which then has a knock on effect on supplying demand.

There remains the problem of consumers' perceptions. The initial view of most people when we told them that the growing media they were going to be using was actually sewage sludge, was a significant `yuck' factor. So we have had to try to manage the perception and explain to the consumers that this product is safe, it has been sanitised, and it is has been tested, otherwise we would not launch it on to the market.

In terms of reliability, the product has to provide consistent results. There can be no hit or miss, otherwise, again, this is going to reduce the consumers' demand for this type of product.

The Minister mentioned that British Standards are required for composted materials. We are taking an active part in trying to help to develop these to move forward, not just the compost and green waste, but the composting of other materials such as bio-solids or another typical project that we are working on for a major coffee manufacturer - we actually compost coffee waste for spreading onto agricultural land.

How people use the product is also going to be critical. Everybody has just got used to going and buying a bag of peat based compost, planting out in it, watering it and getting the results. Just because somebody is buying a peat free growing medium, it does not necessarily mean that you have to treat it in the same way. It is vital to get the consumers to actually read the instructions to understand when they need to water; otherwise it could have adverse effects, which again will not help the overall image of the peat free growing medium.

The product has also got to be extremely sustainable, Both environmentally and financially, because if we cannot make it financially sustainable for manufacturers and for retailers and for the people actually using the product, then we might as well pack up and go home. Also, we need to make sure of our supplies, that we have the right quantity, we have them at the right time, and that we try to recycle as many materials as possible.

The main issues we have to contend with are:
Forecasting what the market will demand and to try to meet that demand.
Reducing the production times to give us flexibility - always a compromise between maturity and meeting consumers' expectations.
Marketing. In the past this has not been so strong, but now we have got to look at peat based products, and plan our tactics - The right product, the right place, right packaging, and the right time. We have found that, since we reduced our price last year when the peat free was a premium, we can now compete head on at the same price, again this helped to increase sales. It has got to be in the right place, otherwise people will not buy it or they cannot buy it. To be competitive, we have to have the right quality and it has to be sustainable.

Scotts R&D of Peat Alternatives

Paul Waller – Scotts U.K.

I stand before you today as the only person, as far as I can see, who has come to the platform, who has been, in our Chairman's words, 'At the wrong end of a Craig Bennett campaign'. I actually met him recently and he is really rather a nice guy, and as you will see he is quite influential because I have got the word 'sustainable' in my presentation, as he suggested. Secondly, I don't have two horns and a tail! Thirdly I would like to mention quite specifically that the title of my talk and the invitation to come here not only came through Helen Kirk, but also through Nick Kirkbride, the MD of Scotts UK, and I can tell you quite directly that he is highly committed to peat replacement. I see Craig nodding there.

The first thing to say is that Scotts is operating positively on the basis of a twin strategy of peat dilution and peat free. In order to do this, however, we as a commercial company do need access to appropriate materials in industrial quantities at prices that allow us to compete in the market place where we do not set the benchmark prices. Strategies are being developed to enable the widest application of sustainable indigenous waste wherever possible, but it is critical that these materials are able to deliver the consistent performance which is demanded by our customers. It is our policy to avoid using materials that are dug from the ground, other than peat, of course, mined or produced primarily by milling.

R&D have a number of objectives to meet in order to deliver this, and I will draw attention to the need to ensure that our premium brands meet their claims for top quality performance and fitness for purpose, and this of course relies upon the quality, consistency and safety of the materials used. In order to do this, we are developing our own minimum standards, which suppliers should meet, and be assured that certificates of analysis are sent with each batch. We have yet to implement this but aim to do so.

There is much still for us to learn, although I have been working with peat alternatives for 27 years since 1975. I was instrumental in introducing the first Fison peat free compost in 1984, based exclusively on bark, but the problem is that the materials are not consistent. In addition, suppliers change their price structures and there are all sorts of other issues. Apart from the physical and chemical variables, understanding what constitutes acceptable, good or best performance is something we are addressing, particularly given that one mix is unlikely to work for other uses. Here is a list of the options which are available to us now and the first two of these we are actually using in Natures Way Peat Free Multi Purpose, but supplies are limited. Green compost is apparently limitless in supply and securing large volumes from one of the few reliable suppliers is key, but this is something that Scotts has only recently achieved. Both coir and wood fibre are both expensive and suffer from supply issues.

Lets look at some of the plants we grow *(slide displayed showing plant trials but not available for inclusion in paper)*. Now, what I would like you to do, if you would just look at the front row – look at the colour and size of the plants, and if I run my pointer with a slightly shaky hand across this, I will roughly trace the specimens. OK? Now the plant on the left, this one, is grown in 100% Hatfield peat, the next three columns have got progressive dilution. Can you read the numbers on those pots from there. 25, 40 and

60% dilution with green waste, the crop of course is the Christmas Cherry, and you can see there I think that the plants look a similar green, with a slight climb in size towards the end. The next plant is grown in Irish peat, and is not growing quite as well as the Hatfield. The addition of green waste has increased colour, but actually there is a decline in growth size in response to increase in dilution again; 25, 40 and 60% dilution is actually slightly greater so there is a slight increase in colour but a greater response to the increase in green waste or negative response to increase in waste. The next two plants are grown in Baltic peat with 25 or 40% green waste. Here again the plants are smaller still. The plants at the end are grown in two peat free products. This particular plant does not seem to like growing in these materials. One of these is a Levington product, and the other is by another supplier. The conclusions from this trial, or this demonstration of a trial, is that the Hatfield peats tend to perform a little less well with or without the green waste and that this particular species tends not to like peat free.

This is a petunia [*slide*]. Now petunias are a lot more sensitive than the *Solanium*..Let us start in the middle here. Here is the standard. Here is a particular batch – Irish peat. The next three columns are the deductions and dilutions, and the one on the left is peat free, again the two pots, the orange label is a competitor and across the front there are two different rows. These represent different sources of green waste. Unfortunately they are not consistent, and do not give reliable results.

There are some alternatives that we are not currently using, and we shall look at these. We have said that bark is going to be in short supply and would need to be imported, and I can see that there is going to be competition between suppliers for the available resources in the UK. We can look at local green waste sources, not just the ones we have located so far and that are closest to the Works. Composted wood chips are interesting, and composted paper sludge, and even bedding straw have been offered to us.

Now this is the photograph of a demonstration that was set up for a trial, and I shall take you through it. What you have to do is concentrate on the front row. Tomato is fairly vigorous, robust and hungry. The plant on the left illustrates this. It has 40% composted paper sludge in peat and is doing pretty. It has done about as well as the bark we were using as the comparison and nearly as well as in peat. Then we come to the peat free option. This is the competitor – very vigorous and doing very well. This is Natures Way peat free multi purpose compost. This is the Scotts' offering. Don't please make the initial judgement that this is a weaker product, a less strongly formulated compost with a greater flexibility in its use. Because this is a hungry plant, it grows well. The next rows contain the composted paper sludge mixed with bark and going from left to right – we have 25% plus 75% of the bark, 50:50, then 75% composted paper sludge, and the last one could equally be – I don't know what that one is but that equivalent to 100% composted paper sludge mixed with bark. Not exactly a success – so you win some, you lose some.

This slide is using a petunia, sensitive plants. We start again – let us start with here. This is the competitor's peat free materials. We did not have an equivalent one to put in there, but we did have Natures Way peat free multi purpose compost from Scotts – two plants. Here this plant is slightly bolder than that one, whereas in the tomato it was the other way round. Coming across on the right we have the same problems as before. Progressive increase in proportion of composted paper sludge mixed with bark. We have had in the front row, compared with the back row, two different batches of this material from the same supplier. Consistency is what we require; consistency is not what you are getting.

Obviously there is a lot for us to do, and what we are going to try to do is to match better the materials we have got and to neutralise the nutrient status that is available within the mixture. There are a couple of things for us to bear in mind as experimenters, first of all with peat and then with the alternatives. It is a fact both in these trials and in previous trials and well understood, that the darker more humified peats do get buffered, and it is the organic waste that needs the buffering. The younger peats - and we believe that we should need to continue using peats for some time - actually present more challenges for a growing medium. However as you can see, my brief is to eliminate as much peat use as is possible and of course to eliminate the use of Hatfield peat in Scotts' promotions.

There are other factors. As I have said, bark demand is such that it has to be imported. We are expected and expect to use green waste, but source, consistency and plant pathogens are real concerns. We believe that wood waste and industrial sludges will in the end be attractive sources of material and we are looking at these closely.

I have undertaken a lot of analysis recently of particular sources of materials, and here [slide] I have compared the levels of these individual components down the left, that you find in either coir or bark, which are low nutrient materials compared with composted wastes and the comparison is with a fully formulated typical Levington compost. N2 is the standard glass house potting and bedding compost – the industry standard if you like. So you can see that coir and bark is weak and low in these materials, but the composted waste actually causes problems and it is quite usual to find 13 – 14 times as much potassium as sodium in these materials, and there are lessons to be learned from that.

Perhaps of more concern is the level of PTEs – Potentially Toxic Elements. Again two different columns, different orders of magnitude compared with the previous slide. These various metals and heavy metals are a bit troublesome in environmental terms. High levels in coir and bark but do not exceed any limits, don't cause us any formulation problems, as far as we are aware, except manganese occasionally. In composted waste we have one hundred times as much, since we have food formulation products.. With such high levels, we are exceeding both the Composting Association Standards and Ecotoxicity Standards.

Conclusions from the analyses.

Well basically from these results, it is clear that the process needs re-evaluating, and there is a need to put weak materials with them. Suitable, reliable, economically viable alternatives to peat are still hard to find in industrial quantities. Green compost and the like will themselves need dilution with bark, etc. In seeking to develop ways to increase the application of peat alternatives in growing media and I am talking about growing media, not soil improvers, we need to ensure that the properties of the material are better matched to the application and the plants and to support this, new ways of market segmentation may be required. As Tony said to me over lunch, 'What we need is horses for courses'.

Peatlands and environmental change: a long term perspective on peatland management and restoration

Dan J. Charman - School of Geography, University of Plymouth

Introduction

The location of this meeting, Thorne and Hatfield Moors, is just one of the world's peatlands which has suffered huge damage over the last few hundred years. Large parts of the peatland resource in northern Europe and some other areas of the world have disappeared, or been so severely impacted that they no longer function as peatland systems (Charman 2002). Not surprisingly, the response to this situation is to preserve the few remnant sites and to attempt to restore some of the more significant damaged sites. Restoration receives most attention in areas where damage has been greatest, such as in the Netherlands, Germany and the UK, or in regions where there is a strong political or commercial incentive to do so. Given the urgency of protection and restoration there is sometimes a tendency for us not to see peatland management aims and activities in a broader temporal context. This is despite the fact that one of the characteristics of peatland ecosystems is their relatively slow response to management and perhaps even more strikingly, their ability to record past change in the peatland archive. In this paper, I want to examine longer term perspectives and discuss some key aspects of peatland management and restoration in the light of the palaeoenvironmental record. Three areas will form the focus here:

i) Peatlands as changing systems. Management targets are necessarily focused on achieving a particular end point, often suggesting stable conditions are desirable. However, peatlands are constantly changing even in their natural state. We can use the palaeoenvironmental record to establish what natural conditions are, to explore the extent of natural change, and to determine the main drivers for change. This information can be used to determine acceptable limits in peatland condition.

ii) Peatlands and the carbon cycle. Carbon conservation and management is often mentioned in peatland conservation, but there is a lack of precise information on how important peatland carbon is relative to anthropogenically generated atmospheric carbon emissions. A further important question is over the relative importance of the carbon pool in peatlands compared to their ability to continue to sequester CO_2 from the atmosphere. Should management focus on preservation of the carbon pool or on increasing carbon sequestration?

iii) Climate changes and peatland management. There is huge concern over the impact of future climate change on wildlife conservation including peatland habitats. The problem is our inability to predict what might happen to peatlands as a result of climate change, even if we assume climate predictions are correct. In the peatland archive, however, we have a perfect record of past response to climate change and we can use this to get a much clearer idea of potential future impacts.

All of these issues may lead us to a reconsideration of our aims and aspirations in peatland management. When we consider restoration, it is important to remember that a realistic timescale for returning badly damaged systems to favourable conditions is long, perhaps as long as 50 to 100 years. It is therefore imperative that we also consider how factors outside our control will influence the peatland. We may be able to mitigate some of the external influences but in other cases we may need to ask hard questions about whether our management targets are achievable and sustainable in the long term.

Peatlands as changing systems

Peatlands change constantly. This simple fact is evident from any palaeoecological record from any peatland anywhere in the world. Some are more stable than others in terms of plant communities, surface wetness, carbon accumulation or any other measure of stability, but they all change. Visually, peatlands can appear to be relatively static, unchanging features in the landscape but the dynamism of water movement and subtle differentiation of plant communities is shown when we look from afar through satellite images with swirling water pathways and complex vegetation patterns picked out in false colour composites (see Glaser 1992, for example). Historical observations over long periods of time also demonstrate the dynamism and changing nature of peatlands. For example, the development of floating *Sphagnum* mats in kettle hole peatlands in North America can be seen in photographs from the early 1900s onwards emphasising the relative rapidity of changes in some systems (Warner 1993). A more conventional way of looking into the past and obtaining a view of continuous time, is to use palaeoecological records. Many such records extend over thousands of years but we can also look at changes over shorter time periods in greater detail.

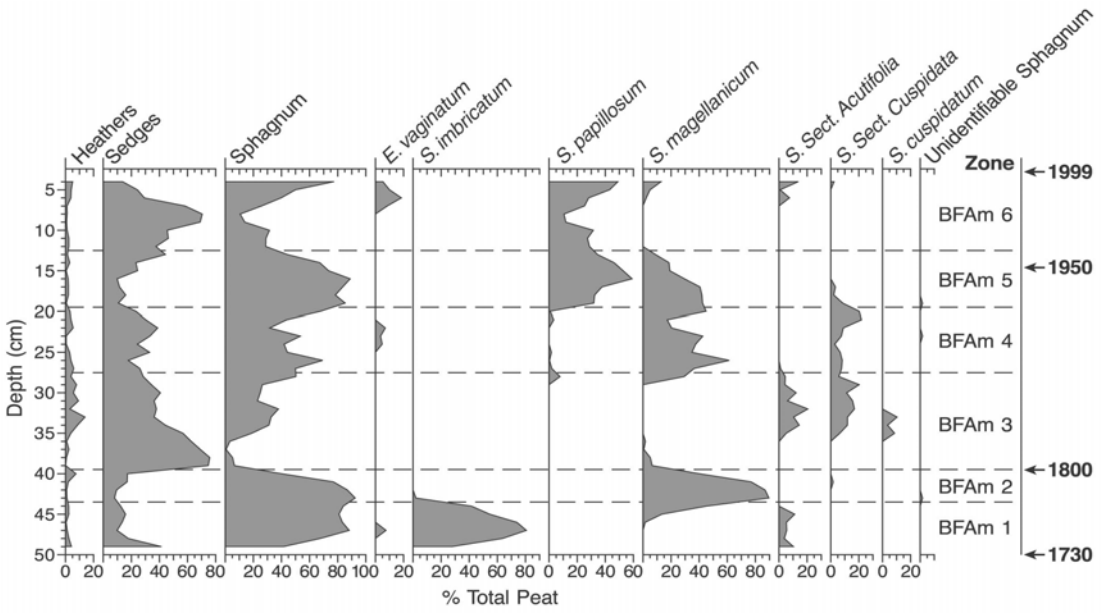

FIGURE 1: CHANGES IN THE COMPOSITION OF PEAT DOWN A SHORT CORE FROM BUTTERBURN FLOW, CUMBRIA. THE CHANGES IN THE BOTANICAL COMPOSITION OF THE PEAT REFLECT CHANGES IN THE SURFACE VEGETATION OVER TIME. THE DATES ON THE RIGHT HAND SIDE ARE DERIVED FROM CHANGES IN POLLEN CONTENT AND INDUSTRIAL PARTICULATE FALLOUT. SEE HENDON AND CHARMAN (2004) FOR DETAILS.

Figure 1 shows the changes in main peat components over approximately the last 270 years from Butterburn Flow, a large raised mire in Cumbria. The site is considered to be largely undamaged so the changes probably represent natural variability related to climate and internal peatland dynamics. Throughout most of the 18th century, *Sphagnum* was dominant at the sample site but towards the end of this period, *Sphagnum* shows a

dramatic decline and is replaced by sedge dominated peat. Following this there is a period of slow recovery in *Sphagnum*, but ericaceous dwarf shrubs also show some expansion during the early 19th century. By the early 20th century, *Sphagnum* has recovered to its former extent, only to decline again in the period after about AD1940, almost disappearing in the 1980s. Changes in the top few cm suggest a further recent recovery but this is difficult to be sure of because the top layers of peat are incompletely decayed so that data are not directly comparable with earlier periods. What we can say for sure is that over the last 270 years, this site has seen at least two periods of *Sphagnum* dominance with intervening phases when other taxa (notable sedges) replaced *Sphagnum*. This suggests that reductions in Sphagnum cover and other species indicative of relatively wet ombrotrophic mires which have occurred over the last 50 years may be part of a natural response to changing climate rather than as a function of management changes (Hendon and Charman 2004; Chapman and Rose 1991).

Seen against this background, we should perhaps not be unduly concerned about changes in the relative extent of *Sphagnum* on sites where there is no obvious direct cause. Instead we should embrace such changes as part of the fascinating variability of peatland vegetation. Management efforts which attempt to keep peatlands in the same condition over decadal to centennial timescales are fighting against nature, not working with it.

Peatlands, carbon cycling and UK carbon emissions

One of the areas in peatland conservation which sometimes receives only a secondary mention but probably warrants much greater prominence is the role of peatlands in the global carbon cycle (but see Immirzi et al. 1992; Maltby and Immirzi 1993). Perhaps even more politically significant in the national context is the contribution of peatlands to conserving carbon and limiting greenhouse gas emissions. Here, I want to explore some data relevant to this issue. Thorne Moors and the UK peatlands occur in the broad band of peatlands which occur across the mid and northern latitudes of the northern hemisphere. In this respect they are reasonably representative of peatlands in the temperate zone. The question arises over to what extent they can contribute to the global carbon pool. The total global soil carbon is in the region of 1400 Gt carbon – almost twice the total carbon content of the atmosphere. Of this total soil carbon pool, somewhere between one quarter and one third is held in peat deposits. This is around three times the amount held in rainforest soils. Clearly peatlands are an important element of global carbon pools and on this basis alone we ought to defend them against damage which causes a loss or release of the carbon through oxidation of peat carbon to carbon dioxide (CO_2). On a UK scale there are two ways of looking at the contribution to carbon cycling. First, how much carbon is held in our peatlands? Second, what is the annual carbon exchange between peatlands and the atmosphere? Precise estimates for either of these figures are hard to arrive at with any accuracy but we can at least make some educated guesses.

If we assume an estimate of approximately 1.64×10^6 ha total peatland, an average depth of 1.5m and 5% dry weight of carbon, the total amount of carbon in UK peatlands is 1,235 MtC. Expressed another way this is equivalent to 4,570 Mt CO_2. To put this in perspective, the annual UK greenhouse gas emissions are approximately 637 Mt CO_2 equivalent (1999 figures), so the total carbon held in peatlands is about 7 years worth of CO_2 emissions. Looking at carbon exchange, the figures for peatland demonstrate that there is perhaps less to lose. In terms of CO_2 equivalents, the potential accumulation of carbon over the entire UK peatland area probably does not exceed 6-7 Mt CO_2, or only 1% of the total UK greenhouse gas emissions. Thus the pool of carbon is far more important than the

potential carbon sequestration, at least in the short term. Management strategies might be guided towards preservation of the carbon pool rather than necessarily at maintaining sequestration. Thus rewetting of peatland is certainly worthwhile if it prevents remnant peat from further decay, even if peat forming vegetation is never reinstated. Although such restoration efforts might be regarded as less than successful from a biological point of view, they are undoubtedly very valuable for climate protection and limiting national greenhouse gas emissions.

Peatlands and climate change: back to the future

A final area where we might usefully apply understanding of long term changes on peatlands to future management issues is in the area of climate change. There has been a huge amount of research on reconstructing climate change from peat stratigraphy, with a primary aim being to understand the climate system and the ways in which climate has changed over centennial and millennial timescales. However, we can easily look at the results of this work from another perspective and ask what it tells us about how peatlands react to climate changes of different kinds. Typically, records of past climate change from peatlands involve using biological evidence preserved in the peat such as plant macrofossils or protozoa ('testate amoebae') or using chemical and physical characteristics of the peat to reconstruct the past surface wetness conditions (Blackford 2000). Surface wetness is assumed to be related to the 'effective precipitation' (annual precipitation minus the losses due to evapotranspiration) and thus directly to climate.

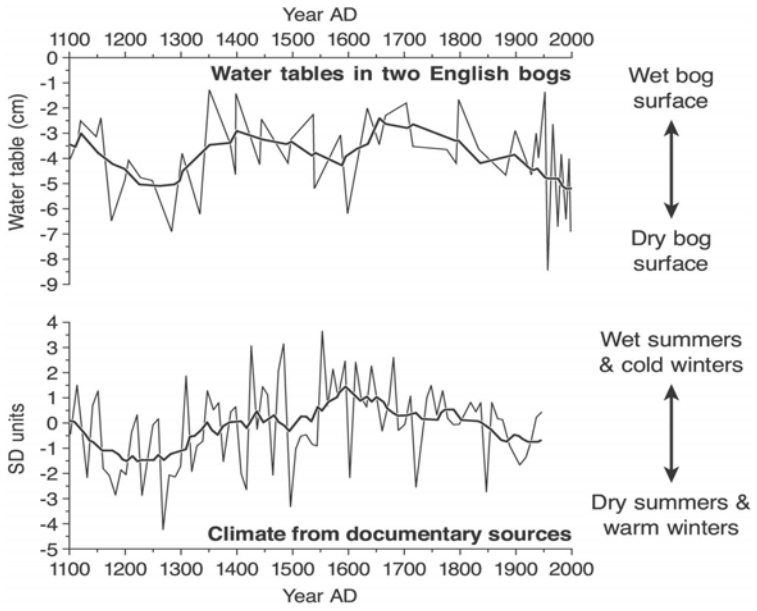

FIGURE 2: A RECORD OF WATER TABLE CHANGE OVER THE PAST 900 YEARS FROM TWO ENGLISH BOGS (TOP) COMPARED TO AN INDEPENDENT DOCUMENTARY RECORD OF CLIMATE CHANGE OVER THE SAME TIME PERIOD. THE TWO RECORDS SHOW VERY SIMILAR CHANGES DEMONSTRATING THE STRONG LINK BETWEEN BOG WATER TABLES AND CLIMATIC CONDITIONS OVER CENTENNIAL TIMESCALES. THE THICK LINES IN BOTH PLOTS ARE RUNNING 100 YEAR MEANS. BASED ON CHARMAN AND HENDON (2000).

Figure 2 shows one such record covering the last 900 years – a relatively short period of time in the context of the 11500 years since the last ice age. One of the problems in reconstructing climate change from such records has been that it is unclear whether a wetter bog surface primarily reflects increased precipitation, decreased temperatures (via decreased evapotranspiration) or both. This limitation in understanding of the climate-peatland relationship also limits the usefulness of the records in predicting what might happen to peatland surface wetness under future climate change.

Recent work has shed some light on this problem and allows us to begin to say with a little more confidence what we might expect to happen in the future given current predictions of climate change to the end of the 21st century. High resolution reconstructions of past water table changes have been compared with meteorological records for the last 200 years at sites in northern England (Butterburn Flow) and Estonia (Männikjärve bog) (Charman *et al*., 2004). In the English site, there is a strong correlation with summer precipitation but no clear relationship with temperature.

	N England	**CE Estonia**
Annual precipitation	0.188	*0.716
JJA precipitation	*0.458	0.437
Annual temperature	0.026	0.260
JJA temperature	-0.046	*-0.698
Annual water table		*0.654
Summer water table		0.406

Table 1: Correlations between climate variables and reconstructed water table records for two peatlands. The record from England is a decadal average from two cores covering AD1800-1999. The Estonian record is a five year average from a single core (AD1951-2000). For Estonia, the reconstructed water table record was also compared to an instrumental record of water table. * $p < 0.05$. Extracted from Charman *et al*. (2004).

In contrast in Estonia, it appears that annual precipitation is more influential and summer temperature plays a role in depressing water tables. These are only correlations and do not necessarily demonstrate cause and effect. However, these findings do make ecohydrological sense. In oceanic peatlands such as those in the UK, peatlands are saturated through the winter period, generally from early October through to the end of April. Excess winter precipitation runs off and thus has no bearing on an annual average of water table. In summer, temperatures are always relatively low and water table variability is primarily related to the amount of precipitation. As we move across Europe into a more continental climate regime, the hydrology-climate relationship changes. The peatlands are frozen for most of the winter months, perhaps from November through to the middle of April, depending upon the exact location of the site. Winter precipitation builds up on the surface as snow and the major input of water occurs during snowmelt in the spring. Summer precipitation keeps the surface moist but higher summer temperatures are a major modifying influence on the water table status. Added to this, the effect of summer temperature is probably even greater on moisture content of the surface moss than it is on water table, and it is moisture which the biological proxies are related to more strongly than the water table position *per se* (Charman *et al.*, 2004).

What are the implications for the future hydrological status of peatlands in the UK? If we take current projections of future climate change for northern England, summer temperatures are predicted to increase by between 2 and 4.5 ^{o}C by the 2080s and summer precipitation is expected to decrease by 20-50% over the same time period (Hulme et al. 2002). While increases in winter rainfall are predicted (up to 30+ %), this will not compensate for the reduced rainfall and increased evapotranspiration in summer. Peatlands will still be saturated (perhaps to a greater extent) in the winter but will suffer enhanced moisture stress in summer. This may mean that efforts to restore damaged sites, as well as to maintain those in near natural condition, will be severely compromised by a lack of water during the summer. There are two logical alternative implications of this. First, additional water supplies may be required to supplement precipitation during the summer months and a method will be needed to distribute this effectively. Temporary storage of rainfall over winter months may be the best way to approach this. Second, management objectives could be modified – especially for sites which already have limited water supplies. It may be more realistic to aim for a surface dominated by dwarf shrubs and *Eriophorum vaginatum* for example rather than one dominated by a very wet *Sphagnum*-rich surface. Clearly there are no easy answers at this stage and predictions are always fraught with uncertainties. However, it would seem prudent for those responsible for identifying suitable site management objectives to consider carefully the implications of future climate change, and especially changes in seasonal water supply, on water availability during the summer period.

Conclusions

My intention in writing this short paper is not to provide difficulties or obstacles to the conservation activities of the many organisations and individuals who are performing an excellent job in maintaining and improving our peatlands. The continuation of these efforts is vital to conserve the dwindling and much damaged resource that exists in the UK and in many areas of Europe. However, I do think we need to lift our eyes from the bog surface once in a while and look forward fifty or a hundred years hence to consider the long term future of the peatlands we cherish. My chief conclusions would be:

- Peatlands can be expected to change. We should not expect stability and a greater range of vegetation types may be equally acceptable management objectives. Percentage *Sphagnum* cover is not the only measure of success.
- Carbon management is an increasingly important political consideration which should be understood and accounted for in management. Protection of carbon stores is the most critical aspect – this means prevention of oxidation by rewetting is a key priority even if *Sphagnum* rich vegetation and renewed peat growth are not achieved.
- Future climate changes are a real threat to sustainable management of peatlands in the UK. Reduced summer precipitation and increased summer temperatures will undoubtedly result in much drier peatlands. Management and restoration may have to consider artificially supplemented water supplies for particularly sensitive sites, and we should expect drying of peatlands and consequent changes in vegetation on many relatively undamaged sites.

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Towards a Peat-Free future?

Sally Ockenden – B&Q

<*I plan to*> give you an idea from a retailers perspective of what's in the market leaders in the growing media area and we have our responsibility to work towards the peat ban – the peat free future, and hopefully today I will be able to give you some idea of where we come from, what our targets are, what we are aiming for and how we are going to get there and the hurdles that we are going to have to overcome along the way in order to be able to share our problems with you so that you can understand the sorts of things that we're going to have to go through.

In 1991 B&Q policy stated that we should not use peat, and should not purchase peat from SSSI sites. We have been in this debate for over ten years now, and so obviously over this decade the debate has evolved somewhat.

The 2001 peat policy.

B&Q recognises that the use of peat in growing media has a finite future, and that we then have the unacceptable exploitation of currently unharvested bogs. We shall therefore work progressively towards eliminating the use of peat without compromising product performance or customer satisfaction. At the time this was seen as a ground breaking policy, but with some real challenging targets. Having said that, over those ten years, all the other DIY multiple retailers have fallen in line in that they have recognised that we have all got to do something and it is not just public relations. It is, however, essential for us to respect the bottom line, that we do this without compromising policy and without losing any performance for our customers, if they are going to continue to purchase from us in the future and also from a viewpoint that if the product does not perform well, our customers will go back to peat- based products. We are all trying to find products that work, but what we want to be doing is leading, not following, not just doing what we have to do, but also what we want to do.

So how do we get there? We are already talking to vendors about distribution. We also have a product, and we are working on it. We have got coir, bark, wood fibre, and inorganic materials., so there are lots of alternatives to peat out there, but again you will have heard that there is not any huge volume, any real volume in any one of these; that is the struggle that we have at the moment. Green waste for compost is another alternative. You've heard all about green waste and we're already using this and peat free products. We are already bagging it, which is great in view of the Habitats Directive.

There are, however, currently insufficient peat free viable alternatives available. It is a hard fact, but you cannot get away from it, although it does not mean to say we have to change our targets. That does not mean to say that we change anything that we do – we have to keep striving to do something about it

Green waste in compost, what are the issues?

We need to be sure if we are going to use this product that we are going to get year round consistency. If we are talking about composted products January/February time we have

got lots of Christmas trees around or whatever; other times of the year are dramatically different.

Coir.

There are plenty of coir products around. The location of the source is critical to the product, - *transport*, we have got to get it here. Obviously the costs include the transportation costs, as well as the costs of the initial raw material product in the first place. There are other concerns, even to the extent of how it looks and feels to the customer. People understand peat, people are used to dealing with peat, they put their hands in the bag, they know what this feels like. There is just this automatic, 'I know it's going to work, this is fine', but the general alternatives feel different, and we have to educate the customer to understand that just because it feels different, just because it looks different, just because it smells different, it does not mean to say that the performance is going to be any different.

What will B&Q do to deliver the policy?

Our peat free product is already no different in retail price than the equivalent peat-based product, the peat free option without added cost. We must educate our staff and our customers. Our staff need to know as much as they possibly can in order to help the customer make that informed choice and make sure that they understand what they are buying, how to grow in it. If you have got to change the attitude slightly, if you've got to change attitudes, then it is all about education, and we need to drive sales into peat free. If we are to push more and more sales into peat free gardening, then obviously the dilution route is going to make a huge difference. We need to get to that total peat free alternative.

We feel we are doing our bit, we are trying very hard on all fronts, but we need your help too. We need you to do a lot of the education. We need the information to push these products and drive the demand for the product, because together we have all got to make this work.

Peatlands Park N.I., A Case History

Keith Stanfield - Environment & Heritage Service of Northern Ireland

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During the period from 1965 – 1975 a series of Nature Reserves and Country Parks were established, reflecting most of the natural ecosystems present in Northern Ireland. By 1975 a few interested members of the public, as well as our own staff, had highlighted the anomaly that despite covering over 15% of the country and representing the bulk of our remaining semi-natural habitats, bogs were absent from the Park series.

Jointly the innovative idea of a site where both high scientific interest and the provision of controlled public access to a bog landscape could be accommodated was developed. Here bogs could be experienced, appreciated and enjoyed.

This culminated in 1978 with the purchase of the land that would become Peatlands Park.

Peatlands Park at 265ha is an intimate mosaic of peat cuttings and remnant intact raised bog, interspersed with a number of low wooded drumlin hills and a series of small oligotrophic lakes. Preserved as a hunting/shooting reserve for almost three centuries as the Churchill Estate, following bankruptcy, the site suffered intensive hand worked turbary operations for 60 years ending in the late 1960's.

At the time of acquisition, bog land value was minimal, ensuring the site could be purchased relatively cheaply. Located beside an interchange on the M1 motorway enabled easy access, with 90% of Northern Ireland's population living within an hour's driving distance. Past disturbance was seen as a bonus, minimising the potential impact of an influx of visitors.

Development Aims:

1. In 1979 the site was named Peatlands Park, the first of its type in the UK and only the second in Europe, after Finland.
2. The areas of highest nature conservation interest were to be declared National Nature Reserve.
3. Development would entail a mix of features, in descending priority, conservation, education and recreation.

Site Development:

1. Nature conservation management has always been the highest priority on site. In June 1980, the 99ha Mullenakill and Annagarriff NNR was declared. This was followed by the development of long term management strategies on issues such as bog hydrology, control of invasive alien species and management for notable species, etc. Where necessary, specific research projects have been commissioned to enhance management aims. In 2000, some 207ha of the Park was declared an ASSI, followed quickly in 2001 with confirmation of the same area as a candidate Special Area Conservation. Listed SAC features comprise degraded raised bog, bog wood, old sessile oak woods and active raised bog.

2. Education programmes on site date back to 1980. Experience soon identified that most interest centred on combining peat ecology with the cultural/historical aspects of

peatlands. By the early 1990's, education demand far outstripped staff resources. The 1993 Government Policy Statement on Peatland Conservation provided for funding to enhance on site facilities, including resource packs and a laboratory. Initial lack of funding for professional staff however soon proved an omission. At about the same time the development of a national curriculum necessitated a rethink of our whole approach. A full time educator was appointed with the task of specific targeting of Key Stage 3, 4 and older students. This proved a most successful decision when combined with lobbying of the Education Department. Peatland studies became a compulsory element of the GCSE Geography curriculum in Northern Ireland and almost 75% of all those students visit Peatlands Park annually. In 2002 a second Educator was appointed to build on this success and develop curricular linked programmes for KS 1 & 2 and to help introduce adult learning resources.

3. Recreational development received low priority at first. It quickly became apparent that it would prove vital in winning over local opinion. Providing facilities previously lacking in the area, creating local employment and raising the locality in national esteem were vital to the success of the Park. Despite financial constraints, by 1988 facilities such as the revitalised narrow gauge railway, visitor centre, way marked routes, etc., had been established. Visitor numbers rose rapidly peaking at 120,000 in the early 1990s. With the advent of relatively more peaceful times from the mid 1990s, competition with many new facilities has seen a slight falling off, settling at an average 100,000/year; or almost 7% of the total population.

Performance Measures

Success/failure of the Park project can be judged by a variety of means.

Conservation

- Feature based planning - Adoption of a 'features' based management planning system requires the setting of specific targets, outlines the management required to achieve these and ensures monitoring to judge efficacy of the process.
- Interpretation/Understanding/Appreciation – Can be assessed in a number of ways such as the number of information requests received, attendance at events, requests for demonstrations and visitor questionnaires.

Education

- Demand for education programmes – Can be assessed in terms of the overall numbers, the distance schools will travel to the site, the time of year they are willing to come and the affects we have on influencing the national curriculum.
- Evaluation forms – All schools must return to the warden a two page evaluation form on the value of their formal education visit, with opportunities to highlight potential improvements, etc.
- A-level projects – The topic a pupil picks to carry out is a reflection of the interest generated in the peatland subject. From 0% on bogs only five years ago, currently 15% of all A-level geography students are choosing some aspect of peatland study.
- Written word – Assessment of thank you and complaint correspondence.

Recreation

- Visitor numbers – Total numbers, time of day/year can all be assessed. The number of their events held on or moved to our property.
- Visitor questionnaires – Can provide vital information, both negative and positive indicators.
- Perception measures – How we are perceived in terms of value to the general public can be assessed by a variety of subtle means. People use the location of the Park in their advertising, mimic the name or attempt to take ownership to the site.

Peatlands Park in the 21st Century

Strengths

- Presentation of peatland ecology and cultural history.
- Accessibility of the site and features/facilities on site.
- Important NI resource for educational facilities and curriculum materials on peatlands.
- Robust site can accommodate large numbers of visitors.
- Demonstration site for land and visitor management on peatlands.

Weaknesses

- Insufficient recreation and interpretation provision.
- Absence of a full marketing strategy.
- Income generation insufficient.
- Failure to take full advantage of passing motorway traffic.
- Awaiting new Bio-diversity and Education centre.

Where from here?

Dr.Rob Stoneman

Introduction

Drawing together the threads of the many different conference speeches inevitably requires some repetition of what has been said. It is, though, useful to remember why we want to save peatlands, and remind ourselves how far we have come and then reiterate five big actions to move us forward.

A fabulous habitat

Peatlands are a fabulous habitat. From the awe inspiring wilderness landscape of the Flow Country in Caithness and Sutherland to the fabulous wet oases of biodiversity of our lowland raised bogs, dotted across the coastal plains of England and Scotland and the Scottish central belt. Our raised bogs have been highly damaged, but even these cutover bogs still contain fabulous wildlife -common and rare.
Common wildlife is represented by wetland generalists such as frogs and damsel flies; rare wildlife represented by the bog specialists -sundews, cranberry and the *Sphagnum* mosses. Whether it is the spectacular spectacle of long tailed skua nesting on the blanket bog of Handa Island or enchanting scenes such as a sea of wispy cotton grass above the industrial cities of northern England, bogland is a precious resource. It is even more remarkable, when one thinks of how that primitive group of mosses -the *Sphagnum* bog mosses -is able to create an ecosystem that is perfectly attuned to its requirements -wet, acidic and nutrient poor. This truly is the kingdom of the bog mosses.

And yet, we have, for our raised bogs at least, brought this habitat to the edge of extinction in the UK. As recently as 1992, conservationists were extrapolating the decline of this habitat to UK extinction by 2020. Richard Lindsay, speaking at a British Association for Nature Conservation conference in 1992 summed it up as *"this Cinderella of habitats is doomed never to escape the kitchen, indeed is doomed completely".*

Society had a choice: it could kiss goodbye to this special slice of biodiversity or bring the *Sphagnum* back to repair the damage, revive our raised bogs and let bogland wildlife thrive once more in lowland Britain. Through desperate nature conservation action, spearheaded by the Peatland Campaign Consortium, we can happily report that Society appears to have taken that second course of action averting the looming catastrophe: bogland is coming out of the kitchen and into people' consciousness.

Conservation Success

The plight of our raised bogs has been much improved through better legislation. European Directives and national legislation to protect bogland sites of special scientific interest has helped enormously. Other sites have been protected through nature reserve designation and management. Indeed, management techniques are now far more

effective, from the Sheffield 'bund and flood' school of peatland management (Wheeler & Shaw 1997) to the Scottish 'wait for a rainy day and twiddle around with bits of plyboard' school (Brooks and Stoneman (1997). These books represent a better understanding of how to manage bogs and many more techniques have been employed and used. Today, a more rigorous research base for peatland management exists through detailed research, better documentation and, crucially, Hugh Ingram's (1982) insights into the way raised bog hydrology works.

Reducing the demand for peat through the provision of peat alternatives has also moved on greatly. Only ten years ago, there was no such thing as available peat alternatives. Today, there is a vibrant peat alternative industry with very high market penetration in some stores (especially B&Q).

A long way to go

We have turned a corner; society has made that choice to let the *Sphagnum* come back. Arguably, the downward curve of peatland decline to extinction has bottomed out. Can we now manage to turn that curve back up again?

We still have, I think, a pathetically weak planning system that means that we have to buy out extant planning permission for peat mining. Deep peat sites are still being destroyed by peat mining in Scotland, whilst Somerset fen peats are still being extracted for Gro-bags –it's an untenable situation if we are to reverse that decline. Protection through the SSSI network ought to be in place for such a rare habitat yet the network in Scotland and Northern Ireland is far from comprehensive with many, many bogs left unprotected. Worse still, peat use has actually gone up. Sadly, most gardeners are still not making the connection between their Gro-bags and wide-scale habitat destruction. In 1995, the Peatland Convention in Edinburgh concluded with five basic actions. These actions are still valid and are worth re-iterating.

Action 1 -Survey and Monitoring

We now have a fair idea of where peatland is and in what condition it remains. Sadly, the inventory has become fragmented since the break up of the Nature Conservancy Council and I would implore the agencies to re-establish a single peatland inventory for the UK made freely available on GIS via the internet *(cf* the ancient woodland inventory). Nevertheless, a few areas of Scotland and Northern Ireland remain poorly surveyed.

These surveys give us a good general understanding of the remaining resource and the threats it faces. The picture, however, is probably misleadingly optimistic. An examination of some of 'best' (least damaged) sites shows extensive alteration. An aerial photo of Ofference Moss in the Upper Forth Valley for example, shows a network of drains, extensive historic peripheral peat cutting and lagg fen drainage. Ground water mound theory tells us that the prospects are not good -the bog's shape has altered and the water

level will drop to allow the bog to re-establish its ground water mound. We do not have much idea of timescales nor the process of ground water mound re-establishment - survey and monitoring is crucial to assess the scale of damage. Indeed, the biggest threat to our raised bogs is lack of management as the cumulative effect of past damage continues to degrade the habitat: bogs are far from favourable conservation status and only continued survey and monitoring provides the data upon which to take action.

Action 2 -Conservation Management

We need to continue to bring more and more sites into conservation management, whether in perpetuity through nature reserves, or through SSSI and SAC/SPA designation. Sadly, many sites in this country are not protected in this way and do not receive conservation management. The Scottish bog survey identified hundreds of these sites - small rather dried lowland raised bogs that are full of wildlife and often with intact peatland surfaces and full Holocene environmental histories in the peat column. These sites are dying by neglect and are desperately in need of some form of management. We need to provide mechanisms for land managers to bring these sites into positive conservation management. The Scottish Wildlife Action Programme, run by the Scottish Wildlife Trust, provides a good model where peatland specialists provide advice to land managers to manage their special sites. Finance could be provided through a revamped agricultural subsidy system.

Working with farmers is critical since so much of our peatland is used as extensive grazing. Environmentally perverse subsidy systems, such as headage payments, are thankfully being phased out. Government now needs to implement the thinking contained within, for example, the Curry report on the *Future of Food and Farming* to allow farmers to manage extensive grazing on peatlands in an environmentally beneficial manner.

Action 3 -Peatland Rehabilitation

Expanding the resource of 'near-natural' raised bog is no easy endeavour. Peat is not a renewable resource (at least in any human time-scale) and peatland ecosystems can only be recreated where peat remains. Much work has been undertaken on cutover bogs; Thorne Moors and Wedholme Flow provide good examples, where block cut patterns are once again brimming with *Sphagnum* bog mosses (albeit mostly *Sphagnum cuspidatum* and S. *fimbriatum,* rather than S. *magellanicum* and S. *papillosum).* We must not kid ourselves: we cannot restore these cutover bogs to pristine bog (the ground water mound has been cut away) but we can return these sites to something akin to their former splendour through careful hydrological management.

Tantalisingly, many of raised bogs that were afforested in the 1960s, offer the prospect of rapid restoration given that, in many cases, the ground water mound is more or less still intact. Recent work by the Scottish Wildlife Trust, Scottish Natural Heritage and the Forestry Commission on Longbridge Muir and Kirkconnel Flow is, therefore, tremendously

exciting as large areas of conifers are removed trom uncut bog surfaces. Cumbria Wildlife Trust is conducting similar large-scale trials on Foulshaw Moss. Success on these sites could pave the way for tripling the raised bog resource given the large area of raised bog currently under conifers.

Action 4 -Awareness and education

Rising sales of peat during the late '90s, paralleling considerable action by the Peatland Campaign Consortium to raise awareness of the issue, does not bode well. In contrast to the CFC campaign to protect the ozone layer, the Campaign does seem to have failed to link 'compost' to habitat destruction. Perhaps, peat bogs are just too obscure a habitat for gardeners to get worried about. That many of our bogland nature reserves are closed to public access on spurious nature conservation grounds does not help. Personally, I wish our bogs were over-run with people (with appropriate management controls of course) and peat use declined. In truth, peatlands are a difficult habitat to inspire people -good interpretation is required.

Ideally, we should follow Northern Ireland's example and create similar *Peatland Parks* in mainland UK. Thorne and Hatfield Moors provide a good opportunity with easy access to the motorway network and over five million people living in a fifty mile radius. This type of tourist initiative, currently being discussed by English Nature, fits well with efforts to regenerate South Yorkshire. It could provide the springboard for Thorne town and Moorends village regeneration. A *Peatlands Park* in the M8 Glasgow -Edinburgh corridor could also be used to further regeneration of deprived communities in the former Scottish coalfields. It would be apt, as the area is the raised bog heartland of Scotland.

There are then significant opportunities to get substantial numbers of people on to our bogs, and develop that understanding to ram home the message that peat use equals environmental destruction. To take these and other peatland campaign initiatives forward, perhaps the time has come to structure the Peatland Campaign more formally through dedicated staff mirroring the Irish Peatland Conservation Council perhaps or through a staffed secretariat for the Peatland Campaign Consortium. Certainly, a grand coalition of partners is required to take forward initiatives like Thorne and Hatfield Moors restoration. Here, the peat industry can play an important and constructive role, both in using their knowledge and skills to restore the bogs and by using their marketing abilities to create new markets for peat alternatives. Indeed, it is the peat industry that holds the key to the last action.

Action 5 -Zero Peat Use

A tour of the world's peatlands reveals amazing biodiversity. From the frozen palsa mires of the sub-arctic, through boreal aapa (string) bogs, western seaboard blanket bogs and temperate raised bogs, the European diversity of peatlands is truly fascinating. The vast areas of tropical raised bog in Sumatra and Borneo are a biodiverse paradise. Carnivorous

pitcher plants climb around the air-breathing roots of towering giants -60 metre trees growing on vast buttresses or root mats floating on a soup of liquid peat. These tropical peatland rainforests form the last great tracts of SE Asian rainforest with their hornbills and orang utan.

And so it was with great sadness, that I saw at first hand the success of the western European peat campaign, which has come close to eliminating peat mining from the UK, Holland and Germany. On a wonderful trip to look at bogs on the White Sea's Solovetsky Islands, the International Mire Conservation Group party bussed across the taiga forests from Finland to the Russian White Sea. The scenery was of pristine taiga forest, interspersed with peatland. Bog after bog had had their first drains put through paving the way for industrial peat mining. As peat mining reduces in western Europe and peat use continues to rise, perhaps all the Peatland Campaign has achieved is to have exported our environmental problems abroad -to Estonia, Latvia and Russia. There is no room for complacency. We must reduce peat demand in the UK to zero.

This is why B&Q's commitment to phasing out the use of peat in its composts is so important. It is also why it is so important for the peat mining companies to undertake the research and development required to produce alternatives that are as good if not better than peat. Thirty years of peat compost experimentation has delivered an excellent product to the amateur gardener and professional horticulturalist. The challenge is to shorten the R&D endeavour to create similarly excellent peat alternative products. This challenge is achievable. Already, gardens across the UK are moving to a peat-free future. The Royal Botanic Gardens at Kew has paved the way with the National Trust spreading the demonstration yet further.

It is appropriate that the Peat Producers Association has changed its name to the Growing Medium Association as hopefully this reflects a new commitment to creating a sustainable growing medium industry based not on peat but composted materials (especially green waste). The Thorne and Hatfield Moors peat factory would make a particularly appropriate site to develop this new industry creating much-needed new jobs in South Yorkshire and turning the sometimes bitter battles against habitat desecration into a positive future. The Growing Medium industry, with its skills, knowledge and marketing power thus holds the key to saving those Estonian and Russian bogs by taking forward the win-win-win of sustainable development. At Thorne Moors, this win-win-win involves the end to peat mining, the composting of green waste, a reduction in landfill, the development of tourism, the creation of new jobs and prosperity and the protection of eastern European bogs. Now that is truly what sustainable development is all about: will the Growing Medium Industry grasp the opportunity?

Long live the weeds and wilderness yet!

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