THE HEATHER TRUST

Promoting Integrated Moorland Management

Members' Briefing

Peatland Management

Peat has been used as a fuel for thousands of years, and it was traditionally of great value to people in the uplands where there is a historical shortage of wood. Today, we are beginning to understand the value of peat for a variety of other uses, which go far beyond heating and cooking.

Climate change has been linked to the amount of carbon in the atmosphere, principally as Carbon Dioxide, and the role that peatland can play in reducing the amount of atmospheric carbon is being increasingly recognised. The plants that form peat are able to capture carbon from the atmosphere and, provided that it is kept waterlogged, peat is stable enough to store carbon for extended periods.

Peatland can also act as a sink and a filter for rainwater, allowing beneficial hydrological processes to take place, which can lead to cleaner drinking water and a lowered risk of flooding in river valleys downstream. There is increasing interest in peat because of its ability to deliver these natural or "ecosystem" services, and for this reason there are growing calls not only for damaged peatland to be restored, but also for sensitive management measures to be employed to maintain existing stocks of peat.

Why should landowners and land managers be interested in peat?

With interest from all four devolved UK governments in the better management, restoration and preservation of peat, landowners and land managers could benefit from considering their peatland as an asset rather than waste land and they could see these areas providing a new income stream through a carbon market.

Changes to our climate have been linked to the increasing amount of carbon in the earth's atmosphere in the form of carbon dioxide (CO_2). The ability of peat to capture large quantities of carbon from the atmosphere, and then subsequently store it for extended periods has received international recognition. International climate change talks have agreed that greenhouse gases (GHG) captured from the atmosphere and stored as carbon in peat may be used to meet reduction targets for the emissions of GHG.

Under the revised agreements, "wetland drainage and rewetting" is now an option for countries, which are working towards meeting their national greenhouse gas targets. As a result, we expect

peatland restoration to receive a major investment boost. Currently, millions of pounds are being spent on research into peatland restoration and management, and the Trust, through its advocacy work, is seeking to ensure that forthcoming grant programmes across Britain will incorporate measures that will allow funding for the maintenance and restoration of peat.

What is peat?

Peat is made up from the preserved remains of dead vegetation, primarily consisting of sphagnum mosses. Dead plants are unable to decompose fully because the material is stored in anaerobic conditions. These same conditions explain why so many archaeological finds are so beautifully preserved when they are found in peat.

New sphagnum plants grow on top of the old plants and a self-perpetuating cycle of peat production is initiated. Over vastly extended periods and under the right circumstances, peat can become coal.

Peat is found on poor ground where natural drainage is absent or slow and where there is a sufficiently high level of rainfall to ensure that the ground is wet throughout the year. These conditions lead to the formation of blanket mires or bogs. The majority of peat in Britain is now found in the uplands but there are some significant areas of lowland peat that have become a rare and fragmented habitat for a variety of different species.

The absorbent nature of sphagnum moss (and peat) is such that it can create its own water table, which is not confined by natural topography. This leads to “raised bogs”, which hold water like blotting paper and are largely fed by rainwater.

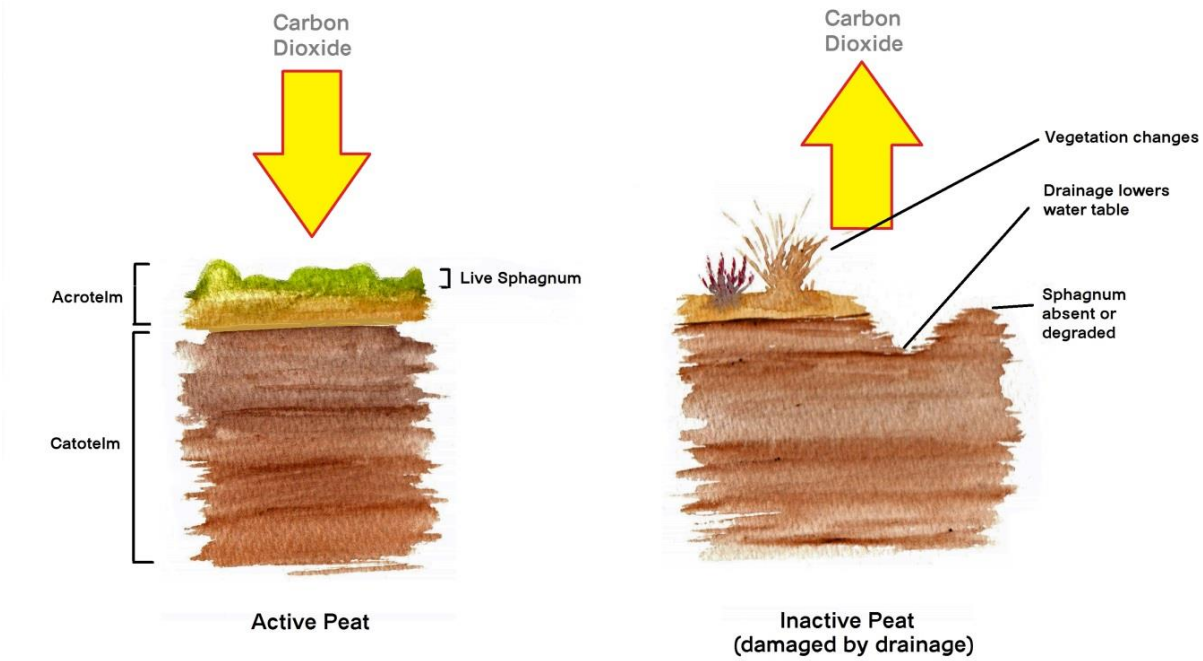
Structure of a Peat Bog

Peat is very loosely divided into two layers. The thin upper layer (known as the acrotelm) consists of live sphagnum moss and other vegetation, and this includes a small amount of dead or dying vegetation from previous years. This layer has a changing water table and will vary in its wetness according to the seasons. Depending upon the water table, the acrotelm can be aerated, allowing the dead vegetation to decompose to varying extents.

The catotelm lies beneath the acrotelm and consists only of water and dead organic material. In well-maintained peat, no air reaches the catotelm, and it represents a deep storage unit which is gradually built upon and expanded with each passing year as dead vegetation in the acrotelm is passed downwards. Usual estimates for peat formation suggest that a bog can lay down about 1mm of peat to the catotelm every year.

Scientists differentiate between “active peat” and “inactive peat”. Active peat has a high water table and a healthy acrotelm, which is capable of capturing and storing atmospheric carbon and gradually passing it down into the catotelm as peat.

Inactive peat is no longer capable of sequestering carbon, so while it may still be storing carbon in the catotelm, the acrotelm is no longer capable of producing more peat; it may be damaged, degraded or even non-existent.



As its name suggests, bare peat has no acrotelm at all. The catotelm is exposed to the elements and can do little else but quickly erode by action of wind and / or water. Bare peat can be a major problem in localised areas across the U.K.

The issue of bare peat is exacerbated by historical air pollution. The combustion of coal releases Sulphur Dioxide (SO_2), which lowers the pH of the soil, making it impossible for the acrotelm to grow to protect the catotelm and also capture atmospheric carbon.

A great deal of Sulphur Dioxide has been released into the atmosphere since the Industrial Revolution, and the effects of that pollution persist in areas of peat which are adjacent to industrial centres such as the Peak District, South Wales and Southern Scotland.

Management Aims

There are three central goals for peat management in the UK, and these will form the basis for future funding and work:

1. The repair of damaged or degraded peatland so that the loss of the stored carbon is reduced or prevented;

2. The restoration of damaged or degraded peatland so that it becomes active and healthy enough to resume the capture and storage of atmospheric carbon; and

3. The long- term preservation of peatland and the associated water resources through appropriate management.

Why is peat damaged?

There are a number of different reasons why peat has been damaged or degraded, and these vary as widely as historical peat extraction to the afforestation of peatland. The most common causes of peat degradation have been identified as agricultural over-grazing, heather burning and drainage.

Over Grazing

Over grazing can lead to a change in the vegetation cover that can be caused by a combination of heavy grazing, trampling and the nutrients in dung. The changes have a negative impact on the peat forming sphagnum species in the acrotelm and often lead to the predominance of Purple moor-grass *Molinia caerulea* or heather species on peatland, potentially turning active peat into inactive peat.

Heather Burning

Inappropriate burning can damage the sphagnum species that form peat. This can lead to the ground becoming drier and less able to support a thriving acrotelm. The outcome of the debate about whether or not to burn on bogs is not clear cut; so much depends on the starting conditions of the fire and the mix of vegetation in the burn.

Drainage

Drains and “grips” carry surface water away from the areas where peat is usually formed. Drains were dug over extensive areas during the twentieth century with a view to improving the grazing for livestock and provide a more productive environment for heather.

A network of ditches can lower the water table causing the acrotelm to dry out. This will make the peat inactive but it can also lead to erosion of peat in the catotelm.

Restoration

The level of peat degradation varies enormously from moor to moor, and the amount of restoration work needed and the techniques needed to restore inactive peat will vary across the country.

Where peat has been dried out or damaged by afforestation, trees may need to be removed altogether before restoration work can even begin.

In many cases, damaged or degraded peat can be restored by “re-wetting”. In its simplest sense, re-wetting is an attempt to boost sphagnum production by raising the water table. It is usually a reaction to drainage, where the water table has been deliberately lowered and peat has become inactive as a result.

There are a number of different ways to re-wet an area of peatland, but the most simple is to block the drainage ditches. When ditches are blocked and water is allowed to stand, sphagnum quickly recolonises, the water table is raised and a new acrotelm can form.

Ditch blocking also reduces the level of water erosion of peat and limits the amount of loss of dissolved carbon from the peatland. This is of particular interest to water suppliers, who are required to carry out expensive treatments on “peaty” water so that it is suitable for use. Water companies might gauge the quality of peat management according the levels of peat in the water supplies.

Peaty coloured water in watercourses is an indication that erosion of the catotelm is taking place, and the strength of the subsequent solution can be indicative of inactive or degraded peat.

As this carbon is dissolved, eroded and lost, the land’s ability to provide for a range of human and natural interests (including agriculture and sporting prospects) is diminished. It should therefore be a goal for all upland land owners and managers to reduce dissolved peat levels in water.

Ditches can be blocked using a variety of different methods, from plastic sheeting to chunks of peat. Some larger ditches may need to be re-shaped using specialist equipment in order to allow for efficient blocking without the risk of erosion or further damage.

Methods of restoring extremely damaged and polluted bare peat back into functioning peatland have been developed and demonstrated with some success, but these techniques can be costly and involve a tremendous amount of intervention.

Restoration Options

It is possible to improve the condition of some areas of peatland by relatively small changes in management. Changes to the management of the peatland by burning, grazing or cutting may be all that is needed. These changes could be combined with some blocking of drains to reduce the amount of erosion and ultimately lead to an increase in the amount of sphagnum moss and an improvement in the land’s capacity to lay down peat.

As the condition of the peatland deteriorates, progressively more intervention is required to achieve any improvement. Some of the drainage ditches could collapse and block themselves as a result of natural processes, but where the drains are larger, proactive work is required to block them. This can involve bringing materials onto the moor to form the blocks (e.g. stone, timber, plastic piling).

It may be necessary to artificially aid the re-vegetation of peat, including chemical attempts to raise the pH and the use of fertiliser to establish a nurse crop of grasses which will help to bid the topsoil. Another technique is to spread matting in the form of geo-jute, or even to use heather brash to stabilise the peat for long enough to allow new vegetation to grow.

Funding

Restoration work is expensive and it is unlikely that landowners will be able to fund this without external support. Some funding is available through agri-environment schemes and the Heather Trust is working with other organisations to maintain some funding as part of the current review of these schemes.

Some large organisations are concerned about their carbon emissions and there are now some voluntary schemes that allow these organisations to fund peatland restoration to capture an equivalent amount of carbon in peat. These schemes are generally viewed as contributing to the corporate social responsibilities (CSR) requirements.

A Peatland Carbon Code is being developed that will initially aim to provide credibility for the voluntary schemes (CSR). It is anticipated that this phase of the Code will be launched as part of the conference being organised by the IUCN UK Peatland Programme in September 2013.

The Trust is keen to encourage the development of more of this type of funding, but it is essential that it carried out in accordance with the Peatland Carbon Code. It is vital that these schemes provide verifiable benefits and value for investors. If the schemes are not credible, investor confidence will be lost and with it the opportunity to develop an income stream for landowners.

In the longer term, the hope is that it will prove to be possible to develop the Peatland Carbon Code to provide guidance on the establishment of a carbon market. This will allow for the trading of carbon on a market, opening up greater opportunities for landowners to earn income from their peatlands. It may be several years before the Carbon Code can be developed to this level.

Research is needed to be able to justify claims for the amount of carbon capture that will occur as a result of management changes. This information is required to provide a market value that can be traded.

It is important to realise that payments for peatland will depend on capturing new carbon from the atmosphere, not just storing what is already stored in peat.

Conclusion

Some may see this interest in peatland as a threat to land management. It may take time to establish a full carbon market and this might not even be possible, but the Heather Trust believes that the possibility is worthy of serious investigation, and we suggest that all landowners should keep abreast of developments.

The impact on most estates would be limited. Most estates do not have large areas of continuous blanket bog and in these areas the impact would only be on the small areas of bog which may in the past have been treated as wet areas of limited value to the estate. If the carbon market develops, it may be possible for even small areas to generate some income.

Owners of large-scale bogs may need to look to their current management, but we suggest it is possible to manage these areas for carbon storage and capture alongside other uses. A balance will need to be struck but this is what land managers have always been good at!

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This is one of a series of briefings that have been produced by the Heather Trust to provide an overview on a range of topics that are relevant to people with an interest in the management of moorland or through visiting these areas.

These briefings are not intended to be definitive but aim to provide some useful background. We are only too aware that every bit of moorland is different and the Trust will be pleased to provide more detailed advice about how this guidance could be relevant to a particular area of moorland. Please see the contact details above.

All the briefings are available to download from the Trust's website free of charge. However, if you find the content useful and you are not already a member of the Trust, you might like to consider supporting our work by joining. Details of how to do this can be found on our website: www.heathertrust.co.uk/members

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