IUCN UK Committee Peatland Programme
*Briefing Note N°**6***

IUCN National Committee United Kingdom
Peatland Programme

Commercial peat extraction

Purposes and Impacts peat formation

Commercial peat extraction usually for energy or horticulture, physically removes peat from the ground (see below), along with its stored carbon, at a **rate which substantially exceeds the original rate of deposition and accumulation**. In the UK, commercial extraction is **largely but not exclusively restricted to lowland raised mires** (see ***Definitions Briefing Note 1***) which are the least abundant of the UK's bogs, occupying an area 77% smaller than the area covered by blanket bogs (JNCC 2008).

Focus on lowland raised mires

Rates of extraction

Natural rates of peat accumulation are **less than 2 mm per year,** and are outpaced by modern extraction methods that **typically remove 100x that depth each year**.

Impacts on blanket bogs

Blanket bog (see ***Definitions Briefing Note 1***) is less commonly extracted commercially, but the **habitat impact may arguably be even greater** where it is extracted because the rate of blanket peat accumulation can be less than half that of raised bogs, while the accumulated peat deposit is invariably much thinner and so the **resource may be exhausted much sooner**. There may also be consequences for drinking-water supplies (see below).

Extractive mining or sustainable harvesting?

Despite efforts being made towards sustainable management and post-harvesting restoration, commercial peat extraction in its current guise can only be seen as a type of **extractive mining rather than a form of sustainable harvesting**. This is because re-growth of peat is too slow to support repeat commercial extraction on any meaningful timescale.

Commercial fuel peat may be obtained using standard peat milling techniques which

Fuel peat is classed by the EU as a fossil fuel

repeatedly strip off thin layers of loosened peat (see below), or may be extracted using such techniques as 'sod cutting' and 'sausage extraction'. In the UK, fuel peat is almost exclusively extracted commercially from blanket bogs. Although it has been claimed that such fuel peat should be classed as a sustainable biofuel, the EU has officially defined peat as a fossil fuel.

Target to end peat use by 2030

In the UK, peat is in demand largely as a horticultural growing medium and soil conditioner, and its use is increasing despite increasing take-up of alternatives to peat because the whole horticultural and gardening sector continues to expand. **The UK Government has meanwhile stated its ambition for the horticultural sector to end peat use by 2030 through the development of alternative, sustainable, growing media**. This ambition, combined with the fact that a number of planning consents have already reached the end of their permitted life or will do so in the coming years, means that there is a significant ongoing need for effective restoration management of these former peat workings. To be successful, such management must address the impact of current commercial extraction methods on the peat bog system.

Extraction methods

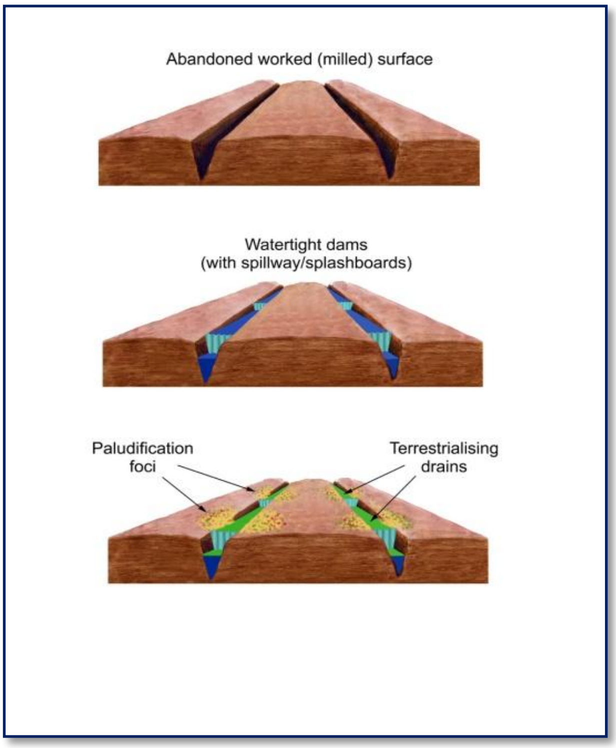
Removal of acrotelm

The current most widespread method of commercial extraction is surface milling for horticultural peat. This entails **removal of the *acrotelm*, with its living vegetation, to expose the mass of the waterlogged *catotelm* peat deposit** (see ***Biodiversity Briefing Note 2***) beneath. An extensive drainage system is then installed across the site (above). Such site preparation means the loss of almost all biodiversity, all surface pattern and loss of active condition with its associated capacity for resilience (See ***Biodiversity Briefing Note 2*** and ***Climate Change Briefing Note 10***). It also results in a radical change in the hydrology of the site. Loss of the acrotelm and installation of drains together result in a number of effects (see ***Drainage Briefing Note 3***) including subsidence of the bog surface and loss of carbon through oxidation, POC and DOC.

Removal of 200mm per year

Permanent loss of peat archive

The drains separate the peat mass into long 'milling fields', from which several thin layers of peat are then stripped during a year, **amounting to around 200 mm per year**. This bulk removal of the peat in the form of the industrial crop represents both **loss of carbon and loss of the peat archive**. The latter is lost forever because it recorded a particular set of moments in time which cannot be repeated. In the case of carbon, the net result of cutting and restoring a bog will be a loss of carbon compared to leaving the bog in its natural uncut state.

Extraction may increase water treatment costs	Areas of commercial peat extraction (generally for fuel peat) in the upper reaches of peat-dominated catchments used for public drinking-water supplies may result in increased water-treatment costs because of the increased levels of DOC and POC and the need to prevent trihalomethane formation (see ***Drainage Briefing Note 3***).
Restoration ***Critical importance of different Sphagnum species in rate of restoration*** ***Sphagnum species typical of ridges and hummocks are more effective*** ***Terrestrial-isation*** ***vs*** ***Paludification*** ***Loss of the peat archive is irrevocable***	**Restoration** of a milled bog surface depends primarily upon the **re-establishment of peat-forming vegetation**, most notably *Sphagnum* bog moss because this provides much of the essential architecture necessary for a functional acrotelm. Although much restoration of commercial extraction sites in the UK has relied on the re-shaping the milled surface and the encouragement of aquatic *Sphagnum* species such as *S. cuspidatum* as primary agents of recovery, **it should be recognised that the aquatic species of Sphagnum are also the least effective at generating peat.** Such ***terrestrialisation*** (infilling of open water - *see below*) also appears to require many decades before more vigorous peat-forming species of *Sphagnum* are able to colonise the swards of aquatic bog mosses. Research on milled peat surfaces in Canada and more recently in Germany has therefore concentrated on **re-establishment of *Sphagnum* species more typical of ridges and hummocks where possible, with minimal re-shaping of the peat surface**. The methods involve blocking the milling-field drains to raise the water table beneath the milled surface (***paludifying*** it), creation of low peat bunds only where essential to retain moist surface conditions, then spreading macerated ridge or hummock *Sphagnum* species across the bare peat surface, generally with a protective layer of straw. Results have been remarkably rapid and successful in re-establishing a rich sward of peat-forming *Sphagnum* species, thereby establishing at least the initial characteristics of a functional acrotelm.  It is essential to reiterate, however, that even if the full microtopography and species diversity can in time be restored (and there is no evidence as yet to show that this is possible, particularly for rarer and more vulnerable species), the peat archive which had developed over thousands of years **can never be restored**. Consequently successful restoration cannot be used to justify new extraction.
Importance of starting conditions, especially peat depth	The work in Canada, backed up by research in Estonia, has also highlighted the **importance of the starting conditions for restoration**, particularly in terms of the depth of peat remaining at the end of commercial extraction. **Areas with less than 0.5 m of peat** remaining over the mineral sub-soil generally s**how little or no recovery of peatland vegetation**, even after some years, particularly as the lowest layers of a raised bog generally consist of ancient fen peat deposits. In contrast, those areas with at least 1 m of peat remaining, and particularly those with significantly **more than 1 m of pure bog peat** (*ombrotrophic* peat - see ***Definitions Briefing Note 1***), appear capable of showing **rapid recovery to bog vegetation** well within the 30-year timeframe required, for example, by the EU Habitats Directive for 'Degraded raised bogs capable of recovery'.

Areas at risk	Any areas that are licensed for peat extraction and any surrounding hydrologically connected areas. These may include raised mires, blanket mires and even fens.
Other benefits from addressing this issue	Restoration of the acrotelm and associated active bog vegetation will preserve the remaining carbon store and encourage the long term carbon sink. Water quality downstream will improve as the DOC levels in bog outflow decrease and a range of bog biodiversity will also be restored.
Gaps in Knowledge	Identified gaps are: • The length of time to full recovery of 'active' bog (likely to be site specific). • Optimal restoration methods, particularly in relation to the interplay between terrestrialisation of water bodies (through creation of shallow lagoons across the restoration site) versus the paludification of the peat body (through the blocking of adjacent drains and seeding of bare peat surfaces). • Potential for *Sphagnum* farming on agriculturalised peat soils.
Practical Actions	Practical actions: • Encouragement towards the use of alternative sustainable growing media. • Further development of restoration techniques for milled peat sites, particularly building on research in the UK, Canada and Germany, in partnership with industry. • Research into the commercial potential for Sphagnum farming on agriculturalised peat soils.
More Information	Underpinning scientific report: http://www.rspb.org.uk/Images/Peatbogs_and_carbon_tcm9-255200.pdf (low resolution) http://www.uel.ac.uk/erg/PeatandCarbonReport.htm (high resolution : downloadable in sections) IUCN UK Peatland Programme: http://www.iucn-uk-peatlandprogramme.org/ Natural England Uplands Evidence Review: http://www.naturalengland.org.uk/ourwork/uplands/uplandsevidencereviewfeature.aspx Scottish Natural Heritage Report on peat definitions: http://www.snh.org.uk/pdfs/publications/commissioned_reports/701.pdf Peatland Action: http://www.snh.gov.uk/climate-change/what-snh-is-doing/peatland-action/ *This briefing note is part of a series aimed at policy makers, practitioners and academics to help explain the ecological processes that underpin peatland function. Understanding the ecology of peatlands is essential when investigating the impacts of human activity on peatlands, interpreting research findings and planning the recovery of damaged peatlands.* *These briefs have been produced following a major process of review and comment building on an original document: Lindsay, R. 2010 'Peatbogs and Carbon: a Critical Synthesis' University of East London. published by RSPB, Sandy. http://www.rspb.org.uk/Images/Peatbogs_and_carbon_tcm9-255200.pdf, this report also being available at high resolution and in sections from: http://www.uel.ac.uk/erg/PeatandCarbonReport.htm*

	The full set of briefs can be downloaded from:www.iucn-uk-peatlandprogramme.org.uk *The International Union for the Conservation of Nature (IUCN) is a global organisation, providing an influential and authoritative voice for nature conservation. The IUCN UK Peatland Programme promotes peatland restoration in the UK and advocates the multiple benefits of peatlands through partnerships, strong science, sound policy and effective practice.* *We are grateful to Scottish Natural Heritage, Natural England, Natural Resources Wales, the Forestry Commission RSPB Scotland and the Peter de Haan Charitable Trust for funding support.*
Authors ***Date***	**Richard Lindsay, Richard Birnie, Jack Clough** **Version Date: 5th November 2014**