

## Peatlands and Greenhouse Gas Emissions Reduction Opportunities in Scotland

Across the world, large scale degradation of peatlands is causing serious environmental and social impacts<sup>1</sup>. One of the most pressing concerns is the loss of stored carbon that is contributing to global warming. Globally, damage to peatlands is responsible for around 2 G tonnes of carbon dioxide – 10% of all global carbon dioxide emissions. Of the worlds 175 peatland nations, the UK is among the top 20 for carbon emissions from damaged peatlands<sup>2</sup>.

Rewetting damaged peatlands reduces the climate change relevant emissions from the drained peatland and provides a long-term carbon sink<sup>3</sup>.

Delivering peatland restoration targets for 2015 in Scotland could provide at least 2.7Mt CO<sub>2</sub>-eq savings per year.

### Peatland restoration reduces greenhouse gas emissions

A Scottish Government study<sup>4</sup> suggests Scotland's deepest peats (>1m) store around 6500Mt CO<sub>2</sub>-eq: ten times as much carbon stored in the whole of the UK's forest biomass. Bog habitat in Scotland covers around 2 million ha<sup>5</sup> of which over 60% may be affected by landuse activities including drainage, forestry, burning, grazing and peat extraction<sup>6</sup>. Temperate zone peatlands that have been damaged through drainage can release up to 30 tonnes CO<sub>2</sub>-eq per ha per year<sup>7</sup>. A review of drained bogs across Europe gives an average emission of 4.6 tonnes CO<sub>2</sub>-eq per ha per year<sup>8</sup>.

Restoring peatlands by blocking ditches to raise water tables and allow rewetting has clear benefits in Global Warming Potential terms over the unrestored case, even taking account of temporary methane emissions from the restored site<sup>9</sup>. The result of rewetting damaged peatlands gives avoided losses as well as further gains through initial regrowth of *Sphagnum*

<sup>1</sup>Assessment on Peatlands, Biodiversity and Climate Change, 2007. <http://www.peat-portal.net/index.cfm?&menuid=113>

<sup>2</sup>Joosten H 2009, The Global Peatland CO<sub>2</sub> Picture, Wetlands International, Ede.

<sup>3</sup>Joosten and Couwenberg 2009. Wetlands international, Ede.

<sup>4</sup>Smith et al 2007, ECOSSE: Estimating Carbon in Organic Soils - Sequestration and Emissions: Final Report (2007)

<http://www.scotland.gov.uk/Publications/2007/03/16170508/0>

<sup>5</sup>SNH Natural Heritage Trends, Scotland 2001, SNH, Battleby

<sup>6</sup>Immirzi, C.P., Maltby, E., and Clymo, R.S., (1992). The global status of peatlands and their role in carbon cycling. A report for Friends of the Earth by the Wetland Ecosystems Research Group, Dept. of Geography, University of Exeter, pp 1-145. FoE, London

<sup>7</sup>Kaat & Joosten 2008. Factbook for UNFCCC policies on peat carbon emissions. WI, Ede.

<sup>8</sup>.Smith et al 2007 gives a European drained bog average Global Warming potential of 1253 CO<sub>2</sub>-C equivalents kg per ha per year –in the ECOSSE report this equates to emissions of around 4.6 tonnes CO<sub>2</sub>-eq per ha per year.

<sup>9</sup>Baird, A, Holden, J and Chapman, P 2009 A literature Review of Evidence on Emissions of Methane in Peatlands DEFRA Project SP0574.

mosses, and in the long term, would be expected to provide a carbon sink of 0.8 tonnes CO<sub>2</sub>-eq per ha per year as found in a natural bog<sup>10</sup>.

## Peatland rewetting and the Kyoto protocol

Under the Kyoto Protocol, land use activities which result in emissions or removals are included under Articles 3.3 (afforestation, reforestation and deforestation) and 3.4 (cropland management, grazing land management, forest management and revegetation), but the approach can result in peatland emissions being overlooked and the benefits of rewetting are missed as an opportunity. At the UNFCCC meeting in Copenhagen, draft rules were agreed, which could come into force from 2012, specifically including peatlands and rewetting of drained areas<sup>11</sup>.

## Scotland's opportunity for peatland restoration

The Scottish Government has a commitment to restore peatlands, in recognition of their climate change benefits<sup>1213</sup> as a biodiversity priority and as an important soil ecosystem. The UK Biodiversity target for blanket bog<sup>14</sup> equates to around 800,000ha to be restored by 2015. With Scotland supporting over 80% of the resource it is reasonable to apportion around 600,000ha by 2015 for restoration. The Scottish Government has a variety of peatland restoration policies and funding measures available, such as those under the SRDP and payments for management of protected sites (SSSI and Natura 2000 areas).

Taking an average emissions figure of 4.6 tonnes CO<sub>2</sub>-eq per ha per year, would mean that achieving the Biodiversity target of 600,000ha restoration by 2015 **could deliver emissions reductions of at least 2.7 million tonnes CO<sub>2</sub>-e per year.**

## Peatland restoration gives cost effective carbon abatement

Peatland restoration is cheaper than many other forms of carbon abatement<sup>15</sup> with the added benefit that a single expenditure can result in indefinite carbon abatement through reduction of ongoing emissions, and also provide a long term sequestration opportunity. Taking a costs for drained blanket bog of £100 – £200 per ha, restoration would require £60 million - £120 million over the next 6 years to deliver 2.4 million tonnes CO<sub>2</sub>-e annual savings. Using a standard carbon cost (in the UK 2009 - £79.5/tC) restoration would avoid a carbon damage cost of £47 million every year (i.e. £280 million over the same six year period). Furthermore, the restoration of these peatlands would provide other financial benefits in terms of tourism, sporting and water management.

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<sup>10</sup> Laine et al 2006 Estimating net ecosystem exchange in a patterned ecosystem: Example from blanket bog. *Agricultural and Forest Meteorology*, 138, 231-243

<sup>11</sup> Report of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol on its tenth session, held in Copenhagen from 7 to 15 December 2009. <http://unfccc.int/resource/docs/2009/awg10/eng/17.pdf>

<sup>12</sup> Climate Change Delivery Plan: Meeting Scotland's Statutory Climate Change Targets <http://www.scotland.gov.uk/Publications/2009/06/18103720/0>

<sup>13</sup> Scottish Soil Framework <http://www.scotland.gov.uk/Publications/2009/05/20145602/0>

<sup>14</sup> UK Biodiversity Group (1999) Blanket bog Habitat action Plan. Tranch 2 Action Plans Vol IV. DEFRA

<sup>15</sup> McKinsey and company 2009. Pathway to a Low- Carbon Economy v2.