UplandsManagementGroup

BLANKET BOG RESTORATION AND METHANE

Guidance Note by Natural England
May 2019

1 Blanket bogs[1] are wetlands and accumulate carbon when in good condition due to high water tables lowering rates of decomposition. When drained, these sites lose this carbon due to oxidation and physical degradation, resulting in large carbon dioxide emissions to the atmosphere and increased loss via water pathways.

2 All bogs produce methane (other names for methane are bog gas or swamp gas), a potent greenhouse gas. This gas is produced by methanogen microbes as a result of anaerobic decomposition processes under waterlogged conditions, typically in the deep, wet layers of peat. In natural conditions, this gas then moves through the peat column. A proportion of it is oxidised by methanotroph microbes in the aerated surface layers and the rest is emitted to the atmosphere.

3 When damaged bogs are rewetted, methane emissions are elevated in the short term due to the creation of open water and blocked ditches promoting these anaerobic processes. As wet areas are colonised by Sphagnum moss methane emissions would be expected to fall to background levels.

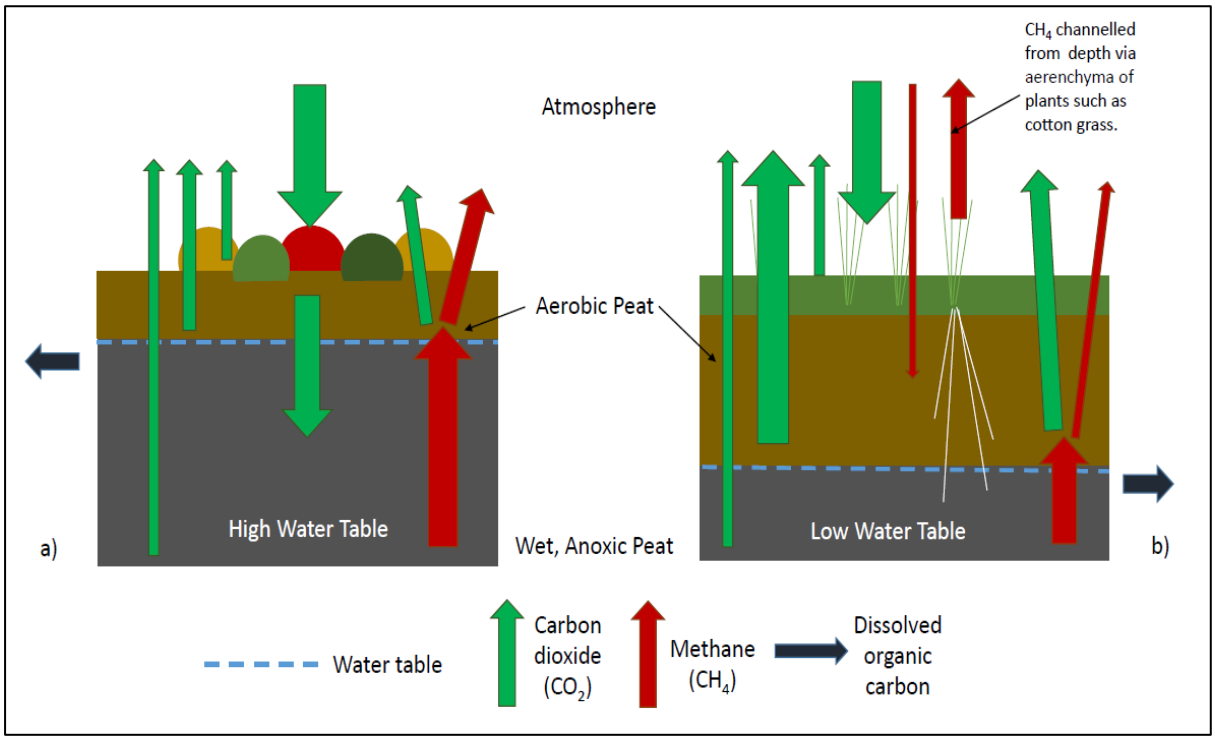

Figure 1: A simplified representation of carbon cycling in peatlands under a) a high water table and b) low water table typical of drained conditions. The water table is a key driver in determining the amount of methane and carbon dioxide emitted due to its influence on anaerobic and aerobic decomposition processes. Flux arrows are not to scale but aims to give an indication of the change in influence of the two gases under different hydrological conditions. (Diagram: Ruth Gregg).

[1] Blanket Bog is a habitat type: Other Peatland Habitats in the uplands such as Upland Fens, Flushes and Mires & wet heath also have similar properties and emissions responses.

4 To achieve effective restoration, bogs must be wet so that the decomposition of organic matter slows to allow peat and carbon to accumulate long term. The initial increased fluxes of methane post restoration must be balanced with the inevitable long-term loss of carbon should the bog have remained in its dry and degraded state.

5 Restoring the hydrology by raising the water table is a relatively quick fix, but in the context of methane, other factor such as vegetation composition and pH, play a significant role and change over longer timescales. There is a lag in the adjustment of greenhouse gases while the microbial communities that control the cycling of methane respond to such changes.

6 There is a lot of variability in methane emission from bogs with 'hotspots' in some areas, for example dam pools or areas dominated by vascular plants such as cotton grass, but areas where Sphagnum mosses become dominant are associated with lower emissions. Research suggests that eroded gullies on blanket bog are also significant areas of methane release due to the dominance of sedges and the influence of mineral soil resulting in vegetation change towards poor-fen which is associated with higher methane emissions than blanket bog.

7 The changes that take place in the function of bogs as they are restored are complex and we are learning more all the time. Restoration techniques can be adapted to mitigate the elevated fluxes of methane that arise by considering methane 'hotspots' when drawing up restoration plans.

8 **Further Information:**

8.1 There is more detailed information in the report produced by Richard Lindsay of the University of East London and in the IUCN briefings based on it.

8.2 More information about emissions of methane from peatlands is available in a report by the Centre for Ecology and Hydrology for the Department of Business, Energy and Industrial Strategy: 'The Implementation of an Emissions Inventory for UK Peatlands'.