



Defining disturbance for the assessment of the Irish peatland carbon stock

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In Ireland peatlands have been sequestering and storing carbon (C), in some places, for the last ~9000 years. Irish Peatlands cover large areas of Ireland. According to two recent studies, peatlands contain between 53% and 62 % of the national soil organic C stock. Pristine peatlands may function as a sink for atmospheric CO₂. However, the majority of peatlands in Ireland are not pristine and have suffered from extensive anthropogenic disturbance both historically and in more recent times. This disturbance in Ireland takes the form of drainage, peat extraction (both domestic and industrial), forestry plantations, burning and grazing. These activities have had, in the past, a major impact on the resources' ability to act as a carbon sink / store and continue to do so today. In 2002, Canadian researchers completed the first regional scale analyses of the effects of disturbance on peatland ecosystems in Canada under current disturbance regimes. They noted that C uptake is reduced by 85% when compared to a non-disturbance scenario. They also suggest that peatlands accumulate 24.5 gC/m²/yr during periods of no disturbance but under contemporary levels of disturbance this is reduced to 3.6 gC/m²/yr. This type of data is very sparse for Irish peatlands, however, it has been recorded at two sites. The first site, at Glencar, Co. Kerry, is a relatively pristine Atlantic blanket bog and a net sink of C. CO₂, CH₄ and dissolved organic carbon were measured at this site. The uptake rate of C was about 45 gC/m²/yr. The second site, Clara bog, Co. Offaly is a stressed raised bog. Measurements were taken here on both the intact and damaged parts of the bog and they indicate that this site is a source of C. Measurements on the intact bog were about 33 gC/m²/yr and were several times greater at the damaged site. These figures from both Canada and Ireland indicate that disturbance has a large impact on a peatlands' ability to function as a carbon sink or store. This aim of this paper is to create a working definition for the term peatland disturbance in Ireland by examining: 1. disturbance on Irish peatlands and 2. what disturbance means in terms of the peatland C stock.. This definition will be used to aid the assessment of the effect that disturbance has on the Irish peatland C stock at present and how climate change may enhance that effect into the future