

Best Natural History Presentation at Environ 2023

Winner: Elena Aitova, University of Galway

Carbon balance of a restored Irish raised bog: comparing models to estimate GHG emissions

Peatlands are unique and important ecosystems, as they are one of the largest natural terrestrial carbon (C) stores. However, anthropogenic activities such as extensive drainage and land use change are causing them to emit a greater amount of greenhouse gases (GHG) compared to natural peatlands. According to the latest research, national emissions from Irish peatlands (excluding horticulture and combustion) amount to 2.3 Mt C annually. This indicates the need for a national climate policy to prioritise the rewetting of peatlands and restoration of their carbon storage capacity. To inform the policy, we need to quantify GHG emissions, and this requires an accurate GHG modelling approach.



This research is part of the EU Interreg [Care-Peat](#) project, which includes partners from Belgium, France, Ireland, the Netherlands and the United Kingdom working together to reduce C emissions and restore the carbon storage capacity of different types of peatlands in North-West Europe. The main goal of Care-Peat is to set up and demonstrate innovative technologies for new restoration and C measurement techniques and involves the participation of local and regional stakeholders.

This study aimed to evaluate the effect of rewetting on GHG emissions in Cloncrow raised bog by measuring carbon dioxide (CO₂), methane (CH₄) fluxes and associated environmental parameters. Cloncrow bog in Co. Westmeath was restored by National Parks and Wildlife Services (NPWS) in late 2020 using peat dams in the drains and the construction of bunding (earth barriers). We measured GHG fluxes from two distinct vegetation types in drained and rewetted areas of the bog over a two-year period (2021–2022).

Using measured GHG and environmental data, we made the first attempt to develop a site-specific GHG modelling approach and compare it with other existing models to improve our understanding of the mechanisms that drive GHG emissions from peatlands. Our results will provide valuable insights into the design of future models and help to improve the accuracy of reported

national GHG emissions and sinks. These results will also be valuable to inform policy and management decisions regarding the rewetting of degraded peatland ecosystems.

Cloncrow bog is Natural Heritage Area (NHA) and has a significant conservation value. It is a raised bog — a rare habitat in the European Union and one that is increasingly scarce and threatened in Ireland. Raised bogs provide habitat for a wide range of plant and animal species, many of which are rare or endangered. By rewetting degraded sites, not only can we preserve the C stored within them, but also improve water quality in the area and protect many species that depend on peatlands for their survival.



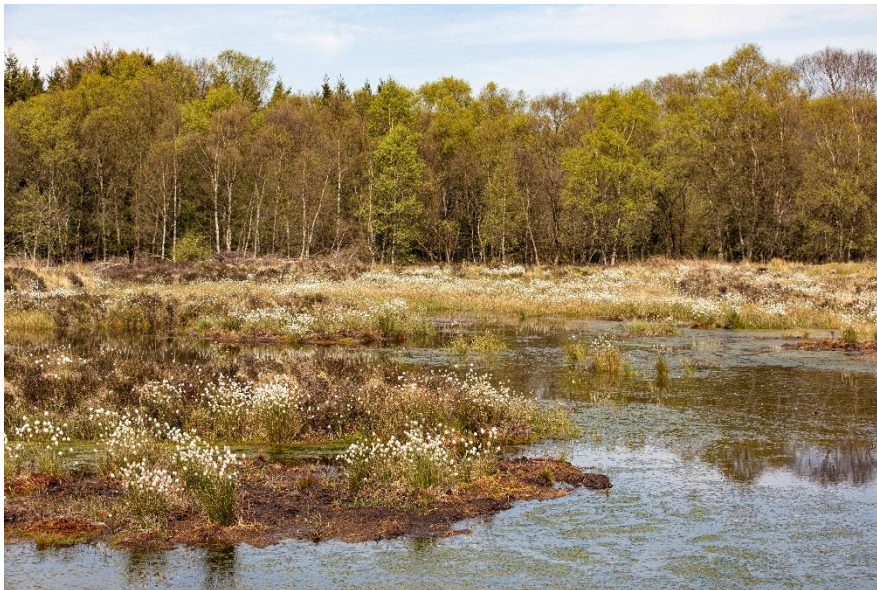
Typical GHG measurement equipment



Cloncrow bog (photo by Eugene Dunbar)



Cloncrow bog before rewetting (photo by Eugene Dunbar)



Cloncrow bog after rewetting (photo by Eugene Dunbar)