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Peatland properties influencing greenhouse gas emissions and removal (AUGER Project)

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DISCLAIMER

This report is based on research carried out/data from April 2016 – Jan 2021. More recent data may have become available since the research was completed.

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Executive Summary

A nationwide peatland survey was conducted across 50 ombrotrophic peatlands (bogs) in the Republic of Ireland to ascertain a wide range of peat properties. In addition to natural (relatively intact) sites, we surveyed the most prevalent peatland land use categories (LUC): grassland, forestry, peat extraction (both industrial and domestic), as well as management options (deep drained; shallow drained; rewetting). Furthermore, the entirety of the peat profile (down to the sub-peat mineral soil/bedrock) was sampled. Our results demonstrate that Irish bogs have been drastically altered by human activities and the sampled peat properties reflect the nature and magnitude of the land use and management.

Natural bogs were found to be the deepest of all LUC. When the residual peat depths under the other LUC are compared, a picture emerges of more intensive utilisation of raised and mountain bogs compared to lowland blanket bogs. The shallower depths under all LUC (compared to natural sites) indicate high rates of subsidence and loss of peat through organic matter decomposition, as well as peat removal due to domestic and industrial extraction. Lowland blanket bogs exhibit the least degradation due to their more extensive utilisation.

Using the areal extent of all LUC reported in the National Inventory Report, we estimate the carbon stock held in natural and managed peatlands at 2,216 Mt of carbon with *c*. 42% in raised bogs, *c.* 42% in lowland blanket bogs, and *c.* 15% in mountain blanket bogs. Natural and cutover peatlands together contain just under half of the national peatland carbon stock.

Deep-drained grassland was at the extreme end of the degradation scale encountered (in comparison to natural bogs), containing the lowest organic matter and total organic carbon contents. However, combined with greater bulk density values, this LUC comprises large soil organic carbon densities and contains a valuable carbon stock. Nonetheless, high von Post (humification) and high ash content values make this peatland LUC very sensitive to continued organic matter decomposition and, thus, this LUC remains a potential hotspot of carbon dioxide (CO_2) and nitrous oxide emissions.

Despite a shallower peat depth, cutover bogs hold the largest carbon store after undrained natural peatlands. These results infer the importance of these degraded ecosystems in providing some critical ecosystem services. Therefore, they should be identified for immediate management interventions to prevent further degradation, particularly the on-going loss of their carbon store. For instance, the drained cutover bog at Moyarwood in our study was found to emit 5.2 tonnes of CO_2/ha/yr over a 5-year monitoring period. Rewetting at Moyarwood resulted in a sustained and elevated water level and rapidly switched this degraded site into a net CO_2 sink with a 5-year average of 3.8 tonnes CO_2/ha/yr Moreover, initial results from Clara bog indicate a carbon sink of 4.6 tonnes CO_2/ha/yr under 'normal'

climatic years. Methane emissions was found to remain elevated in Moyarwood for at least five years after rewetting. Given the large heterogeneity of peatlands demonstrated in this study, our results indicate that more sites must be monitored for GHG dynamics across a wider geographical range.

Finally, work carried out on the ECOSSE model using an improved water table simulation approach (i.e., application of seasonally varying drainage factor Dfa(i) parameter) could improve the model performance for the simulation of CO_2 fluxes, thus contributing towards potential future development of process-based modelling approaches (IPCC Tier 3 methodology) for estimating and reporting GHG emissions from peatlands under various LUC/management practices.

Overall, recognition of the heterogeneity found across Irish peat soils, together with an understanding of the relationships between key soil properties, are critical to develop effective strategies for remedial management of these degraded ecosystems. This study and findings clearly support the need for a site-by-site approach for future rewetting management schemes.

1 Information required to predict GHG fluxes from peatlands

1.1 Policy impetus

The importance of the peatland carbon stock and fluxes in the international framework of climate change mitigation and adaptation has been widely acknowledged. International biodiversity and climate change conventions (Convention on Biological Diversity and United Nation Framework Convention on Climate Change (UNFCCC)) now recognise peatlands as a priority for action, with peatland rewetting and restoration identified as "low-hanging fruit, and among the most cost-effective options for mitigating climate change." (Achim Steiner, UN Under-Secretary General and Executive Director UN Environment Programme (UNEP).

The introduction of the Wetlands Drainage and Rewetting (WDR) activity under Article 3.4 in the second commitment period of the Kyoto Protocol provided countries with the opportunity to report greenhouse gas (GHG) emissions or removals from drained and rewetted organic soils, respectively, although Ireland did not elect to report this activity. The second Kyoto Protocol period (2013–2020) has concluded, and the first period of the EU LULUCF regulations under the EU Climate and Energy Framework will run from 2021–2025 (the second period is 2026–2030). Ireland has chosen to elect managed wetlands for the first commitment period under these regulations prior to mandatory accounting for the second period. The LULUCF Regulations base year is the average value from 2005–2009.

At EU Level, wetlands have already been highlighted as playing a central role in achieving the temperature goals agreed in the Paris Agreement, and peatlands are already included in 2030 Climate and Energy Framework (Regulation (EU) 2018/841, European Parliament 2018). At the national level, the Climate Action and Low Carbon Development (Amendment) Bill (2021) provide a legal framework that will to "support Ireland's transition to Net Zero and achieve a climate neutral economy by no later than 2050" (Government of Ireland 2021). It plans to introduce a series of strategies which includes 'removals' and LULUCF but fails to specify how they will be used in accessing progress towards the targets. Ireland has significant emissions from LULUCF at present, largely due to the management of Irish peatlands. These need to be addressed in order to achieve the 2050 objective. One contribution to the lowering of emissions should involve improving the management of carbon-rich soils, such as peatlands, as recommended by the Climate Change Advisory Council in their Annual Review (2020): "*The rewetting of drained peatlands is one of the most cost-effective measures supported by carbon tax revenue*". This has been re-affirmed in the European Green Deal with new Common Agriculture

Policy instruments (CAP 2021–2027) currently negotiated to decrease GHG emissions associated with managed peatlands (European Parliament 2020). While debatable as to the ultimate effect, offsetting emissions in sectors that are difficult to abate (aviation) has been targeted with international schemes involving peatland restoration (ICAO2016). Of significance is the government-funded Peatland Climate Action Scheme (PCAS) to manage 33,000 ha of publicly own cutaway as well as fringed uncut peatlands in a way that will safeguard the carbon stored in the remaining peat and contribute to further carbon sequestration where possible (DECC 2020).

1.2 Reporting emissions/removals

Action to improve management of peatlands require a capability to accurately report GHG emissions/removals. The IPCC 2013 Wetlands Supplement (IPCC 2014c) has set out methodological guidance for the quantification and accounting of GHG emissions/removals associated with the management of different wetland types. From an Irish perspective, the IPCC Wetlands Supplement provides a rigorous and comprehensive methodological framework for LULUCF reporting. Its implementation is, however, not without issues.

Firstly, the Tier 1 default emission factors may not be transferrable to an Irish situation: Renou-Wilson et al. (2014) point to a unique combination of peat soils properties and local management of grasslands over peat soils that affect the emission factors (EF) of these LUC; Wilson et al. (2015) also identified several site specific factors (peat quality) that affecting the EF of harvested/exploited peatlands. In addition, some peatland types may not be well represented, in particular blanket bogs, a dominant part of the Irish peat soils resource. Overall, these discrepancies point toward the need to improve our fundamental understanding of the role of peatland properties in the carbon cycle with the main uncertainties identified as (1) carbon density of peat soils, (2) regional peat volumes, (3) nutrient contents, and (4) water table levels. These gaps have been addressed in the AUGER project (Chapter 3) with the deployment of a national survey of peat soil properties.

Secondly, while it is possible for Ireland to use country-specific EF (Tier 2), this comes with caveats. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) has highlighted that a greater density of observations, coupled with sampling strategies appropriate to specific observation types, is required for monitoring hotspot C pools/fluxes in large carbon reservoirs, such as peatlands (IPCC 2013, Ciais et al. 2014). While several Irish studies have now contributed to the reporting of GHG emissions from managed peatland LUCs at Tier 2 levels (Wilson et al. 2015), the current state of GHG observations is not adequate given the significant hotspots of CO_2 represented by a specific LUC, and the contrasting smaller footprint of certain managed peat soils under extensive grassland (Renou-Wilson et al. 2016). Moreover, as Ireland has chosen to elect managed wetlands for the first commitment period under EU LULUCF Regulations, there is a need to investigate rewetted peat soils from various LUC.

The AUGER project set out to fill critical knowledge gaps by monitoring two rewetted/near-natural peatlands and report much needed country-specific net ecosystem carbon balances (NECB), which include one long-term (5-year) site (**Chapter 4**). At the same time, capability and potential expansion of an integrated observation network in Ireland was also reviewed in order to (1) improve the fundamental understanding of the role of peatlands in the carbon cycle (by reaching a high spatial resolution for CO_2 and CH_4 fluxes, both of which are critical for peatlands), (2) to improve our ability to project future changes by predicting flux changes due to land use change or other underlying processes (management), and (3) to verify the effectiveness of policies that aim to reduce GHG emissions and increase carbon sequestration (i.e. removals).

Thirdly, given the significant proportion of peat soils, it is in ROI interest to move to higher tier (Tier 3) reporting levels. Process-based models have the potential to integrate the interactions between various carbon pools of the peatland ecosystem, as well as to provide improved spatial and temporal estimates of GHG exchange. They do, however, require a very high level of information and complexity in regard to the interactions and processes described above and require existing observations to support model development, site parameterisation and testing. Many deficiencies have been highlighted especially in the modelling of simulated soil water, resulting in significant discrepancies of simulate CO_2 fluxes relative to the observed data (Flattery et al. 2018). The AUGER project set out to review and identify effective biogeochemical process-based models to predict GHG emissions/removals under various management practices (**Chapter 5**). To contribute towards the future development of Tier 3 methodologies for estimating peatland GHG emissions in Ireland, the focus was then placed on the development of approaches to improve the “Model to Estimate Carbon in Organic Soils – Sequestration and Emissions (ECOSSE) (Smith et al., 2010). It was a particular requirement that these modelling improvements should allow for the inclusion in the predictions of different peatland LUC/management categories, such as drainage and rewetting/restoration.

Box 1: AUGER project objectives

Identifying pressures

Peatlands have played an important role in climate regulation over the past 10,000 years. Natural peatlands are a small carbon sink (absorbing CO_2 while emitting CH_4) but 80% of Irish peatlands have been damaged to various extent. Anthropogenic disturbances, mainly in the form of drainage (for agriculture and forestry) and peat extraction result in increased CO_2 and N_2O emissions, and reduced CH_4 emissions. To mitigate emissions from peatlands two actions need to be taken: avoiding new or recurrent drainage and reducing emissions on the existing drained areas. In order to provide for better climate policy instruments involving peat soils, basic information on the peatland resource and associated properties are required.

Therefore, the main objective of this project was to carry out a nationwide survey to document the properties of various types of peatlands and peat soils, how they are affected by various management options and how this influences the carbon and GHG dynamics of these systems, thereby quantifying the role of human activities on the climate footprint of Irish peatlands.

Key objectives:

1. Characterisation of peatland types (LUC) and their associated edaphic and ecosystem properties. This will build on existing data to identify potential gaps to be filled and will be further informed by a nationwide peatland survey of physical, chemical and ecological parameters of peatlands and peat soils (and overall assessment condition). Compilation of database regrouping all types of peatlands under existing LUC (including 'natural') and management.
2. Support of on-going field observations and modelling of GHG emission/removals at 2 core peatland sites: Moyarwood and Clara bogs to improve Tier 2 reporting and review of Ireland's need for carbon stock and GHG flux monitoring capacities on peatland sites.
3. Modelling of anthropogenic impacts on GHG emissions: development of ECOSSE model to allow Ireland to move to Tier 3 level of reporting.

2 Irish Peatlands

2.1 A unique, sensitive resource

In Ireland, peatlands form a substantial part of the physical and cultural landscape. Irish peatlands are dominantly bogs[1] (~1.4 M ha) (Connolly 2018) with a very small area of fens (~20,000 ha) (NPWS 2015). The word 'bog' is derived from the Gaelic *bogach* and is an internationally accepted word for 'ombrotrophic' peatlands[2], referring to those peatlands that receive all of their water and nutrients from precipitation. Three bog types can be distinguished in Ireland, based on their surface vegetation and genesis (Hammond 1981). These are Raised Bogs (RB), Lowland Blanket Bogs (LBB) and Mountain Blanket Bogs (MBB) (see Box 2). Raised bogs occur in the central part of the island (Midlands) and range from a "True Midland Type" to a "Transitional Midland Type" in the West where precipitation is greater. Their formation originated back to postglacial lakes and their subsequent terrestrialisation. Meanwhile, blanket bogs developed from paludification of the landscape, and both lowland and mountain types extended over either mineral soils or acidic bedrock and quaternary deposits.

While covering c. 20 % of the land surface, much of the peatland area has been extensively modified by humans and currently more than 40 % of the peatland area does not have the original hydrophytic vegetation, which has been replaced by forest, grass or removed altogether through peat extraction for energy, horticulture and domestic purposes (Wilson et al. 2013b). Only 20% of our national peatland resource is deemed of conservation value with intact raised bogs being one the rarest habitats in Ireland in Europe (European Commission 2017). As such many peat soils are under various Land Use Categories (LUCs), namely: grassland, forestry or peat extraction. Lands with peat soils are crucial in the global carbon balance as they contain soils with high carbon content.

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[1] The words 'bog' and 'peatlands' are used interchangeably in this report.

[2] Peatlands and bogs are used interchangeably in this report.

Box 2: Main types of peatlands found in Ireland (Photos: Dr Flo Renou-Wilson).

Low-level Atlantic blanket bog (Co. Mayo)

Mountain blanket bog (Co. Sligo)

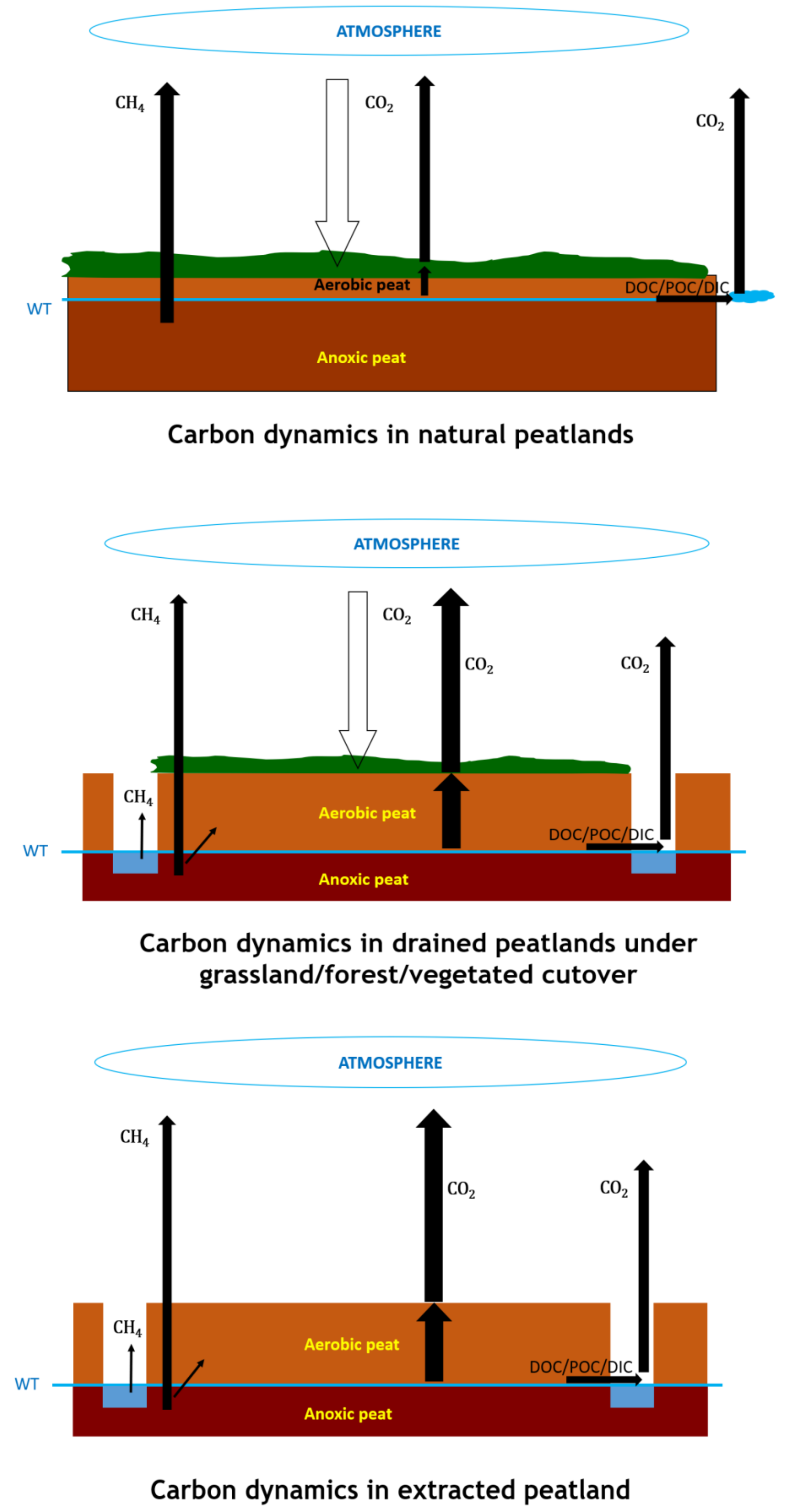
Raised bog and cutover margins (Co. Roscommon)

Industrial cutaway peatland (Co. Offaly)

2.2 Peatlands and the carbon cycle

The carbon in peatlands is stored in a number of pools (i.e. biomass, litter, peat layer, mineral subsoil and pore water); each pool with its own dynamics and turnover rates. The peat pool is the main long-term store of carbon as peat largely consists of organic material with, for Irish peats, an average carbon content of 48 % (Hammond 1981, Tomlinson 2005, Renou-Wilson et al. 2008, Kiely et al. 2009). Global peatlands are estimated to contain more than 600 GT of carbon (as much as all the terrestrial vegetation including forests) despite covering less than 3% of the earth surface (Limpens et al. 2008, Yu 2012, Xu et al. 2018). The carbon stores estimates for Irish peat soils have been associated with large uncertainties due to lack of field data (between 53 and 75 % of the total Irish soil organic carbon stocks) (Tomlinson 2005, Renou-Wilson et al. 2011). The accumulation of these vast quantities of carbon occurs over many thousands of years and results from the slow accumulation of partly decomposed plant remains (carbon-rich organic material) under the water-saturated, oxygen-depleted conditions that prevail in natural peatlands.

The biogeochemical processes behind this accumulation make natural (undisturbed) peatlands very unique ecosystems. In short, they are net sinks for carbon dioxide (CO_2 uptake) and sources of methane (CH_4 emission). Therefore, their climate footprint depends on the magnitude of the land-atmosphere exchange of these two major greenhouse gases (Figure 2.1). The greenhouse gas nitrous oxide (N_2O) on the other hand becomes significant only in nutrient-rich fens and when wetlands are converted to agriculture or afforested. Globally, wetlands contribute to c. 20 % of total global CH_4 emissions (Saunois et al. 2020) and are the main driver of atmospheric CH_4 inter-annual variations (Bousquet et al. 2006). While the net annual GHG budget of natural peatlands is spatially and temporally variable (McVeigh et al. 2014), it is sensitive to natural and anthropogenic perturbations. The climate footprint of peatlands has been found to be strongly dependent on site specific properties and management (Petrescu et al. 2015, Renou-Wilson et al. 2016).



Carbon dynamics in natural peatlands

Carbon dynamics in drained peatlands under grassland/forest/vegetated cutover

Carbon dynamics in extracted peatland

Figure 2.1: Schematics of GHG fluxes in natural, drained and extracted peatlands.

2.3 Factors influencing GHG emissions and removals

2.3.1 Peatland utilisations

The small proportion of natural peatlands that remain in the Republic of Ireland (ROI) sequester an estimated -0.27 t C ha^{-1} yr^{-1} (Wilson et al. 2013b). However, GHG dynamics are significantly altered when a peatland undergoes a change in land use through human intervention; all of which generally involve the same fundamental ecosystem changes (i.e. drainage and lowered water table levels) thus producing essentially similar negative effects (Figure 2.1). Increased emissions of CO_2 and N_2O, and a reduction in CH_4 emissions have been widely reported for drained grasslands on organic soils (Klemedtsson et al. 2009, Renou-Wilson et al. 2014), for industrially mined peatlands (Wilson et al. 2007b, Wilson et al. 2012, Wilson et al. 2015), as well as forested peat soils (Byrne and Farrell 2005, Minkkinen et al. 2008). Rewetted/restored peatlands have increasingly become the focus of GHG studies and the effect of rewetting on GHG dynamics in these new ecosystems can be somewhat unpredictable, with some studies reporting high CO_2 and CH_4 emissions post-rewetting (Wilson et al. 2007b, Wilson et al. 2009, Vanselow-Algan et al. 2015a), while other studies have shown that the CO_2 sink function can be re-established relatively quickly (Tuittila et al. 1999, Wilson et al. 2013a). Least degraded peatlands within the Natura 2000 network that have been rewetted and restored are showing promising results with balances close to natural sites (Swenson et al. 2019, Regan et al. 2020). In addition, climate change could result in greater CO_2 and CH_4 losses from peatlands, thereby acting as positive feedbacks on climate change (Frolking et al. 2011, Renou-Wilson and Wilson 2018).

2.3.2 Peatland properties

While the emissions/removals from organic soils can occur under any land-use category (and is the first division in the IPCC Wetlands supplement), other factors can affect these processes, including the climate (boreal, temperate and tropical) and specific peatland properties. Currently, the 'nutrient content' of the peat and 'drainage depth' are included in Tier 1 guidance of the IPCC Wetlands Supplement (IPCC 2014c) as further division to report the emissions/removals under both drained and rewetted peat soils. Nutrient poor peat is typically defined as peat that has accumulated in condition where water and nutrients were received from precipitation only. While nutrient rich peats also received water (and nutrients) from their surroundings. Furthermore, the delineation between shallow and deep drainage is marked as the mean annual water table either above or below a reference baseline of -30 cm.

However, more specific peat properties coupled with certain land-use management intensity may affect the decomposition of the organic matter in synergistic fashion. It has been widely demonstrated that in all cases of peatland utilisation where the peat soil is not 'wet', the decomposition of the organic matter and, therefore, associated GHG fluxes are controlled by four main factors which are tightly inter-related. These processes are quickly reviewed below.

- Edaphic properties: peat carbon and nutrient content
- Water table position
- Vegetation / site management
- Soil temperature regime

Peat carbon and nutrient content

Peat quality (evaluated by its main properties such as carbon density, von Post[3], bulk density etc.) is an important factor in determining CO_2 emissions (Reiche et al. 2010). The amount of easily degradable carbon in the peat is positively correlated with CO_2, CH_4 and N_2O fluxes (Blodau 2002, Berglund and Berglund 2011). However some organo-mineral and gleysols (containing less carbon content) were found to have GHG emissions as high as those from typical peat soils (Leiber-Sauheitl et al. 2014). Moreover the same authors demonstrated that mixing peat with less carbon dense soil (e.g. sand) did not translate into lower GHG emissions.

Nutrient status of a peatland has been found to significantly affect GHG fluxes (Frolking et al. 2011). In their natural state, nutrient rich peatlands produce greater emissions of CH_4 and N_2O than nutrient poor sites, with the relationship between N_2O emissions and the C:N ratio in the peat particularly strong (Klemedtsson et al. 2005). This difference is accrued when peat soils are under various LUC (Tiemeyer et al. 2020). In Ireland, high nutrient peat soils under grassland were found to lose carbon at rate of 5.8 t C ha^{-1} (Renou-Wilson et al. 2014). These emissions were halved when the peat under grassland had a low nutrient content and under similar deep drainage depth (Renou-Wilson et al. 2014). Other parameters have been identified as drivers of GHG fluxes. The presence of sulphate, for example, in the peat have been observed to result in a suppression of CH_4 emissions (Gauci et al. 2004, Davidson et al. 2021).

Water table position

In both natural and managed peatlands, modelling of GHG fluxes is strongly driven by the water-related physical properties of the peat (water table levels, hydraulic conductivity). However, hydrological phenomena are typically difficult to model due to (a) high variability even within one peatland type due to differences in bulk density, plant composition, peat pore geometry (Gnatowski et al. 2010), as well as location within the peatland (Kiely et al. 2014); and (b) their water-related

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[3] The von Post scale gives an idea of the level of humification of the peat.

physical properties, which are altered under certain land use management options. For example, a natural peatland typically demonstrates a high hydraulic conductivity in the acrotelm (i.e. the fibrous zone above the water table) and a lower value in the catotelm (i.e. the more decomposed layer below the water table), which correlates well with the degree of decomposition and porosity (Quinton et al. 2008) as well as with bulk density (Boelter 1969). These relationships are much less clear in a drained site (Kopp et al. 2013). Drainage and associated land use alter peatland properties and lead to changes in peat properties by introducing partially oxic conditions into otherwise water-logged, anoxic soils. This can lead to increased emissions of CO_2 and N_2O, and reduced CH_4 emissions although their magnitude is directly related to the drainage depth (Renou-Wilson et al. 2014) and to drainage ditch density in blanket bogs (Gatis et al. 2015). This 'drainage depth' factor is now included in Tier 1 guidance of the IPCC Wetlands Supplement (IPCC 2014c) with the delineation marked as the mean annual water table either above or below a reference baseline of -30 cm. In addition, the drying of a wet peat soil alters its physical properties due to primary consolidation (Hobbs 1986) and slow subsidence (Kennedy and Price 2005). Changes to the surface of a bog due to subsidence can result in changes to the flow patterns and catchment areas leading to a general trend of the bog drying out, as observed at Clara bog, Co. Offaly, for example (Regan and Johnston 2013). Decomposition and erosion processes in drained peatlands can also release a significant amount of nutrients, metals and suspended solids, in particular Dissolved Organic Carbon (DOC) (Kiely et al. 2014, Renou-Wilson et al. 2014), which can re-mineralise off-site and contribute to atmospheric CO_2 emissions (Evans et al. 2015).

Vegetation composition (management)

The role of vegetation is central in determining GHG dynamics across most peatlands' LUCs: grassland, forestry and cutover peat areas, whereas cutaway peatlands are usually bare. Vegetation composition has been employed as a proxy for water table level in predicting GHG emissions/removals (e.g. Couwenberg et al. 2011). In natural peatlands, the persistently high water table provides optimum conditions for the growth of Sphagnum mosses, which are considered a keystone species of a healthy functioning bog ecosystem (Rochefort 2000). As the decomposition of Sphagnum litter is slow, organic matter accumulates and the carbon within is stored beneath the water table level. As Sphagnum is able to absorb and hold large volumes of water within its tissues, it is therefore able to provide a buffer to some extent during times of drought (Wilson et al. 2013a). The role of aerenchyma species (*Carex*, *Phragmites* and *Eriophorum* spp.) in driving CH_4 emissions in higher-pH bogs and fens has been well documented (Couwenberg et al. 2011) and result in the occurrence of CH_4 "hotspots" within a peatland (Wilson et al. 2009). The role of Sphagnum in the oxidation of CH_4 has also been recognised

(Fritz et al. 2011), which provides further evidence of the role of vegetation in determining the very high spatial variation in CH_4 emissions in wetland ecosystems (Forbrich et al. 2011). There is a significant change in the vegetation composition of a peatland following land use change. For industrially mined peatlands, the complete removal of vegetation prior to peat extraction prevents assimilation and sequestration of carbon by the ecosystem. Emissions of CO_2 increase (as a function of drainage and soil temperature) from the bare peat surface (Wilson et al. 2015), and the presence of aerenchyma species around drainage ditches also produces "hotspots" of CH_4 emissions (IPCC 2014c). In domestic peat extracted peatlands, the vegetation remains in the uncut part of the peatland, although wetland species are replaced by "drier" species, such as *Calluna vulgaris*. In this situation, the whole peatland (cutover and remaining uncut high bog) is usually a net CO_2 source in part due to the possible priming effect of the recalcitrant peat by "fresh" organic inputs (Wilson et al. 2015). In both industrial and domestic peat extraction, CH_4 emissions may be significantly reduced but could remain high in areas where drainage is not effective (near drains and lower cut areas).

Spatial variation in plant communities also regulate GHG dynamics in rewetted/restored peatlands (Zak et al. 2015). The conversion to grassland results in a complete replacement of the natural peatland vegetation and a radical change in GHG dynamics (Renou-Wilson et al. 2014), although extensive grazing on nutrient poor peat under grassland are likely to emit much less CO_2 (Beetz et al. 2013, Renou-Wilson et al. 2014). In afforested peatlands, the biomass (trees, understory vegetation) and litter carbon pools increase significantly given the greater productivity of the forest stand, although there is a depletion of the soil carbon pool due to drainage (Byrne et al. 2000), which depending on the age and condition of the plantation may be larger than the carbon held in the tree biomass (Lindsay 2010).

Soil temperature

A strong exponential relationship between ecosystem respiration (CO_2) and soil temperature has been widely reported across all peatland LUC (Wilson et al. 2007b, Renou-Wilson et al. 2014, Wilson et al. 2015). In modelling studies, soil temperature is often combined with water table level to simulate ecosystem respiration. Similarly, the interaction between these two variables in determining CH_4 emissions has been recognised (Laine et al. 2007, Wilson et al. 2009). Soil temperature is itself influenced by soil moisture and vegetation cover (Buttler et al. 2015). Soil temperatures is a key driver of microbial activity which affect directly the decomposition and thus all GHG dynamics within peatlands are driven by microbial activity (except for peat fires) (Hilasvuori et al. 2013).

3 Peatland field investigations

3.1 Background

3.1.1 Definitions

Organic soils, also referred to as ‘histosols’ or as ‘peat soils’ are variously defined, depending on the country, scientific discipline or indeed international context (see Box 3.1). In the context of IPCC methodologies, the definition of organic soils is heterogeneous across the European Union and is not transparently provided in the national GHG inventory reports. In Ireland, organic soils are defined as soils with a high organic matter content (greater than 20 %) with a peat depth greater than 30 cm. If the organic or peat layer is less than 30 cm then the soil is classified as organo-mineral (or peaty-mineral). According to the Irish National Soils Database (Fay et al. 2007), the term ‘organic soils’ is used for all soils with a soil organic carbon (SOC) content > 15 % (~25 % Soil Organic Matter). Wet organic soils are defined as having a water table between 0 and 30 cm below the soil surface. Internationally, wet soils are not defined by the water table but as soils (mineral or organic) that are inundated or saturated by water for all or part of the year to the extent that biota (particularly soil microbes and rooted plants) has adapted to anaerobic conditions.

Box 3. For IPCC methodologies purposes (IPCC 2006, 2014a), an organic soil is a soil with a high concentration of organic matter and, if they satisfy requirements **1** and **2**, or **1** and **3** below:

1. *Thickness of organic horizon greater than or equal to 10 cm. A horizon of less than 20 cm must have 12% or more organic carbon when mixed to a depth of 20 cm.*
2. *Soils that are never saturated with water for more than a few days must contain more than 20 % organic carbon by weight (i.e. about 35 % organic matter).*
3. *Soils are subject to water saturation episodes and have either:*

a. At least 12 % organic carbon by weight (i.e. about 20 % organic matter) if the soil has no clay; or

b. At least 18 % organic carbon by weight (i.e., about 30 % organic matter) if the soil has 60 % or more clay; or

c. An intermediate proportional amount of organic carbon for intermediate amounts of clay.

3.1.2 Peat soil data

Since the first peat map of Ireland was created by the Geological Survey in 1920, much has been discovered about peat soils. The 1978 peatland map of Ireland published by An Foras Taluntais, and its accompanying publication, showing the distribution, composition and some of the peat soil characteristics (Hammond 1981), had already pointed to the considerable differences that existed between the various peat types. While the impetus of the former surveys was on their utilisation to contribute to agricultural and industrial development, peat properties, and especially carbon stocks, are now required to be assessed with a view to understanding the impact of anthropogenic activities on the role of peatlands in water and the carbon cycle in particular. More recent peat soil data have been mostly collected as background to other research work and national soil surveys (Renou et al. 2007, Fealy et al. 2009, Kiely et al. 2009, Simo et al. 2014). Efforts to estimate carbon stocks have been especially limited by a lack or scarcity of directly measured soil properties, specifically depths of the various peatlands types in both their intact state and under various management categories. Past studies have estimated the carbon stock in Irish peatlands to range from 1071 Mt (Tomlinson 2005) to 1503 Mt (Eaton et al. 2008) and 1566 Mt (Renou-Wilson et al. 2011). These relied on estimates of parameters, such peat depth, bulk density and soil organic carbon contents, all of which display a high level of uncertainty due to measurement bias: e.g. mostly upper layers or geographical bias, i.e., modelled from limited regional extent (Holden and Connolly 2011). Therefore, a more robust assessment of C storage in Irish peatlands requires contemporary field-based assessment of peat properties under various land uses and management regimes.

3.2 Material and methods

3.2.1 Sampling sites selection

Several datasets were used to map the area of peat soils in the ROI, in order to identify geographical clusters that would form primary units for sampling (Figure 3.2.1). The 'Derived Irish Peatland Map' (DIPMV2) (Connolly and Holden 2009) and the Irish Soil Information system (Simo et al. 2014), along with other available mapping data (CORINE land cover map 2012, Coillte Forest cover map, EPA-Soils and subsoils mapping project (Fealy et al. 2009)), provided additional useful information for the selection of primary units, sampling sites and plots, as well as sampling locations.

Sampling sites were selected using a multi-stage design (de Gruijter et al. 2006), involving the nesting of three sampling levels: 10 primary units (**PU**) were selected within the most representative geographical extent of the three Irish bog types, namely raised bogs (**RB)**, Lowland blanket bogs (**LLBB)** and mountain blanket bogs (**MBB)**. These were located in counties Donegal, Galway, Sligo, Mayo, Offaly, Longford and Kerry. Within each PU, sampling sites (**SS**) were then selected for each **LUC**: grassland, forest, cutover (domestic peat extraction) and cutaway (industrial peat extraction), as well as a natural (near-intact) site. An additional sampling level was introduced to represent the management of the Water Table (WT); namely **drained** or **rewetted**. The definitions follow the IPPC Wetlands Supplement (2014). For grassland, this management level was disaggregated into more refined options: **deep drained** (where the annual WT remains on average -30 cm or deeper below the ground level), **shallow drained** (where the annual WT remains on average above -30 cm) and **rough grazing** (containing semi-natural vegetation from bog, heathland or natural grassland habitat, and used or suitable for livestock grazing). Some LUC were not found across all peatland types (e.g. cutaway in mountain blanket bogs. A total of 50 sites, representing all existing combinations, were sampled (Table 3.2.1). Finally, at each site, sampling locations (**SL**) were randomly chosen, amounting to 270 sampled points (or profiles). The number of peat soil samples at each sampling location varied depending on the variability in peat depths at each sampling site. The sampling design and size were found to be statistically robust (see detailed analysis in Appendix 1).

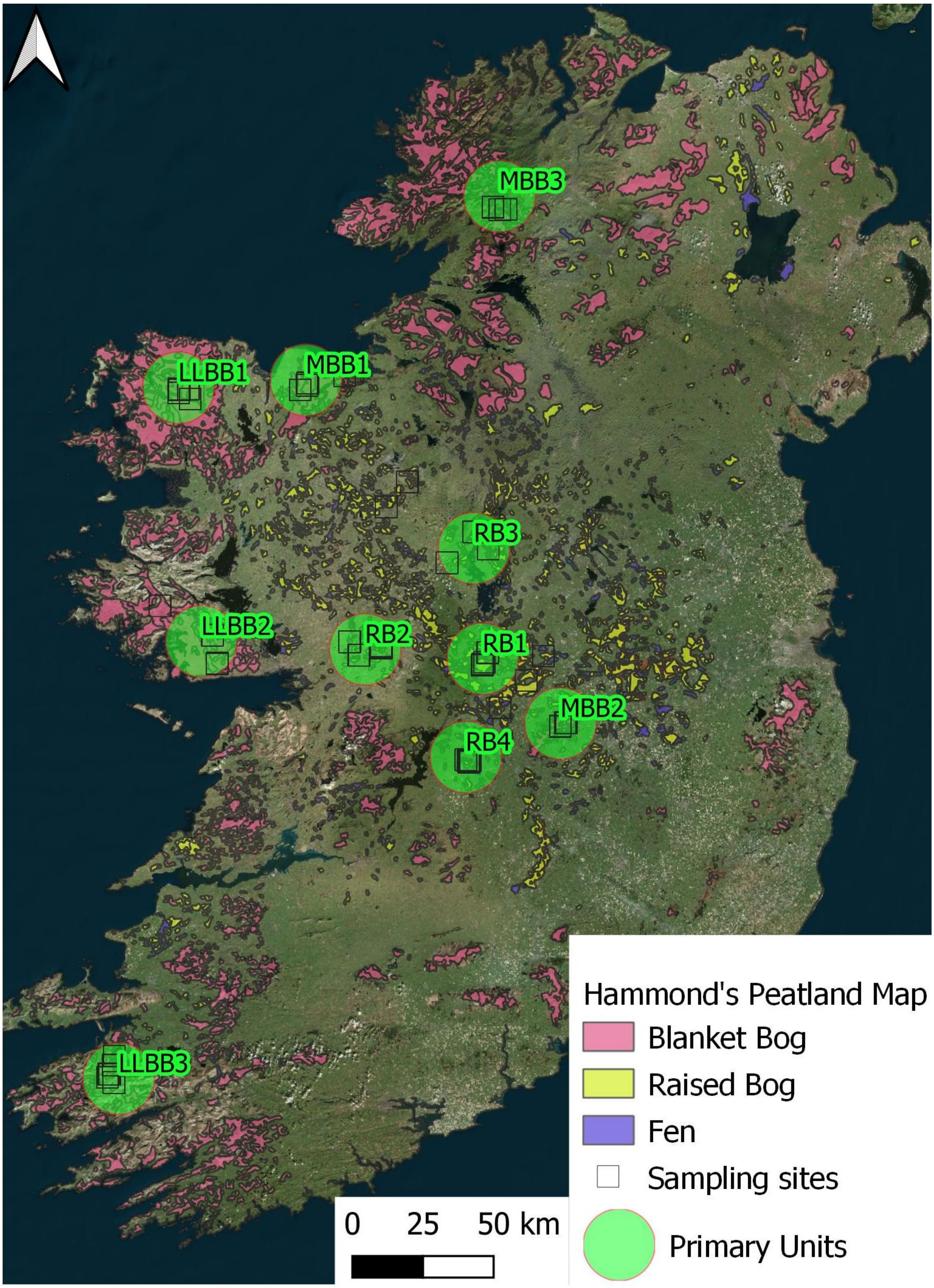

Figure 3.2.1. Distribution of AUGER sampling sites within primary units (see codes in Table 3.2.1) together with peatland map (Hammond, 1981).

Table 3.2.1. Nested sampling design with names (County names in bracket) and number of sites surveyed according to peatland type, land use category and management.

		Peatland types										
		Raised Bogs				Lowland Blanket Bogs			Mountain Blanket Bogs			
		Primary units										
		RB1	RB2	RB3	RB4	LLBB1	LLBB2	LLBB3	MBB1	MBB2	MBB3	
		Shannon-bridge (Offaly)	Woodlawn (Galway)	Longford (Longford)	Birr (Offaly)	Ballycroy (Mayo)	Galway (Galway)	Glencar (Kerry)	Sligo (Sligo)	Slieve Bloom (Offaly)	Donegal (Donegal)	
Land use category	**Management**	**Peatland sites**										**Sites #**
Natural	Undrained	Mongan	Monivea	Cloonshanville	Scohaboy	Knockmoyle	Redhill	Ballyghisheen	Letterunshin	The Cut	Croaghonagh	10
Cutover	Drained	Clara	Moyarwood	Castlerea	Scohaboy	Knockmoyle	Redhill	Ballyghisheen	Fiddandary	Glenlahan	Croaghonagh	10
	Rewetted		Moyarwood									1
Cutaway	Drained	Blackwater	Clough	Curraghroe	Ballycollin	Bellacorick						5
	Rewetted	Blackwater				Bellacorick						2
Forest	Drained	Blackwater	Moyarwood*	Mote	Scohaboy	Knockmoyle	Cloosh	Glencanane	Ox Mountains	Glenlahan	Croaghonagh	10
	Rewetted	Scohaboy						Ballyghisheen				2
Grassland	Deep-drained (>30cm)	Boora		Lanesborough	Scohaboy	Knockmoyle		Gortnagan				5
	Shallow drained naturally rewetted (<30cm)		Moyarwood									1
	Rough grazing						Caher	Caanknoo-gheda	Letterunshin		Croaghonagh	4
Total												**50**

**afforested cutover*

3.2.2 Soil sampling and aliquots

A 'Russian' peat sampler" (Eijkelkamp® 2005, Pitkänen et al. 2011), consisting of a semi cylindrical steel sample chamber of 500 mm length and a volume of 500 cm^3 was used for extracting soil samples of varying size from consecutive depth intervals along the soil profile for most LUC (Figure 3.2.2). At each sampling point, soil was sampled from three augered points at ~30 cm distance. Two were used for bulk density to avoid compaction of subsequent layers. The last auger point was used to take samples for the nutrients. The entire depth of the peat soil at each sampling location was sampled into 'cores', until the sub-peat mineral soil or bedrock was reached. Each soil core was further sampled into soil aliquots with fixed volumes for each depth interval (Figure 3.2.3). A total of 2012 soil aliquots were extracted during the survey. Each depth interval sample contained the same volume, except for the last sample (before the sub-peat mineral soil was reached) due to unknown total depth. Of note, the sub-peat substrate was identified (see Appendix 6) and processed for storage but not analysed.

- 0 – 10 cm: all aliquots possess the same volume, with similar subsample mass.
- 10 – 25 cm: all aliquots possess the same volume, with similar subsample mass.
- 25 – 50 cm: all aliquots possess the same volume, with similar subsample mass.
- 50 – 100 cm: all aliquots possess the same volume, with similar subsample mass. Subsamples from layers 50–75 cm and 75–100 cm were combined to form one composite aliquot.
- 100 cm – peat-mineral interface layer: all aliquots possess the same volume, with similar subsample mass. Subsamples from layers >100 cm and < depth sub-peat mineral interface layer were combined to form one composite aliquot.
- Peat-mineral interface layer: proportional mass of subsample according to individual aliquot volumes.

Some compacted sites in the 'grassland' LUC required soil sample extraction from excavated soil pits using soil sampling rings (Eijkelkamp® 100 cm^3). Sample rings were taken from the centre of equivalent depth intervals within the soil pit (Figure 3.2). For samples from soil rings, the entire sample represents the soil aliquot. Aliquots of sampling locations belonging to the same sampling site, were subsampled to form a composite aliquot for each sampled layer (depth interval) per plot. Thus, one composite aliquot was formed for each layer per sampling location. In case of differing depths at sampling locations, a proportional mass according to individual sample volumes was drawn as a subsample. Due to budget constraints, layers beyond 50 cm were combined into a single composite aliquot. Before subsampling, composite aliquots were manually homogenized using a spatula. For aliquots pertaining to the sub-peat mineral interface layer, with different volumes for each sampling point, a proportional volume of subsample was taken instead. This was done to ensure that an equal proportion of each aliquot was represented within each 'physical mean', formed by the compositing process, and to account for the aliquot's weight in each composite aliquot per layer or layer combination.

Figure 3.2.2. Soil sampling equipment used during the peatland survey. Top row (left to right): vegetation quadrat, 'Russian' peat sampler with closed fin, three auguring points used for extracting the two sets of soil aliquots from the centre of the quadrat. Middle row: 'Russian' peat sampler with extension rods, peat soil core with tools used for extracting aliquots; example of a clear transition between peat and sub-peat lacustrine clay sediment. Bottom row: soil pit sampling in a compacted grassland site (30 x 50 cm); a 100 cm^3 soil sample ring; and a soil sample within the soil sample ring.

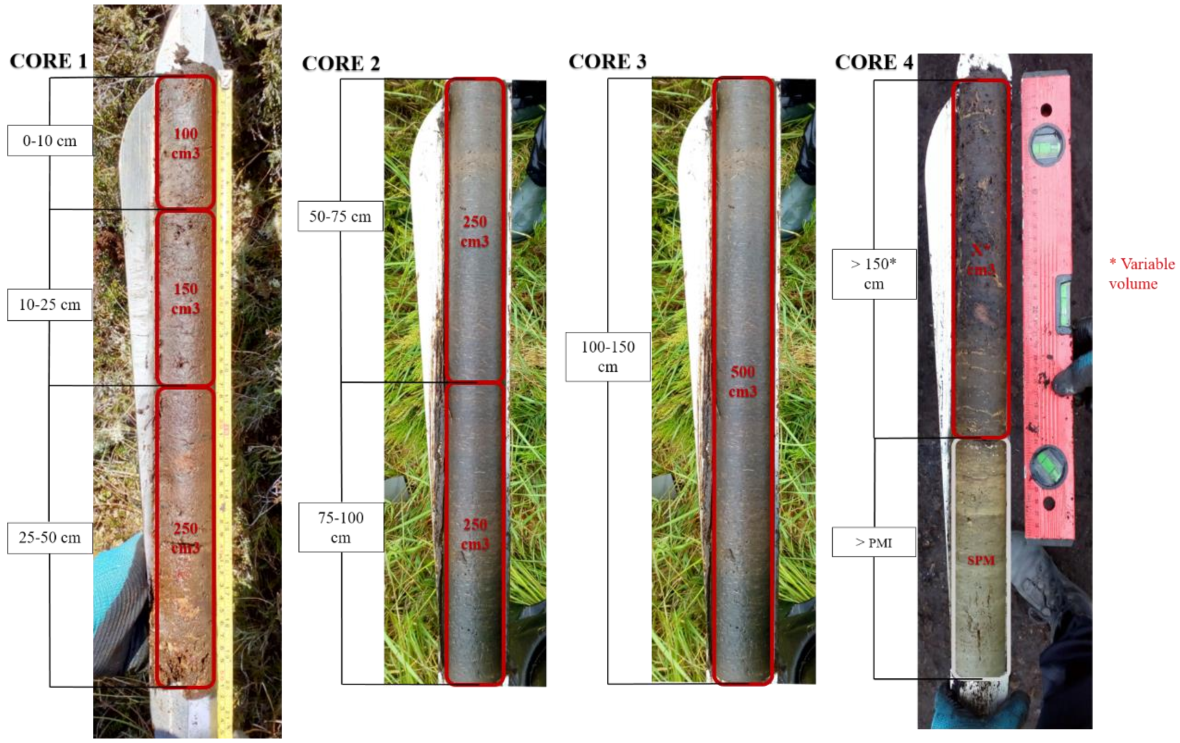

Figure 3.2.3. Depth interval sampling employed during the peatland survey. Depth intervals and volumes of aliquots are shown starting from the top of the soil column (core 1) to the sub-peat-mineral layer (core 4).

3.2.3 Laboratory measurements

Single sample measurements

Dry bulk density, ash, organic matter contents and pH were measured for each soil aliquots. Soil aliquots were placed in a drying oven at 105 °C for at least 24 hours and until constant mass was reached. **Dry bulk density (g cm^{-3})** was then measured as the ratio between dry soil mass and the initial volume of the soil aliquot (NSAI 2010, Chambers et al. 2011). Thereafter, aliquots were milled to a grain size of 200 µm in a rotor mill (Fritsch Pulverisette 14®REF). Before drawing a subsample for measurement, aliquots were manually homogenized, using a spatula. **Ash-content (% DM) and organic matter (% DM)** were measured on subsamples of homogenized, oven-dried aliquots in a muffle furnace (Nabertherm B180® REF). Subsamples were corrected for water content at 105 °C overnight before measurement (NSAI 2009a, b).

pH (H_2O) was measured on fresh semi-disturbed aliquots within 1–2 days after sampling, using a glass-calomel electrode (Hanna®). Three subsamples were drawn from a fresh aliquot to approximately 15 g of subsample and were placed in a 100 ml beaker; larger beakers were used for very fibrous aliquots.

50 ml of distilled water with pH ~6.5 was added to the beaker. Measurements were recorded once the pH reading remained constant.

Composite sample measurements

Carbon content (% DM) and **nitrogen content (% DM)** were determined for each composite aliquot by elemental analysis using a Elementar Vario MACRO-Cube®. Analysis was performed in duplicate and was corrected by water content by drying overnight (NSAI 2011).

3.2.4 Statistical analysis

A statistical description of all analysed peat properties has been tabulated and presented in Appendix 4, while graphical statistical analysis (model predictions and multiple-comparison) are presented in Appendix 5. In order to make inferences comparable to existing soil databases in the country (e.g.Teagasc et al. 2015), the sampled peat layers were combined into three main soil layers namely ‘top’, ‘sub’ and ‘basal’, referring to topsoil layers (0–10 cm + 10–25 cm), subsoil (25–50 cm) and basal peat layers (> 50 cm), respectively. This also permitted to test the hypothesis that peatland type, land use, management and depth have a significant influence on the combined peat soil properties.

Mixed-effects model to compare modelled estimated marginal means of peat depth

A mixed-effects model was fitted to the data, including sampling depth as dependent variable and peatland type and land use as predictors. Land use was nested in peatland type to account for peatland type - specific peculiarities of land use and to circumvent singularities caused by the incomplete sampling design. Since peat depth was measured at each sampling point, these measurements allowed for the inclusion of site-specific variability of peat depth (which, if peat depth had been aggregated at sampling plot level, would have led to loss of information on plot variability).

The final model included a nested random intercept for sampling points and sampling location, accounting for the clustering of sampling points and the hierarchical structure of the data. Parametric bootstrap tests of the nested random effects confirmed that no variance component for primary units was necessary (p > 0.05). The final ‘factorial peat depth model’ was specified as follows:

$$y_j = \beta_0 + \sum_{l=1}^{k} \beta_{l.1} f_l + u_{j1} + u_{j2} + \varepsilon_i ,$$

where y_j is the measured value of peat depth at the i-th depth of the j-th sampling point. β_0 is the general intercept, $\beta_{l.1}$, the coefficient of the l-th fixed effect (peatland type and land use (f_l)). u_{j1} and u_{j2} are the random intercept deviations for sampling plot and sampling point nested within sampling plot, respectively. ε_{ij} represents the residual error term of the j-th sampling point.

Hypothesis were tested comparing the estimated marginal means (EMM) of the mean modelled values of the peat soil properties of each group. Mean modelled values were estimated using restricted maximum likelihood (REML). Peat depth was tested for differences between peatland types and their specific land uses using multiple comparisons of the estimated marginal means (Searle et al. 1980).

3.3 Peat properties for different land use categories

3.3.1 Overview of results

A summary of peat properties is presented in graphical box plot form (Figure 3.3.1) along the peat profile and includes von Post, dry bulk density (BD, g cm^{-3}), pH, electric conductivity (EC, mS cm^{-1}), organic matter content (OM, dry mass %), ash (%), carbon (C, %), nitrogen (N, %), gravimetric water content (WC g, %) and volumetric water content (WC vol, %). A summary of basic statistics is also presented in a tabular format (Table 3.3.1) for the surface peat layer (0–0.1 m): Min=minimum, Max=maximum, Q25= 25th quantile, Q75=75th quantile, Lower CI= lower bound of confidence interval (alpha =0.05) and Upper CI=upper bound of confidence interval (alpha=0.05). In conjunction with the full database and metadata submitted with this report, a tabular statistical description of all peat properties along each profile layer for each soil aliquot, as well as for each aggregated sample, is presented in Appendix 4 for each peatland type and LUC, and includes additional peat properties not presented in the main body of this report (porosity, hydrogen, oxygen and sulphur).

Peat depth

The greatest mean depth was encountered in natural raised bogs (6.9 m) (Table 3.3.1). Surprisingly, natural mountain blanket bog had a greater mean peat depth (3.4 m) than natural lowland blanket bog (2.7 m). However the mean peat depth under all other LUC was lower than their lowland blanket bog counterparts. For each peatland type, natural bogs were always deeper than other land uses but this was only statistically different for raised bogs and mountain blanket bogs, demonstrating that these two bog types have been the most altered by man’s activities. Combining all peatland types together, the effect of management on peat depth was significant, with grassland and cutaway LUC displaying much shallower peat depths (median of 148 and 150 cm respectively) compared to cutover (275 cm) and forestry (220 cm) (Figure 3.3.1). Peat depth is a primary indicator of peat degradation with drainage leading to both subsidence and loss of volume, as well as loss of peat through organic matter decomposition. In addition, extraction of peat reduces the depth of peat. Comparing each LUC against their natural bog types, reduction of peat depths ranges from 20% (cutover lowland blanket bog) to as high as 80 and 85% (cutaway and grassland over raised bogs respectively). The least discrepancies between natural and other LUC peat depths were measured in lowland blanket bogs demonstrating their more extensive utilisation.

Few, disparate peat depth data sources have been published and used subsequently to estimate SOC. Hammond (1981) mean average depths for natural raised bogs was 7.0 m which corresponds to our results (6.9 m). The cutaway mean was somewhat higher at 2.5 m compare to 1.4 m in this study and confirm the intensification of the peat extraction activity. Atlantic lowland blanket bog, regardless of LUC were estimated at 3.0 m on average (compare to 2.7 m in this study). However mountain blanket bogs depths averaged 1.2m comparing well with grassland and cutover bog but under-estimate the natural mountain blanket bogs measured in this study (3.4 m). This is perhaps an artefact of the range of elevation where these bogs are found. Hammond only referred to an elevation > 152 m. The mountain blanket bog sites investigated here had an elevation median: 177 m and mean: 229 m (min: 136 m; max: 457 m). While it was noted that mountain blanket bogs were more rocky in the west of Ireland, leading to an arbitrary half reduction of the estimated peat depth in Tomlinson’s study (2005) for example, this assumption was not found in our study sites.

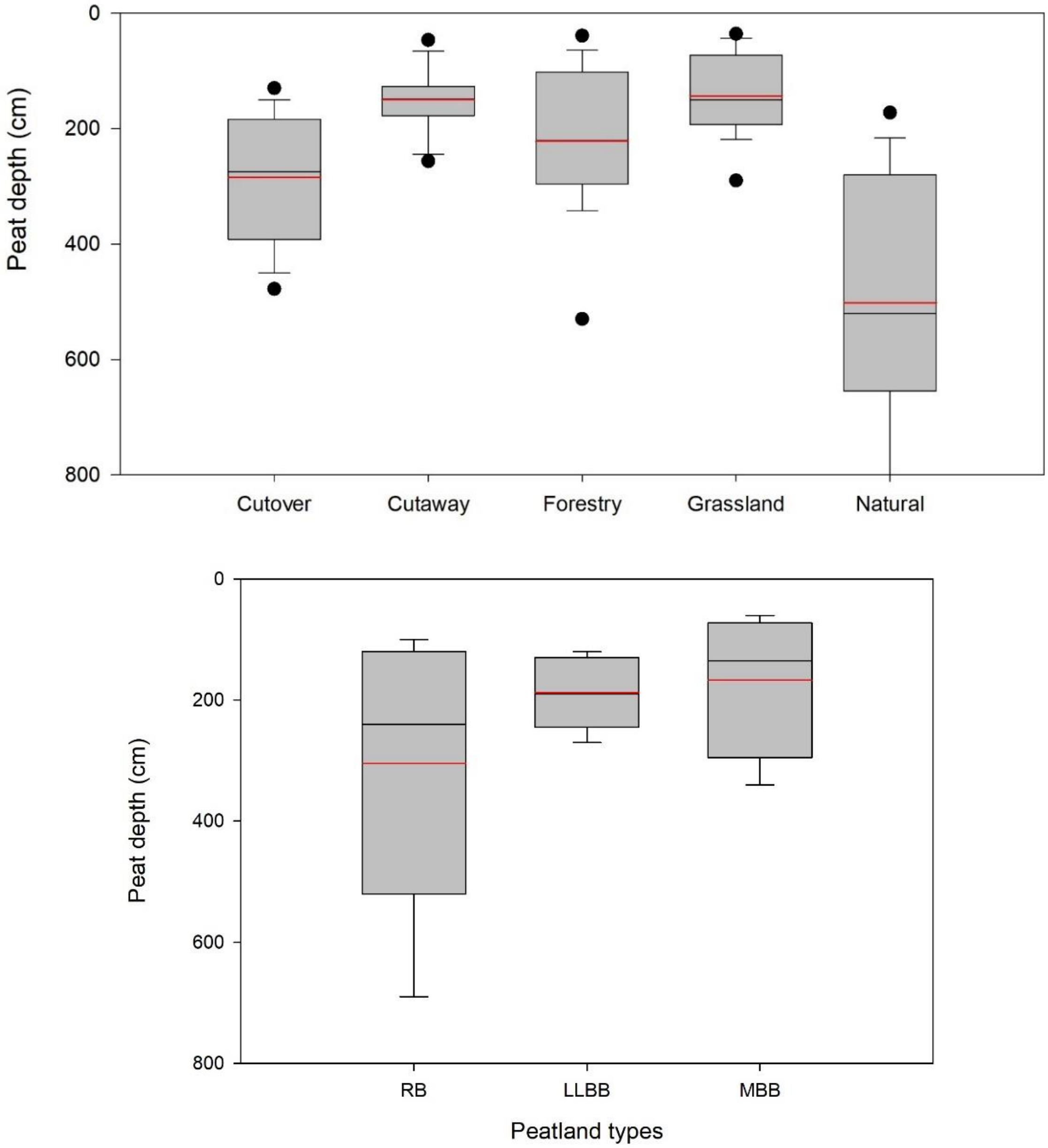

Figure 3.3.1. Box plot distribution of peat depth (cm) with median (black line) and mean (red line), minimum and maximum values as well as error bars and outliers (dots), across land use categories (all peatland types). (a) by Land Use Category ; (b) by peatland types.

Table 3.3.1. Statistical distribution of peat depth (cm) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	690	520	870	660	610	800	620	760	14
	Forest	240	30	540	220	190	260	190	280	28
	Grassland	100	30	290	70	40	160	70	140	22
	Cutover	350	200	500	350	270	440	310	390	23
	Cutaway	140	50	260	140	130	160	130	160	30
Lowland blanket bog	Natural	270	150	420	270	230	290	240	300	17
	Forest	190	60	340	190	100	280	150	240	24
	Grassland	140	50	320	150	80	200	110	170	21
	Cutover	220	100	340	210	170	270	180	260	17
	Cutaway	120	40	280	100	50	180	70	170	12
Mountain blanket bog	Natural	340	130	590	390	180	460	250	440	14
	Forest	60	30	110	50	40	70	40	70	18
	Grassland	110	30	210	110	50	150	70	150	12
	Cutover	160	30	300	20	140	180	120	190	18

Von Post

The von Post method classifies the peat depending on its degree of humification using a scale of 1 to 10 (the higher the value, the more humified the peat). It is a good measure of peat decomposition (Rydin and Jeglum 2006). Recorded values in the surface peat (0–0.1 m) of all raised bog land use categories, with the exception of cutover are greater than in the natural category (Table 3.3.2). The greatest values are found under forestry and grassland. In lowland blanket bog, von Post values in the surface peat (0–0.1 m) are greater in all land uses compared to the natural category, apart from forestry (Table 3.3.2). In mountain blanket bog, von Post values in the surface peat (0–0.1 m) in forest and domestic extraction categories were greater than the natural category, but grassland was similar (Figure 3.3.2).

In all the natural categories, von Post values increased with depth, reflecting peat age, and therefore greater humification with depth (Figure 3.3.2). In general, the same pattern occurred for all other categories, greater values associated with deep drainage of grassland on raised bogs and low-level blanket bog.

Table 3.3.2. Statistical distribution of von Post values in the surface peat (0–0.1 m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	6	4	8	6	4	7	5	7	14
	Forest	7	2	10	8	5	9	6	8	28
	Grassland	7	4	9	8	6	8	7	8	22
	Cutover	6	2	9	6	5	6	5	6	23
	Cutaway	8	5	10	7	7	9	7	8	30
Lowland blanket bog	Natural	4	2	6	4	3	4	3	4	17
	Forest	4	1	6	4	3	5	3	5	24
	Grassland	5	2	9	5	3	7	4	6	21
	Cutover	6	4	7	5	5	6	5	6	17
	Cutaway	5	4	7	5	5	6	5	6	12
Mountain blanket bog	Natural	4	2	7	5	4	5	4	5	14
	Forest	6	2	9	6	4	7	4	7	18
	Grassland	4	2	7	4	4	5	3	5	12
	Cutover	6	1	9	6	4	7	5	6	18

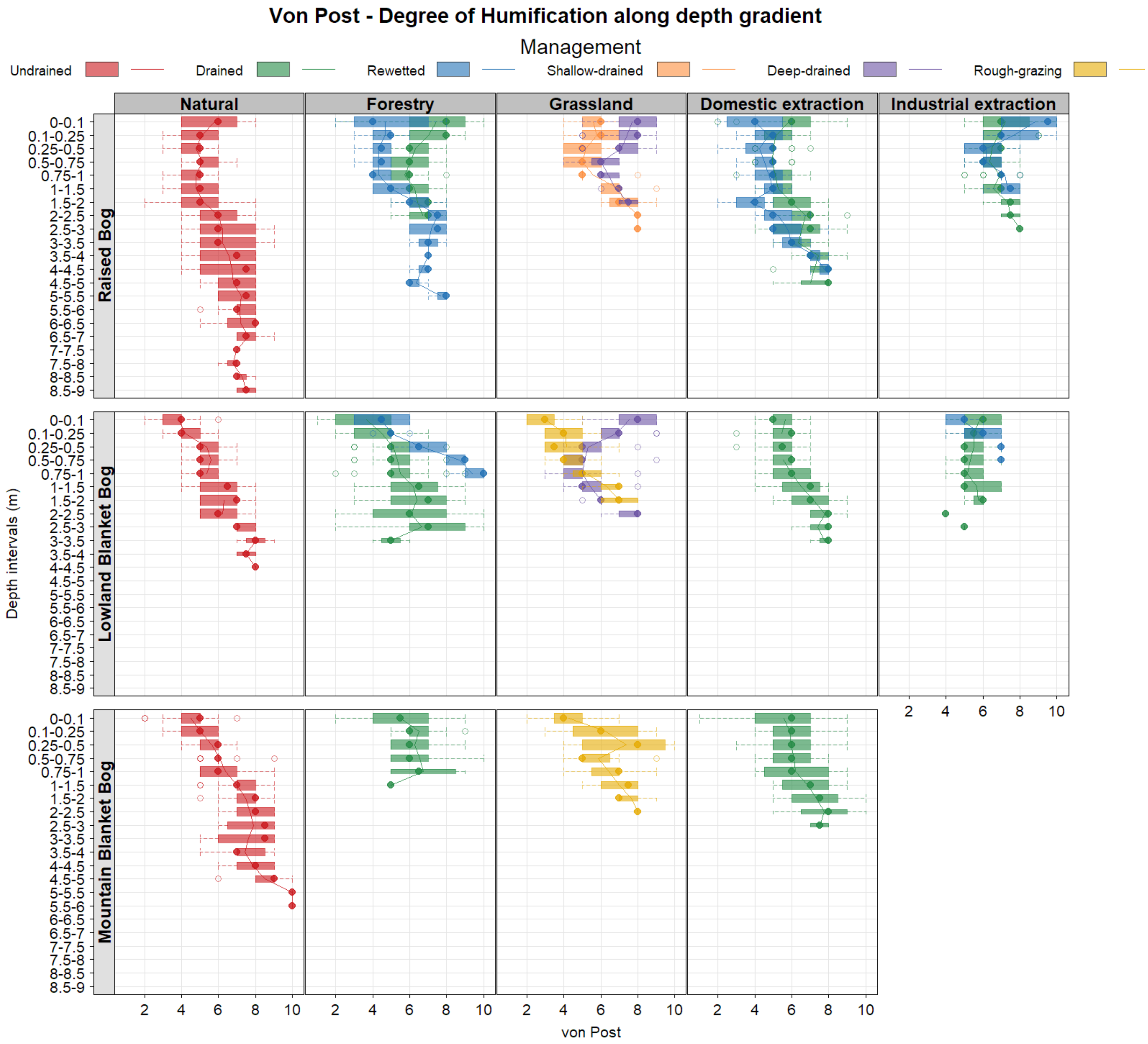

Figure 3.3.2. Distribution of von Post values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover and cutaway). Depth intervals (m) are connected through an average line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained and rough grazing only for grassland.

Bulk density

Bulk density is a very useful indicator of soil degradation and it can be expected to increase following drainage and subsidence. In both raised bogs and lowland blanket bogs, the mean and median bulk density values of surface peat (0–0.1 m) were greater in all LUC compared to the natural category, with the greatest values observed under grassland (Table 3.2.3). In mountain blanket bog, the mean bulk densities in the surface peat were not significantly different between natural (0.06 g cm^{-3}) and grassland (0.09 g cm^{-3}) with the greatest mean bulk densities recorded under forest (0.17 g cm^{-3}) (Table

3.2.3). There was little variation in bulk density with depth in all categories, although it was less under rewetted forest, and domestic extraction (raised bog) (Figure 3.2.3). The greater bulk density values recorded in deep drained grassland sites compared to shallow drained grassland sites on both raised bog and lowland blanket peat, is only evident at the 0.25 m depth (Figure 3.2.3).

Table 3.3.3. Statistical distribution of bulk density values (g cm^{-3}) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	0.07	0.02	0.11	0.07	0.06	0.10	0.06	0.09	14
	Forest	0.14	0.03	0.24	0.14	0.11	0.19	0.12	0.17	28
	Grassland	0.33	0.17	0.67	0.33	0.23	0.39	0.28	0.39	22
	Cutover	0.13	0.05	0.24	0.13	0.11	0.17	0.12	0.16	23
	Cutaway	0.18	0.09	0.32	0.18	0.17	0.21	0.17	0.20	30
Lowland blanket bog	Natural	0.05	0.01	0.12	0.05	0.03	0.06	0.04	0.07	17
	Forest	0.07	0.05	0.10	0.07	0.06	0.08	0.06	0.08	24
	Grassland	0.18	0.05	0.60	0.18	0.09	0.33	0.15	0.28	21
	Cutover	0.12	0.06	0.20	0.12	0.09	0.16	0.11	0.15	17
	Cutaway	0.17	0.10	0.20	0.17	0.13	0.18	0.14	0.18	12
Mountain blanket bog	Natural	0.06	0.03	0.10	0.06	0.05	0.09	0.05	0.08	14
	Forest	0.14	0.03	0.80	0.14	0.10	0.18	0.09	0.25	18
	Grassland	0.09	0.04	0.15	0.09	0.07	0.13	0.07	0.12	12
	Cutover	0.13	0.07	0.22	0.13	0.11	0.15	0.11	0.15	18

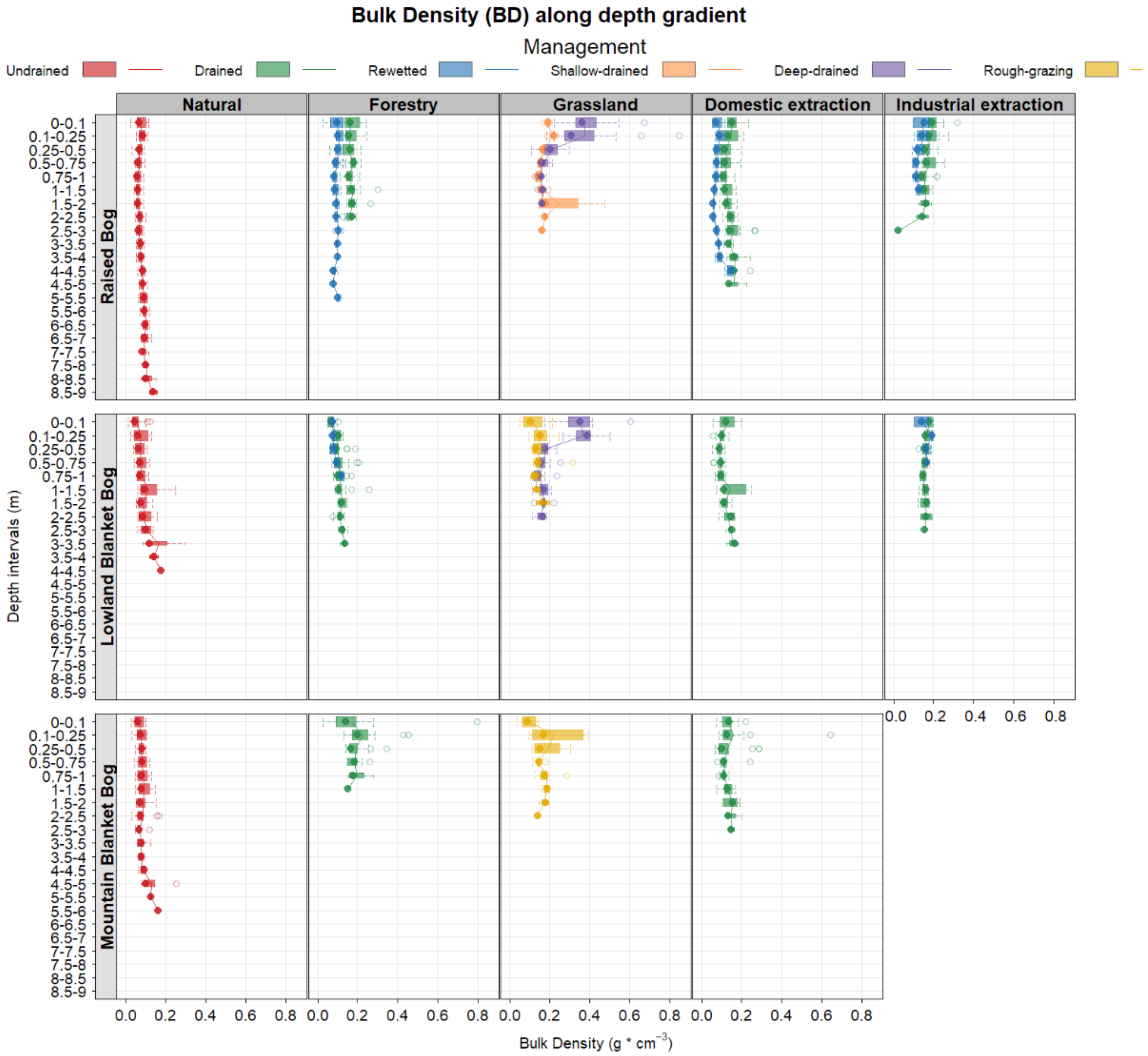

Figure 3.3.3. Distribution of dry bulk density (g cm^{-3}) values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Organic Matter

Mean organic matter (OM) content of the surface peat (0–0.1 m) was lower in all LUC, across all peatland types, compared to the natural category (Table 3.3.4). The lowest median values were 71.65 % in raised bog under grassland, and 72.84 % in mountain blanket bog under forest. Organic matter values show little change with depth in raised bog, lowland blanket bog and mountain blanket bog (Figure 3.3.4). Forest and grassland exhibit a wider range of values at all depths with deep drained grassland in both raised bog and lowland blanket bog displaying lower OM values compared to shallow drained (Figure 3.3.4).

Table 3.3.4. Statistical distribution of organic matter content (%) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	96.36	94.81	97.83	96.5	95.93	96.92	95.85	96.86	14
	Forest	93.24	77.54	98.43	95.67	92.82	96.86	90.93	95.55	28
	Grassland	71.65	29.71	93.96	77.56	57.95	85.98	63.19	80.11	22
	Cutover	96.67	93.83	98.44	97.04	95.81	97.36	96.15	97.2	23
	Cutaway	92.52	85.77	98.65	92.27	87.63	97.04	90.83	94.22	30
Lowland blanket bog	Natural	97.05	96.05	98.05	96.97	96.81	97.32	96.82	97.29	17
	Forest	96.77	92.29	98.42	97.12	96.11	97.67	96.16	97.39	24
	Grassland	76.27	24.80	97.39	94.57	52.75	96.06	64.83	87.71	21
	Cutover	97.08	93.74	98.19	97.25	96.86	97.65	96.54	97.62	17
	Cutaway	95.16	88.57	97.99	95.44	94.76	96.42	93.59	96.74	12
Mountain blanket bog	Natural	96.79	95.58	98.39	96.77	96.14	97.1	96.32	97.25	14
	Forest	72.84	20.69	97.52	81.92	52.13	93.70	60.24	85.43	18
	Grassland	89.1	62.79	96.89	92.27	86.85	96.51	82.6	95.59	12
	Cutover	93.02	34.06	97.8	96.65	96.14	97.02	85.69	100.34	18

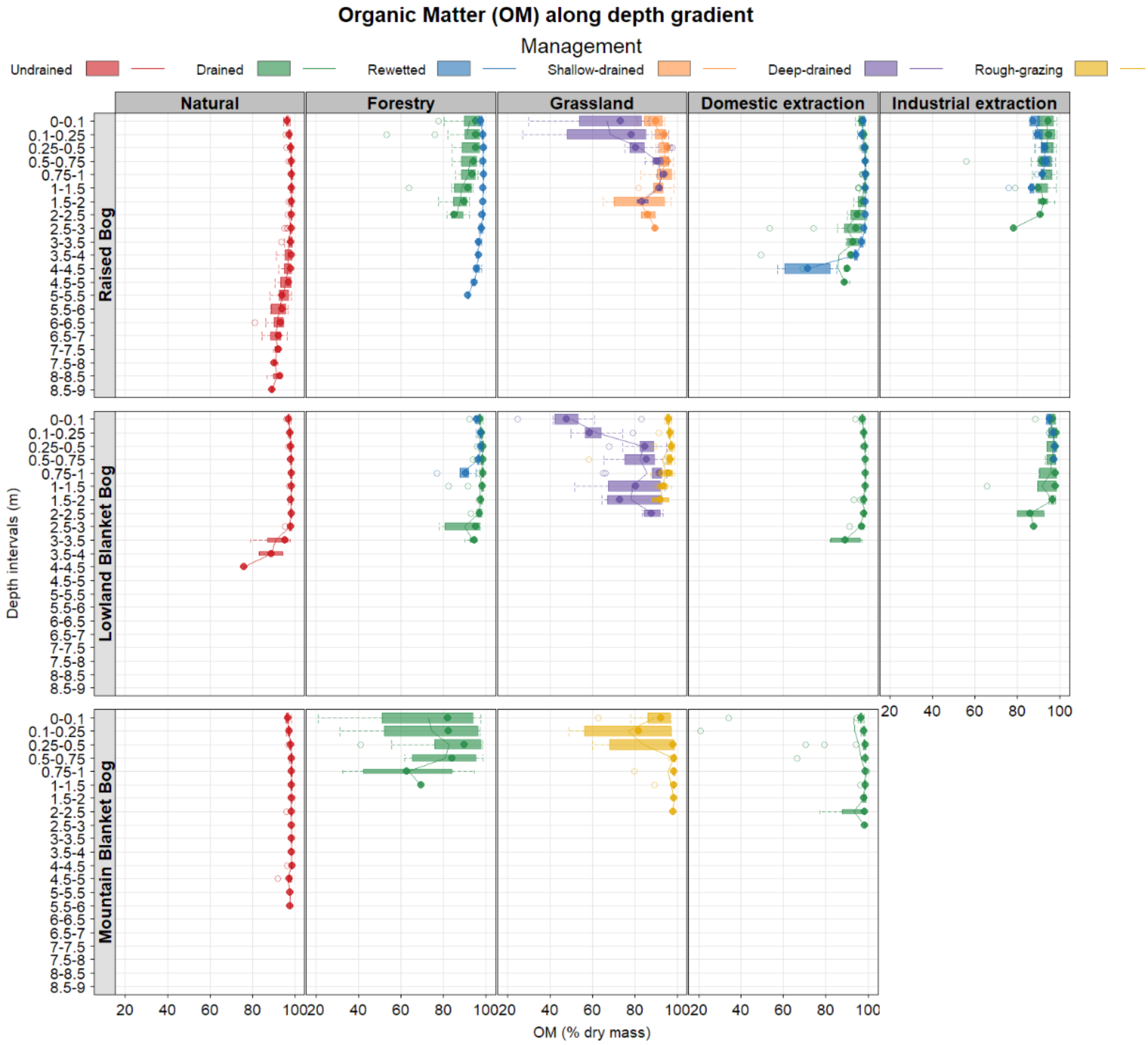

Figure 3.3.4. Distribution of organic matter (%) values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Ash

Mean ash content of the surface peat (0–0.1 m) was greater in all LUC, across all peatland types, compared to the natural category, with the exception of cutover raised bog (Table 3.3.5). In the raised bog category, the ash content was greatest in grassland (19.89 %), compared to 3.64 % in the natural category. In lowland blanket bog, the greatest value was also in grassland (12.29 %) compared to 2.71% in natural. In mountain blanket bog, the greatest value was observed in forestry (14.57 %) compared to 3.21% in natural.

There was little variation in ash content with depth in the natural category (Figure 3.3.5). Grassland exhibited the greatest variation in ash content; greater in deep drained grassland on all peatland types, with deep drained sites exhibiting a greater ash content than shallow drained sites.

Table 3.3.5. Statistical distribution of ash content (%) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	3.64	2.17	5.19	3.5	3.08	4.07	3.14	4.15	14
	Forest	6.76	1.57	22.46	4.33	3.14	7.18	4.45	9.07	28
	Grassland	28.35	6.04	70.29	22.44	14.02	42.05	19.89	36.81	22
	Cutover	3.33	1.56	6.17	2.96	2.64	4.19	2.8	3.85	23
	Cutaway	7.48	1.35	14.23	7.73	2.96	12.37	5.78	9.17	30
Lowland blanket bog	Natural	2.95	1.95	3.95	3.03	2.68	3.19	2.71	3.18	17
	Forest	3.23	1.58	7.71	2.88	2.33	2.89	2.61	3.84	24
	Grassland	23.73	2.61	75.20	5.43	3.94	47.25	12.29	35.17	21
	Cutover	2.92	1.81	6.26	2.75	2.35	3.14	2.38	3.46	17
	Cutaway	4.84	2.01	11.43	4.56	3.58	5.24	3.26	6.41	12
Mountain blanket bog	Natural	3.21	1.61	4.42	3.23	2.9	3.86	2.75	3.68	14
	Forest	27.16	2.48	79.31	18.08	6.30	47.87	14.57	39.76	18
	Grassland	10.9	3.11	37.21	7.73	3.49	13.15	4.41	17.4	12
	Cutover	6.95	2.2	65.94	3.35	2.98	3.86	0	14.31	18

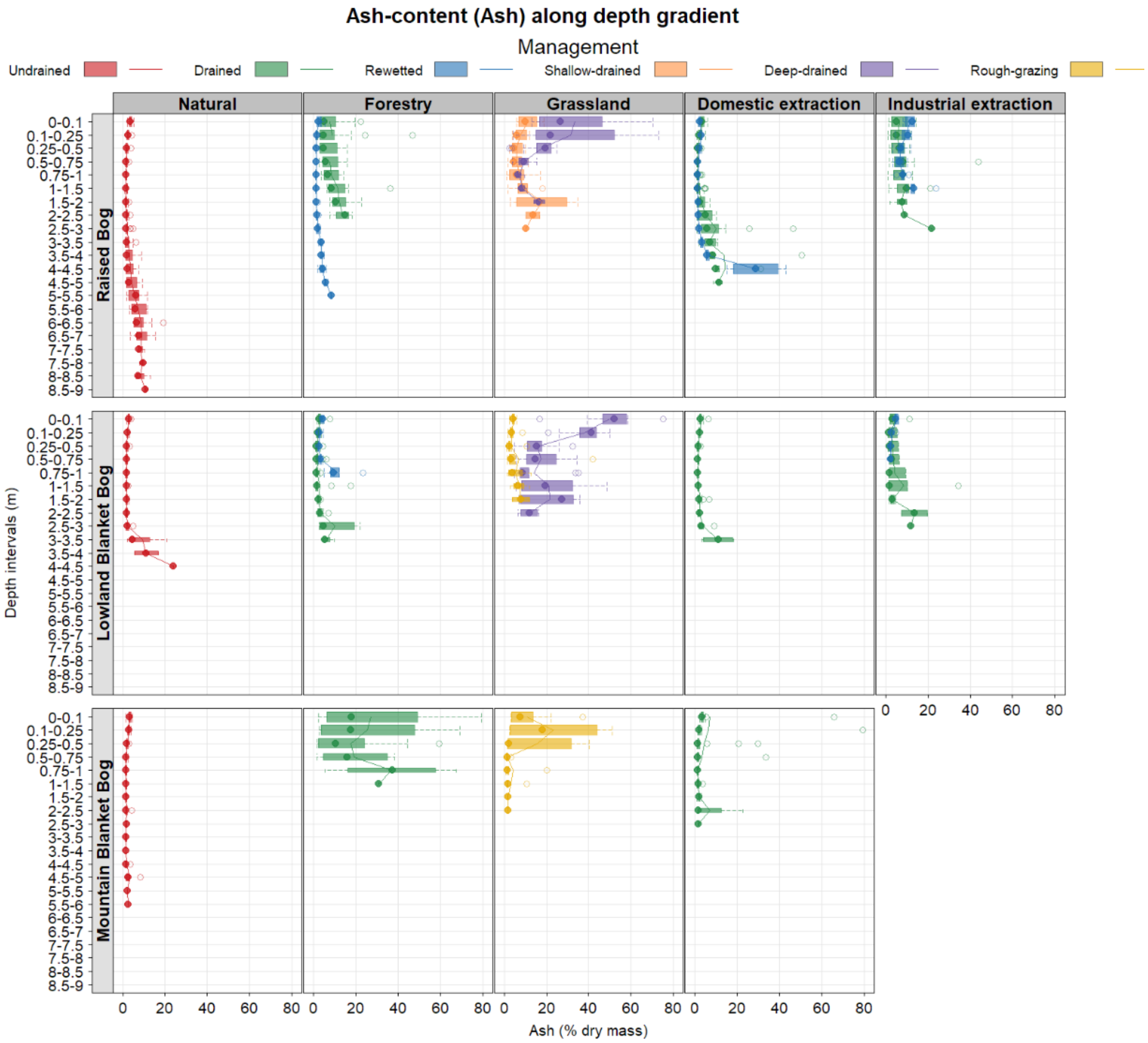

Figure 3.3.5. Distribution of ash (%) values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Total Organic Carbon content

In raised bogs, the mean total organic carbon (TOC) content of the surface peat (0–0.1 m) was greater in all LUC than in natural, except for grassland where it was lower (40.64 % vs. 51.59 %) (Table 3.3.6). The same pattern was repeated in lowland blanket bog where the highest mean TOC was recorded in the cutaway peatlands (Table 3.3.6). In mountain blanket bog, the mean C content of the surface peat (0–0.1 m) was lower in both forest (43.38 %) and grassland (46.77 %) than natural (52.31 %) (Table 3.3.6).

Change in C content with depth was most evident in deep drained grassland on both raised bog and lowland blanket bog categories, exhibiting a much lower C content in the upper 0.5 m of the profile (Figure 3.3.6).

Table 3.3.6. Statistical distribution of carbon content (%) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	51.59	50.78	52.24	51.7	50.9	52.15	51.21	51.96	14
	Forest	53.11	49.41	56.06	53.45	52.36	54.14	52.28	53.93	28
	Grassland	40.64	24.81	49.6	41.61	29.01	49.53	36.00	45.29	22
	Cutover	53.44	52.29	54.38	53.54	52.32	54.09	53.05	53.82	23
	Cutaway	54.72	51.48	58.27	55.38	52.36	56.09	53.77	55.66	30
Lowland blanket bog	Natural	51.80	51.44	52.35	51.56	51.44	52.35	51.59	52.02	17
	Forest	52.91	52.75	53.17	52.87	52.77	53.01	52.84	52.99	24
	Grassland	41.26	25.94	52.23	51.22	25.94	52.23	35.58	46.93	21
	Cutover	54.14	52.38	56.22	53.74	52.38	56.22	53.27	55.00	17
	Cutaway	58.11	57.89	58.32	58.11	57.89	58.32	57.96	58.25	12
Mountain blanket bog	Natural	52.79	51.54	53.34	53.21	51.96	53.34	52.31	53.26	14
	Forest	39.74	28.05	51.60	39.57	28.05	51.60	34.82	44.66	18
	Grassland	46.77	45.96	47.58	46.77	45.96	47.58	46.23	47.31	12
	Cutover	54.06	52.9	54.83	54.46	52.9	54.83	53.64	54.49	18

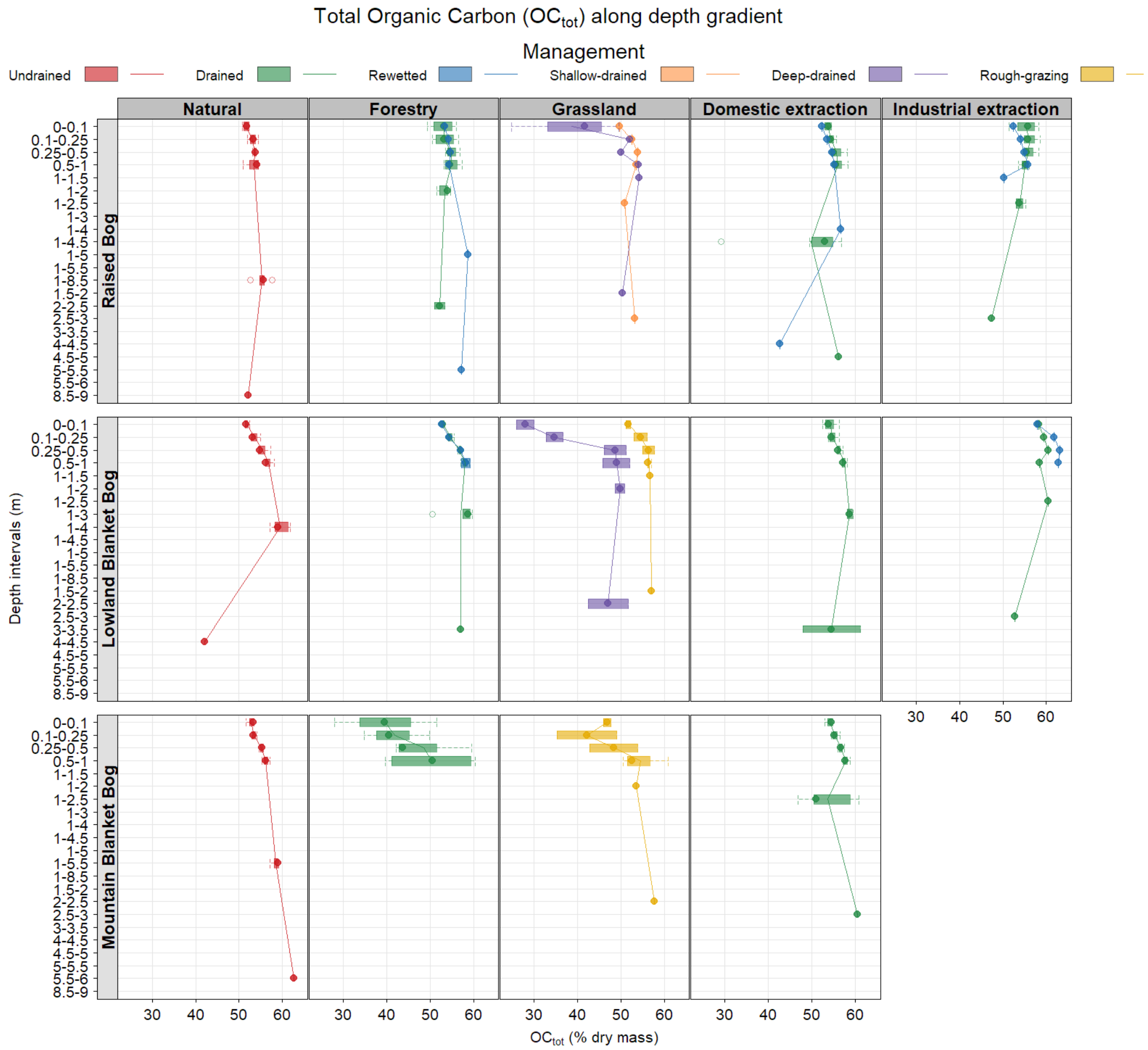

Figure 3.3.6. Distribution of carbon (%) values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Nitrogen

Mean N values in the surface peat (0–0.1 m) of natural bogs were similar to all LUC except for grassland which consistently show higher N concentrations (Table 3.3.7). Depth is a significant covariate of N-concentration and thus all bogs that have seen their use affecting their depth would show a different profile due to the type of peat layer currently at the surface. Of significance is the fact that rewetted bogs had still higher N content than their natural counterparts except for the previously afforested raised bogs and previously cutaway lowland blanket bogs. But these results are based on very few sites. Overall, N concentrations across all sampled bogs had a median of 2.05 % (min: 1.07 %; max: 4.03 %). While the distribution is slightly right-skewed by a few high concentration values, this is still higher than the average value for North-Western Europe of 1.6 ± 0.4 %, provided by Loisel et al. (2014) and is a reflection of the historical use of Irish peatlands.

Table 3.3.7. Statistical distribution of nitrogen content (%) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	2.04	1.59	2.32	2.18	1.73	2.2	1.87	2.22	14
	Forest	2.06	1.49	2.65	2.09	1.58	2.52	1.88	2.25	28
	Grassland	2.48	1.99	3.01	2.46	2.04	2.93	2.29	2.67	22
	Cutover	1.83	1.68	1.99	1.82	1.78	1.87	1.79	1.87	23
	Cutaway	1.96	1.24	2.42	1.97	1.75	2.4	1.79	2.12	30
Lowland blanket bog	Natural	1.91	1.83	2.09	1.85	1.83	2.09	1.85	1.97	17
	Forest	1.93	1.53	2.72	1.73	1.62	2.04	1.73	2.13	24
	Grassland	2.03	1.88	2.24	1.95	1.88	2.24	1.96	2.10	21
	Cutover	2.17	1.80	2.48	2.25	1.80	2.48	2.02	2.33	17
	Cutaway	1.62	1.34	1.91	1.62	1.34	1.91	1.44	1.81	12
Mountain blanket bog	Natural	2.01	1.61	2.22	2.1	1.73	2.22	1.86	2.17	14
	Forest	1.77	1.50	1.97	1.83	1.50	1.97	1.67	1.87	18
	Grassland	2.55	2.25	2.85	2.55	2.25	2.85	2.35	2.75	12
	Cutover	2.31	2.04	2.56	2.34	2.04	2.56	2.2	2.42	18

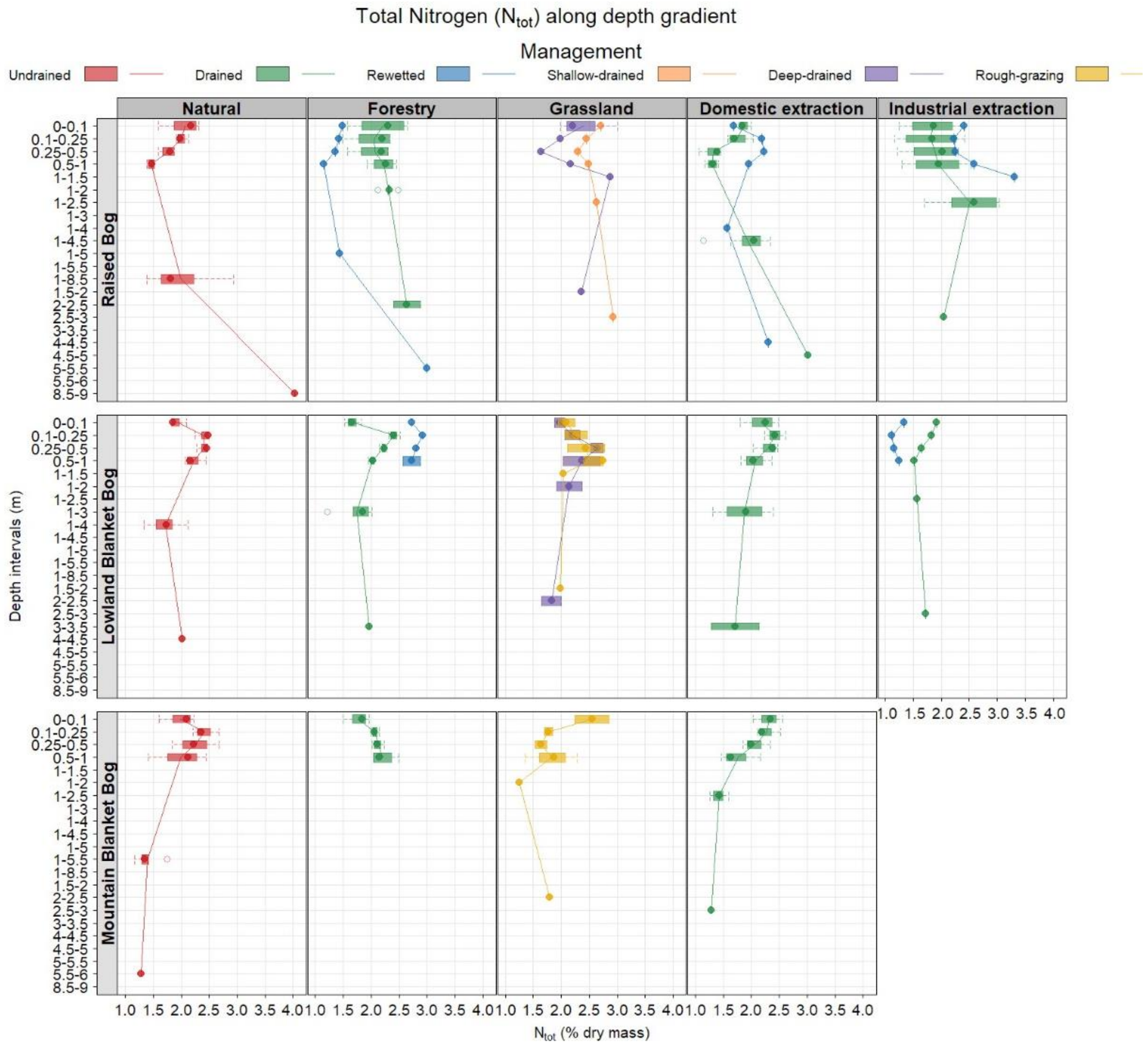

Figure 3.3.7. Distribution of nitrogen (%) values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

pH

In raised bogs, the mean pH of the surface peat (0–0.1 m) in forestry (4.4) and cutover (4.2) was similar to natural (4.2) (Table 3.3.8). In contrast, the mean pH of the surface peat in grassland (5.9) and cutaway (5.3) was much greater. The mean pH of the surface peat in lowland blanket bog across all land uses was similar to natural (Table 10). In mountain blanket bog, the mean pH of the surface peat under forestry (4.9) and grassland (4.8) was greater than in natural (3.9) (Table 3.3.8).

In general, pH values increased with depth across all site types (Figure 3.3.8). Deep drained grassland on both raised bog and lowland blanket bog, exhibited greater pH values than shallow drained grassland.

A wider range of peat pH values was observed in peatland sites under forestry and grassland compared to their natural equivalent.

Table 3.3.8. Statistical distribution of pH in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	4.3	4.1	4.6	4.3	4.2	4.3	4.2	4.4	14
	Forest	4.4	3.6	5.9	4.2	4	4.4	4.1	4.6	28
	Grassland	5.9	4.1	7.1	6.3	5.4	6.5	5.5	6.3	22
	Cutover	4.2	3.9	4.5	4.2	4.1	4.3	4.1	4.3	23
	Cutaway	5.3	4.2	6.8	5.2	4.5	6	5	5.6	30
Lowland blanket bog	Natural	4.6	4.4	5.0	4.6	4.5	4.6	4.5	4.7	17
	Forest	4.4	3.9	4.7	4.4	4.3	4.6	4.3	4.5	24
	Grassland	4.7	4.1	5.3	4.8	4.4	5.0	4.6	4.9	21
	Cutover	4.3	3.9	4.6	4.3	4.2	4.4	4.2	4.4	17
	Cutaway	4.5	3.9	4.8	4.5	4.3	4.7	4.3	4.6	12
Mountain blanket bog	Natural	4.1	3.6	4.7	4.2	3.7	4.5	3.9	4.4	14
	Forest	4.9	4.0	6.6	4.5	4.2	5.5	4.4	5.3	18
	Grassland	4.8	4.5	5.1	4.8	4.6	5.1	4.7	5	12
	Cutover	4.2	3.8	4.6	4.3	4.1	4.4	4.1	4.3	18

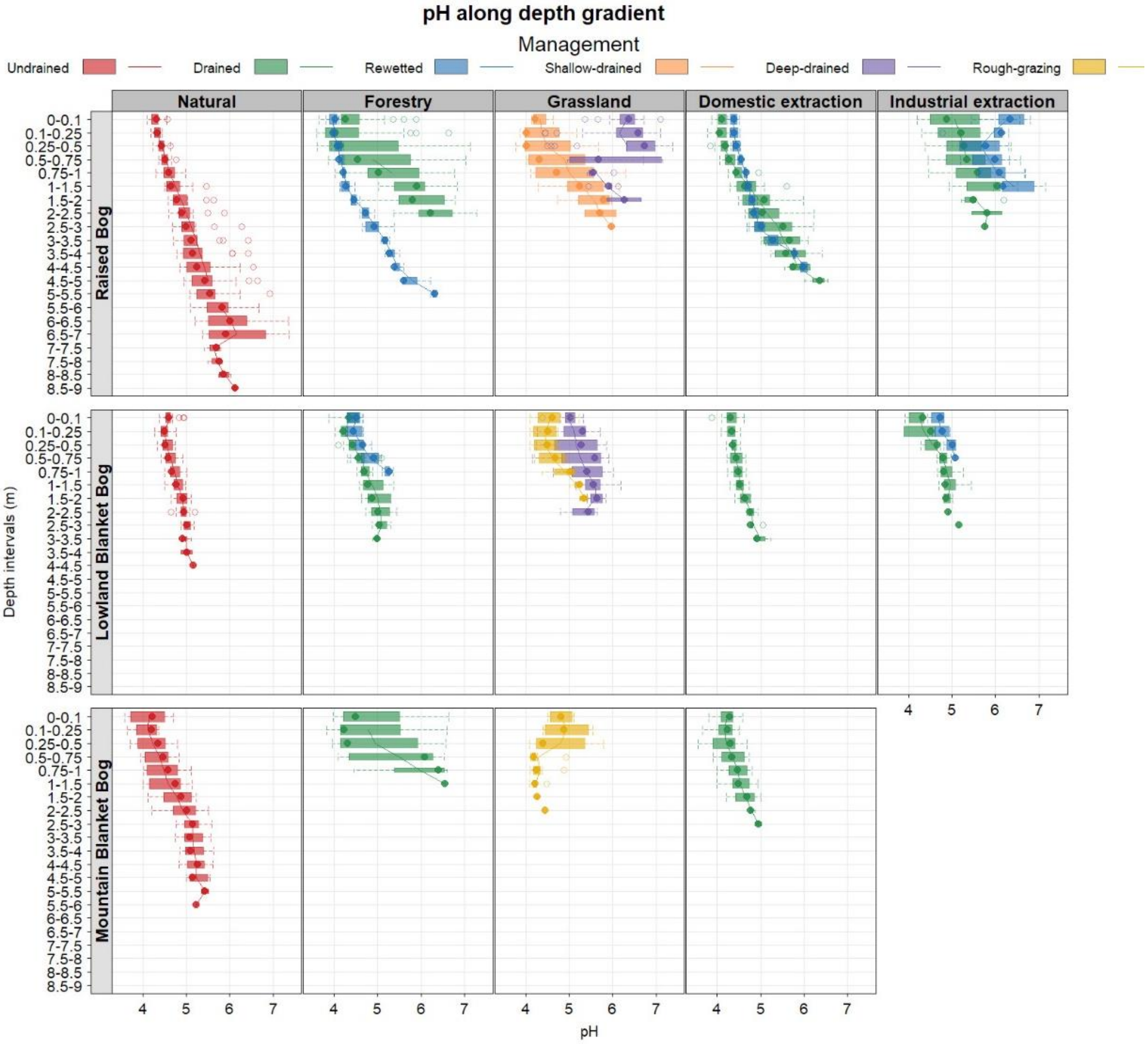

Figure 3.3.8. Distribution of pH values along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Electrical conductivity

In raised bogs, mean EC values in the surface peat (0–0.1 m) were greater in all LUC than in natural, with the greatest value observed in grassland (404.2 mS cm^{-1}) (Table 3.3.9). In lowland blanket bog, mean EC in the surface peat (0–0.1 m) was greater in all LUC than in natural. In mountain blanket bog, mean EC in the surface peat (0–0.1 m) was greater in all LUC compared to natural, except for grassland.

There was little variation in EC values with depth across all LUC and peatland types (Figure 3.3.9). Values for grassland on deep drained raised bog were greater than for grassland on shallow drained raised bog.

Table 3.3.9. Statistical distribution of electricity conductivity (mS cm^{-1}) values in the surface peat (0–0.1 m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	57.8	24	110.5	54.5	42.6	69	44.5	71.1	14
	Forest	99.5	42.1	191.7	86	61.7	121.9	81.8	117.2	28
	Grassland	404.2	77.3	896	394.5	156.2	537.8	289.6	518.8	22
	Cutover	62.2	34.8	108.8	60.2	49.5	70.6	53.8	70.6	23
	Cutaway	98.9	36.9	388	71.9	63.5	101.8	68.4	129.4	30
Lowland blanket bog	Natural	51.7	31.8	71.7	48.1	42.2	63.3	45.2	58.2	17
	Forest	67.5	32.2	178.1	53.7	47.6	84.1	52.6	82.4	24
	Grassland	61.7	25.4	131.2	51.2	45.7	83.7	49.2	74.2	21
	Cutover	66.7	17.1	165.1	44.3	40.3	88.2	44.0	89.3	17
	Cutaway	56.8	37.4	121.3	52.5	49.5	54.0	43.4	70.2	12
Mountain blanket bog	Natural	56.6	25.6	79.8	59.3	40.6	75.4	45.2	67.9	14
	Forest	123.1	28.2	337.0	94.2	73.6	137.0	79.6	166.6	18
	Grassland	47.1	34.7	67.7	43.5	38	53.8	39.9	54.2	12
	Cutover	59.4	28	113.9	52.1	39.2	73.1	47.6	71.2	18

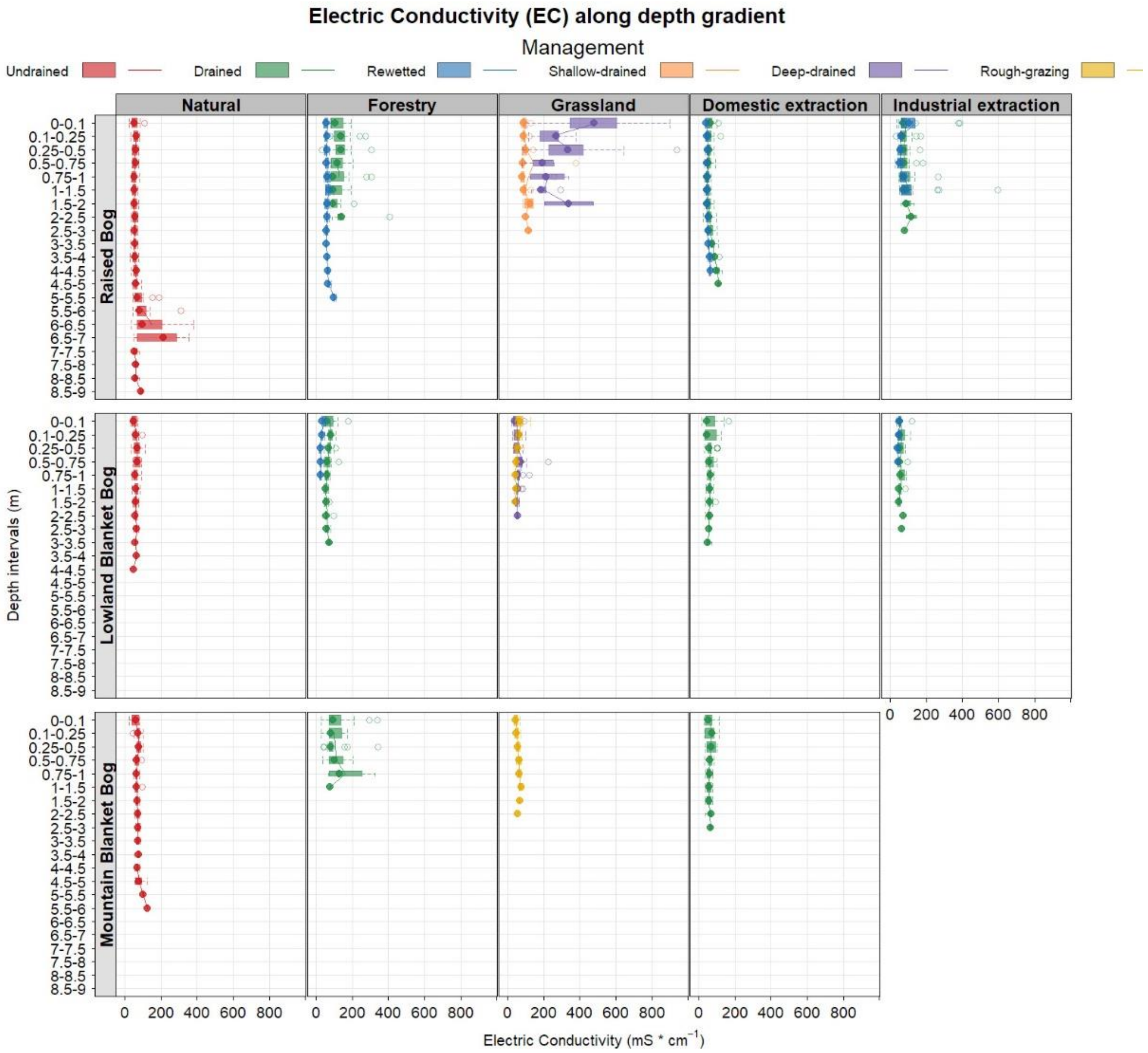

Figure 3.3.9. Distribution of electric conductivity values (mS cm^{-1}) along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

Gravimetric water content

Mean gravimetric water content was lower in all LUC across all peatland types compared to their natural equivalent. In raised and lowland blanket bogs, the lowest value was observed in grassland. Whereas in mountain blanket bog, the lowest value was observed in forestry (Table 3.3.10). There was little variation in gravimetric water content with depth across all LUC and peatland types although rewetted forestry, domestic and industrial extraction on raised bogs exhibited greater water content values (Figure 3.3.10). Deep drained grassland sites on raised bog and lowland blanket bog, exhibited lower gravimetric water content compared to shallow drained grassland sites.

Table 3.3.10. Statistical distribution of gravimetric water content (%) in the surface peat (0–0.1m) across peatland types and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	91.9	87.1	94.8	92.1	91.2	92.9	90.9	92.9	14
	Forest	73.2	45	90.8	70.8	66.8	82.1	68.8	77.7	28
	Grassland	63	42.8	82.6	61.6	55	65.6	57.8	68.2	22
	Cutover	85.6	75.2	95.2	85	83.9	88.2	83.7	87.5	23
	Cutaway	79.8	68.9	90.4	80.6	76.3	83.8	77.7	81.9	30
Lowland blanket bog	Natural	92.2	88.6	94.6	92.5	90.7	93.7	91.2	93.2	17
	Forest	86.0	64.3	94.0	88.7	86.6	90.6	82.5	89.5	24
	Grassland	77.8	49.3	90.7	82.4	67.1	88.0	72.3	83.3	21
	Cutover	87.5	80.8	93.1	87.8	83.7	91.2	85.4	89.6	17
	Cutaway	84.7	82.7	89.1	84.4	83.7	85.2	83.6	85.8	12
Mountain blanket bog	Natural	91.9	88.8	94.9	91.7	91.1	93.1	91.0	92.8	14
	Forest	81.4	50.5	91.8	83.8	79.3	86.3	76.8	86.1	18
	Grassland	86.8	80.4	91.5	86.6	85.9	88.1	85.1	88.6	12
	Cutover	86	63.9	92	86.7	85.9	88.9	83.1	89	18

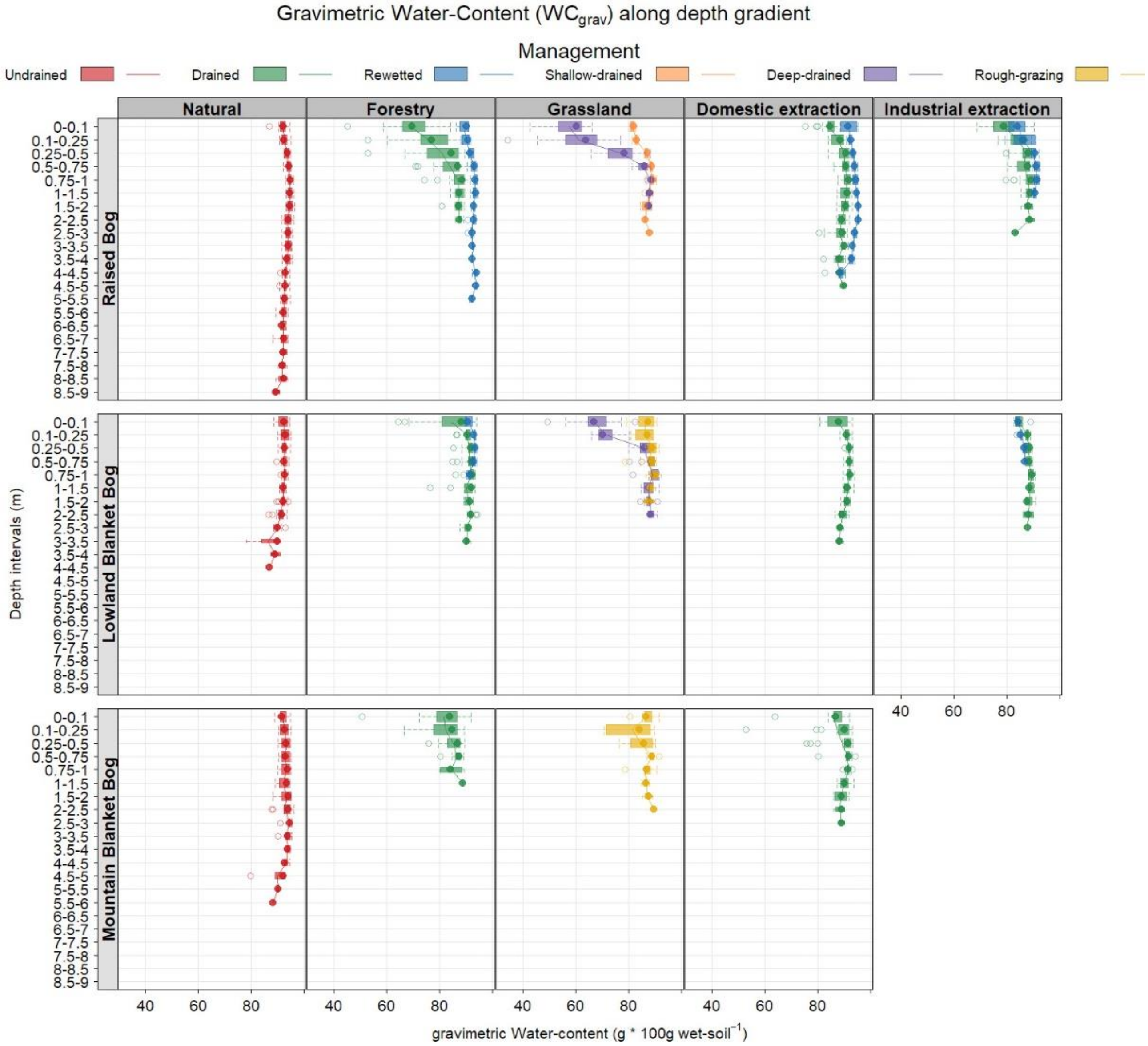

Figure 3.3.10. Distribution of gravimetric water content (%) along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained and rough grazing, only for grassland).

Volumetric water content

In raised bogs, volumetric water content in the surface peat (0–0.1m) was lower under forest and grassland (57.6 $cm^3\ cm^{-3}$) compared to natural (84.8 $cm^3\ cm^{-3}$) (Table 3.3.11). In lowland blanket bogs, mean volumetric water content in the surface peat (0–0.1m) was in forest (53.7 $cm^3\ cm^{-3}$) and grassland (68.5 $cm^3\ cm^{-3}$) compared to natural (62.6 $cm^3\ cm^{-3}$) but was greater in domestic (84.9 $cm^3\ cm^{-3}$) and industrial extraction (77.2 $cm^3\ cm^{-3}$) (Table 3.3.11). In mountain blanket bogs, volumetric water content in the surface peat (0–0.1m) was lower in forestry (54.3 cm^3 cm^{-3}) and grassland (50.2 cm^3 cm^{-3}) compared to natural but was greater in domestic extraction (85.7 cm^3 cm^{-3}).

Table 3.3.11. Statistical distribution of volumetric water content (%) in the surface peat (0–0.1m) across peatland type and land use categories.

		Mean	Min	Max	Median	Q25	Q75	Lower CI	Upper CI	N
Raised bog	Natural	84.8	32.9	118.7	84	75.2	101.4	71.8	97.8	14
	Forest	49.7	4.2	98.9	40.4	31.6	75.6	38.6	60.8	28
	Grassland	57.6	29.8	85.7	57.5	43.7	64.3	50.1	65	22
	Cutover	83.3	50.8	106.3	88.5	70.3	95.7	76.2	90.4	23
	Cutaway	76.4	45	107.8	73.3	63.6	92.4	69.3	83.6	30
Lowland blanket bog	Natural	62.6	21.2	95.8	58.6	46.2	77.3	51.0	74.2	17
	Forest	53.7	11.7	99.3	56.7	38.0	71.5	43.8	63.7	24
	Grassland	68.5	44.1	97.8	73.3	57.1	74.9	61.9	75.2	21
	Cutover	90.7	69.0	107.7	92.6	84.0	98.7	84.9	96.5	17
	Cutaway	88.5	56.5	110.8	89.0	82.1	101.7	77.2	99.7	12
Mountain blanket bog	Natural	71	43.6	102	68.9	58.8	82	59.9	82.1	14
	Forest	66.0	18.3	94.4	71.1	45.9	85.8	54.3	77.8	18
	Grassland	60.4	34.5	87.6	59	53.6	72.3	50.2	70.7	12
	Cutover	85.7	39.1	120.8	89.3	77.1	98.1	75.2	96.1	18

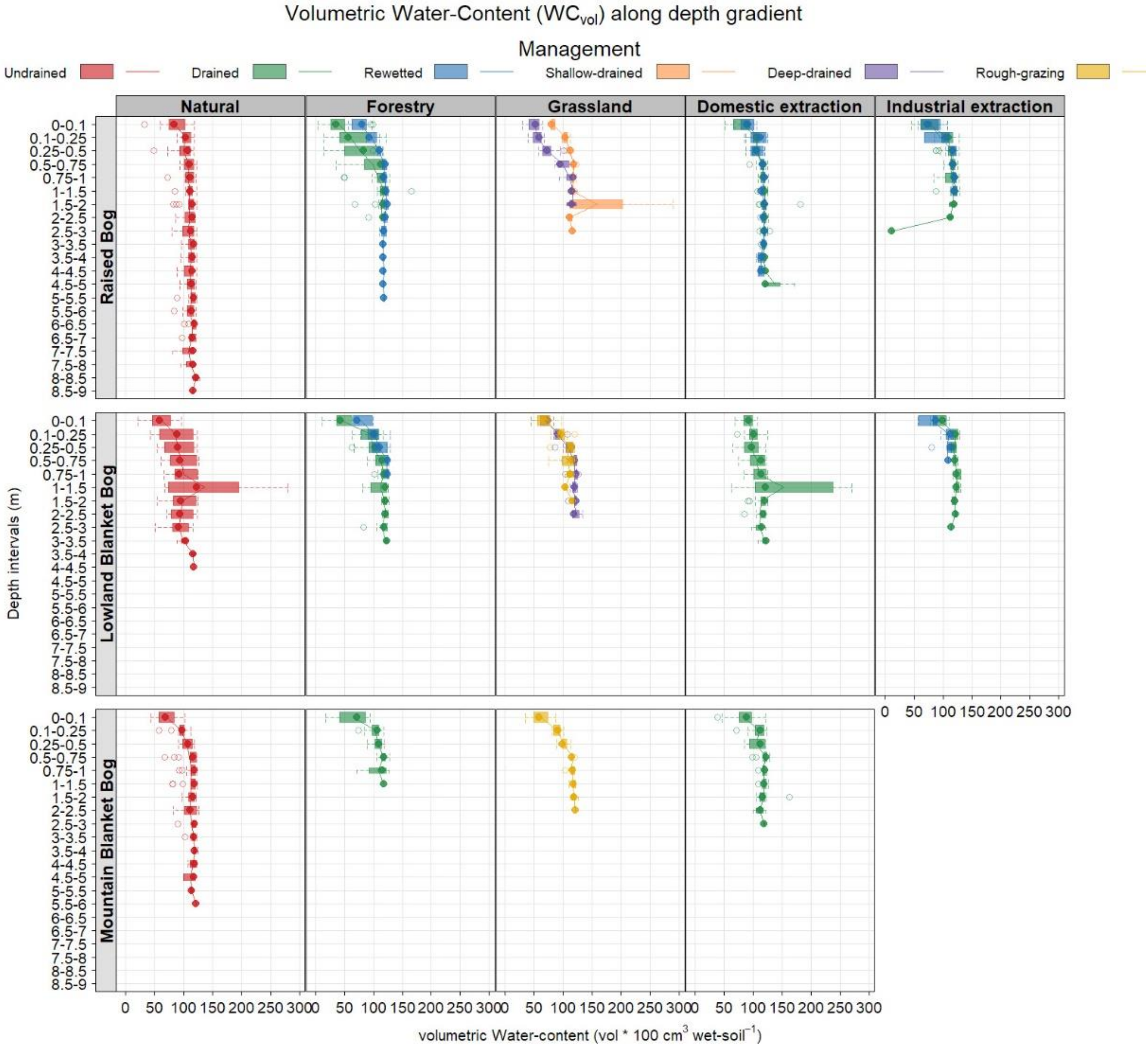

Figure 3.3.11. Distribution of volumetric water content (%) along depth gradient for combinations of peatland type (vertical: raised bog, lowland blanket bog, mountain blanket bog) – land use (horizontal: natural, forest, grassland, cutover, and cutaway). Depth intervals (m) are connected through an average-line. Colour box plots with error bars depicts each peatland type – land use category combination across management options (undrained, drained, rewetted, shallow-drained, deep drained, and rough grazing only for grassland).

3.3.2 Relationships between properties

The soil properties of the peat soils encountered throughout ROI in this survey were found to vary over a wide range, thereby confirming the pronounced diversity of peat types that are produced under unique conditions at each individual site. Utilisation and management have also altered peat properties along a very broad scale from acute to limited changes, compared to their 'natural' counterpart. The variances encountered reflect the nature and magnitude of the impacts of utilisation of peatlands and thus are critical to develop effective strategies for remedial management of degraded peat systems.

Regardless of peatland types, the greatest variations were encountered in the grassland LUC, either vertically (down the peat profile) or horizontally (across the site). This confirms the historical development of grassland on the margins of bogs, where drainage conditions could be improved more easily, or where a favourable soil moisture content prevailed post-peat extraction.

After drainage (regardless of use), changes in the physico-chemical properties of peat occurs due to aeration, compaction and increased ash content. The bulk density values were greater in the upper layers of all LUC but particularly under grassland, which coincided with greater decomposition (von Post) and pH values (Figure 3.3.12).

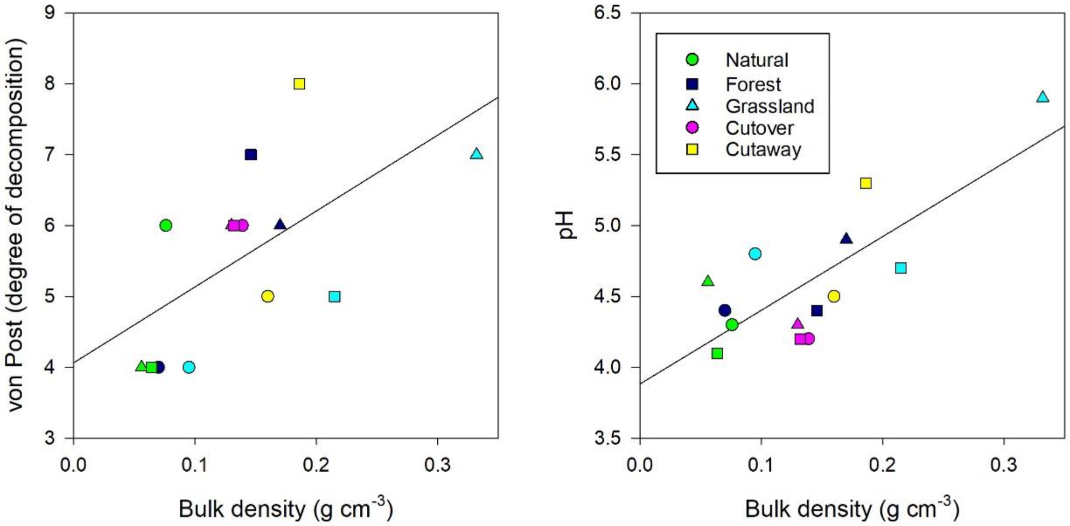

Figure 3.3.12. Distribution of peat properties: von Post degree of decomposition and pH (both unitless) and Bulk Density (g cm^{-3}) by land use category and peatland type (RB=circles; LBB=squares; MBB=triangles). Regression line left r^2=0.37; right r^2=0.59.

In general, shallower peat depth, greater bulk density and lower carbon content values characterise the degraded peat associated with managed peat soils. This is particularly the case for deep drained grassland peat soils. Mountain blanket bogs were the most severely affected by both grassland and forestry displaying low OM content and high bulk density values (Figure 3.3.13). Cutover bogs differ from natural sites in regard to bulk density values (regardless of peatland type) but contain a similar OM content. A bulk density value of approximately 0.2 g cm^{-3} was identified as a critical threshold point; whereby above and below this value, macro-porosity and hydraulic parameters follow different pedo-transfer functions with regards to bulk density (Liu and Lennartz 2019).

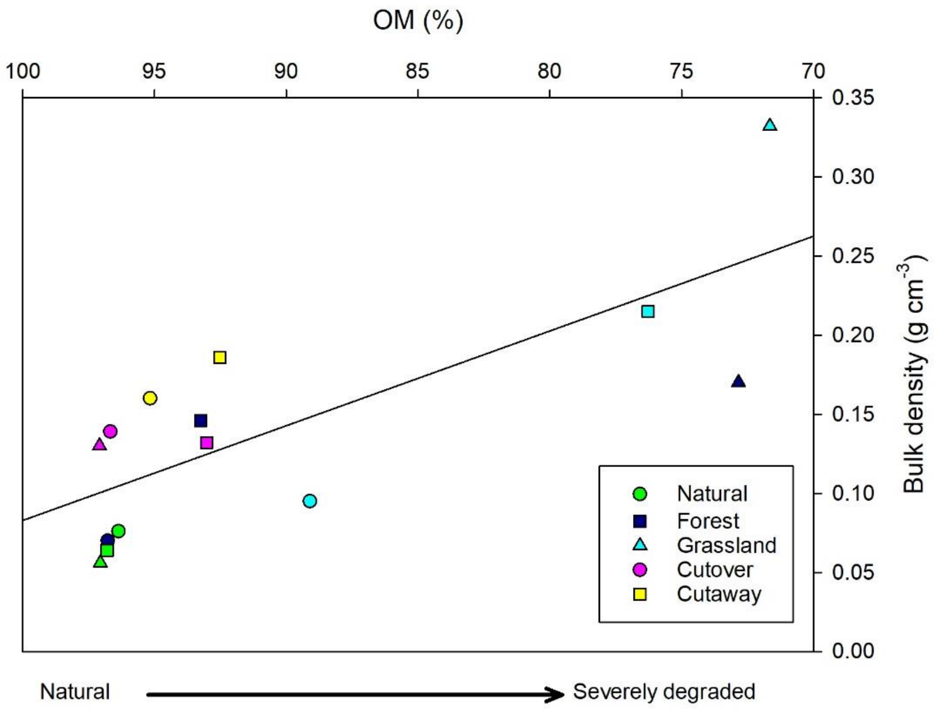

Figure 3.3.13. Relationship between Organic Matter (%) and Bulk Density (g cm^{-3}) by land use category and peatland type (RB=circles; LBB=squares; MBB=triangles) and associated degradation scale. Note OM axis increasing left to right. Regression line R^2=0.59.

3.4 Peatland carbon stocks and uncertainties

3.4.1 SOC density

Soil Organic Carbon (SOC) densities (g C cm^{-3}) were calculated for each peat type and LUC using weighted means of carbon content and bulk density (according to volumes). SOC densities were not significantly different across peatland types ($p=0.237$). Raised bogs showed the most variable SOC densities and also had the greatest values (Figure 3.4.1).

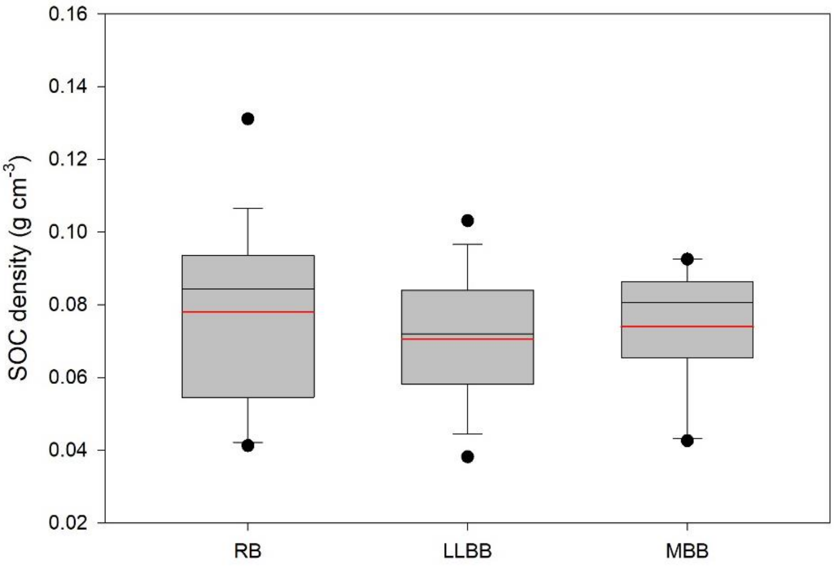

Figure 3.4.1 Box plot (min, max, median and outliers) with mean (red line) soil organic carbon (SOC) density (g C cm^{-3}), across peatland types (RB: raised bogs; LLBB: lowland blanket bogs; MBB: mountain blanket bogs).

Combining peatland types, SOC densities varied between LUC with grassland showing the most variation and also the greatest carbon density (Figure 3.4.2).

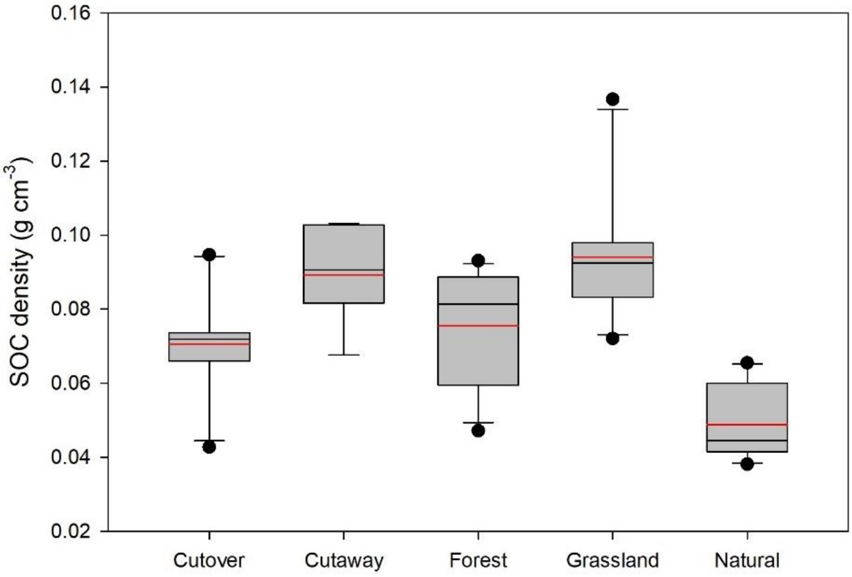

Figure 3.4.2 Box plot (min, max, median and outliers) with mean (red line) soil organic carbon (SOC) density (g C cm^{-3}), across land use categories.

There was a significant effect of LUC on SOC densities ($p<0.001$) compared to the natural sites. Post-hoc comparisons between LUCs showed that grassland C densities differed significantly from cutover and forestry but not from cutaway. SOC densities increased with land use intensity:

Natural < Cutover < Forest < Cutaway < Grassland

Change of land use affected SOC densities more than the peatland type.

3.4.2 SOC stock and LUC

SOC stock (in tonnes of carbon per hectare) per each LUC and peatland types (S) were calculated using the weighed site means and standard errors:

$$SOC_{LUC}\left(\frac{t}{ha}\right) = \sum_i^n SOC_S * w_S ,$$

$$SOC_S\left(\frac{t}{ha}\right) = p_{SOC-S} * d_S * 100,$$

where w_S is the weighting of the site mean:

$w_S = \frac{n_S}{n_{LUC}}$,

and p_{SOC-S} , ρ_{SOC-L} are SOC-densities of site (S) and layer (L):

$p_{SOC-S} = \sum_i^n \rho_{SOC-L} * w_L$,

$\rho_{SOC-L} = SOC_L * \frac{\sum_i^n \rho_{bd}}{n_L}$,

Where w_L is the weighting of layer (L) size:

$w_L = d_L$,

and ρ_{bd} corresponds to dry bulk density of single samples, n_L to sample size in each layer.

Initial results demonstrate that natural peatlands comprise large carbon densities, especially raised bogs (3037 t C ha^{-1}) (Table 3.4.1 and Figure 3.4.2). Cutover raised bogs contain 80 % of the carbon density contained in natural peatlands, thereby demonstrating their relative importance in the national carbon stock (Figure 3.4.2). Cutaway carbon density were 40 % of those in natural peatlands. Natural mountain blanket bogs had a higher carbon density (1800 t C ha^{-1}) than lowland blanket bogs (1409 t C ha^{-1}). However, this was reversed for all LUC associated with blanket bogs. The mountain blanket bog forest category had the lowest carbon density (476 t C ha^{-1}) but it was more than tripled for lowland blanket bog forest (1646 t C ha^{-1}). Grassland had the lowest average carbon density across bog types but displayed the largest standard errors. They are still larger than previous estimates including a recent individual ombrotrophic peat soil, which accounted for 748 t C ha^{-1} but was on the shallow end of the spectrum (116 cm) (Tuohy et al. 2021). Overall, carbon stock decreased with land use intensity: Natural > Cutover > Forest >Cutaway > Grassland

Regardless of LUCs, raised bogs contain the largest carbon densities followed by lowland blanket bogs. Mountain blanket bog displayed the largest variation across sites and LUC (Table 3.4.1). When compared to previous estimates of carbon densities for natural and exploited peatland types, it is apparent that peat depth was the critical factor leading to under-estimation for the mountain blanket bog category (Eaton et al. 2008). The carbon density estimates for cutaway peatlands were the most comparable, demonstrating the importance of the large datasets that were already acquired for this LUC.

Table 3.4.1. Soil organic carbon (SOC) (t C ha^{-1} ± SE) across land use categories (LUC) and peatland type with 95 % confidence interval in brackets.

	Raised bog	Lowland blanket bog	Mountain blanket bog
Cutover	2398 (9.4)	1550 (11.8)	1248 (16.7)
Cutaway	1240 (13.9)	1396 (10.3)	-
Forest	1902 (13.2)	1646 (10.7)	476 (15.7)
Grassland	1239 (13.4)	1323 (27.9)	1091 (24.0)
Natural	3037 (8)	1409 (10.6)	1800 (19.1)

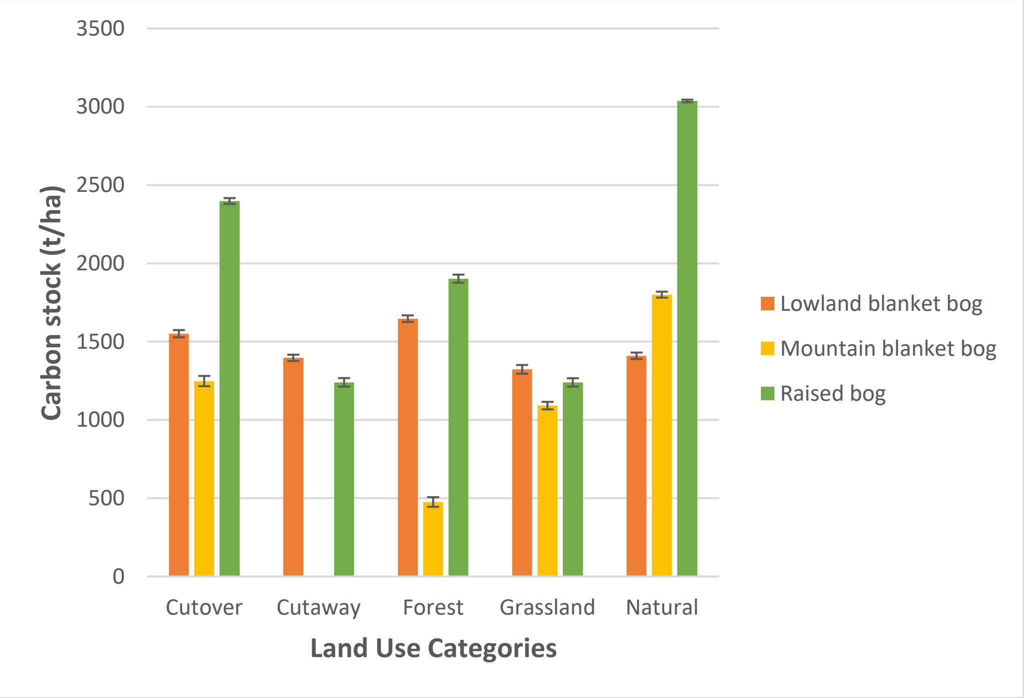

Figure 3.4.2 Distribution of carbon density (t ha^{-1} ± SE) across peatland types and land use categories.

3.4.3 Estimates of national peatland carbon stock

Best areal estimates for each peatland land use category were compiled using various updated sources[4]. The cutover bog areas, so far not measured, were subtracted from the total area of peat soils of 1.454 Mha according to the DIPMv 2 map (Connolly and Holden 2009). While the LUC of blanket bogs in general can be estimated reasonably accurately, the disaggregation between mountain and lowland blanket bog for each LUC has never been determined. The proportion of each bog type found in the DIPMv2 map (65 % lowland blanket bog: 35 % mountain blanket bog) has been applied.

This is the first time that upscaled carbon stocks have been calculated for each LUC and peatland type, based on total carbon density for the whole peat profile (Table 3.4.2). Overall, Irish peatlands are estimated to store **2,216 Mt of carbon** (uncertainty range: 2,005-2,320). An approximately equate proportion (42 %) of the carbon store is located in both raised bogs and lowland blanket bogs with the remaining (15%) in mountain blanket bogs (Figure 3.4.4). Natural and cutover bogs hold just under half of all the SOC stored in Irish peatlands (Figure 3.4.5). Grassland, forestry and cutaway follow in decreasing order.

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[4] NPWS (2016 and p. com, 2020), EPA (Duffy et al, 2020), Teagasc (Green, 2020), Bord na Móna (p. com., 2020) and DAFM (NFI, 2020).

Table 3.4.2. Estimated area (ha) and total carbon stock (Mt) per peatland type and land use category. There are no industrial extraction on mountain blanket bog.

		Natural	Grassland	Forest	Cutaway	Cutover	TOTAL
Raised bog	Area (ha)	80,000	171,572	83,000	71,401	98,504	**504,477**
	C stock (Mt C)	243.0	212.6	157.9	88.5	236.2	**938.2**
Lowland blanket bog	Area (ha)	123,026	161,478	239,161	8,599	96,041	**628,305**
	C stock (Mt C)	173.3	213.6	393.7	12.0	148.9	**941.5**
Mountain blanket bog	Area (ha)	66,245	86,950	128779	-	51,714	**333,688**
	C stock (Mt C)	119.2	94.9	58.0	0.0	64.5	**336.6**
Total	Area (ha)	269270.0	420000.0	450940.0	80000.0	246259.0	**1466469.0**
	C Stock (Mt C)	535.5	521.1	609.5	100.5	449.6	**2216.3**
	Uncertainty range (Mt C)	559-892	321-640	260-500	71-123	460-722	**1672-2878**

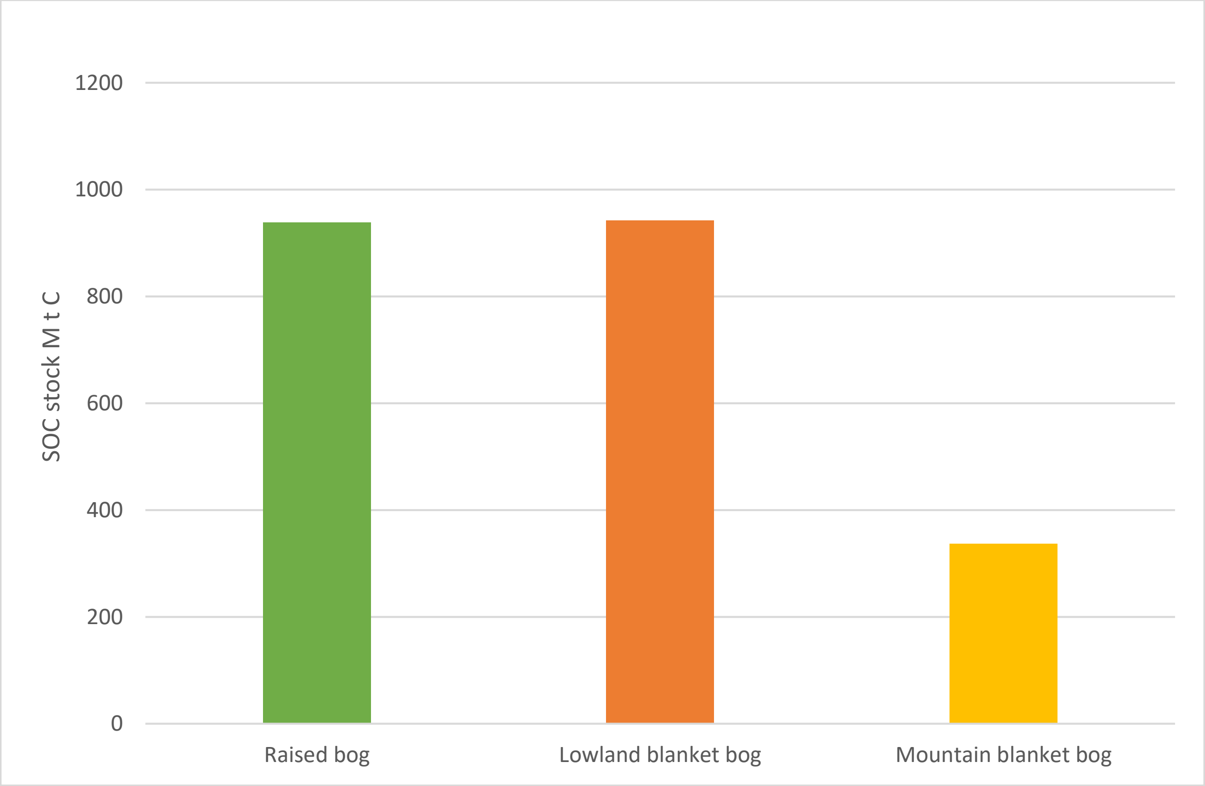

Figure 3.4.4. Estimated amount of carbon stored (Mt) across peatland types.

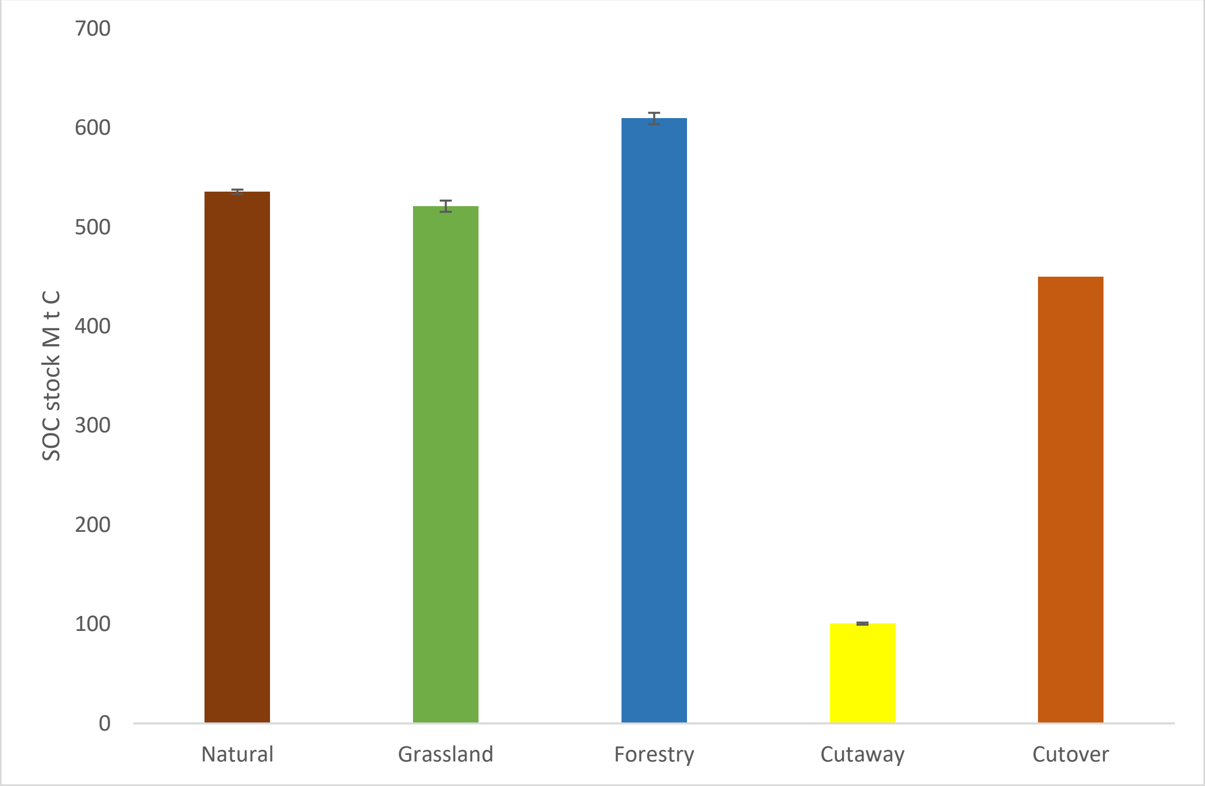

Figure 3.4.5. Estimated amount of carbon stored (Mt) across peatland land use categories. Error bars denote the 95 % confidence interval.

3.5 Water table monitoring

3.5.1 Two-year WT monitoring at a raised and lowland blanket bog under various LUC

Water level monitoring was conducted over a 2-year period (November 2017–December 2019), at two peatland types, namely Scohaboy raised bog (RB4, Co. Offaly) and Knockmoyle lowland blanket bog (LLBB1, Co. Mayo) (see Appendix 3 for GPS coordinates). Four LUC was represented at each site: natural, forest, cutover and rewetted in Scohaboy, and natural, forest, grassland and cutover in Knockmoyle. A combined approach was deployed using (1) a high-frequency water table logger (OTT Orpheus Mini® – diameter: 22 mm) recording Water Table Level (WTL) and water temperature at 1-hour intervals, and (2) a series of piezometers (hollow perforated steel tubes), where monthly manual measurements were carried out using a water level probe (Eijkelkamp®, diameter: 4.8 mm, accuracy: ± 0.5 cm) (see Figure 3.2.5 and Field Protocol Document for more details). The steel tubes (5 –8 tubes per site) were inserted within 200 m of the logger within various representative micro-habitats.

Figure 3.2.5. Equipment used for high-frequency hydrological monitoring: Top row – preparation and installation of high-frequency water level loggers at a sampling location. PVC-tubes were installed in augered holes (left), loggers were inserted into tubes (centre). Orange PVC tubes (diameter 150 mm) were used as mounts for the communicator devices of the loggers (right). Middle – Monitoring stations at drained (left) and rewetted (centre) raised bog in Scohaboy. Monthly calibration of loggers, and data download of logging data (right). Bottom – Manual hydrological measurements: Preparation of iron rods (left), installed rod at a domestic extraction site (centre), and measurement of water table depth using water level probe (right).

3.5.2 Results

Water level monitoring was conducted over a 2-year period (November 2017–December 2019), at two peatland PU namely Scohaboy raised bog (RB4, Co. Offaly) and Knockmoyle lowland blanket bog (LLBB1, Co. Mayo). Precipitation recorded at the closest Met Éireann stations are typical of these climatic regions with long-term averages of 1211 mm in Belmullet, Co. Mayo compared to only 948 mm in Gurteen, Co. Offaly. Summer in 2018 was much drier than in 2019 at both meteorological stations, although the annual mean value was similar in both years at Belmullet while the annual mean was significantly lower in 2018 at Gurteen (847 mm) (Figure 3.5.1). The two sites provide a good representation of the prevailing weather conditions in the two regions, with much greater precipitation in the West (Belmullet) compared to the Midlands (Gurteen).

Four LUC were represented at each site: natural, forest, cutover and rewetted in Scohaboy and natural, forest, grassland and cutover for Knockmoyle. During the two-year monitoring period, water table regimes contrasted significantly between the LUC at each peatland type (Figure 3.5.2). The deepest Water Table Level (WTL) were recorded in cutover and forest over RB in Co. Offaly (-60.8 cm and -62.2 cm respectively) compare to the natural (-8.0 cm) and rewetted (-8.2 cm). The natural lowland blanket bog in Co. Mayo had a mean WTL of -3.3 cm, with cutover and grassland exhibiting similar means (-22.2 and -23.6 cm respectively) and forest with the deepest WTL (-33.7 cm). Water retention curves showed that the Water Table (WT) position remained above -10 cm for 70 % of the time in natural, but this dropped to 60 % in the rewetted sites (Figure 3.5.3). At the lowland blanket bog, the natural site was wetter with the WT position remaining above -10 cm for 90 % of the time. For all other LUC, the WTL was below -30 cm for more than 50 % of the time with the forest LUC showing the deepest WTL (Figure 3.5.4).

Seasonal variation was evident with a summer dip in WTL in all peatlands, which was more substantial in the grassland and forest LUC at Knockmoyle (Figure 3.5.2). The cutover LUC demonstrated very erratic WTL regimes at both LUC; being strongly coupled with precipitation rather than vegetation cover (Figure 3.5.5).

The high temporal WTL monitoring (with one data logger) was contrasted with the high spatial WTL (manual) monitoring at each site. For both peatlands, the two measurement methods were in agreement for the natural, rewetted sites, as well as for the forest LUC. However, the loggers over-estimated WTL compared to the manual measurements for other LUC, especially cutover (Figures 3.5.5 and 3.5.6). Grassland LUC was the most ambiguous, probably due to the deep WTL observations.

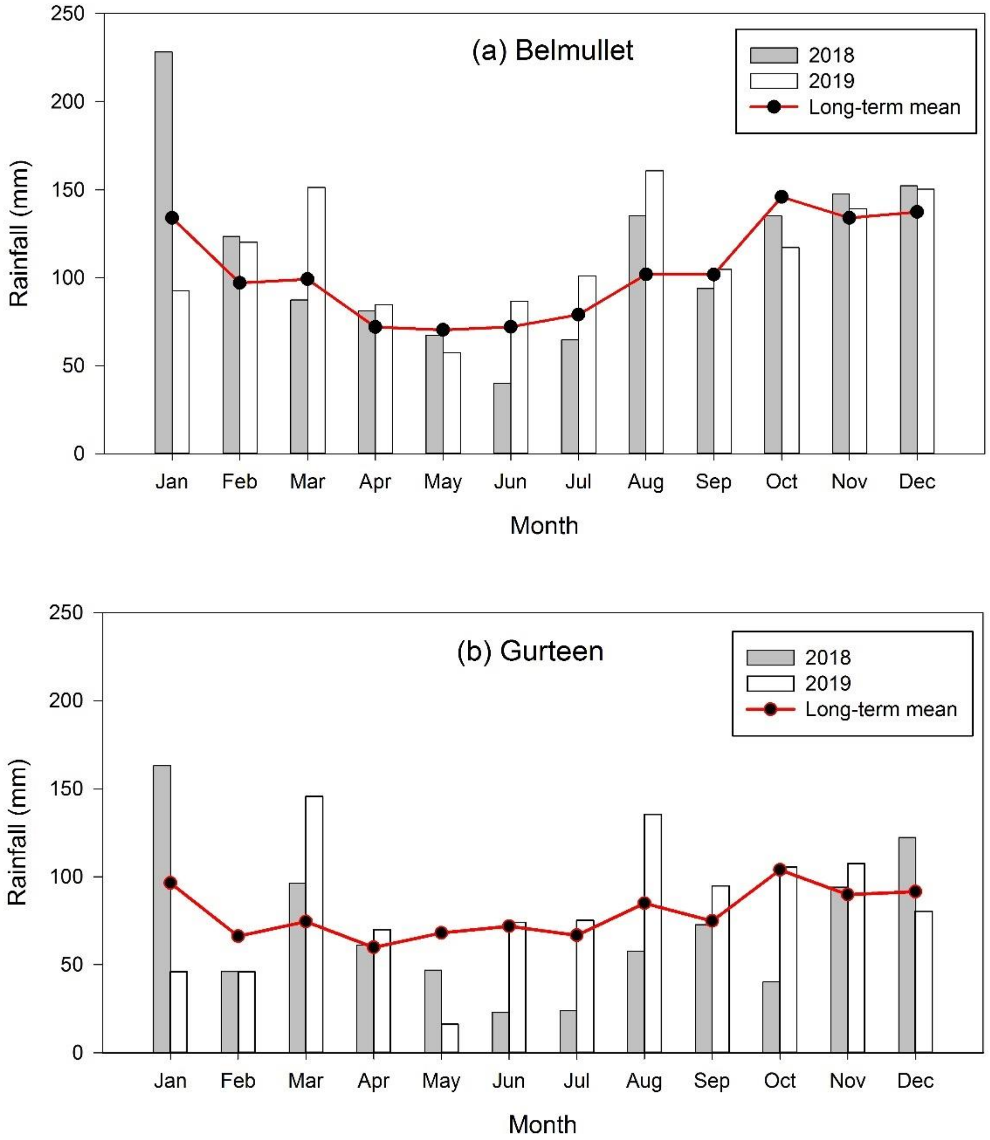

Figure 3.5.1. Annual precipitation and long-term mean for 2018 and 2019 at Belmullet (near Knockmoyle sites) and Gurteen (near Scohaboy sites) meteorological stations (www.met.ie).

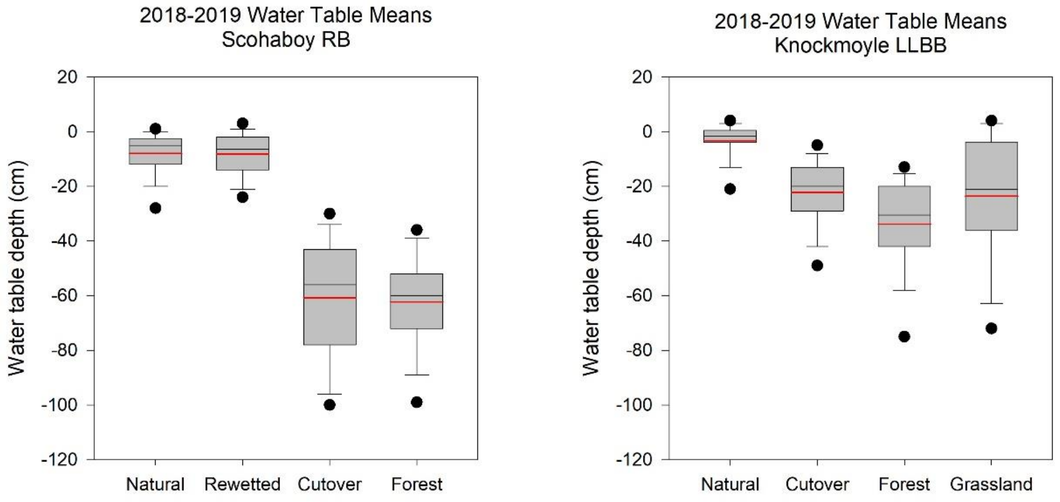

Figure 3.5.2. Box whisker water table mean (red line), median and outliers (for the 2-year monitoring period 2018/19) at Scohaboy raised bog and Knockmoyle lowland blanket bog across all land use categories.

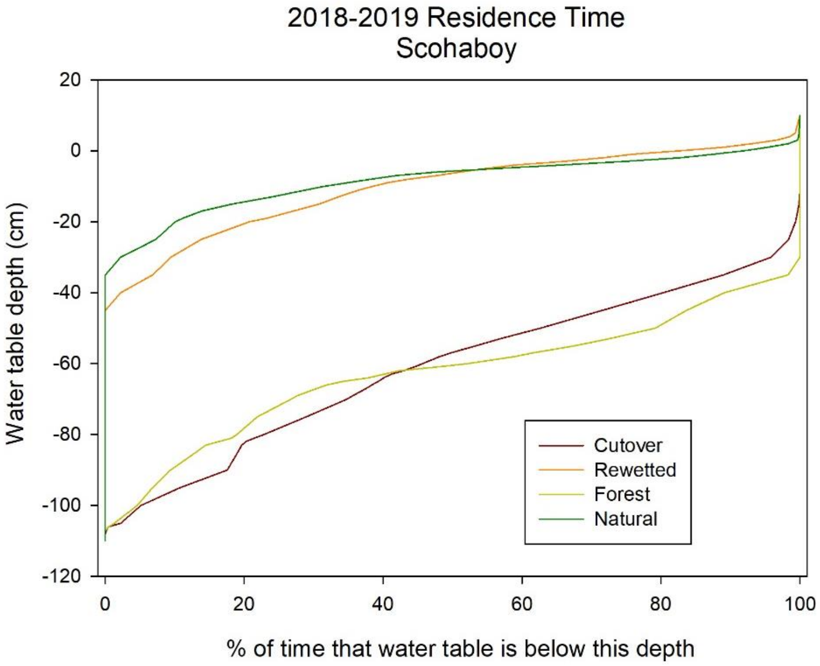

Figure 3.5.3 Water table (cm) residence time curves for each land use category in Scohaboy raised bog.

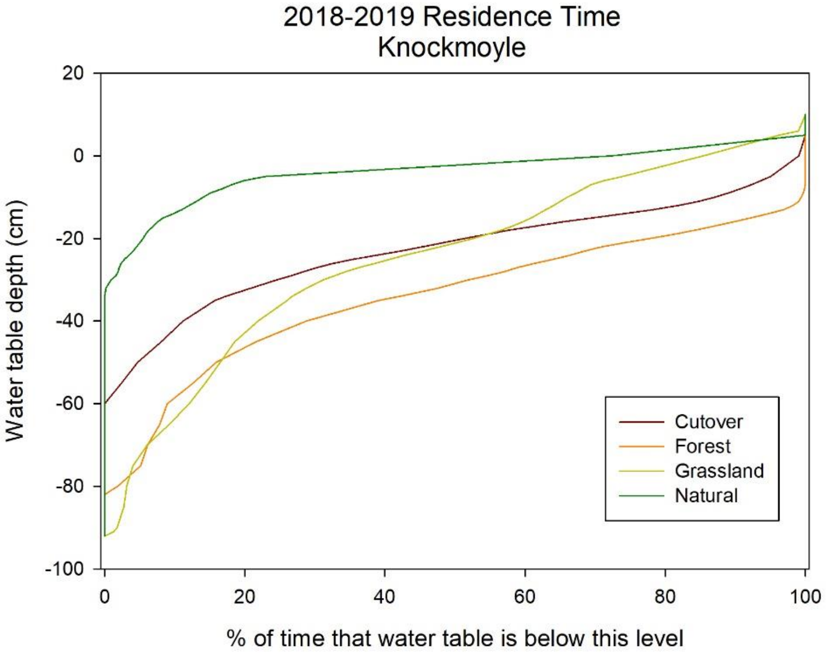

Figure 3.5.4. Water table (cm) residence time curves for each land use category in Knockmoyle lowland blanket bog.

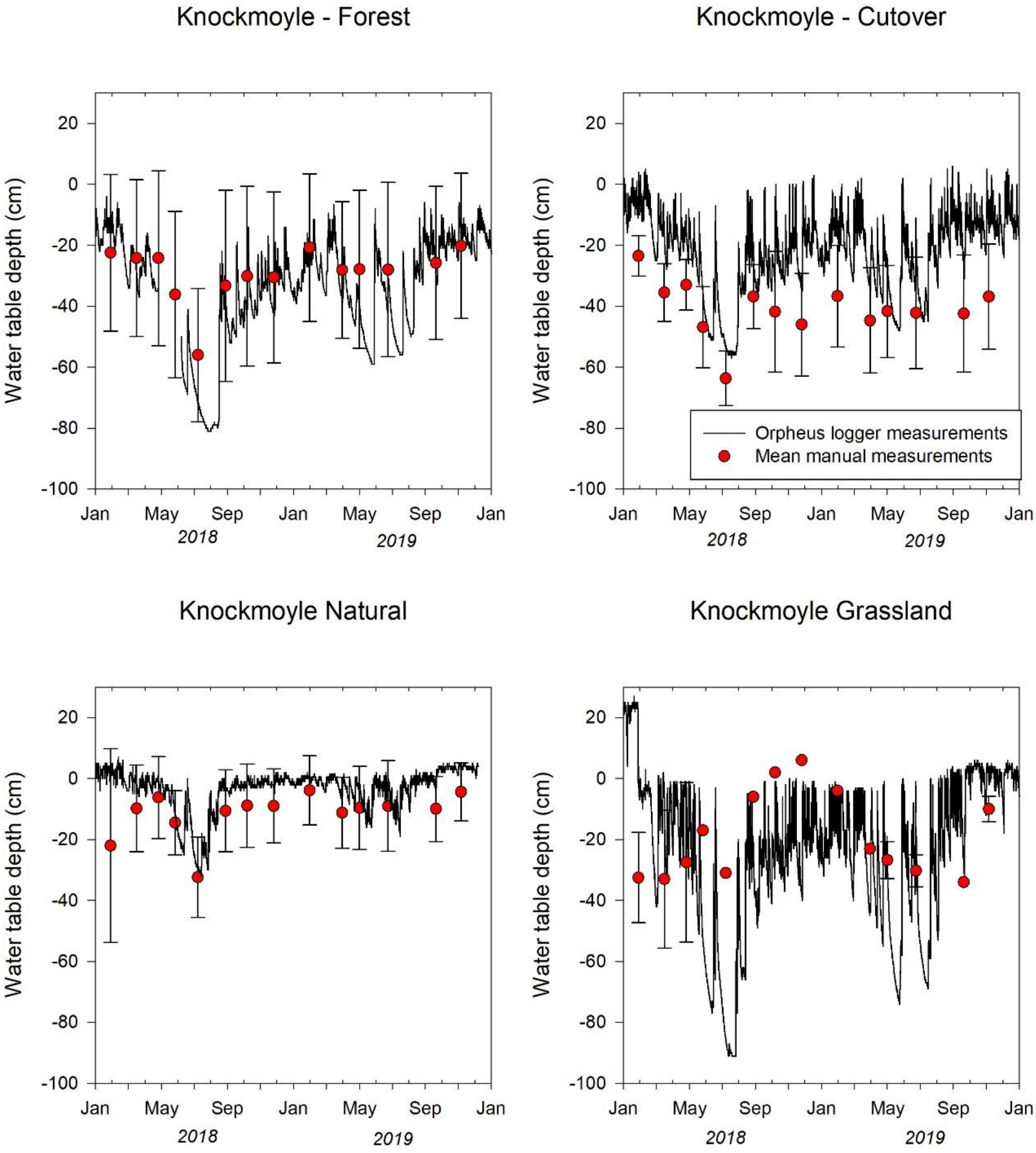

Figure 3.5.5. Water table levels for all land use categories at Knockmoyle lowland blanket bog. Black line denotes Orpheus logger data, red circles denote mean manual measurement and associated error bars (n = 5–8).

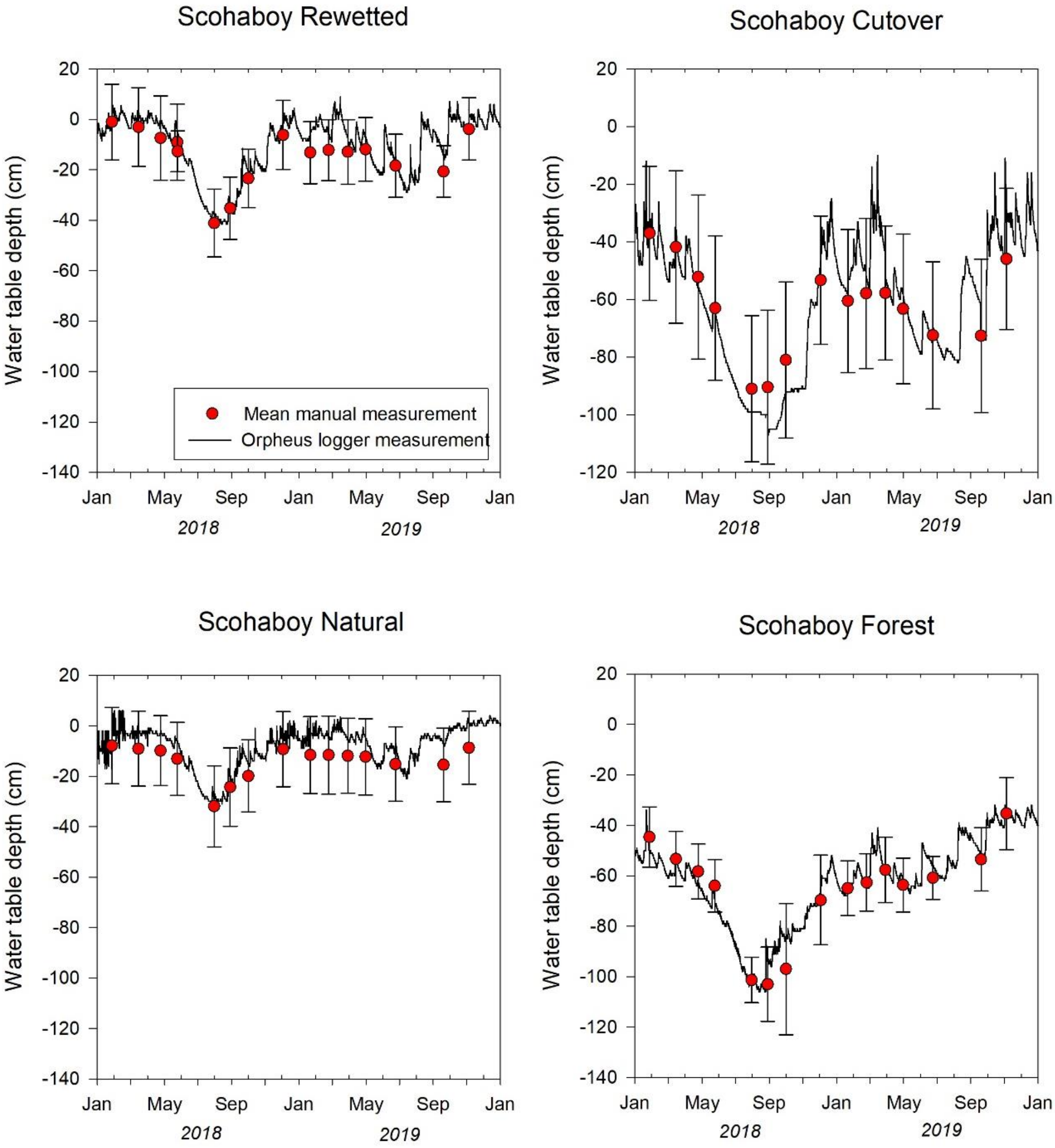

Figure 3.5.6. Water table levels for all land use categories at Scohaboy raised bog. Black line denotes Orpheus logger data, red circles denote mean manual measurement and associated error bars (n =5-8).

3.5.3 Water table monitoring across peat LUC: Conclusions

All LUC demonstrated a wide variation in water table levels, irrespective of peatland type, although the erratic regimes were more pronounced in the raised bogs. It should be noted that all sites were relatively flat and thus slopes did not affect hydrological regimes. In the natural lowland blanket bog, levels remained above -10 cm of the ground surface for over 90 % of the time, reflecting the availability of negligible supplementary storage capacity for most of the hydrological year. This dropped to 70 % in the natural raised bogs. All the other LUC demonstrated greater intra- and inter-annual fluctuations with significantly deeper depths to WTL observed in the forest category, especially in raised bogs. Seasonal variation in WTL was evident in the grassland sites in the west, which highlights the importance of precipitation. Groundwater levels also responded rapidly to rainfall in the cutover sites. The increase in WTL in these sites generally results in increased runoff with associated DOC.

This study also supports previous work demonstrating the success of bringing back the water table in rewetted bogs similar to their natural counterparts (Renou-Wilson et al. 2018b). The successful 'plumbing' of degraded bogs is the first critical step towards full recovery of all the ecosystem functions including vegetation.

Overall, while monitoring of WTL in natural/rewetted sites can be successfully achieved by a single logger, the spatial heterogeneity present in the other LUC warrants the deployment of several loggers.

3.5.4 WT monitoring at Moyarwood rewetted site

Hydrological investigations carried out at the restored raised bog site at Moyarwood, Co. Galway (see also GHG monitoring site in Chapter 4) aimed to evaluate whether rewetting measures undertaken at the site had succeeded in restoring hydrological supporting conditions necessary for the re-establishment of peat accumulating plant communities. Monitoring infrastructure installed at the site consisted of (a) water table piezometer, (b) a piezometer installed at the base of the peat, in contact with the inorganic substrate, and (c) a third monitoring point installed in an adjacent drain, approximately 5 m from the shallow/deep monitoring well pair. Monitoring of groundwater and drain water levels, initiated on 21st June 2016, used automatic data loggers to measure water table levels at 30-minute intervals. Water table monitoring continued until 31st March 2018. Due to equipment limitations, data loggers were installed in the drain and deeper piezometer for shorter periods (until August 2017). In all cases, intermittent manual measurements supplemented datalogger data, while also permitting the reliability of automated measurements to be verified.

Previous Investigations

Previous investigations (Cushnan 2018) examined Irish raised bog water table fluctuations, noting that depth to the water table, and its range of fluctuation, varied by ecotope type. Overall, the peat accumulating ecotopes that were investigated (central and subcentral) had more stable water table regimes with water tables occurring closer to the surface. More critically, it was noted that differences in water table regime became most distinct during summer (April to September), when the effects of evapotranspiration proved greatest. During this period, water levels in the peat accumulating ecotopes rarely dropped more than 10 cm below the ground surface, while slopes of duration curves, as reflected by the range of D_{10} and D_{90} values, did not exceed 15 cm (the latter proves a more valuable metric due to the complicating effects of microtopography).

3.5.5 Results

The hydrograph presented in Figure 3.5.7 summarises the regime in the drain and shallow piezometer at Moyarwood over the summer (mid-April to mid-August) of 2017. The results reveal the intimate correspondence between the water level in the drain and the water table. Critically, the range of groundwater fluctuation throughout the summer rarely exceeds 15 cm (less than 1 % of the time). The regime in the deeper piezometer differs slightly (Figure 3.5.8). This difference arises due to the lower permeability of the more humified peat at depth, resulting in a greater time taken for piezometers to respond to water level changes (also known as piezometer lag time). Of note the discrepancy between the manual dip and the logger relates to two issues: the accuracy of the dipper (+/- 1 cm) and its temporal resolution vis-à-vis manual measurement (+/- 12 hours).

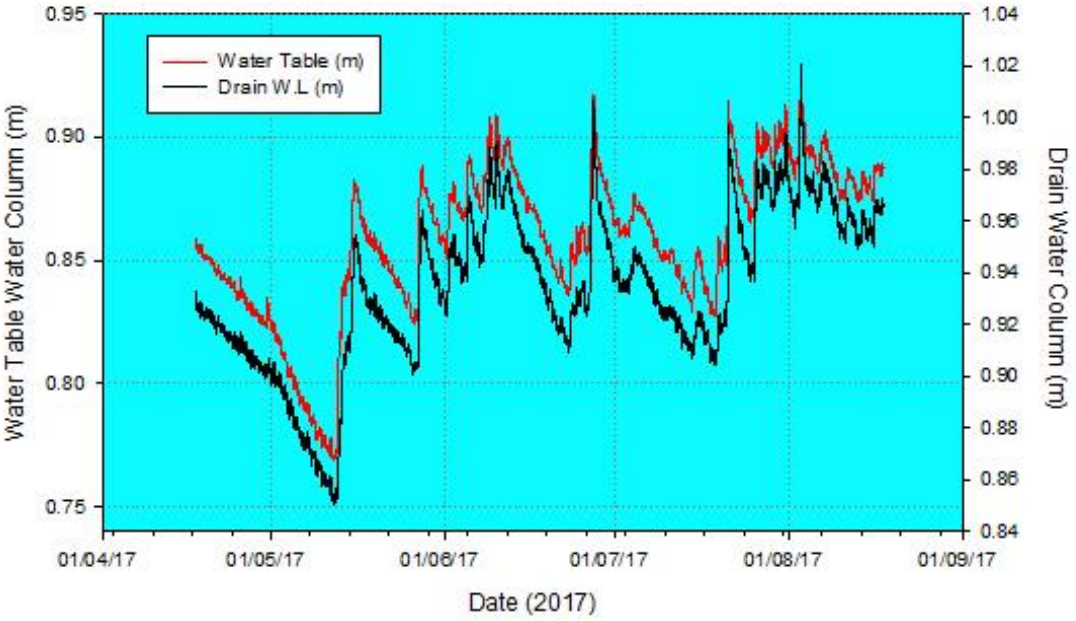

Figure 3.5.7. Water level regime in the water table and drain piezometers at Moyarwood, Co. Galway (April to August 2017).

Meteorological data from the nearby Met Éireann station at Athenry has allowed the impact of rainfall and potential evapotranspiration rates on the water level regime to be investigated (Figure 3.5.8). Results once again reveal a close relationship between water levels and meteorological data. This is particularly apparent when the cumulative deficit (rainfall – potential evapotranspiration) is compared to water level fluctuations, with the gradual decline in water level at the start of the monitoring period and its gradual rise at the end effectively explained by the sensitivity of bog hydrology to meteorological inputs.

The water table regime for the previous summer (2016) displays a comparable narrow range of fluctuation (Figure 3.5.9). Compilation of the data to generate a water level duration curve for the water table piezometer revealed that, over summer 2016, the water table never dropped more than 6 cm below the ground surface, while the range, as reflected by D_{10}-D_{90}, proved even less than during the following summer (3 cm).

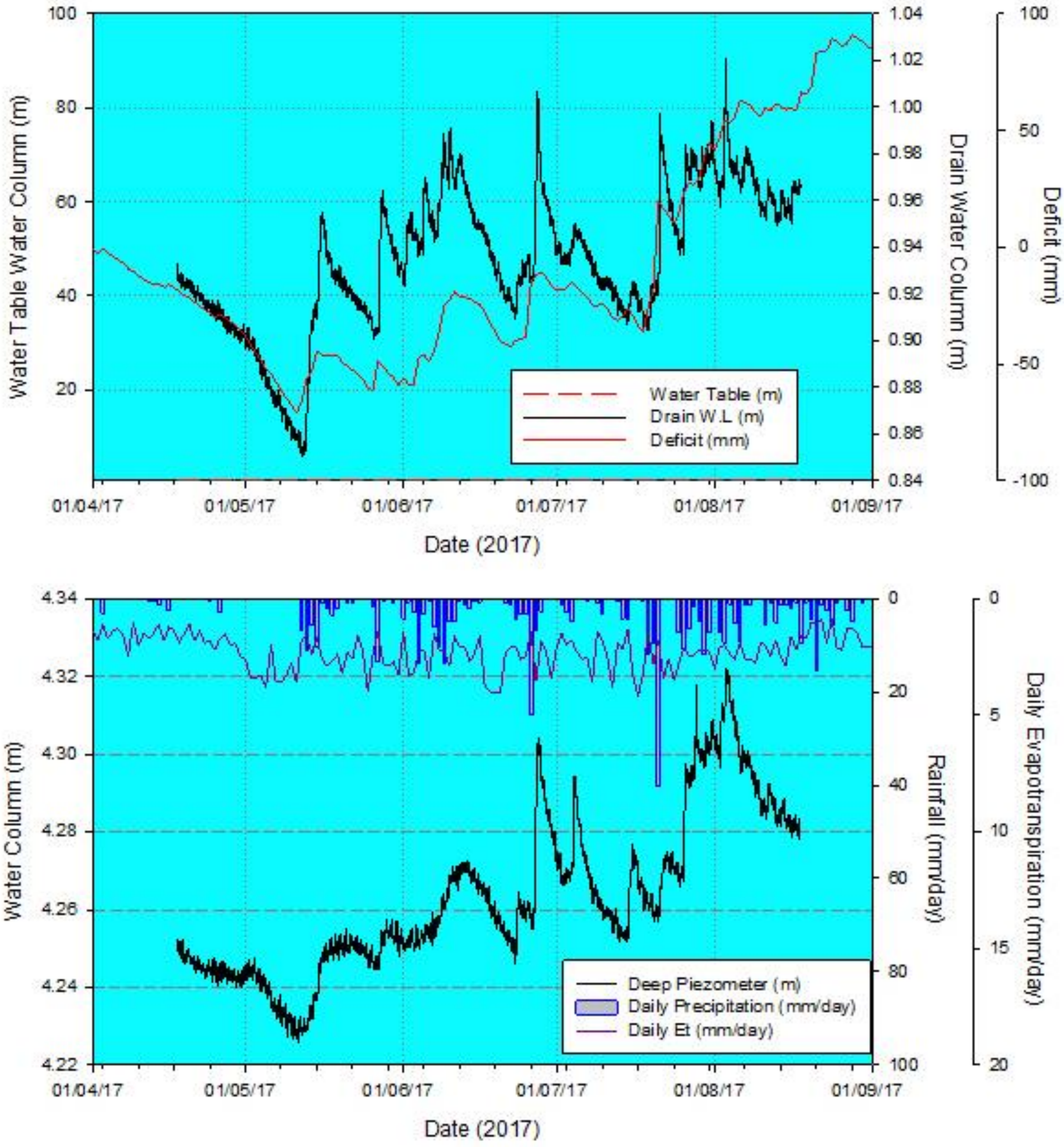

Figure 3.5.8. Plot of water level fluctuations with meteorological inputs for water table (upper graph) and deep piezometers (lower graph) at Moyarwood, Co. Galway (April 2017–August 2017).

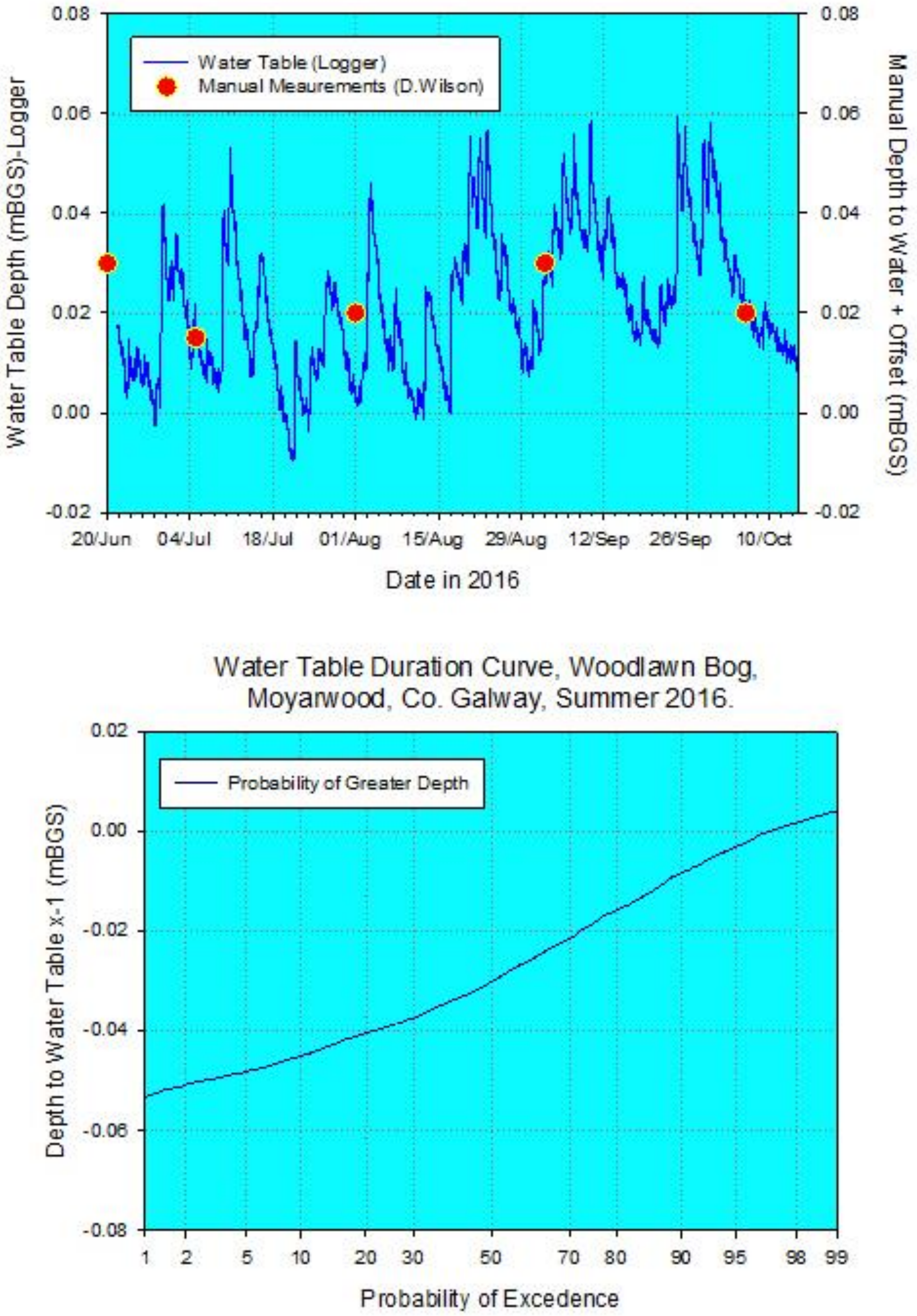

Figure 3.5.9: (Upper graph) Hydrograph illustrating the variation in depth to water table between June 2017 and October 2017; large dots illustrate manual measurements. (Lower graph) Water level duration curve for the water table piezometer for the same period. The range of fluctuation falls within the range observed by Cushnan (2017) for Central ecotopes on Irish raised bogs showing that hydrological supporting conditions for peat accumulating communities were present during the monitoring period.

3.5.6 WT position at a rewetted raised bog site: conclusions

The results of water level monitoring carried out at the Moyarwood site over two summers reveal an intimate relationship between groundwater and drain water level. The blockage of these drains has resulted in raised water levels. The data collected suggest that this has increased the water level in the surrounding peat, thus reducing the depth to the water table, compared to pre-restoration conditions. The resulting range of water level fluctuation falls within that observed in peat accumulating (central) ecotopes on other Irish bogs. Consequently, the restoration measures undertaken are considered to have successfully restored hydrological supporting conditions for peat accumulating plant communities at Moyarwood. Critically, the success of these measures depends on peat properties, with the deeper peat at the site displaying considerably lower permeability than that encountered at the surface (based on piezometer lag). In cases where peat proves more permeable and hydraulic gradients can be controlled, the effects of restoration measures can be anticipated to be more widespread. Conversely, where this control cannot be implemented, restoration measures in permeable peat units are likely to prove less effective, particularly where water levels in adjacent drains drop more than 15 cm below ground. It should be cautioned that permeability is not a function of current peat depth. Well-humified (high von Post values) peat layers which can limit water fluxes can be present in shallow deposit (e.g. cutaway). However the near-surface layer of bare peat is likely to have been affected in turn by absence of vegetation and weathering processes affecting the macroporosity and matrix flow.

3.5.7 Water table monitoring: conclusions

Our results confirm the high variability in hydrological regimes in all peatland types including natural bogs, whereby different ontogenic development, peat properties (bulk density, degree of decomposition) and allogenic factors (e.g. local climate) will show contrasting hydrological regimes both within and between sites. These relationships become even more complex in drained peatlands. This makes for difficult monitoring of this spatio-temporal variable that critically drives GHG dynamics and would require the deployment of intensive instrumentation. While ground water table can be measured reliably in the field using piezometers and shallow monitoring wells, these point-based techniques are difficult to scale. Recent developments using earth-observation data acquired from Unmanned Aerial Vehicles (UAV) have provided accurate models of groundwater levels, especially in open, tree-less peatlands (Rahman et al. 2017).

This study also supports previous research that confirmed the importance of the relationship between water table and peat properties when rewetting peatlands, to inform sustainable engineering solutions on a site-by-site basis.

3.6 Vegetation profile of Irish peatlands with different LUC and management regimes

3.6.1 Vegetation assessment methods

A vegetation assessment was carried out at each soil sampling location (270 points) in conjunction with other abiotic parameters (see field sheet in Appendix 2). Vegetation cover (abundance) and vegetation composition were assessed using 1 x 1 m quadrat (Figure 3.2.4). A vegetation assessment scheme developed in the context of previous peatland research was adopted. (Renou-Wilson et al. 2018b). In short, we assessed micro-habitat heterogeneity and micro-topography. Positive indicators of "good micro-habitat heterogeneity" are presence of patterning (hummocks, hollows, tear patterns). Indicators of "poor micro-topography" are presence of bare peat, algal cover, exposed rock (with no lichens) and eroded areas (gullies, hags). In addition, the vegetation can be described by identifying presence/absence and % cover of the main plant functional types (PFT): woody vegetation; Ericoid dwarf shrubs, total graminoids (grasses, sedges, forbs), bryophytes (Sphagnum mosses, other mosses, liverworts), lichens (demonstrating absence of burning events), litter and bare peat. Finally, all taxa of vascular plants, mosses and lichens and their cover were estimated using a revised Domin scale (Kent and Coker 1998). The scale includes cover values from 0 to 4, whereby 0 = absent, 1 = rare (<5 %), 2 = occasionally (5–20 %), 3 = frequently (21–50 %) and 4 = dominant (>50 %). Nomenclature for vascular plants follows Parnell and Curtis (2012), for bryophytes, Atherton et al. (2010), and for lichens, Whelan (2011). Species richness and diversity were measured using the Shannon-Weiner index. Assessment was conducted before soil sampling. A photograph of each quadrat from above and parallel to the vegetation surface was taken (e.g. Figure 3.2.4).

The Shannon-Weiner index was calculated for each sampling point based on the cover of PFT observed at that point. Significant differences between populations were calculated using the Kruskal-Wallis test in R, and a Wilcox pairwise comparison test was run between each population to observe differences between individual populations.

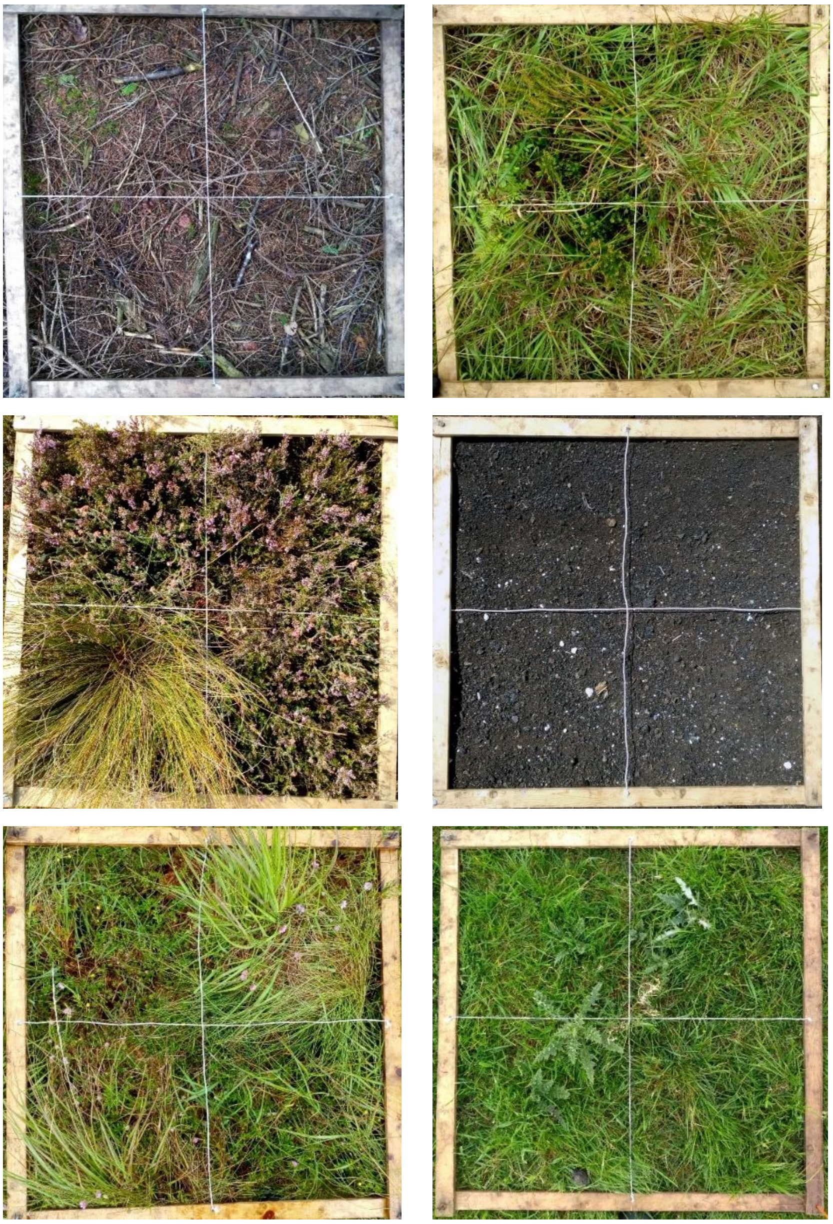

Figure 3.2.4. Examples of 1 x 1 m quadrats for vegetation assessment. Row 1: LUC 'natural'; LOWLAND BLANKET BOG (left) and RB (right). Row 2: LUC 'forest' (left) and 'rewetted' (right). Row 3: LUC 'cutover' (left) and 'cutaway' (right). Row 4: LUC 'grassland-rough grazing' (left) and 'grassland-deep-drained' (right).

3.6.2 Microhabitats

The relative abundance of microhabitats (i.e. number of quadrats containing a micro-habitat over the total number of quadrats) was much lower in all LUC compared to natural (Figures 3.6.1–3.6.3). The high micro-habitat diversity of natural bogs is in stark contrast with their conspicuous absence in all other peatland LUC. This is particularly true for raised bogs, which display the greatest microhabitat diversity with the Mongan and Scohaboy sites each with five microhabitats. Pools were observed in all but one natural bog types and in three of the four rewetted sites. Rewetted cutover bogs have nonetheless shown they are on a trajectory that could bring back the full microhabitat diversity of natural bogs. There was a significant different in habitat heterogeneity between the study sites based on their management ($p<0.05$).

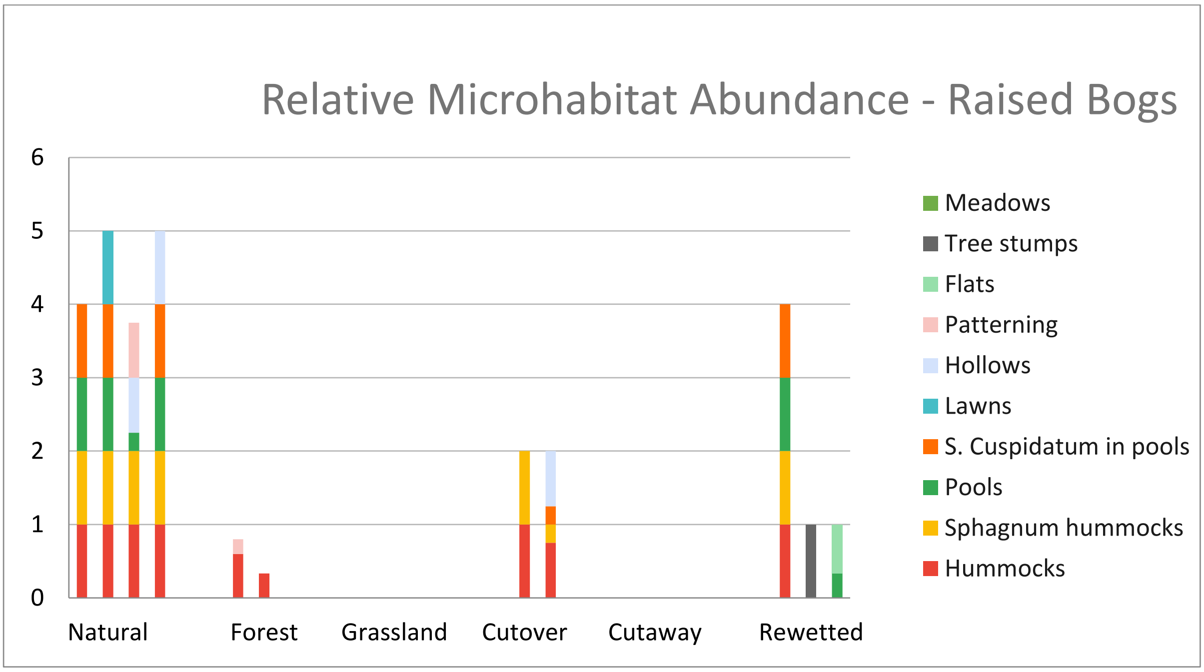

Figure 3.6.1. Relative microhabitat abundance of the raised bog sampling sites.

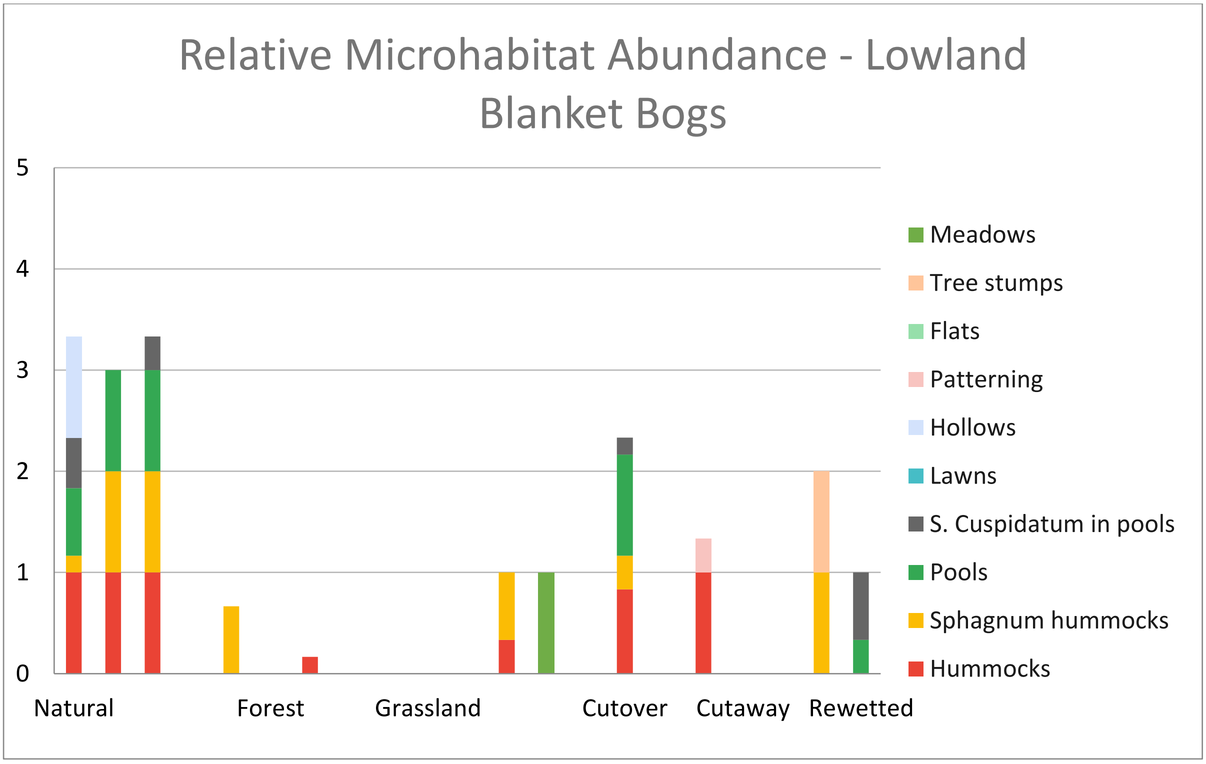

Figure 3.6.2. Relative microhabitat abundance of the lowland blanket bog sampling sites.

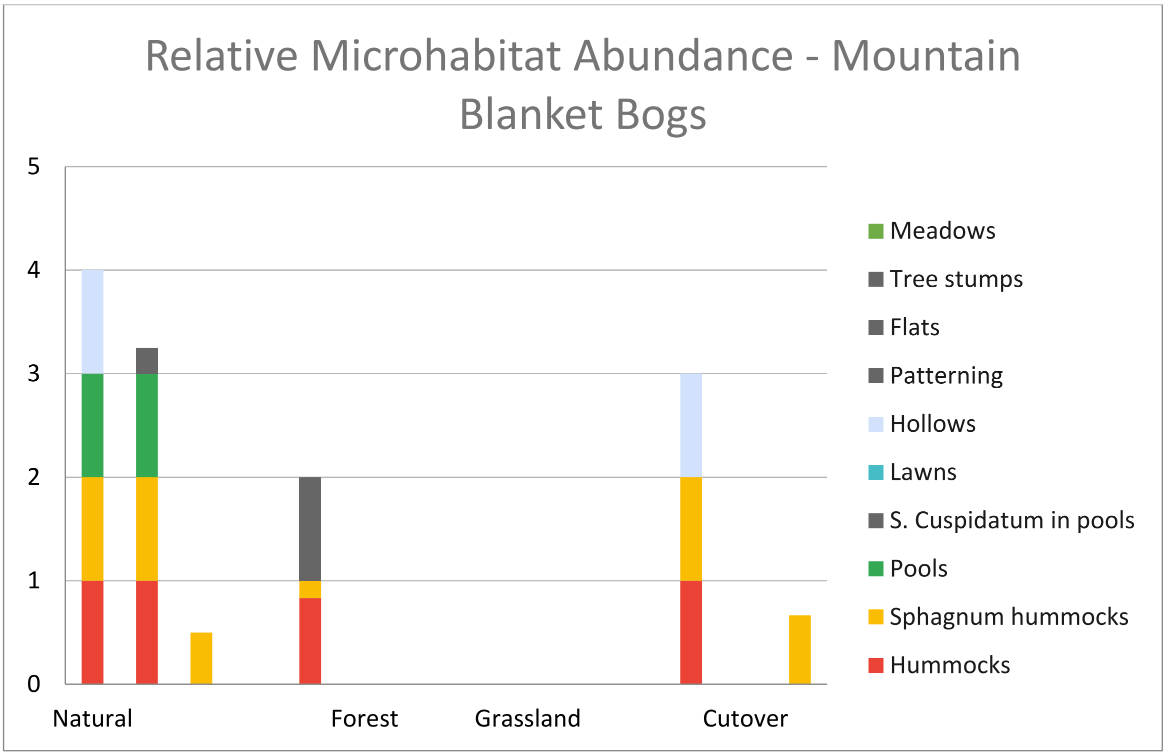

Figure 3.6.3. Relative microhabitat abundance of the mountain blanket bog sampling sites.

3.6.3 Species richness and diversity

A total of 70 species was identified (algae species were not determined). The rewetted cutaway bog in Blackwater was unique in that it had 5 species that were not observed at any other location. Natural sites had significantly higher Shannon-Weiner Index (SWI) values than drained and rewetted sites ($p < 0.01$), with drained sites exhibiting lower SWI values than the other management types (Figure 3.6.4). The natural sites had a significantly higher SWI than all other LUC ($p < 0.05$), and the cutaway sites had a significantly lower SWI ($p < 0.05$) than the remaining (Figure 3.6.5). There was no significant difference between the SWI values for the drained and rewetted cutover sites ($p = 0.45$); an artefact of the short time since rewetting was carried out at certain cutover sites. However, there was a significant difference between drained and rewetted cutaway sites ($p < 0.001$), and between the forest drained and forest rewetted sites ($p < 0.001$).

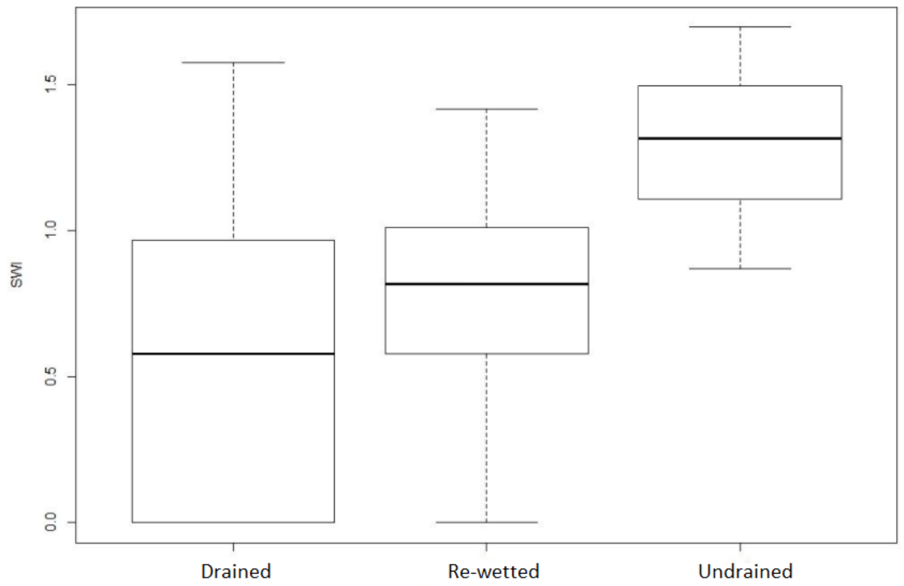

Figure 3.6.4. Boxplot of Shannon Weiner Index (SWI) values at each sampling point according to the management type at that point (drained, re-wetted, undrained).

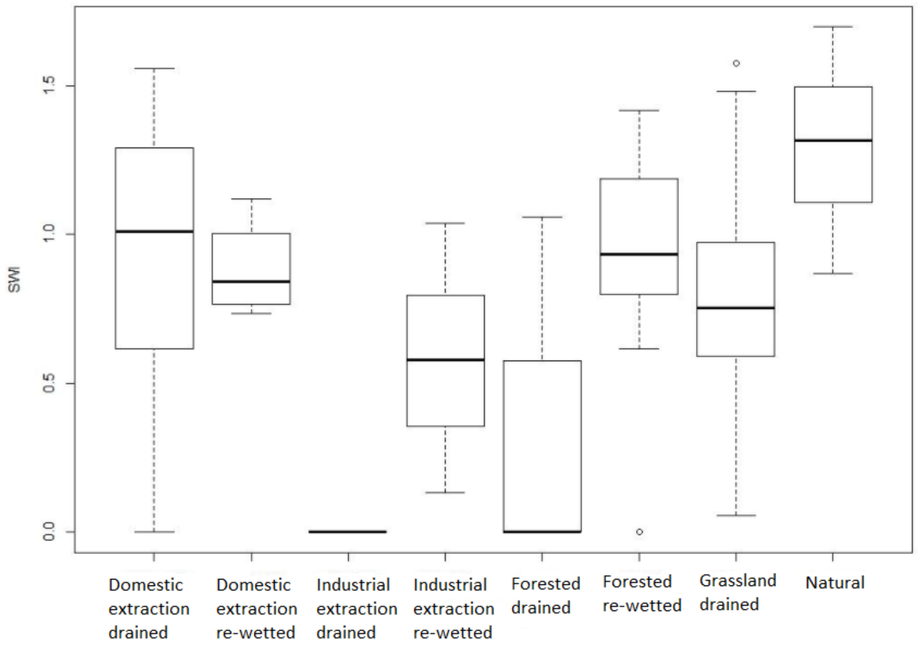

Figure 3.6.5. Boxplot of Shannon Weiner Index (SWI) values at each sampling point according to the management type at that point.

Management affected PFT cover, showing distinctive assemblages for forest, grassland and cutaway (Figure 3.6.6) compared with the natural sites, which resembled the rewetted and the cutover sites (Figure 3.6.7).

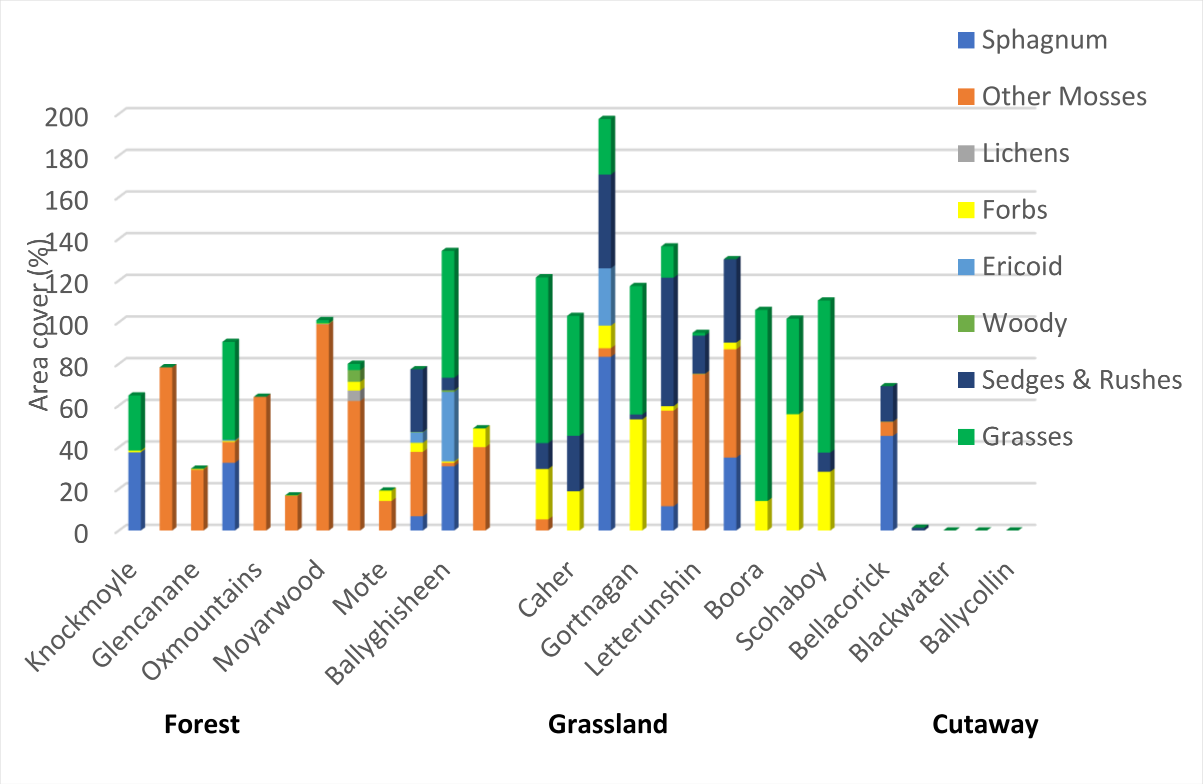

Figure 3.6.6 Average area cover (%) of each plant functional type at all Forest, Grassland and Cutaway sites.

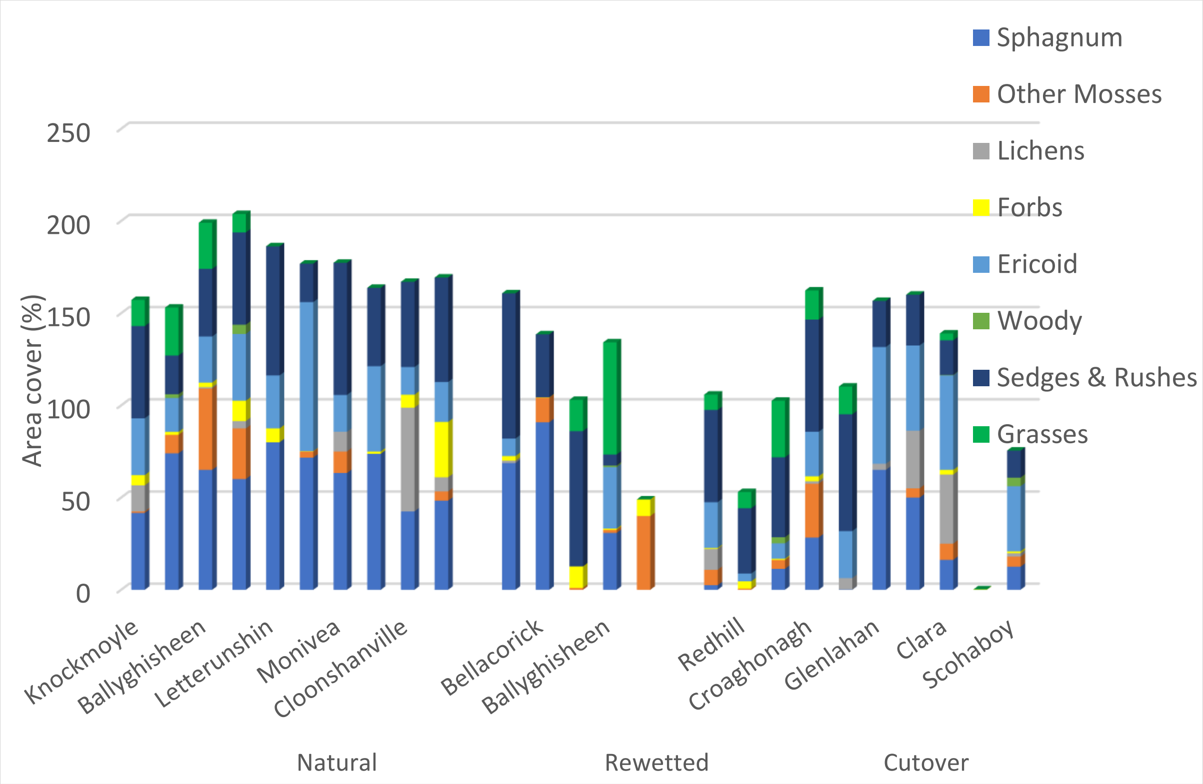

Figure 3.6.7. Average area cover (%) of each plant functional type at all natural, rewetted and cutover sites.

Overall, micro-habitats and PFT were affected by management (undrained, drained and rewetted) in a similar fashion, with rewetted sites showing a limited variation from the natural (undrained) sites (Figures 3.6.8 and 3.6.9).

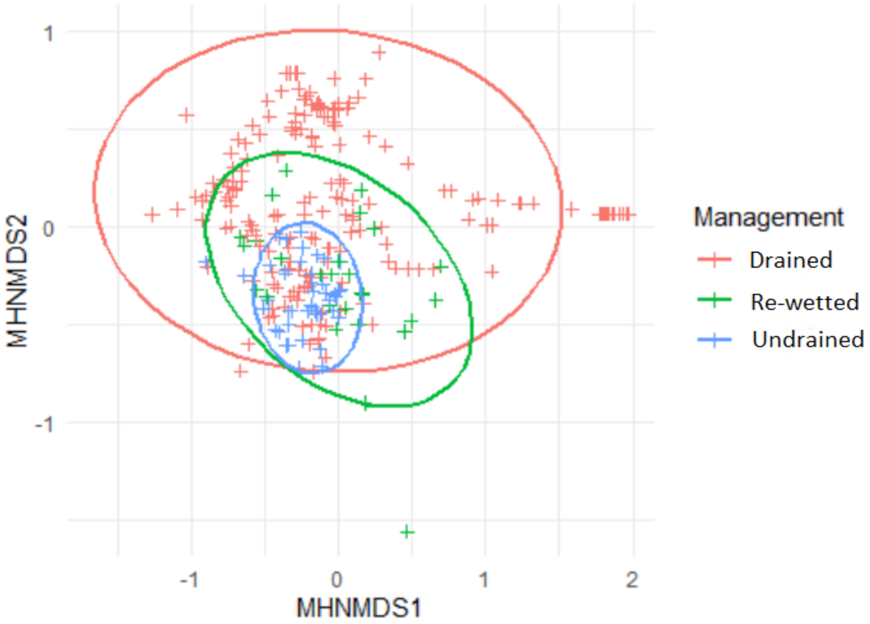

Figure 3.6.8. Non-metric multidimensional scaling (NMDS) figure of all sampling locations plotted according to similarity of microhabitats. 95 % confidence ellipsoids plotted for each management type.

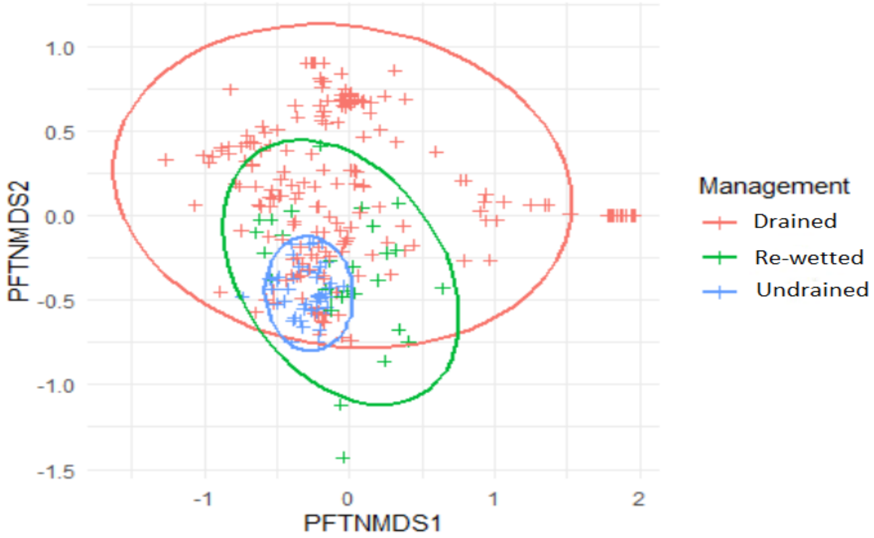

Figure 3.6.9. Non-metric multidimensional scaling (NMDS) figure of all sampling locations plotted according to similarity of plant functional types. 95 % confidence ellipsoids plotted for each management type.

3.6.4 Vegetation assessment: conclusions

Our results confirm that the utilisation of peatlands and associated allogenic[5] factors have affected the vegetation of natural peatlands in a broad spectrum. This heterogeneity is accentuated by additional ‘external factors’ such as local climate, topography and geology (groundwater drainage), reinforcing the ‘each peatland site is unique’ adage. Except for the extreme case of cutaway peatlands where the vegetation is completely absent, the spatial patterns of vegetation communities are strong indicators of peatland type and conditions, which are unique to their location, as well as their management. Even grassland or forest peatlands display a high level of heterogeneity between sites. The results also support previous studies that have demonstrated the importance of cutover bogs in providing biodiversity values and confirm the successful outcomes of rewetting all types of managed drained peatlands (Renou-Wilson et al. 2018b, Renou-Wilson et al. 2019).

It has been previously shown that the role of vegetation composition (or its absence) is central in determining the GHG dynamics of natural and managed peatlands. While certain assemblages (ecotopes) can be used as proxy for the hydrological regime of a site and thus in predicting GHG dynamics (Couwenberg et al. 2011, Regan et al. 2020), the heterogeneity of vegetation composition (within and between sites), together with their associated local hydrological regimes, makes their modelling difficult for GHG predictions. The complexity of monitoring such spatial heterogeneity and attributing relative emission factors seems very high and can only be modelled using innovative methods. While the development of aerial imagery could help map these mosaic sites, certain barriers are still present, e.g. overlapping spectral signatures of different vegetation communities or non-recognition of existing drainage systems.

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[5] Pertaining to factors from outside a system affecting it, as in habitats altered by drainage, cutting or fertilization.

4 Greenhouse gas field measurements at cutover peatlands

4.1 Introduction

Natural peatlands have been shown to be long-term carbon (C) sinks (Roulet et al. 2007, Koehler et al. 2011, Levy and Gray 2015, Rinne et al. 2020) as the amount of carbon dioxide (CO_2) sequestered by the ecosystem is greater than carbon losses though methane (CH_4) emissions to the atmosphere and dissolved organic carbon (DOC) movement to water bodies. However, there is a fundamental shift in greenhouse gas (GHG) dynamics when these natural sites are drained, and the peatland invariably switches to acting as a persistent net CO_2 source (Waddington et al. 2002, Wilson et al. 2015, Renou-Wilson et al. 2019, Swenson et al. 2019). Rewetting offers the potential to reduce CO_2 emissions (through raising of the water table close to the surface of the peat) (Strack et al. 2014, Wilson et al. 2016a) and, in some cases, return the CO_2 sequestration function characteristic of natural peatlands (Wilson et al. 2016b, Nugent et al. 2018, Renou-Wilson et al. 2019, Swenson et al. 2019). At the same time, CH_4 emissions are likely to increase following rewetting (Wilson et al. 2016b, Renou-Wilson et al. 2019, Günther et al. 2020). Given that the magnitude of GHG flux exchange following rewetting is likely to vary considerably between peatland sites (Wilson et al. 2016a), countries are encouraged to develop sufficient data capacity to permit reporting of GHG emissions/removals at the country specific Tier 2 level (Blain et al. 2014).

4.2 Moyarwood, Co. Galway

4.2.1 Study site

The study site is a raised bog at Moyarwood, Co. Galway, Ireland (Lat: 53.347098, Long: -8.515251). The site had undergone peat extraction (domestic) on the margins for decades and was extensively drained (drains located every 15 m) in the 1980s in preparation for milled peat extraction. However, the site was never subsequently developed for peat extraction and a vegetation cover remained in situ between the drains. The drains were active until a rewetting programme commenced in 2012, which involved blocking of the drains with peat dams at regular intervals (generally at any point where there was a fall in the drain level of 10 cm). Average peat depth within the site is 4.40 m and the peat is composed mainly of humified Sphagnum peat overlying limestone parent material. A more detailed site description can be found in Table 4.1.

Table 4.1. Physico-chemical characteristics, and dominant vegetation at Moyarwood, Co. Galway. Air temperature and precipitation data (1981–2010) from Met Éireann Athenry station.

	Drained	Rewetted
Dominant vegetation	*Calluna vulgaris* *Carex panicea* *Cladonia portentosa* *Narthecium ossifragum* *Trichophorum cespitosum* *Erica cinerea* *E. tetralix*	*Sphagnum capillifolium* *S. cuspidatum,* *S. magellanicum* *S. papillosum* *Eriophorum vaginatum* *E. angustifolium* *Rhynchospora alba* *Narthecium ossifragum*
Average peat depth (m)	4.40	
Peat type	*Sphagnum*	
Electrical conductivity (µs cm^{-1})	102	
Bulk density (g cm^{-3})	0.08 to 0.13	
pH	4.4	
C (%)	51.5	
N (%)	1.32	
C:N	39:1	
Mean annual precipitation (mm yr^{-1})	1193	
Mean annual air temperature (°C)	9.9	

4.2.2 Site instrumentation

In February 2013, a total of 15 stainless steel collars (60 × 60 cm) were established at the site; 12 were located in the rewetted area along a transect perpendicular to the ditches; three were located on the drained eastern margins, and one was located in a former drainage ditch (Figure 4.1). The latter collar was placed in a similar manner to the other collars so that the channel at the top of the collar was above the water level and supported on wooden batons that extended across the ditch. All collars were inserted 30 cm into the peat.

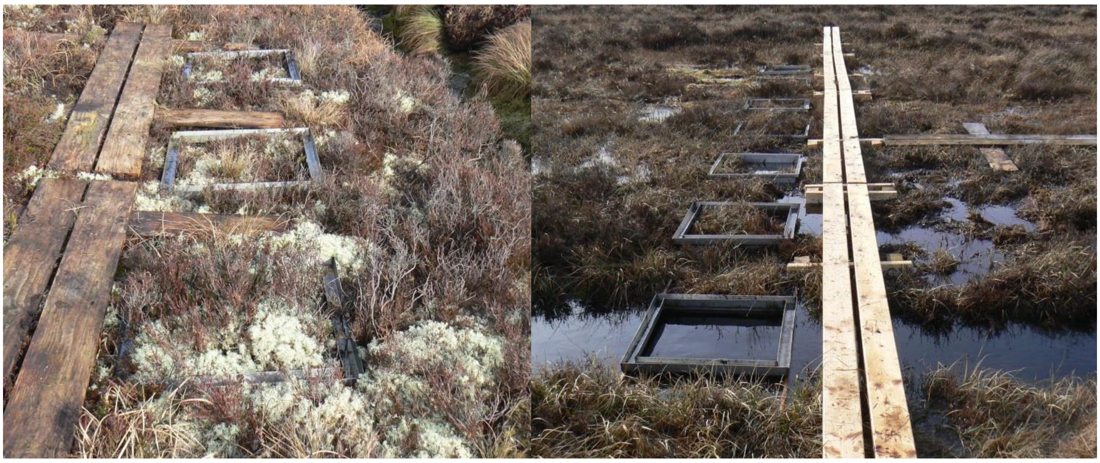

Figure 4.1. Collars in the drained (left photo) and rewetted (right photo) sites in Moyarwood.

Perforated plastic dipwells (5 cm internal diameter) were inserted adjacent to each collar to facilitate the measurement of water levels during each GHG measurement campaign. Wooden boardwalks were established within each sub-site in order to prevent damage to the vegetation and to avoid compression of the peat during GHG sampling. At the drained sub-site, a Watchdog weather station (Watch Dog Model 2400, Spectrum Technologies Inc., IL, USA) was established and recorded Photosynthetic Photon Flux Density (PPFD; μmol m^{-2} s^{-1}), soil temperatures (°C; 5 and 10 cm depths) and soil moisture at 10-min intervals. A soil logger (Hobo External Data Loggers, Onset Computer Corporation, MA, USA) was installed in the rewetted site and recorded soil temperatures at 5 and 10 cm depths at hourly intervals.

4.2.3 Field measurements

Greenhouse gas flux measurements commenced in April 2013 and ended in March 2018. Chambers were employed at fortnightly / monthly intervals (depending on season) during this period (Figures 4.2 and 4.3); each site visit consisted of a 2–4 day campaign during which CO_2, CH_4 and N_2O fluxes were sampled simultaneously with a range of environmental variables; PPFD, soil temperature, water table level and green area index (GAI). For net ecosystem exchange (NEE) sampling, a transparent chamber (60 × 60 cm) was connected to an infrared gas analyser (EGM-4, PP Systems, UK) via a length of Tygon tubing. The chamber was also equipped with a cooling system (to prevent excessive temperature build-up) and internal fans (to ensure uniform circulation of air within the chamber). Vent holes on the chambers ensured that pressure artefacts were minimised during chamber placement.

Figure 4.2. Transparent chamber (left photo) and dark chamber (right photo) used to measure carbon dioxide (CO_2) fluxes (net ecosystem exchange (NEE) in Moyarwood.

The transparent chamber was placed in the water channel of a collar and CO_2 concentration, PPFD and temperature within the chamber headspace were recorded every 15-sec over a 60–180 sec period. The measurement was rejected if PPFD levels deviated by >10 % or if the chamber temperature increased by > 2 °C during the enclosure time. After each measurement, the chamber was removed from the collar to allow the CO_2 concentration to reach equilibrium with the ambient air. NEE was measured under a range of light levels as the position of the sun changed throughout the day. In early mornings, an artificial shroud that blocked approximately 50 % of incoming PPFD was placed over the chamber to permit the measurement of NEE at low PPFD levels (< 100 µmol m^{-2} s^{-1}). Measurements were carried out between 8 am and 6 pm in the summer and between 9 am and 3 pm in the winter to ensure that the maximum PPFD was reached at each measurement date. Ecosystem respiration (Reco) was then measured by covering the chamber in an opaque cover and CO_2 exchange was measured as described above.

Methane (CH_4) and nitrous oxide (N_2O) fluxes (Figure 4.3) were measured at monthly intervals (multiple measurements were carried out during the 4-day measurement campaign in summer) using an opaque, polycarbonate chamber (60 × 60 × 25 cm) equipped with a battery-operated fan that mixed the air within the chamber headspace.

Figure 4.3. Dark chambers used for measuring methane (CH_4) and nitrous oxide (N_2O) fluxes.

Four 50 ml samples were withdrawn into 60 ml polypropylene syringes from the chamber headspace at 5-min intervals over a 20-min period (the measurement period was increased to 40 min during wintertime when low fluxes were expected) and the samples transferred to Exetainers vials (12-ml Soda Glass Vials; Labco, UK) in the field and analysed with a gas chromatograph (Bruker Greenhouse Gas Analyser 450-GC) equipped with a flame ionization detector (FID) and an electron capture detector (ECD). The detector temperatures were set at 300 °C (FID) and 350 °C (ECD), and five CH_4 and N_2O standards were supplied by Deuste Steininger GmbH. Gas peaks were integrated using Galaxie software (Varian Inc., Palo Alto, CA, USA). During each measurement in the field, air temperature inside the chamber, soil temperature (at 5 and 10 cm depths) and WT were recorded at each collar.

To incorporate the seasonal dynamics of the plants into CO_2 exchange models, a green area index (GAI) was estimated for each of the vegetated collars. This involved measuring the green photosynthetic area of all vascular plants (leaves and stems) within the sample plot at monthly intervals. Moss % cover was estimated at the same time. Species-specific model curves were applied to describe the phenological dynamics of the vegetation of each collar, and the models (vascular plants and moss) were summed to produce a plot-specific GAI. For a more detailed description of the method see Wilson et al. (2007a).

4.2.4 Flux calculations

Flux rates (mg CO_2 m^{-2} h^{-1}, mg CH_4 m^{-2} h^{-1}, µg N_2O m^{-2} h^{-1}) were calculated as the linear slope of the CO_2, CH_4 and N_2O concentrations in the chamber headspace over time, with respect to the chamber volume, collar area and air temperature. A flux was accepted if the coefficient of determination (r^2) was at least 0.90. An exception was made in cases where the flux was close to zero for e.g. in early morning/late evening when there are light constraints on photosynthetic activity or in winter time when soil processes are typically slower and the r^2 is always low (Alm et al. 2007). In these cases, the flux data were examined graphically and fluxes with obvious nonlinearity were discarded. The remainder were evaluated using Akaike's Information Criterion for small sample sizes (AICc), and fluxes that exhibited low AICc values (representing lower variance and better model fitting) were accepted.

In this study, we follow the sign convention whereby positive values indicate a flux from the biosphere to the atmosphere (source) and negative values indicate a flux from the atmosphere to the biosphere (sink). Gross primary production (GPP) was calculated as NEE minus Reco (Alm et al. 2007) and the closest Reco flux value in time to a NEE flux value was used, with care taken to ensure that air (within the chamber) and soil temperatures were similar at the time of measurement.

4.2.5 Modelling

Statistical and physiological response models (Alm et al. 2007) were constructed and parameterized for each study site. Model evaluation was based on statistically significant model parameters ($P < 0.05$), the lowest possible standard error of the model parameters and the highest possible adjusted r^2 value (Laine et al. 2009b). The relationship between Reco, GPP or CH_4 and a range of independent environmental variables (recorded in conjunction with flux measurements) was tested during model construction. Only variables that increased the explanatory power of the model were included. The models were accepted if the residuals were evenly scattered around zero. GPP was related to PPFD using the Michaelis-Menten-type relationship that describes the saturating response of photosynthesis to PPFD (Tuittila et al. 1999), and to GAI and/or water table. The GPP model coefficients and associated standard errors were estimated using the Levenberg- Marquardt multiple nonlinear regression technique (IBM SPSS Statistics for Windows, version 21.0, Armonk, NY, USA). The Reco models are based upon the Arrhenius equation (Lloyd and Taylor 1994) and are nonlinear models related to soil temperature and water table. The CH_4 models are nonlinear models related to soil temperature, water table and GAI.

4.2.1 Annual GHG balances

GHG fluxes were reconstructed for each sample plot in combination with an hourly time series of (1) T_{5cm}, (2) WT levels linearly interpolated from weekly measurements, (3) PPFD values recorded by the weather station and (4) plot-specific modelled GAI that described the phenological development of the vegetation. Annual NEE was calculated as the sum of annual GPP (negative values) and annual Reco (positive values). Annual balances (g C m^{-2} yr^{-1}) were calculated for each sample plot by integrating the hourly values over each 12-month period. Annual CO_2 balances from the drained and rewetted sites were previously reported in Wilson *et al*. (2015) and Renou-Wilson *et al*. (2019), and here we provide three additional years of GHG data from both sites.

4.2.7 Statistical analysis

Statistical analyses were performed using SPSS version 21.0 for Windows (IBM SPSS Statistics for Windows, Armonk, NY, USA). P values smaller than 0.05 were considered statistically significant. All data were tested for normality using the Kolmogorov– Smirnov test. Where the data were not normally distributed, the repeated-measures Friedman and the Wilcoxon signed-rank nonparametric tests were used. Uncertainty in reconstructed annual Reco and NEE was calculated by summing up the maximum and minimum standard errors associated with each of the model parameters (e.g. Drösler 2005, Elsgaard et al. 2012, Renou-Wilson et al. 2014). Uncertainty in the annual Reco or NEE estimate was calculated following the law of error propagation as the square root of the sum of the squared standard errors of GPP and Reco.

4.2.8 Results

Environmental variables

Soil temperature showed strong seasonal variability in both the drained and rewetted areas (Figure 4.4). The lowest and highest values were always observed in the drained area in winter and summer, respectively, and daily variability was always more pronounced in the drained area. However, mean annual temperature was consistently greater in the rewetted area (Figure 4.4).

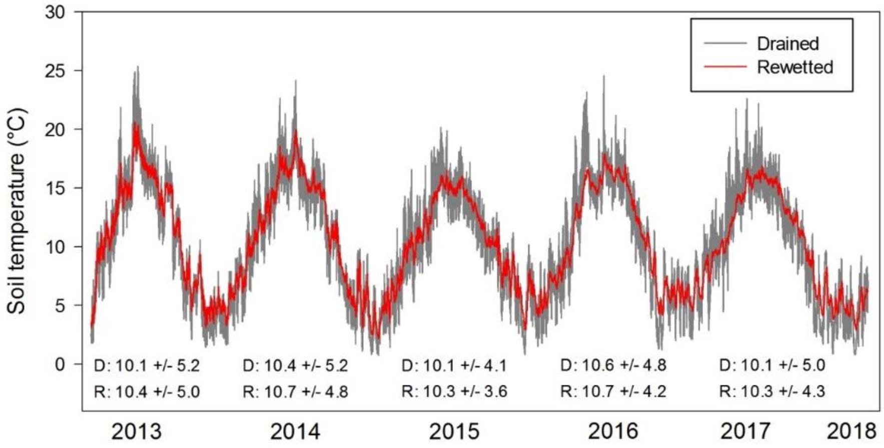

Figure 4.4. Hourly soil temperature (°C) at 5-cm depth in the drained (D: grey) and rewetted (R: red) areas at Moyarwood, Co. Galway. Mean annual soil temperature ± standard deviation shown beneath.

In the drained area, the observed water table level remained 38 to 67 cm below the peat surface for the duration of the study (Figure 4.5). Moreover, seasonal variability was not evident. In contrast, the water table level in the rewetted area remained above the peat surface for the majority of the study period, with the exception of short periods in the summer of 2013, 2014 and 2017.

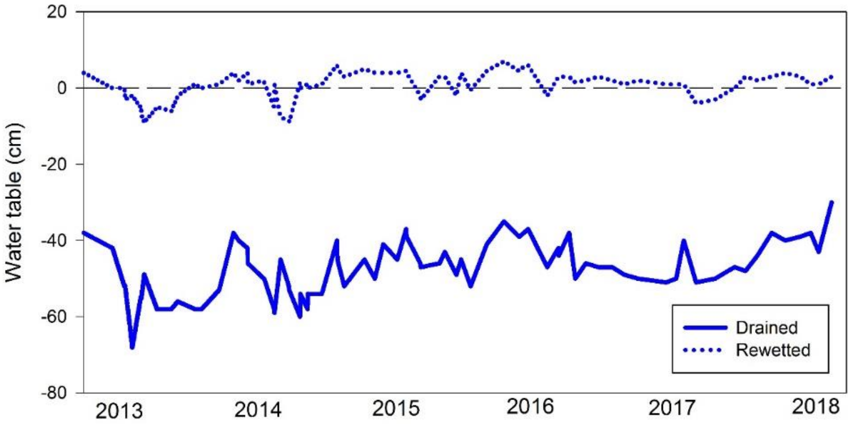

Figure 4.5. Water table level (cm) in the drained (solid blue line) and rewetted (dotted blue line) areas of the study site at Moyarwood, Co. Galway. Water table was manually measured during field visits and water table values were linearly interpolated between site visits.

Net Ecosystem exchange (NEE)

The drained site was a net CO_2 source in all five years (Figure 4.6a, Table 4.2a). Emissions were lowest in year 3 (~ 112 g CO_2-C m^{-2} yr^{-1}), and greatest in year 2 (~164 g CO_2-C m^{-2} yr^{-1}). In years 1, 3 and 4, the drained site functioned as a net CO_2 sink until early summer, but then switched to acting as a CO_2 net source as soil temperatures increased. In years 2 and 5, the drained site was a net CO_2 source for the whole year. In contrast, the rewetted site was a net CO_2 sink in all five years (Figure 4.6b, Table 4.2b). Uptake was lowest in Year 1 (-19.5 g CO_2-C m^{-2} yr^{-1}), with small net losses of CO_2 evident from July to December of that year. Throughout years 2–5, the rewetted site was a constant sink for CO_2, with net annual uptake ranging from around -77 to -148 g CO_2-C m^{-2} (Figure 4.6b, Table 4.2b).

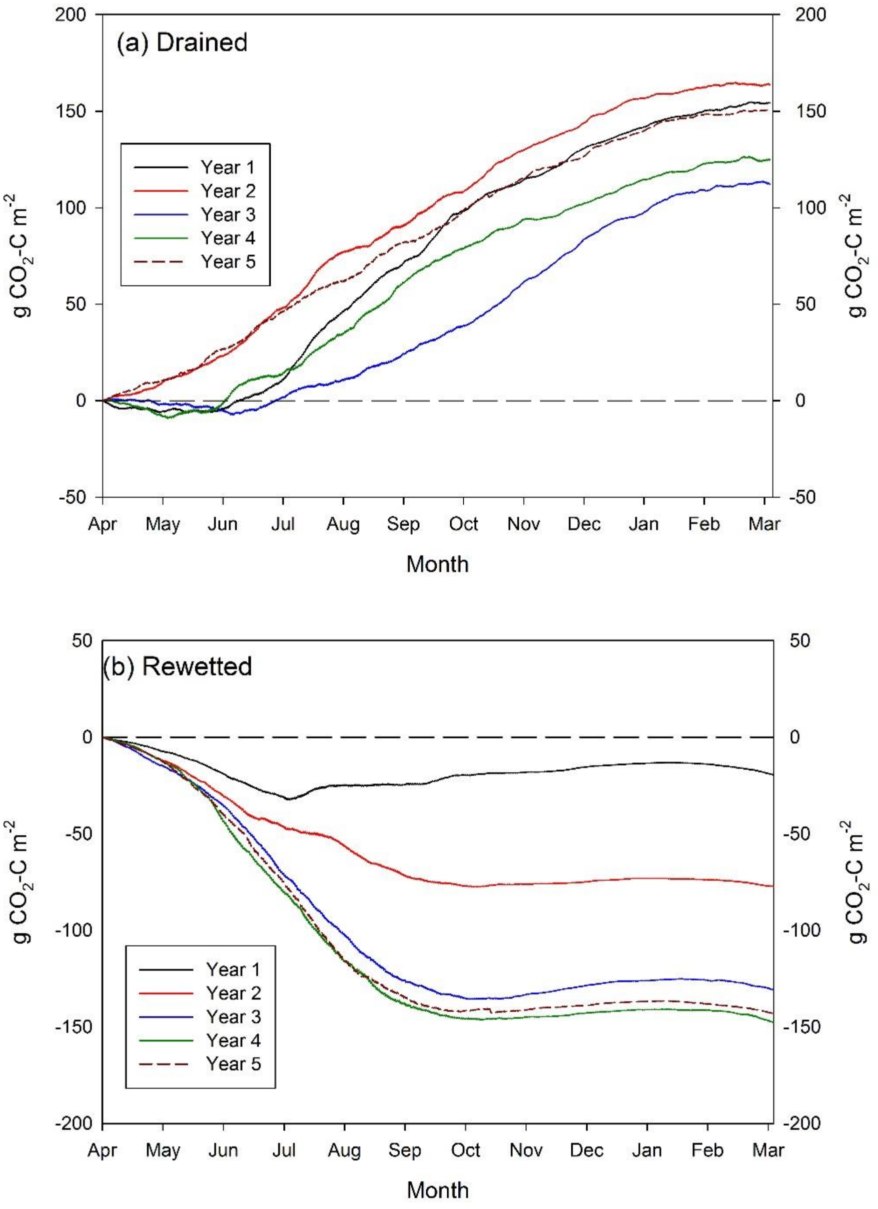

Figure 4.6. Cumulative net ecosystem exchange (NEE: g CO_2-C m^{-2}) in the (a) drained, and (b) rewetted areas in Moyarwood from 2013–2018 (Years 1–5). Positive values indicate a net loss of CO_2 to the atmosphere, and negative values indicate net uptake of CO_2 by the peatland.

Methane and nitrous oxide fluxes

Fluxes at the drained site were very low and ranged from a small uptake to small emissions (Figure 4.7a). However, a statistically significant relationship between fluxes and environmental variables was not established during the modelling process. Instead, annual emissions were estimated by linearly interpolating fluxes between measurement dates to provide values of 0.1 to 0.8 g CH_4-C m^{-2} yr^{-1} (Table 4.2a). Methane emissions at the rewetted site exhibited strong seasonal variations, driven mainly by soil temperatures. Typically, the lowest emissions were observed during the winter months (December to February), and the greatest emission were seen in summer (June to August). Annual

CH4 emissions were very similar between years, ranging from 18.6 g CH_4-C m^{-2} yr^{-1} to 20.6 18.6 g CH_4-C m^{-2} yr^{-1}. Nitrous oxide (N_2O) fluxes were not detectable at either the drained or rewetted sites during the study.

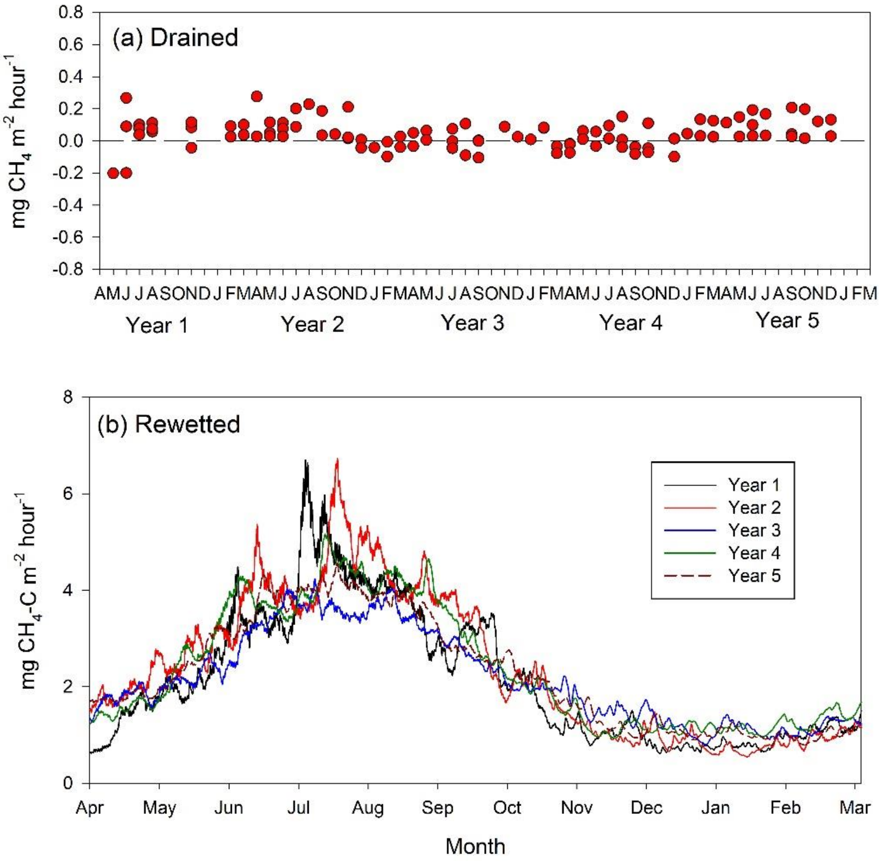

Figure 4.7. (a) Measured methane fluxes (mg CH_4-C m^{-2} $hour^{-1}$) in the drained area, and (b) modelled CH_4 fluxes (mg CH_4-C m^{-2} $hour^{-1}$) in Moyarwood from 2013–2018 (Years 1–5). Positive values indicate a net loss of CH_4 to the atmosphere, and negative values indicate net uptake of CH_4 by the peatland.

Net ecosystem carbon budget (NECB)

In order to provide a net ecosystem carbon budget (NECB) for both sites, data from Regan et al. (2020) was used to provide values for the expected losses of dissolved organic carbon (DOC) from both sites. Considerable inter-annual variation in NECB was observed for both sites. The drained site had a positive NECB (C source) throughout the study period, with a 5-year average of 157 g C m^{-2} yr^{-1} (equates to 1.57 tonnes C ha^{-1} yr^{-1}). NECB in the drained site was dominated by the CO_2 component, which accounted for around 90 % of the total (Table 4.2a).

NECB in the rewetted site ranged from 5.7 g C m^{-2} yr^{-1} in year 1 (C source) to -121.9 g C m^{-2} yr^{-1} in year 4 (C sink). CO_2 was again the dominant component of NECB, but the contribution of CH_4 was much more pronounced than in the drained site (Table 4.2b).

Table 4.2. Net ecosystem carbon balance (NECB: g C m^{-2} yr^{-1} ± standard deviation) for the (a) drained, and (b) rewetted areas in Moyarwood from April 2013–March 2018 (Years 1–5). Positive values indicate a net loss of carbon to the atmosphere, and negative values indicate net uptake of carbon by the peatland. DOC values taken from Regan et al. (2020).

(a) **Drained**				
GHG	**CO_2 g C m^{-2} yr^{-1}**	**CH_4 g C m^{-2} yr^{-1}**	**DOC g C m^{-2} yr^{-1}**	**NECB g C m^{-2} yr^{-1}**
Year 1	154.2	0.6	15.4	170.2
Year 2	163.8	0.8	15.4	180.0
Year 3	111.9	0.1	15.4	127.4
Year 4	124.9	0.1	15.4	140.4
Year 5	150.8	0.7	15.4	166.9
5-year average	**141.1**	**0.5**	**15.4**	**157.0**

(b) **Rewetted**				
GHG	**CO_2 g C m^{-2} yr^{-1}**	**CH_4 g C m^{-2} yr^{-1}**	**DOC g C m^{-2} yr^{-1}**	**NECB g C m^{-2} yr^{-1}**
Year 1	-19.5	18.76	6.4	5.7
Year 2	-77.3	20.58	6.4	-50.3
Year 3	-131.1	19.01	6.4	-105.7
Year 4	-147.8	19.53	6.4	-121.9
Year 5	-143.0	18.62	6.4	-118.0
5-year average	**-103.7**	**19.3**	**6.4**	**-78.0**

4.3 Clara

4.3.1 Study Site

Clara Bog is a Special Area of Conservation (SAC) located in County Offaly in the Irish midlands (Lat: 53.3205; Long: -7.62774, elevation 57 m asl), with a 30-year mean (1971–2000) annual temperature of 9.6 °C and mean annual precipitation of 820.4 mm (data from the Birr Met Éireann station). The site has over 400 ha of uncut peatland (Regan et al. 2020) and is demarcated as Clara East and West, split by a road that runs approximately north to south though the middle of the bog. This study focused on

Clara West (Figure 4.8), which has a greater area of active raised bog but has been historically impacted by a network of marginal drains associated with peat extraction located on the southern boundary of the site. These drains were largely blocked in 1996 and further restoration works implemented in 2016 have increased the area of active raised bog present (Regan et al. 2020). The vegetation on Clara bog has been classified through previous work using the ecotope descriptions as devised by Schouten (2002), which are illustrated in Figure 4.8.

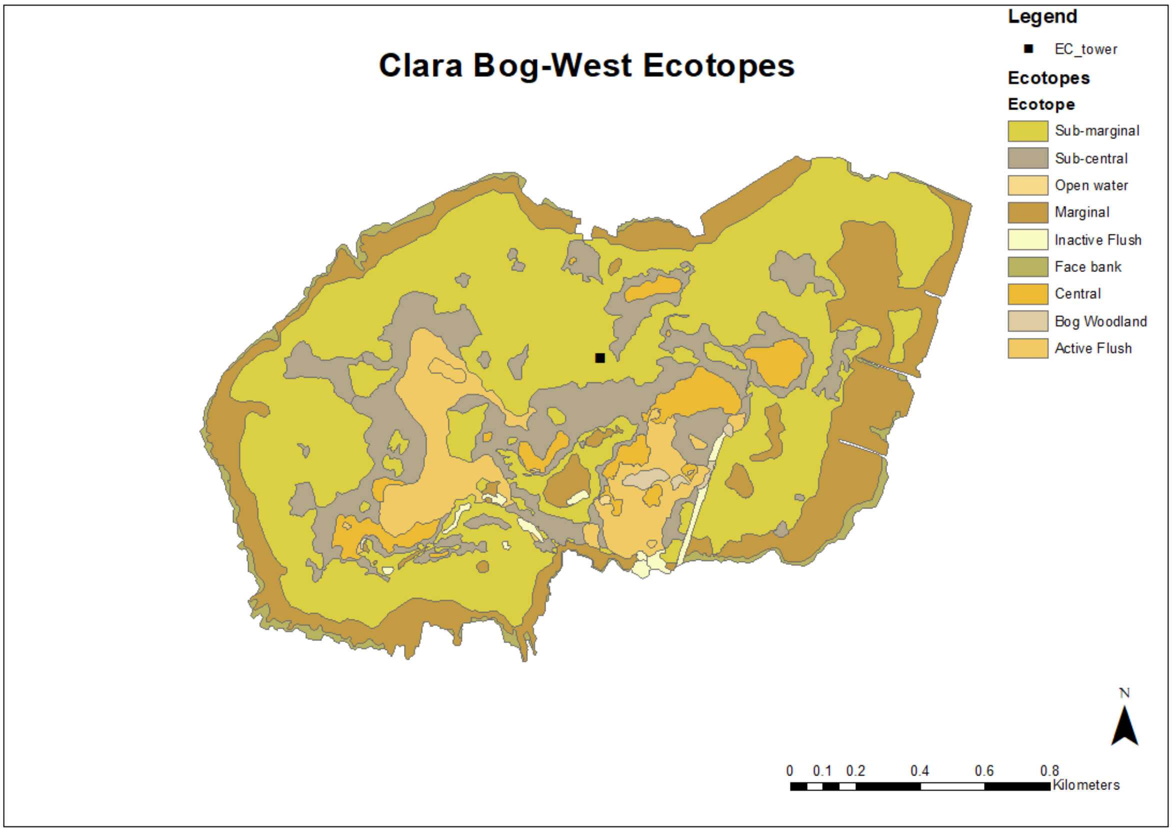

Figure 4.8. Map of Clara bog west indicating the distribution of key ecotopes across the site and the location of the eddy covariance flux tower.

4.3.2 Net Ecosystem Exchange

The net ecosystem exchange (NEE) of carbon dioxide (CO_2) was measured using eddy covariance (EC) techniques. This method is explained in detail in Moncrieff et al. (1997), however the system at Clara is equipped with an infra-red gas analyser (LI-7200 LICOR Biosciences, Lincoln, Nebraska, USA), a 3-D sonic anemometer (Gill Windmaster, Gill Instruments, Lymington. UK) and an associated meteorological station. The in-situ meteorological measurements were further complemented by data from the Met Éireann station at Horseleap, Co. Offaly, which is approximately 7 km north of the site. The EC tower was deployed in February 2018 and was operational during the exceptional climatic conditions observed across Europe in 2018 (Peters et al. 2020). At the Clara site, mean daily air temperatures followed a characteristic season pattern in both 2018 and 2019 where the peak average temperatures (~20 °C) were associated with summer periods and the middle of the growing season (Figure 4.9).

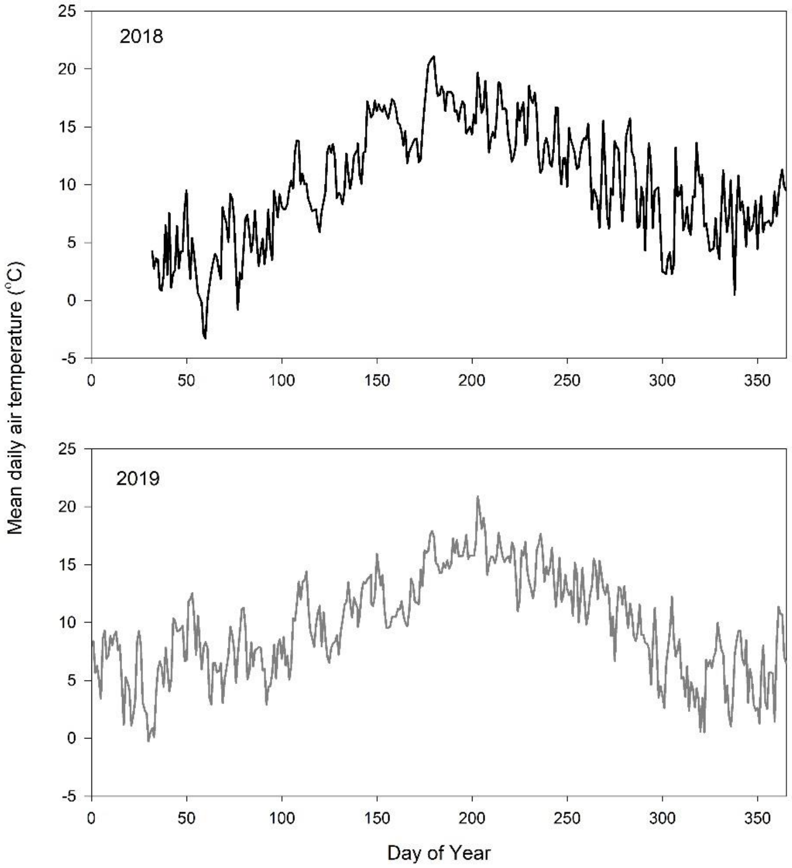

Figure 4.9. Mean daily air temperature (°C) at the Clara bog site in 2018 (upper panel) and 2019 (lower panel).

The total daily incident irradiance in the photosynthetically active radiation (PAR) wavelengths also followed a similar seasonal pattern (Figure 4.10), with peak rates (~35 mmol PAR m^{-2} d^{-1}) occurring during the growing season. Precipitation received at the site (Figure 4.11a-c) demonstrated variability between years, where 2018 (733.3 mm) was a drier year in comparison to 2019 (1034.5 mm) and also the 30-year mean for the region (820.4 mm). Monthly patterns of precipitation varied between years and in comparison to the 30-year mean, where precipitation received between February and October in 2018 was lower than in 2019 and the 30-year mean (Figure 4.11a), and the total amount of precipitation received during the growing season (Figure 4.11c) in 2018 (463.8 mm) was lower than both 2019 (858.0 mm) and the 30-year mean (599.6 mm) respectively. In this study, the start of the growing season was defined as the first day of the year where the mean diurnal temperature exceeded

5 °C for five consecutive days, the end of the growing season was determined in the opposite manner. The variability in the hydrological regime of the site was also observed through measurements of water table height (WTH) at the central ecotope, which varied throughout the year in both 2018 and 2019 (Figure 4.12). A greater reduction in the mean daily water table height at the central ecotope was observed in the 2018 data in comparison to 2019, with maximum reductions in WTH of ~-15 cm in 2018 compared to ~-10 cm in 2019. In addition, an extended period where the water table was below the surface of the site was observed in 2018. Dry periods in peatland systems have been arbitrarily defined as periods of one week or longer where the water table depth is at or lower than 5 cm below the surface of the peat (Helfter et al. 2015). In this study in 2018, an extended dry period was observed with over 150 consecutive days where the water table was below 5 cm (Figure 4.12).

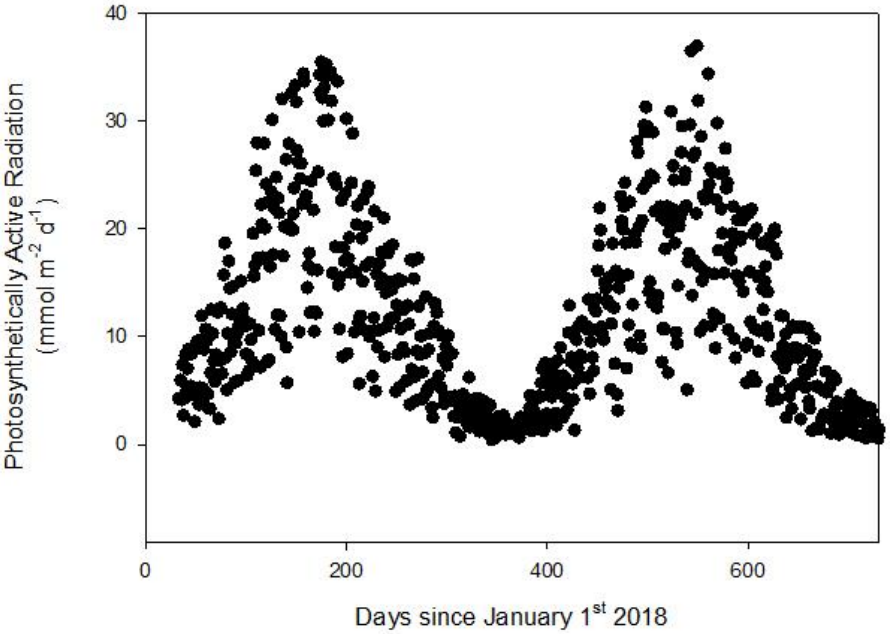

Figure 4.10. Daily incident photosynthetically active radiation at the Clara bog site in 2018 and 2019.

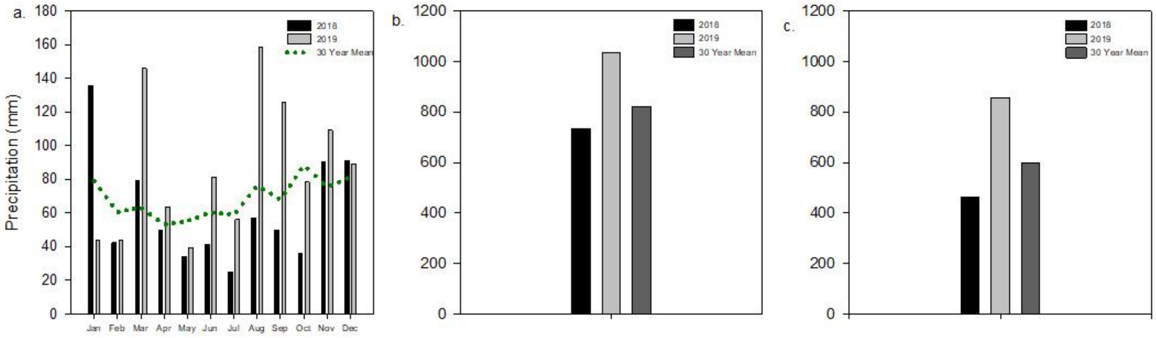

Figure 4.11. Monthly (a), annual (b), and growing season (c) precipitation (mm) at the Clara bog site (data for 2018 and 2019 were derived from the Met Éireann station at Horseleap, Co. Offaly. 30-year mean data derived from the Met Eireann station at Birr, Co. Offaly.

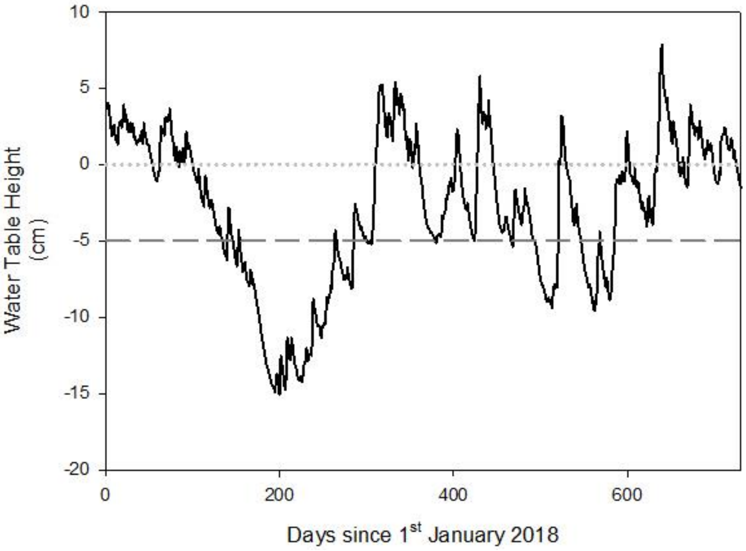

Figure 4.12. Mean daily water table height (cm) for the central ecotope in Clara bog for 2018 and 2019. The horizontal dotted grey line indicates the peat surface, while the horizontal dashed grey line indicates the point at which the mean daily water table drops below 5 cm of the peat surface.

The patterns of carbon uptake through photosynthesis (Gross Primary Productivity (GPP)) and release through ecosystem respiration (R_{eco}), responded to changes in water table height in both years, but the relationship was stronger in 2018 than 2019 (Figure 4.13). The data suggest a stronger coupling of both components of NEE to WTH during the drier year 2018.

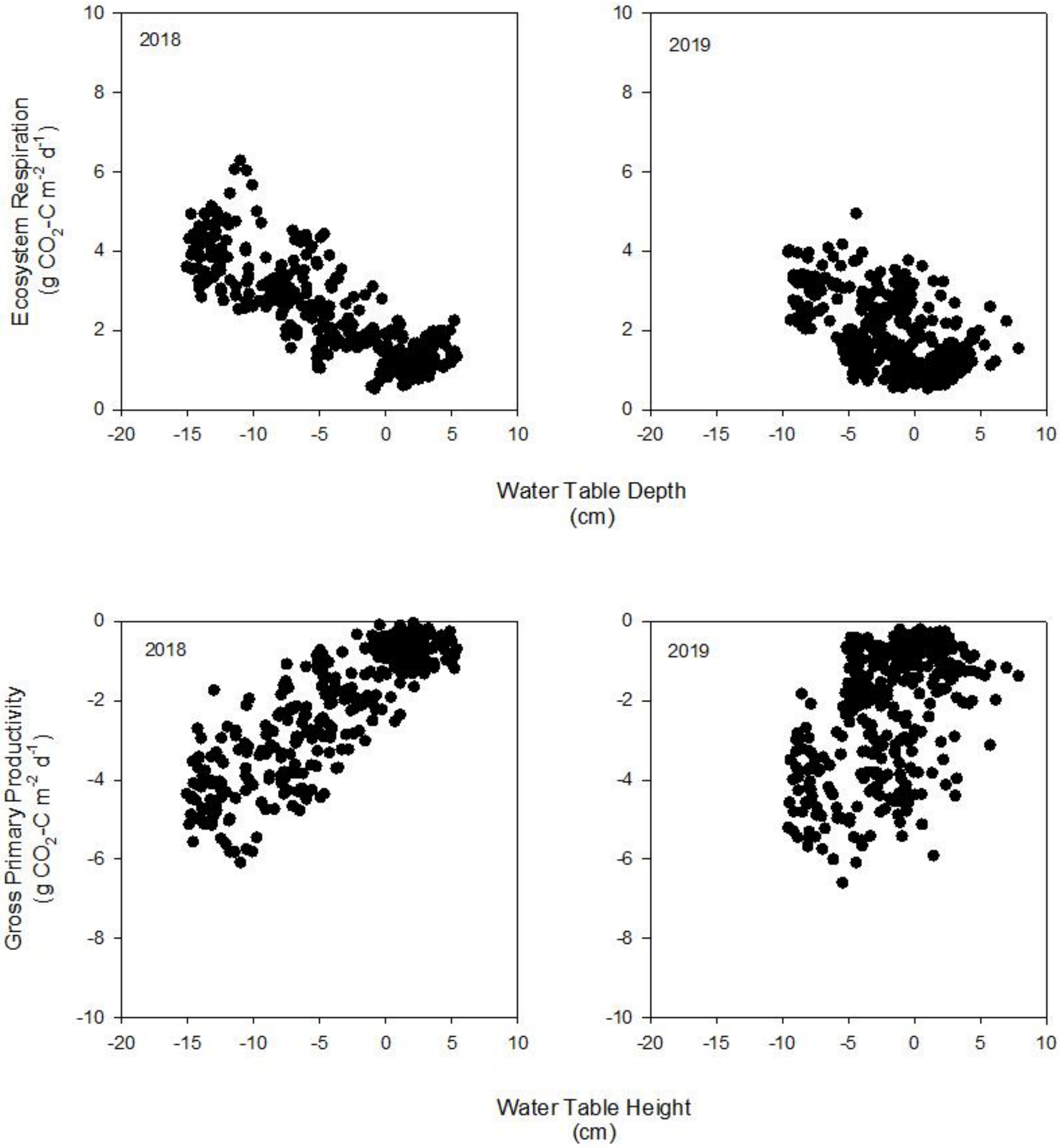

Figure 4.13. The relationship between mean daily water table height (WTH) at the central ecotope and the components of net ecosystem carbon exchange in both 2018 and 2019. The upper panels show the relationship between WTH and R_{eco} in both years, while the lower panels show the relationship between WTH and GPP in both years.

Figure 4.14 shows the monthly sums of GPP (a) and R_{eco} (b), which illustrates that GPP demonstrated less variability between years in comparison to R_{eco}, which were consistently higher in 2018 from May to August when compared to data from 2019. The comparison of the ratio of GPP/R_{eco} (Figure 4.15) demonstrated this further and indicates that R_{eco} dominated the flux dynamics for most of the year in 2018, while GPP tended to dominate carbon gas dynamics during the growing season of 2019.

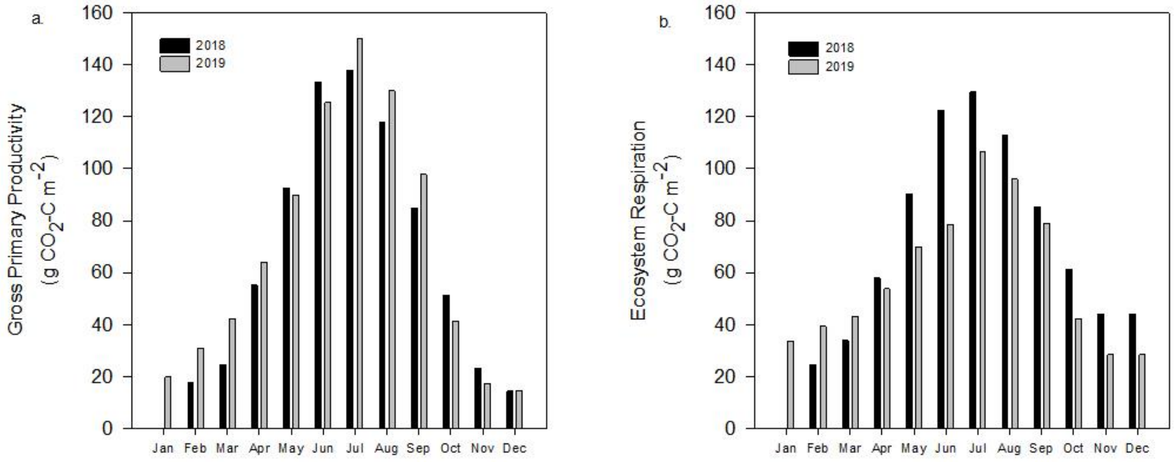

Figure 4.14. Monthly Gross Primary Productivity (a) and Ecosystem respiration (b) for 2018 and 2019.

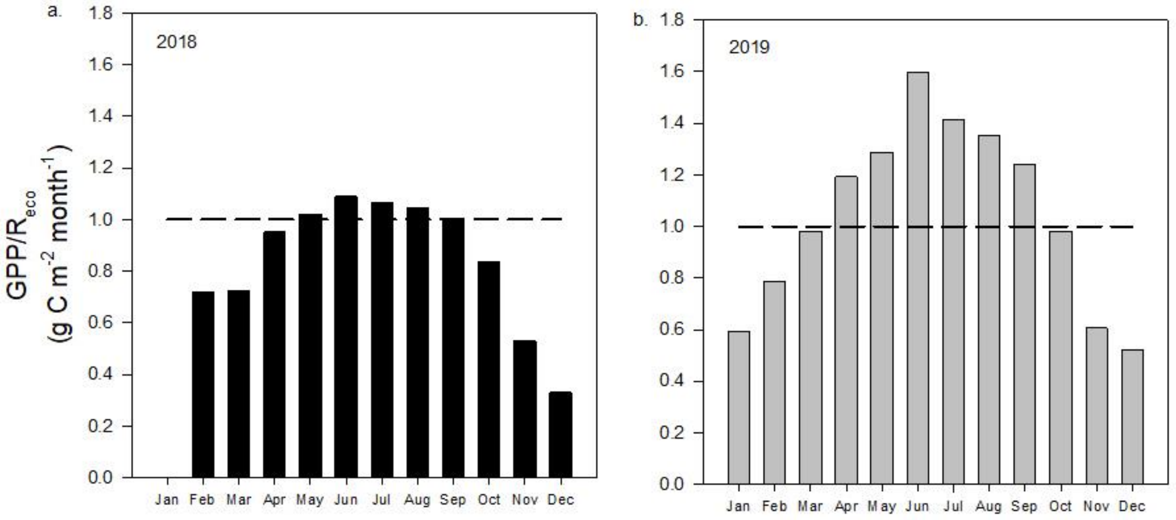

Figure 4.15. The ratio of Gross Primary Productivity (GPP) to Ecosystem respiration (Reco) at Clara bog for 2018 (a) and 2019 (b). The horizontal dashed black line denotes a ratio of 1:1.

The net sum of the carbon budget components is shown in Table 4.3, which show that the area studied acted as a net source of 53.5 g CO_2-C m^{-2} yr^{-1} in 2018 but was a net sink of -125.2 g CO_2-C m^{-2} yr^{-1} in 2019. The difference between years were driven by lower rates of carbon assimilation (-71 g CO_2-C m^{-2} yr^{-1}) and higher rates of carbon release (107.5 g CO_2-C m^{-2} yr^{-1}) in 2018 when compared to 2019. Also of note are the differences in the growing season length between years (231 days in 2018 compared to 272 days in 2019), and the differences in growing season NEE (NEE_{GS} -0.03 g CO_2-C m^{-2} d^{-1} in 2018 compared to -0.58 g CO_2-C m^{-2} d^{-1} in 2019). The NEE_{GS} data provides a further example of the dominance of respiratory losses during the growing season in 2018, which acted as the key driver of the net ecosystem carbon dynamics in this particular year.

Table 4.3. Annual values of Gross Primary Productivity (GPP), Ecosystem Respiration (Reco) and Net Ecosystem Exchange (NEE) for the Clara study site in 2018 and 2019. Also shown are the length of the growing season and the net ecosystem carbon dynamics during the growing season (NEE_{GS}) and the dormant season (NEE_{DS}) in each year.

Year	GPP	R_{eco}	NEE	Growing season	NEE_{GS}/LGS	NEE_{DS}/LGS
	g CO_2-C m^{-2} yr^{-1}			Days	g CO_2-C m^{-2} d^{-1}	
2018	-753.1	806.6	53.5	231	-0.03	0.45
2019	-824.3	699.1	-125.2	272	-0.58	0.37
2-year average	-788.7	752.85	-35.9	252	-0.31	0.41

4.4 Discussion

The results from this study provide valuable information for the management of Irish peatlands, particularly regarding their potential to mitigate the effects of climate change. Under a "business-as-usual" approach, where a peatland has been drained, we can expect that CO_2 emissions will persist for a very long time (Waddington et al. 2002) in the absence of mitigation measures. The drained site at Moyarwood released an average 1.41 tonnes CO_2-C ha^{-1} yr^{-1} (or 5.2 tonnes CO_2 ha^{-1} yr^{-1}) to the atmosphere. While this value is lower than the IPCC Tier 1 emission factor for peatland sites drained for extraction (2.8 tonnes CO_2-C ha^{-1} yr^{-1}) (Drösler et al. 2014), it remains problematic (from a GHG reporting point of view) when, or indeed if, this land use category is scaled up to the national level. Wilson et al. (2013b) estimated that domestic peat extraction in Ireland results in emissions of 673,315 tonnes C per year. Our results here, which are in agreement with the meta-analyses performed by Wilson et al. (2015) for peat extraction sites in Ireland and Britain, would indicate that national emissions could be closer to 860,000 tonnes C per year, based on the areas provided by Malone and O'Connell (2009). Interestingly, domestic (residential) peat extraction is estimated to account for only 400 ha in the most recent National Inventory Report (Duffy et al. 2020), which would suggest that national GHG emissions from this land use category are strongly underestimated. Moreover, CH_4

emissions from drained vegetated peatland sites do occur (Figure 4.7a and Table 4.2a), which is highly relevant given the global warming potential and radiative forcing effect of this gas (Günther et al. 2020). Our annual values of 0.5 g CH_4-C m^{-2} yr-1 (equivalent to 5 kg CH_4-C ha^{-1} yr^{-1}) are close to the Tier 1 emission factor derived for drained nutrient poor peatlands (6.1 kg CH_4-C ha^{-1} yr^{-1}) in the temperate zone (Drösler et al. 2014), and for German peat extraction sites (4.2 kg CH_4-C ha^{-1} yr^{-1}) (Tiemeyer et al. 2020).

This study confirms the potential of some rewetted peatland sites to act as net C sinks, and over a very short time frame following drain blocking. Water levels at the rewetted site in Moyarwood were consistently 40–50 cm higher than the drained area throughout the 5-year study period (Figure 4.5), and contributed substantially to the observed changes in C dynamics, vegetation composition, and soil temperatures at the site. For the latter, higher water table levels led to reduced fluctuations in the daily soil temperatures (Figure 4.4), thereby acting as a “buffer” to external changes. Moreover, water levels at the rewetted area in Moyarwood were comparable to the active raised bog area in Clara (Figure 4.12), which would suggest that the drain blocking at the rewetted site has been very successful in rising and maintaining the water level. Unfortunately, the Moyarwood study finished at the end of March 2018, and so we were not able to quantify GHG fluxes during the drought period in spring/summer of that year.

Annual NEE at Clara exhibited very strong interannual variation (Table 4.3), with a small loss observed in 2018 followed by strong uptake in 2019. This variation was driven primarily by the drier conditions in 2018, the much wetter conditions in 2019 (Figure 4.11), and potentially by the much longer growing season in the second year of the study (Table 4.3). Dry periods and limited water availability in peatlands have been observed to have a greater impact on carbon losses through respiration than the carbon uptake/assimilation capacity of these ecosystems (Helfter et al. 2015). In this study, similar trends were observed where the extended dry period in 2018 resulted in ecosystem respiration dominating the C flux dynamics over the growing season at Clara bog (Figure 4.15, Table 4.3).

Long-term GHG monitoring of peatland sites can provide robust baseline datasets, which can allow for the effects of external and internal stressors to be appropriately evaluated (Wilson et al. 2016b), and interannual variation to be suitably appraised. While there are approximately 10 long-term GHG datasets from natural peatlands in the northern hemisphere (see Figure 7 in Wilson et al. 2016b), datasets of more than 3 years for rewetted peatland sites remain scarce. In a 5-year study at a rewetted industrial cutaway at Bellacorick, Co. Mayo, Wilson et al. (2016b) reported that the site was a CO_2 sink of 104 g CO_2-C m^{-2} yr^{-1} and a CH_4 source of 9 g CH_4-C m^{-2} yr^{-1}. In Canada, Nugent et al. reported that a restored peatland was a net CO_2 sink of 90 g CO_2-C m^{-2} yr^{-1}, a CH_4 source of 4.4 ± 0.2

CH_4-C m^{-2} yr^{-1}, and a DOC source of 6.9 g C m^{-2} $year^{-1}$), resulting in a NECB of 78 g C m^{-2} $year^{-1}$. These values are close to those reported here for Moyarwood (Table 4.2b).

Following rewetting, CH_4 emissions have been widely reported to increase substantially (Wilson et al. 2009, Vanselow-Algan et al. 2015b, Wilson et al. 2016b), as strongly anaerobic conditions are recreated in the formerly drained soils. Annual CH_4 emissions from our two sites varied considerably. Our study at Moyarwood commenced in tandem with the blocking of the drains (in early 2013). Given that a vegetation layer was present at the surface, it is probable that the rise in water level resulted in inundation of some of the vegetation communities, thereby providing a labile carbon source for methanogenic bacteria (Urbanová and Bárta 2020). The high annual CH_4 emissions observed at Moyarwood (equivalent to 193 kg CH_4-C ha^{-1} yr^{-1}) are over twice the magnitude of CH_4 emission factors derived for nutrient poor peatlands in the temperate zone (92 kg CH_4-C ha^{-1} yr^{-1}) (Blain et al. 2014), and for CH_4 emissions at Clara reported by previous studies (Renou-Wilson et al. 2011, Regan et al. 2020). Nevertheless, the newly rewetted site at Moyarwood functioned as a net carbon sink for four of the five years of the study (Table 4.2b).

4.5 Conclusions/Highlights

- Drained peatlands are a substantial CO_2 source and a small CH_4 source.
- Rewetting at Moyarwood resulted in a sustained and elevated water level.
- Rewetting can rapidly transform carbon dynamics and switch a degraded peatland site to a net carbon sink.
- Under “normal” climatic years, annual NEE values at the rewetted Moyarwood site and the near-natural Clara site were similar.
- Methane emissions can increase substantially after rewetting and may remain elevated for at least 5 years.

4.6 Review of GHG monitoring capacity on peatlands in Ireland

4.6.1 Introduction

As a peat-rich country, Ireland should aim to present a comprehensive assessment of GHG emissions/removals from the entire peatland area. Whereas the capacity for monitoring GHG emissions/removals and carbon stocks from peat soils is rapidly increasing in some countries (e.g. UK and Germany), the overall estimates in Ireland still lack accuracy and representability. To address this challenge, Ireland needs to increase the spatial scale and temporal duration of measurement and monitoring systems to develop a long-term observational and experimental network. Such a network would make an important contribution to the objectives of the Integrated Carbon Observation System (ICOS) for example. We provide here a review of the national need for monitoring capacity on representative peatland sites by appraising all past and current peatland studies and identifying the challenges to develop accurate observation systems to monitor GHG emissions/removals from both natural (i.e. non-managed non-degraded) and managed peatlands.

The Fifth Assessment Report (AR5)[6] on climate change by the Intergovernmental Panel on Climate Change (IPCC) provided strong evidence that global temperatures have increased significantly over the last 200 years or so, and that it is *highly likely* that the cause of this increase was anthropogenic in origin (IPCC 2013). Model predictions indicate that global temperatures will continue to rise in the decades and centuries ahead with concomitant effects on food security, human migration patterns, and ecosystem functioning. For the latter, the case of peatlands is particularly salient as these ecosystems, when in natural condition are generally net sinks for atmospheric CO_2 uptake and are sources of CH_4 emissions (Roulet et al. 2007, Christensen et al. 2012) and this interplay in gas exchange over millennia has played a major role in the regulation and maintenance of the global climate, having a cooling effect on the atmosphere's temperature (Frolking et al. 2006). Moreover, as the complete decomposition of dead plant material in natural (i.e. not degraded) peatlands is prevented as a result of permanently waterlogged conditions there is an accumulation of carbon rich peat (Page and Baird 2016a). As such, global peatlands store an estimated 600 Gt C (Page et al. 2011, Yu 2012), more than is currently held in the biomass of all the forests of the world (Köhl et al. 2015).

In recent decades, numerous studies have investigated the impacts of increased temperatures, and water level drawdown, on biosphere-atmosphere carbon and GHG exchange in peatlands (e.g. Laine et al. 1996, Alm et al. 1999, Freeman et al. 2002, Laine et al. 2009a, Turetsky et al. 2015, Bragazza et al. 2016). In general, higher soil temperatures stimulate the production of both CO_2 and CH_4 (Silvola et al. 1996, Augustin et al. 1998), with the former increased and the latter decreased if the water level drops within the peat (Kettunen et al. 1999, Riutta et al. 2007). In addition, DOC losses from a peatland are intensified in conjunction with elevated soil temperatures (Clark et al. 2009) and through drainage (Evans et al. 2016). Moreover, higher temperatures may lead to increased wildfire frequencies and the subsequent loss of carbon stored in the vegetation and in the peat to the atmosphere (Turetsky et al. 2015).

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[6] AR6 is currently underway.

Multi-year peatland carbon monitoring studies have captured the inherent variation in inter-annual carbon exchange, where a site can switch from functioning as a strong net carbon sink in a year when the water level remains close to the surface (at least during the growing season) to either a reduced sink or a net carbon source during a year (or growing season) when there is reduced precipitation inputs (e.g. Roulet et al. 2007, Lund et al. 2012, McVeigh et al. 2014, Levy and Gray 2015, Lund et al. 2015, Strachan et al. 2016). However, under current climate conditions, natural peatlands have tended to remain resilient and relatively insensitive to interannual changes in weather conditions. Furthermore, inter-annual variation in CO_2 exchange (Net Ecosystem Exchange or NEE) in particular, is remarkably similar across natural sites regardless of climate region (Wilson et al. 2016b). However, other experimental studies have shown that under more ‘extreme’ conditions of climate warming, even natural sites may become net carbon sources (Welker et al. 2004, Chivers et al. 2009, Laine et al. 2009a, Wu and Roulet 2014).

At the global scale, peatlands and organic soils are also under threat from a range of land use related factors that have a significant impact on carbon sequestration and storage. Estimates suggest that approximately 15 % of global peatlands have been drained to some extent (Barthelmes 2016) and may account for an increase of 0.9–3 Gt of CO_2 to the atmosphere annually (Joosten et al. 2012, Smith et al. 2014). Peatland drainage is fundamental to such land use change to facilitate either the growing of crops, such as trees, grass or vegetables, or the extraction of peat for energy or horticultural purposes. As outlined above, water level drawdown results in significant emissions of CO_2 from the drained areas (e.g. Renou-Wilson et al. 2014, Wilson et al. 2015, Tiemeyer et al. 2016b) and CH_4 emissions from vegetated ditches (e.g. Minkkinen and Laine 2006, Schrier-Uijl et al. 2011, Peacock et al. 2017). Research has also shown that (N_2O losses from these ecosystems may also be problematic, especially when fertilisers have been applied (Renou-Wilson et al. 2014, Tiemeyer et al. 2016b) or under afforestation which has shown contrasting impacts on trace gas emissions (Benanti et al. 2014).

An additional level of complexity is produced when some of these degraded peatland ecosystems are rewetted, rehabilitated or restored with the aim of re-creating the historic land use that existed before drainage (i.e. natural sites) or the creation of new peatland ecosystems (e.g. natural woodlands). Given the considerable variation in post-drainage site conditions that exist (i.e. peat depth, peat type, nutrient status, presence/type of vegetation, time since rewetting, former land use), it is not surprising that researchers have reported a very wide range in annual greenhouse gas (GHG) values across all climate regions (Blain et al. 2014 , Wilson et al. 2016a). In general, rewetting results in a decrease in CO_2 emissions and in many cases a return of the CO_2 sequestration function characteristic of natural sites (Strack and Zuback 2013, Renou-Wilson et al. 2016, Wilson et al. 2016b) but not always (Wilson et al. 2007b, Renou-Wilson et al. 2018b). However, rewetting can also result in a significant increase in CH_4 emissions that, in some instances, are much higher than the natural site baseline values (Vanselow-Algan et al. 2015b, Wilson et al. 2016b, Renou-Wilson et al. 2018b) and can last for many years. Moreover, these sites may be more vulnerable to changes in inter-annual weather patterns (Wilson et al. 2016b) and potentially less resilient to future climate changes.

Rewetting of drained peatlands is considered an effective climate change mitigation strategy to (a) reduce CO_2 emissions and create significant emissions savings, and (b) potentially re-introduce the carbon sink function that is characteristic of natural (non-degraded) sites (Wilson et al. 2016a). The introduction of the Wetlands Drainage and Rewetting (WDR) activity under Article 3.4 in the second commitment period of the Kyoto Protocol provided countries with the opportunity to report GHG emissions or removals from drained and rewetted organic soils, respectively, although Ireland did not elect to report this activity. The second Kyoto Protocol period (2013–2020) has concluded, and the first period of the EU LULUCF regulations under the EU Climate and Energy Framework will run from 2021–2025 (the second period is 2026–2030). Ireland has chosen to elect managed wetlands for the first commitment period under these regulations prior to mandatory accounting for the second period. The LULUCF Regulations base year is the average value from 2005–2009. Critically, the Peatlands Climate Action Scheme, launched in November 2020, initially targets 33,000 hectares for rewetting in over 80 Bord na Móna bogs, which could be included in revised inventory estimates.

In recent years, robust methodologies to assess and validate GHG emissions or removals from rewetted sites have been established for GHG inventory reporting purposes or for voluntary offset projects (Couwenberg et al. 2011, IPCC 2014a, Emmer and Couwenberg 2017). Under the *2013 Wetlands Supplement*, Tier 1 (default) GHG emission factors are available for the full range of peatland land use categories (LUC) in Ireland (IPCC 2014a), but are subject to considerable uncertainty. As such, countries are directed to develop emission factors (Tiers 2 and 3) that more accurately reflect the influence of climate, peat types, and land management practices on GHG emissions or removals. In Ireland, this has been achieved for some peatland LUC but significant gaps in our knowledge still remain.

4.6.2 GHG data collection

In the scientific literature, GHG data collection in peatlands is commonly undertaken through the use of static chambers and/or eddy covariance instrumentation, although a smaller number of studies (mainly forestry related) have used destructive biomass sampling to provide an estimate of the annual carbon increment (or loss) to/from the ecosystem (e.g. Green et al. 2005, Byrne et al. 2007, Renou-Wilson et al. 2010).

Chambers

Static chambers have been widely used in peatland GHG studies over the last couple of decades (Figure 4.16). The chambers are “box-like” structures (transparent or opaque) that are connected to an infra-red gas analyser (CO_2) or that have a septa through which gas samples are extracted using syringes and stored in vials for subsequent analysis (CH_4 and N_2O). More recently, portable gas chromatograph units using static chambers have been utilised in field studies for the measurement of CH_4 (e.g. Green et al. 2014, Green and Baird 2017, Zhou et al. 2017).

Figure 4.16. Static chambers used for the measurement of carbon dioxide (upper) and methane/nitrous oxide (lower).

Chambers have the advantage of being portable, relatively inexpensive, do not require an external power supply and can be used to investigate the contribution of particular ecotopes or micro-topographical aspects. Data from static chambers can also provide information on the various components of GHG exchange; GPP, R_{eco}, NEE, CH_4 and N_2O. However, the disadvantages of this method are that it requires the construction of significant support infrastructure (insertion of stainless steel collars, wooden boardwalks and data loggers), it is very labour intensive, the chamber itself can influence the soil-atmosphere interface (and thereby influence assimilation/production/emission dynamics), and that it poorly captures temporal variation in GHG fluxes. For the latter, considerable gap filling of data is required (between measurement days) and is commonly achieved through statistical models that use the observed relationships between GHG fluxes and environmental variables, such as soil temperature, water level, and irradiation.

Eddy covariance

The eddy covariance (EC) technique measures biosphere-to-atmosphere fluxes, gas exchange budgets, and emissions from peatlands (Figure 4.17). It consists of a range of instrumentation (gas sensors, environmental variables) attached to a tower (i.e. a scaffold) that extends above the vegetation canopy. The tower is generally two metres high for treeless peatlands but can extend over 10 metres in mature forests. For CO_2 sampling, the sensor is either an open- or fixed path infra-red gas analyser, while a laser diode is typically employed for CH_4 sampling. The EC technique can enhance the temporal resolution of data acquisition (although some gap filling is required) and spatial integration as flux data are derived from the entire ecosystem of interest, however chamber measurements in combination with EC techniques are required in order to determine the contribution of particular ecotopes or micro-topographical features to the net ecosystem flux. This technique is also less intrusive on ecosystem functioning and once operational is less labour intensive. However, these systems are relatively expensive and require a power supply (often difficult in remote areas, although they can be run from solar/wind/fuel cells in low-stature canopies All of the long-term peatland CO_2 monitoring studies in the boreal and temperate climate zones (see Figure 7 in Wilson et al. 2016b for a summary of sites) have employed this technique and it is the cornerstone of the Integrated Carbon Observation system (ICOS).

Figure 4.17 Example of an eddy covariance tower at Clara bog, Co. Offaly, Ireland.

4.6.3 Integrated Carbon Observation system (ICOS)

The Integrated Carbon Observation System (ICOS) is a pan-European research infrastructure that provides “harmonised and high-precision scientific data on the carbon cycle and GHG budgets and perturbations” (https://www.icos-ri.eu). It is an organisation of 12 member countries with over 100 GHG measuring stations. ICOS measures GHG fluxes at the continental scale using a network of atmospheric, oceanic and terrestrial ecosystem stations. The ecosystem stations are coordinated by the Ecosystem Thematic Centre (ETC), which is responsible for the guiding station set-up and operation in addition to the processing of data (Figure 4.18). Ancillary information about the sites, e.g. metadata, vegetation and soil characteristics, disturbances and management are submitted by station principle investigators and are processed by the ETC to ensure high standardization between the different sites. Currently, proposed peatland sites in ICOS-ETC are located in Finland, Sweden and Scotland where peatlands covers 23 %, 15 % (Xu et al. 2018) and 22 % (Artz et al. 2013) of the land surface respectively.

Figure 4.18. Proposed network of ICOS ecosystem stations in Europe. Source: http://www.icos-etc.eu/icos

4.6.4 ICOS peatland sites

Finland

There are currently no Class 1 sites located on peatlands in Finland[7]. Two Class 2 sites are located on fens in Siikaneva (N 61° 50.8', E 24° 12.6') and Lompolojänkkä (N 67° 59.8', E 24° 12.5'). EC measurements have been carried out since 2005 in both sites, supplemented by chamber measurements. Detailed descriptions of both sites and GHG instrumentation can be found in the following publications (Rinne et al. 2007, Aurela et al. 2009, Lohila et al. 2010, Laine et al. 2012, Aurela et al. 2015). In addition, Class 3 sites (Associate site) are located at a fen in Kaamanen (N 69° 8.4', E 27° 16.2) and at a drained forest at Lettosuo (N 60° 38.5' E 23° 57.5'). Details of both sites can be found in (Aurela et al. 2002, Maanavilja et al. 2011, Koskinen et al. 2014).

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[7] http://eng.icos-infrastructure.fi/?q=node/4

Sweden

Two sites are (Oct 2017) undergoing the final labelling process as ICOS sites. Abisko-Stordalen (N 68° 21′, E 19° 03′) is a sub-arctic fen (http://www.icos-sweden.se/station_stordalen.html) with a large portion of the site consisting of a slightly elevated drained area, altered by wetter depressions, and Degerö Stormyr (N 64° 11′, E 19° 33′) is a boreal fen (http://www.icos-sweden.se/station_degero.html), where EC measurements have been ongoing since 2001, supplemented at various times by automatic chambers. Detailed descriptions of the sites and instrumentation can be found in (Christensen et al. 2012, Peichl et al. 2014, Nijp et al. 2015, Zhao et al. 2016).

Scotland

Auchencorth Moss (N 55° 47′, W 3° 14′) is a low-lying ombrotrophic peatland in SE Scotland. EC measurements commenced in 1995–1999, and continuous measurements started in 2002. In addition, chambers have been employed sporadically during that time, and fluvial C losses have also been regularly quantified at the site. Detailed description of the site and instrumentation can be found in (Dinsmore et al. 2009, Dinsmore et al. 2010, Drewer et al. 2010, Helfter et al. 2015).

4.6.5 Candidate site selection

In order to determine the most suitable site (s) for long-term GHG monitoring, it is first necessary to evaluate which LUC are most represented with the national resource (Table 4.4), and assess the advantages and disadvantages associated with their selection, in particular their suitability (or not) for climate change mitigation (Figure 4.19). Moreover, previous GHG monitoring history may be an important prerequisite in site selection.

Peatland cover

In the Republic of Ireland, peatlands cover an estimated 1.46 to 1.65 million hectares (Tanneberger et al. 2017, Xu et al. 2018), which equates to approximately 21–24% of the land area. With the exception of forestry, the areal estimates for peatland LUCs shown in Table 4.4 are less than precise and are likely to be affected by double accounting and possible mis-accounting. However, for the purposes of this exercise, they represent the best available areal estimates.

Natural peatlands

Natural peatlands refer to peatlands that are hydrologically and ecologically intact, i.e. the eco-hydrology has not been visibly affected by human activity in the recent past and, therefore, includes some ‘active’ or ‘peat-forming’ areas or is deemed capable of regenerating as such a habitat. In Ireland, loss of peatland habitat through conversion to grassland, forestry and from peat extraction (industrial and domestic peat extraction) is estimated at 85 % of the national resource (Malone and O'Connell 2009) and the most recent national monitoring survey showed that 84 % of raised bogs (a priority habitat listed in Annex I of the EU Habitats Directive (EU Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC), have been affected by peat extraction alone (NPWS 2017). Only 1,945 ha of raised bog are currently qualified as a peat-forming habitat (active) amongst the designated sites (Valverde et al. 2005) and less than a fifth of the original blanket bog area is deemed to be in a natural condition (NPWS 2007).

Advantages: Long-term monitoring of natural peatlands provides a robust baseline by which climate and land use changes can be assessed (Sottocornola and Kiely 2010, Koehler et al. 2011, McVeigh et al. 2014). In terms of climate change, natural peatlands can function as the “canary in the mine”, e.g. sites that had been long-term annual CO_2 sinks becoming persistent annual CO_2 sources. Monitoring of natural sites also allows for a better understanding of the physiological drivers of GHG exchange for prediction, modelling, upscaling purposes. They can also offer “target” values (in terms of GHG exchange) for rewetting/restoration projects.

Dis-advantages: They are not the most widespread LUC in Ireland, and are somewhat heterogeneous – Atlantic, montane blanket bog, and raised bogs. As they are not managed, GHG emissions/removals are not considered in national GHG inventories.

Forested

In an effort to increase the forest cover in Ireland, considerable areas of peatlands were afforested with coniferous species, such as Sitka spruce (*Picea sitchensis*), lodgepole pine (*Pinus contorta*) and Norway spruce (*Picea abies*) over the second half of the twentieth century. The area of afforested peatlands is estimated at 450,940 ha (Duffy et al. 2020) with the majority of planting carried out on lowland and montane blanket bogs, where despite financial incentives via planting and maintenance grants, the economic viability was, and remains marginal (Renou and Farrell 2005).

Advantages: One of the largest peatland LUC in Ireland (Table 4.4).

Dis-advantages: While field based GHG studies are very limited, Ireland currently reports GHG emissions or removals from the forestry sector at Tier 2 and 3 levels. Therefore, it would be difficult to justify monitoring this LUC when GHG emissions or removals in other LUCs are less well quantified. Moreover, these sites would require EC measurements, and finding suitable sites (i.e. large, flat areas) may be difficult.

Agriculture

The utilisation of Irish peatlands for agricultural activities extends back many centuries (Feehan et al. 2008). Reclamation of peatlands for agriculture was accelerated during the eighteenth and nineteenth centuries as a result of population pressures and has accounted for a considerable loss in the peatland cover in Ireland over the years with a clearly increasing eastward gradient. The reclamation and drainage of organic soils was intensified in the twentieth century as a result of several Acts and Schemes, including the 1945 Arterial Drainage Act, the Farm Improvement Programme and the Programme for Western Development. Agricultural activity on peat soils is largely confined to grassland production and the grazing of cattle or sheep, with a very small area devoted to arable crops (Donlan et al. 2016).

Advantages: Grassland is one of the largest peatland LUC in Ireland (Table 4.4) with potentially high associated GHG emissions and waterborne carbon losses (Renou-Wilson et al. 2014, Barry et al. 2016), and therefore a priority LUC for rewetting. It is possible that the area under grassland could increase in the decades ahead particularly if policy is geared toward increasing agricultural outputs.

Dis-advantages: Areal extent of LUC is somewhat nebulous. GHG exchange is tightly bound to drainage status, which may be difficult to assess remotely. The carbon content can vary widely, e.g. in peaty gley soils (~15 %) to former cutaway sites now under grassland (~50 %).

Peat extraction -industrial

In Ireland, around 80,000 ha of peatlands are utilised for industrial peat extraction (Duffy et al. 2020); composed of active extraction sites, reserve areas (fully vegetated and partially/non-drained), roads, train lines, peat stockpiles, buildings. The majority of the LUC (80 %) is owned by the semi-state body Bord na Móna, who until 2020 extracted around 4 million tonnes of peat annually for energy production and horticultural products (Bord na Móna 2010). The peatlands utilised were predominantly the raised bogs in the Midlands, although some of the lowland blanket bogs were also exploited (Renou et al. 2006).

Advantages: Industrial extraction sites are very suitable for EC towers given the (general) absence of buildings, and high vegetation (trees). Given the cessation of peat extraction for energy purposes by Bord na Móna, these sites could be rewetted or undergo rehabilitation/natural regeneration.

Dis-advantages: A relatively small LUC that has been well studied in recent years (Wilson et al. 2015, Wilson et al. 2016a, Wilson et al. 2016b, Renou-Wilson et al. 2018a).

Peat extraction –domestic

Domestic cutting of peat (i.e. cutover peatlands) has been a notable feature of the Irish landscape and may effect up to 600,000 ha (Malone and O'Connell 2009). In recent times, hand cutting has been superseded by the use of tractor-mounted extractors.

Advantages: Potentially a very large and important LUC now that Ireland has chosen to report emissions/removals from managed wetlands for the first commitment period under the EU LULUCF regulations under the EU Climate and Energy Framework (2021–2025). The limited number of studies to date on this LUC (Wilson 2008, Wilson et al. 2015, Renou-Wilson et al. 2018a) indicates that GHG emissions per drained site are considerable, and therefore a priority LUC for rewetting.

Dis-advantages: As with natural peatlands, this LUC is highly heterogeneous due to peat type (Atlantic, montane blanket bogs, and raised bogs), intensity of peat extraction, extraction method (historical *vs* current).

Rewetted peatlands

In recent years, the restoration of peatlands damaged by forestry, agriculture or extraction has received much interest (e.g. Wheeler and Shaw 1995, Smith et al. 2008, Anderson et al. 2016). In particular, management actions (i.e. rewetting, vegetation re-colonisation) that will reduce GHG emissions and enhance carbon sequestration have been at the forefront of proposed climate change mitigation measures (Höper et al. 2008, Parish et al. 2008, Joosten et al. 2012, Bonn et al. 2014). In Ireland, the area of rewetted peatlands remains relatively low, largely confined to industrial cutaway peatlands.

Advantages: Currently, a very small LUC (Table 4.4) but given the large areas drained during forestry, agriculture and peat extraction (Table 4.4), it is possible that this LUC could become the largest and most important peatland LUC in Ireland in the coming decades, particularly now that Ireland has elected to report emissions/removals under EU LULUCF regulations. Indeed, the momentum for peatland rewetting is building: The Peatlands Climate Action Scheme, launched in November 2020, initially targets 33,000 hectares for rewetting in over 80 Bord na Móna bogs, while under the Department of Agriculture, Food and the Marine *Ag Climatise Roadmap*, released in December 2020, at least 40,000 hectares of drained grassland on peat soils have been targeted for rewetting.

Dis-advantages: A highly heterogeneous LUC driven by variations in land use history, peat type, nutrient status, time since rewetting and vegetation composition.

4.6.6 GHG monitoring capacity conclusions

On the basis of this analysis, the following peatland LUCs would be suitable for the establishment of long term GHG monitoring capacity: *grassland*, *domestic peat extraction*, and *rewetting*. Ideally the monitoring of these sites should align with ICOS and would incorporate a combination of EC and chamber methodologies to fully capture GHG exchange at the micro- and macro scales in the selected site.

Table 4.4. Estimated areas (ha) of peatland land use categories (LUC) in Ireland.

Land Use Category	Area (ha)	References
Natural	269,267	(Wilson et al. 2013b)
Forestry	450,940	(Duffy et al. 2020)
Agriculture		
Grassland	332,000–420,000	(Duffy et al. 2020, Green 2020)
Cropland	1,235	(Donlan et al. 2016)
Peat extraction		
Industrial	80,000	(Duffy et al. 2020)
Domestic	101,767–612,000	(Malone and O'Connell 2009, Forest Service 2012)
Rewetted	21,000	(Wilson et al. 2013b)

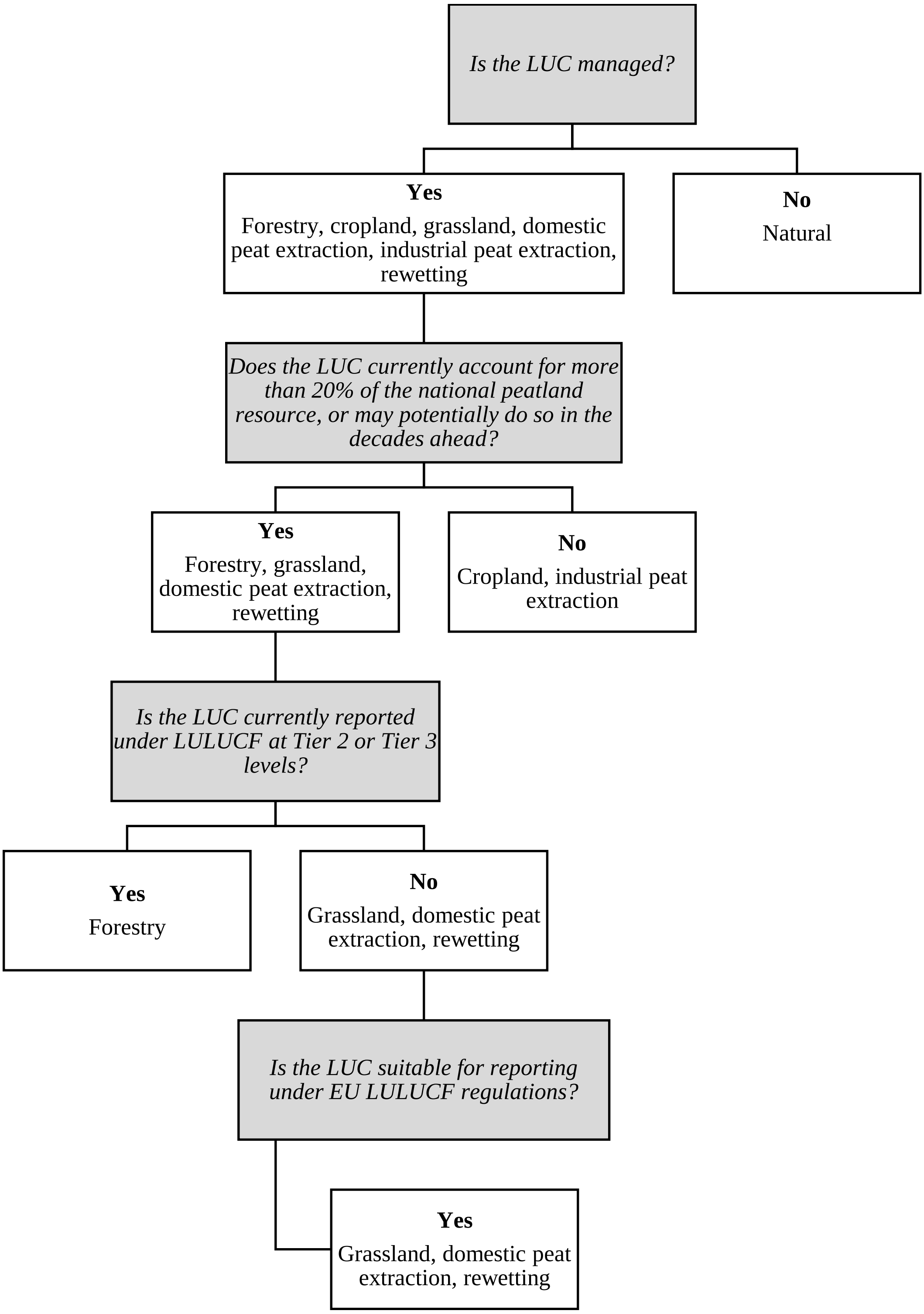

Figure 4.19. Decision tree to determine most suitable Irish peatland land use categories (LUC) for long-term greenhouse gas (GHG) monitoring.

5 Biogeochemical process-based modelling to predict GHG fluxes from Irish peatlands affected by anthropogenic changes

5.1 Introduction

Peatlands are often exposed to anthropogenic disturbances caused by different land use or other land changes, such as drainage for peat extraction, the conversion of peatland to agriculture or forestry, urban or industrial developments, or for a range of other land management practices that include grazing and burning (Ramchunder et al. 2009, Landry and Rochefort 2012, Levy and Gray 2015, Renou-Wilsonm 2018). The ability of peatlands to remove and store atmospheric carbon (C) depends on their degradation status (IPCC 2014b). It is known that peatlands that are exposed to, for example, drainage and land use change, can release carbon dioxide (CO_2) to the atmosphere and act as C sources (Wilson et al. 2015, Kritzler et al. 2016, Page and Baird 2016b, Tiemeyer et al. 2016a). As such, the prevention and reduction of peatland C losses caused by anthropogenic impacts is of critical importance for climate change mitigation (Gallego-Sala et al. 2018).

Managed wetlands must also be included in national greenhouse gas (GHG) inventories by 2026, required by recent European regulation [EU Council Regulation 2018/841], for the inclusion of GHG emissions and removals from Land Use, Land Use Change and Forestry (LULUCF); (EU Council 2018). The IPCC Wetlands Supplement (IPCC, 2014) to the guidelines on the development of national GHG inventories, provides methodologies for estimating emissions at three levels (Tier 1, Tier 2 and Tier 3), where Tier 3 is a higher tier approach, which allows for the use of dynamic, mechanistic models (IPCC 2014b). These models can be used to simulate and better understand the impacts of different land-uses (LU) and management on the underlying processes that drive carbon and GHG dynamics in these ecosystems (van Huissteden et al. 2006, IPCC 2014b).

Biogeochemical process-based models are known to have significant potential to quantify the effects of management practices on GHG emissions in different ecosystems (Olander et al. 2011). In this study, the main focus is on biogeochemical modelling of GHG fluxes in Irish peatlands using the "Model to Estimate Carbon in Organic Soils – Sequestration and Emissions (ECOSSE)" (Smith et al. 2010). The particular focus of this study was placed on the development of approaches to improve ECOSSE process-based biogeochemical modelling for Irish peatlands in order to potentially contribute towards the future development of Tier 3 methodologies for estimating peatland GHG emissions in Ireland.

These modelling improvements should allow for the inclusion of different peatland land uses (LU)/management categories, such as drainage and rewetting/restoration.

The overall goal of this study was to perform modelling and the prediction of GHG fluxes associated with different LU and peatland management categories in Ireland, with primary focus on draining and rewetting. This included the development of such modelling approaches that would enable the application of the ECOSSE model to investigate the impacts of drainage and rewetting in peatlands on GHG fluxes, as well as enable the application of ECCOSE to investigate the main underlying factors (natural/environmental, anthropogenic) that influence GHG emissions in peatlands, to contribute to better understanding of peatland functioning.

5.2 Study background

The need for potential model upgrading was identified during the initial stages of this study, especially in respect to ECOSSE model limitations in inputs regarding the LUC/management of peatlands and the water table (WT). Potential LUC were identified for the future modelling needs of peatland sites in Ireland, for example 'natural, 'bare-peat' or 'drained', 'rewetted'. This required the introduction of new peatland parameters for vegetation in the ECOSSE model (used as default values in 'crop_sun.dat' in the ECOSSE model under 'site-specific' mode), as well as the version of model that will contain the WT module. For this study, The James Hutton Institute, Aberdeen/Environmental Modelling Group, University of Aberdeen provided the required vegetation parameters for peatlands for ECOSSE, as well as the version of model (ECOSSE-6.2b-wt) with the included WT module. Test-simulations were run (using the Blackwater peatland as an example) during which the options for running the obtained model version and peatland parameters for vegetation were explored. This enabled identification of the potential model limitations and the need for further developments and upgrading, especially for the purpose of applying the ECOSSE model for simulating GHG emissions in Irish peatlands under drained and rewetted conditions. This work resulted in the development of an improved ECOSSE WT simulation approach for modelling CO_2 fluxes from drained and rewetted peatlands.

ECOSSE model uses a very simple concept for simulating vertical water movement through the soil profile based on the piston flow approach (Smith et al. 2010) and it does not account for the drainage network system that is normally present in drained peatlands, other than via measured WT inputs. The water movement is simulated through a soil profile consisting of a number of user-defined homogeneous soil layers in a way that the precipitation is added to the top layer and rainwater is distributed downward by a simple piston flow (Smith et al. 2010). Therefore, an improvement of the water table simulation approach was needed, and a new drainage factor was developed to be applied to ECOSSE rainfall input parameters, with the aim of achieving better simulation of GHG fluxes from peatlands under drained and rewetted conditions (Premrov et al. 2020c).

Modelling in this study used data from two Irish drained (former raised) bogs, Blackwater and Moyarwood, both of which developed drained and rewetted areas upon cessation of drainage/drain blocking (Wilson et al. 2015, Renou-Wilson et al. 2019). The main objective was to develop a new drainage factor (Dfa) parameter, specifically for ECOSSE, that could be easily applied to the model rainfall inputs and would potentially enable manipulation and changes in the simulated water levels (WL)[8], for example, from drained to rewetted conditions. The aim was to achieve improvements in both predicted WL and predicted CO_2 fluxes (Premrov et al. 2020c). The modelling approach was based on developing Dfa using empirical data from the Blackwater site and validating its application using data from the Moyarwood site. The model was also based on testing the modelling of the WL change from drained to rewetted conditions by evaluating the model performance against measured WT and CO_2 fluxes at the Moyarwood site (Premrov et al. 2020c).

5.3 Materials and methods

5.3.1 Study sites

The Blackwater (BWdr) industrial cutaway peatland was drained in the 1950s for peat extraction, and upon cessation of the drainage (1999) the landscape remained either drained with bare peat or was naturally rewetted and vegetated. The Moyarwood (MO) cutover site (drained in 1983 and rewetted in 2012) remained vegetated because it was not industrially exploited, and it comprises both drained (MOdr) and rewetted (MOrw) vegetated areas. Further detailed description of these sites, field measurements, GHG fluxes and WT monitoring are explained in Renou-Wilson et al. (2019).

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[8] The term WL is used in order to differentiate between simulated WL and measured WT for the reasons outlined in the study by Premrov et al. (2020)

The use of BWdr, MOdr and MOrw sites for development of Dfa was as follows:

- data from the bare-peat BWdr site were used for the development and testing of Dfa.
- data from the MOdr site were used for validation of the application of the previously developed Dfa in ECOSSE model.
- data from the MOrw site were used for further testing of application of Dfa[9], for drained to rewetted conditions.

The empirical data used were obtained from monitoring of GHG fluxes[10] and WT measurements from 2011–2015 for BW and from 2013–2017 for the MO sites, which are explained in detail in Renou-Wilson et al. (2019). Because ECOSSE model can predict CO_2 only as heterotrophic respiration (Rh) (Khalil et al. 2013, Flattery et al. 2018), the direct comparison of measured vs. modelled CO_2 fluxes could only be carried out for BWdr (bare peat, where ecosystem respiration Reco=Rh); whereas for the vegetated MO site, Rh had to be estimated from Reco (i.e. measured CO_2), following the method described in Abdalla et al. (2014), based on the approach by Hardie et al. (2009).

5.3.1 ECOSSE model and main model input parameters

The ECOSSE model is described in detail in Smith et al. (2010). In brief, ECOSSE has been derived from concepts of RothC (Coleman and Jenkinson 1996) and SUNDIAL (Smith et al. 1996) models, and it is a process-based biogeochemical model that can be used for simulations on both organic and mineral soils (Smith et al. 2010). The ECOSSE model uses a pool type approach, with five specific soil organic matter pools: inert organic matter, humus, biomass, resistant plant material, and decomposable plant material (Eglin et al. 2010). The equations are driven using readily available input variables (Eglin et al. 2010). The model assumes that the system is in equilibrium or steady state during the model spin-up for initialisation before it is run forward (Smith et al. 2010). As explained earlier, the ECOSSE model can predict CO_2 only as Rh; Reco and Gross Primary Production (GPP) are not included in model outputs (Khalil et al. 2013, Flattery et al. 2018). The main required data inputs for this model are mainly of "<.DAT>" and "<.txt>" type files (Smith et al. 2010). This study used ECOSSE-v.6.2b-wtd model ('site-specific' mode, daily time inputs/outputs), which includes a WT module (Smith et al., 2010), and introduced peatland vegetation parameters (i.e. 'natural vegetation' and 'bare peat') as explained in Premrov et al. (2020b).

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[9] i.e. Dfa was applied only for duration of drained conditions.

[10] The measured CO_2 flux (converted into g CO_2 m^{-2} day^{-1} and averaged across replicates) was used in testing and validation of the ECOSSE simulated CO_2 model outputs (in kg CO_2 ha^{-1} day^{-1} which were also converted into g CO_2 m^{-2} day^{-1}).

Information on some of the main ECOSSE model input parameters for BW and MO are outlined below.

- **Daily weather input data**

- Daily weather inputs[11] (precipitation [mm day^{-1}], mean temperature [daily °C], and potential evapotranspiration [mm day^{-1}]) were obtained from WRF (Weather Research and Forecasting Model) daily climate datasets for Ireland available from the Irish Centre for High-End Computing (ICHEC) - ERDDAP, v.1.82 (ERDDAP-ICHEC 2019)[12] and were processed in R v.3.6.0 (R Core Team 2019).

- **Long term average weather input data**

- Long term average weather data (required during model spin up) expressed as monthly data for each site were obtained from 30-year Met Éireann long-term average data (Met Éireann 2012). The potential evapotranspiration was estimated using the Thornthwaite (1948) method, as explained in Premrov et al. (2020a).

- **Atmospheric nitrogen (N) deposition**

- Average atmospheric N deposition data [kg N ha^{-1}] were estimated for each site from EMEP datasets (EMEP 2018, 2019), which were processed using Python 2.7 (PSF 2017) and ArcGIS (ESRI 2018); details on data processing are provided in Premrov et al. (2019).

- **Location**

- Latitude input data were obtained from Renou-Wilson et al. (2019).

- **Main soil parameters**

- Soil organic carbon [kg C ha^{-1}] data were obtained from Renou-Wilson et al. (2019).
- pH and bulk density [g cm^{-3}] data were obtained from Renou-Wilson et al. (2019).
- Peat depth [cm] data were obtained from Renou-Wilson et al. (2019).

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[11] Short-term simulations were run using weather data for 2010–2017 for BW and 2012–2017 for MO. For long-term simulations (the drainage periods prior to commencement of on-site measurements, i.e. 60 years for BW and 29 years for MO sites), the simulations were run by reusing the earlier WRF-ICHEC weather data and measured WT data – further explanation is provided in Premrov et al. (2020c)

[12] ERDDAP is ICHEC's data server (https://erddap.ichec.ie/erddap).

There are other soil input parameters required in ECOSSE, such as soil-water parameters and texture, which are not listed above - details on these soil input parameters are provided in Premrov et al. (2020c).

- **Water table (WT) inputs**
  - WT (daily values [cm] below surface) data measured at BW (2011–2015) and MO (2013–2015 drained, 2013–2016 rewetted) sites were obtained from Renou-Wilson et al. (2019). Data gap-filling and estimation of missing WT measurements[13] and further technical details are explained in Premrov et al. (2020c).

- **Vegetation parameters**
  - New vegetation parameters (part of 'crop_sun.dat' model files) for 'bare-peat' category (used for BW) and 'natural peatland vegetation' category (used for MO) were provided, together with the ECOSSE-v.6.2b-wtd by The James Hutton Institute, Aberdeen/ Environmental Modelling Group, University of Aberdeen.
  - Yield [t ha^{-1}] for vegetated peat was estimated from (van Breemen 1995).

5.3.2 Development of drainage factor (Dfa) and results on seasonally varying Dfa(i)

In order to account for the drainage associated with the management of a peatland site, a new Dfa drainage factor was developed to be applied to the ECOSSE model rainfall inputs using data from the BWdr bare-peat site, which was carried out via a 'failure/success' approach (by running simulation trials) (Premrov et al. 2020c).

The process of empirical estimation of Dfa involved three main steps, which are explained in detail in Premrov et al. (2020c) – a very brief description is provided below:

- *Step 1* involved obtaining main parameters required for computation of Dfa by defining the 'wt-discrepancy event' (Figure 5.1), based on examining ECOSSE simulated WL output against measured WT, and rainfall data.

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[13] i.e. linear interpolation between dates; reusing of data for long term simulations with missing measurements – further details are provided in Premrov et al. (2020c).

- *Step 2* involved development of a series of equations for computation of Dfa using information from an earlier defined 'wt-discrepancy event' (Figure 5.1) and parameters obtained during *Step 1*.
- *Step 3* involved further accounting for seasonal variability in Dfa, i.e. the development of drainage factor that was adjusted for seasonal variability Dfa(i), which could be applied to the rainfall model inputs (in peatlands under drained conditions) as follows:

$\text{Rain}_{\text{adj}}(\text{i}) = \text{Rain}(\text{i}) / \text{Dfa}(\text{i})$ under drained conditions, and

$\text{Rain}_{\text{adj}}(\text{i}) = \text{Rain}(\text{i})$ under rewetted conditions,

where $\text{Rain}_{\text{adj}}(\text{i})$ is the corresponding rainfall value that was adjusted for drainage depending on month (i) and is used as an input in ECOSSE, replacing the previous rainfall value Rain(i) obtained from daily climate input data, as illustrated in Figure 5.2.

Results on the developed seasonally varying drainage factor Dfa(i) for each month (i) are provided in Table 5.1.

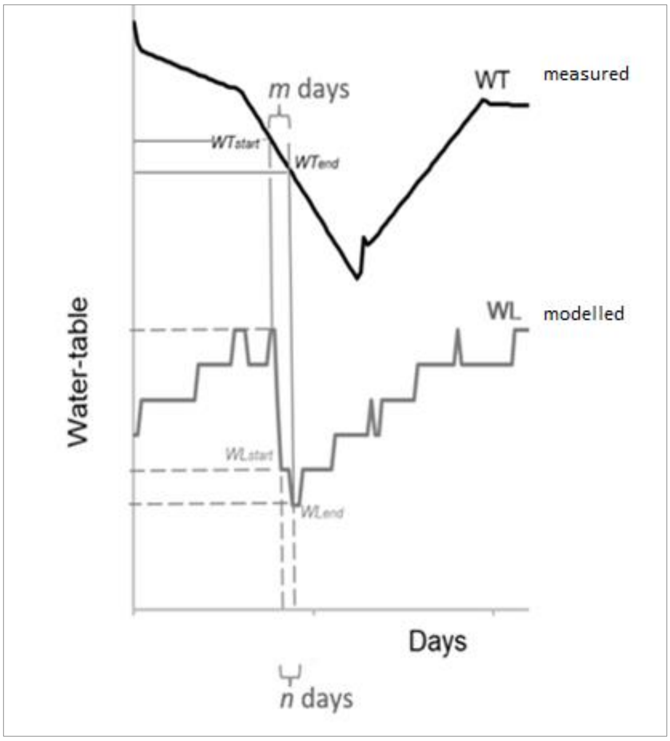

Figure 5.1 Illustrative presentation of 'wt-discrepancy event', which was used to define the main parameters needed in the development and computation of drainage factor Dfa. Figure adapted from Premrov et al. (2020c).

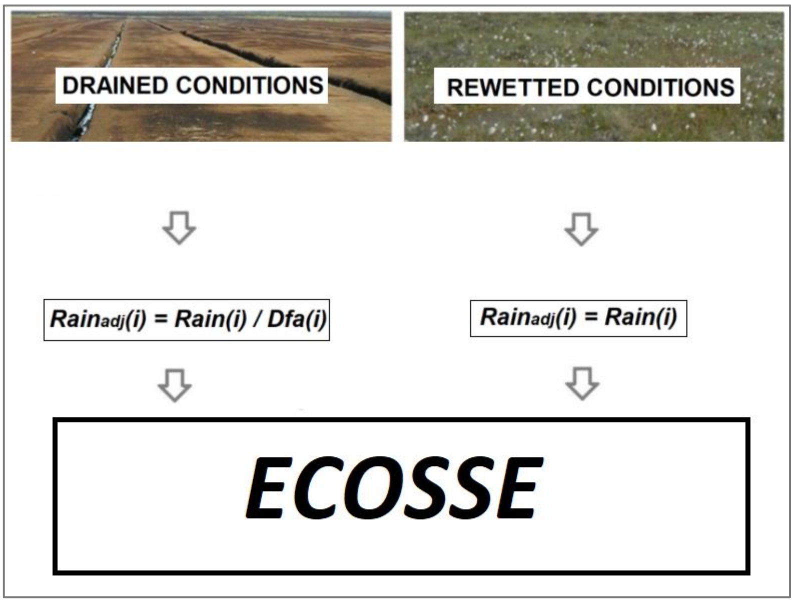

Figure 5.2 Illustrative presentation of application of drainage factor Dfa to ECOSSE rainfall model inputs under drained conditions. Figure adapted from Premrov et al. (2020c).

Table 5.1 Results on computed monthly Dfa(i) drainage factor parameters. Table adapted from Premrov et al. (2020c).

Dfa(i)	Month (i)	value
Df_{Jan}	January	2.86
Df_{Feb}	February	2.86
Df_{Mar}	March	2.92
Df_{Apr}	April	3.26
Df_{May}	May	3.32
Df_{Jun}	June	2.92
Df_{Jul}	July	2.98
Df_{Aug}	August	3.11
Df_{Sept}	September	2.92
Df_{Oct}	October	2.92
Df_{Nov}	November	2.95
Df_{Dec}	December	2.95

5.3.3 Process-based modelling of drained and rewetted peatlands using ECOSSE model with improved water table simulation approach

Dfa(i) was applied to rainfall inputs in the ECOSSE simulation-runs at three different sites (BWdr, MOdr and MOrw) in order to model the WL and CO_2 fluxes at these sites. Model runs were performed with and without accounting for a long-term drainage period (i.e. either including or excluding 60 years of drainage prior to 2010 at the BWdr site; or 29 years of drainage prior to 2012 at MOdr site; detailed explanation is provided in Premrov et al. (2020c)). At the rewetted MOrw site, the simulation was run by introducing a change in WT input from drained[14] to rewetted conditions. Model evaluation involved testing and validation: the testing of the application of Dfa(i) to ECOSSE simulations, which was carried out at the BWdr site, and validation at the MOdr and MOrw sites. Regression analysis of simulated and observed values, and other computed model prediction indices are explained in detail in Premrov et al. (2020c). Computations were carried out using R (R Core Team 2019) and accompanying R-packages.

5.4 Results

5.4.1 Predicting WL under drained conditions at the BWdr and MOdr sites

ECOSSE simulations of WL at both BWdr and MOdr sites were significantly improved through the application of Dfa(i) to the rainfall input data and by the inclusion of a long-term drainage period at each site. This was evident from plotting the modelled WL and measured WT curves as a time series (Figure 5.3), as well as from the results from regression of the modelled WL and observed WT (r^2 and RMSE values[15] - reported in Figure 5.3)[16].

The results further indicate that running simulations that account for long-term drainage periods at drained peatland sites is recommended for modelling WL, even when there is an absence of measured WT and climate data for previous years (i.e. during these periods without measurements, the long-term simulations were run by reusing the existing measured weather and WT data from later years).

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[14] including long-term drainage

[15] r^2 refers to coefficient of determination (regression measured vs. observed), RMSE refers to root mean squared error.

[16] Detailed results on modelling WL from different simulation runs (i.e. inclusion/exclusion of Dfa(i) or long-term drainage periods), as well as results from regression analysis with accompanying model prediction indices, are provided in Premrov et al. (2020c).

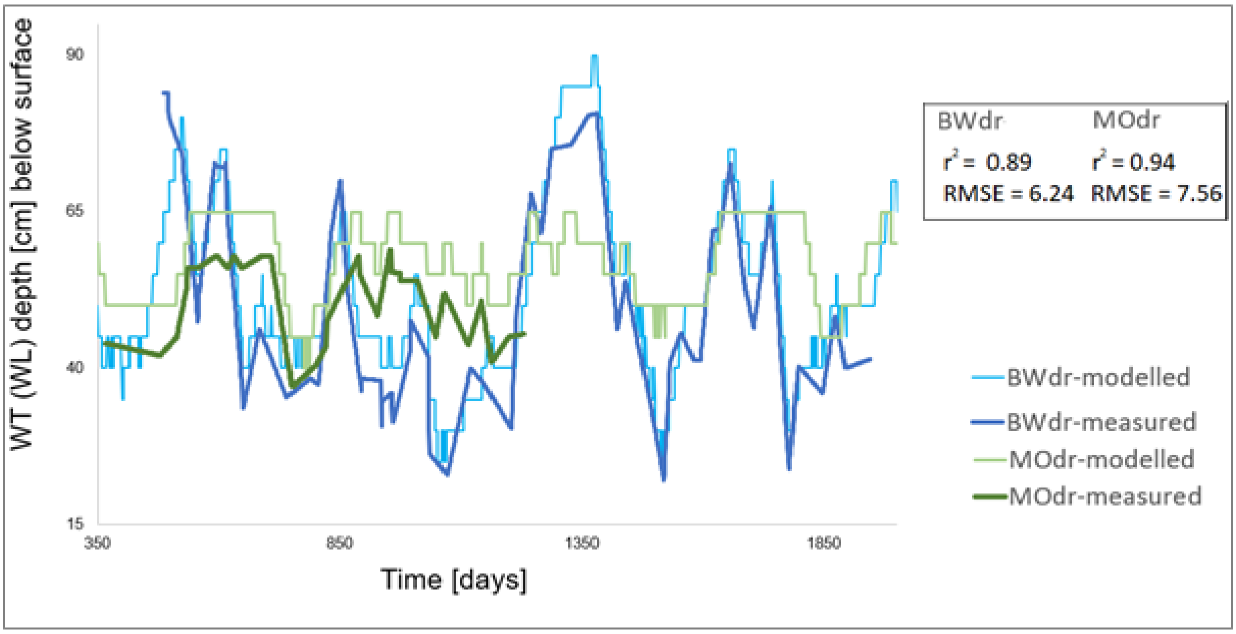

Figure 5.3 Measured water table (WT) and predicted water level (WL) from ECOSSE simulation runs with the application of drainage factor Dfa(i) at the BWdr and MOdr sites. r^2 refers to coefficient of determination (regression measured vs. observed), RMSE refers to root mean squared error; further details are provided in Premrov et al. (2020c). Figure adapted from Premrov et al. (2020c).

5.4.1 Predicting CO_2 fluxes under drained conditions at BWdr and MOdr sites

The ECOSSE simulations of CO_2 fluxes at the BWdr and MOdr sites were significantly improved through the application of Dfa(i) to the rainfall input data and by the inclusion of a long-term drainage period at each site. This was evident from the results from regression of the modelled CO_2 fluxes and observed Rh (where Rh=Reco for BWdr bare-peat site; r^2 and RMSE values are reported in Figure 5.4)[17]. If the simulations were run without the inclusion of long-term drainage periods, high simulated CO_2 values occurred at the start of simulation, which resulted in an overestimation of predicted CO_2 fluxes. Therefore, the results indicated that running simulations that account for long-term drainage periods at drained peatland sites is recommended not only for modelling WL, but also for modelling CO_2 fluxes, even when there is an absence of measured WT and climate data for previous years (i.e. during these periods without measurements, the long-term simulations were run by reusing the existing measured weather and WT data from later years).

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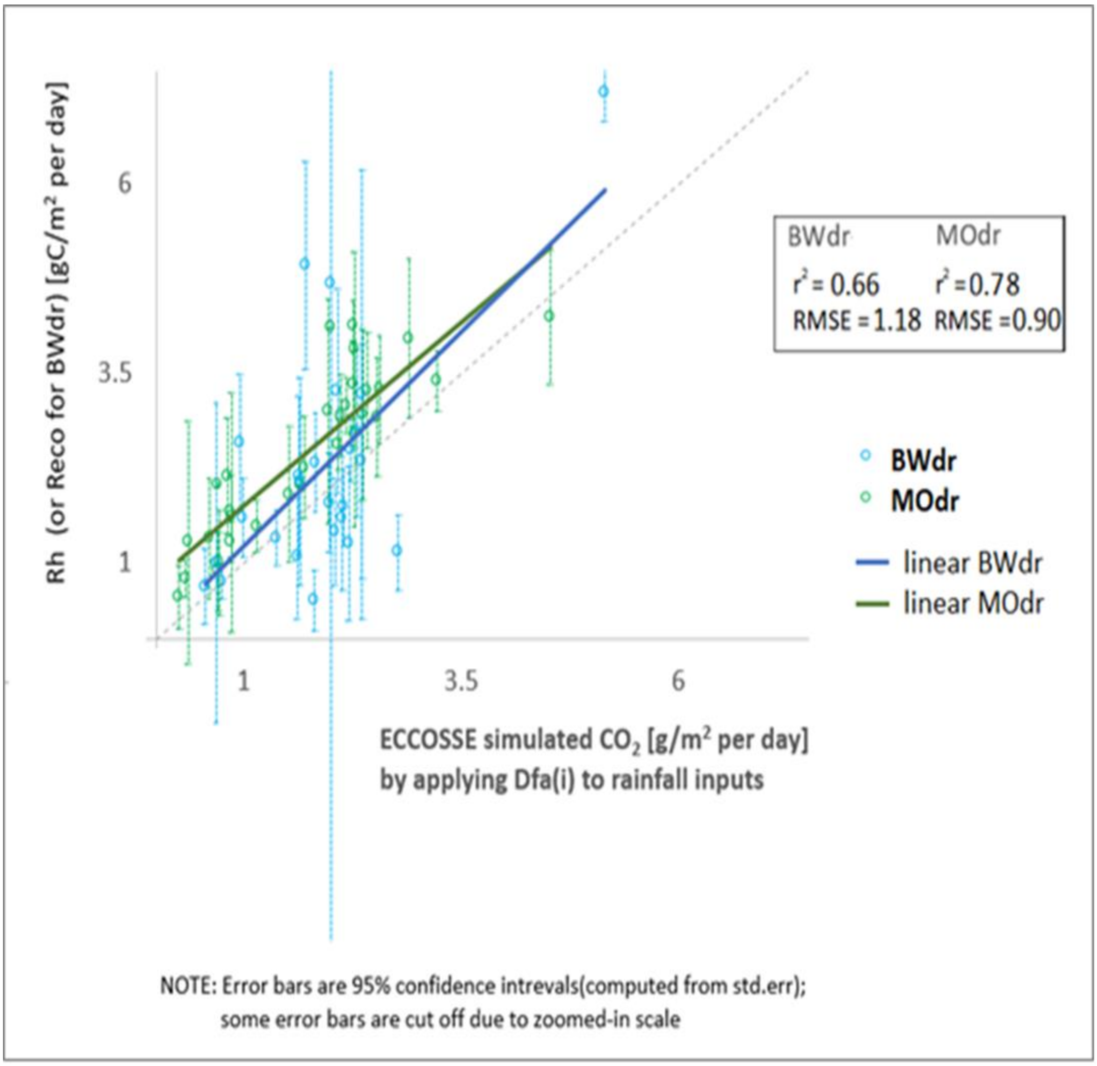
[17] Detailed results on modelling CO_2 fluxes from different simulation runs (i.e. inclusion/exclusion of Dfa(i) or long-term drainage periods), as well as results from regression analysis with accompanying model prediction indices, are provided in Premrov et al. (2020c).



NOTE: Error bars are 95% confidence intrevals(computed from std.err); some error bars are cut off due to zoomed-in scale

Figure 4 ECOSSE simulated CO_2 vs. measured Rh for BWdr and MOdr site, where the simulations were run by applying Dfa(i) to the rainfall inputs and by including long-term drainage periods

NOTE: Rh=Reco for non-vegetated BWdr. r^2 refers to coefficient of determination (regression measured vs. observed), RMSE refers to root mean squared error; further details are provided in Premrov et al. (2020c). Figure adapted from Premrov et al. (2020c).

5.4.2 Predicting WL and CO_2 fluxes under drained to rewetted conditions at the MOrw site

As explained earlier, the simulation at the rewetted MOrw site was run by introducing a change in WT input from drained[18] to rewetted conditions. The results showed that the simulation of WL change from drained to rewetted conditions was successful, although an overestimation in the simulated depth of WL (which refers to an underestimation in the rise of WL) under rewetted conditions was observed in the results (Figure 5.5a). This shows that further work is still needed to improve the prediction of WL for rewetted conditions in ECOSSE.

This result was in agreement with findings reported in earlier ECOSSE modelling studies on cropland/arable soils, which indicates that the model did not correctly simulate the magnitude of soil water content change, although the model was capable of correctly simulating its trends, such as direction and timing (Bell et al. 2012, Flattery et al. 2018, Flattery 2019). Nevertheless, despite the fact that the model performed less well in predicting WL under rewetted conditions at the MOrw site, compared to the drained conditions (BWdr and MOdr sites), the prediction of CO_2 emissions for MOrw was satisfactory, which was evident from the results from regression of the modelled CO_2 fluxes and observed Rh (r^2 and RMSE values are reported in Figure 5.5b) [19].

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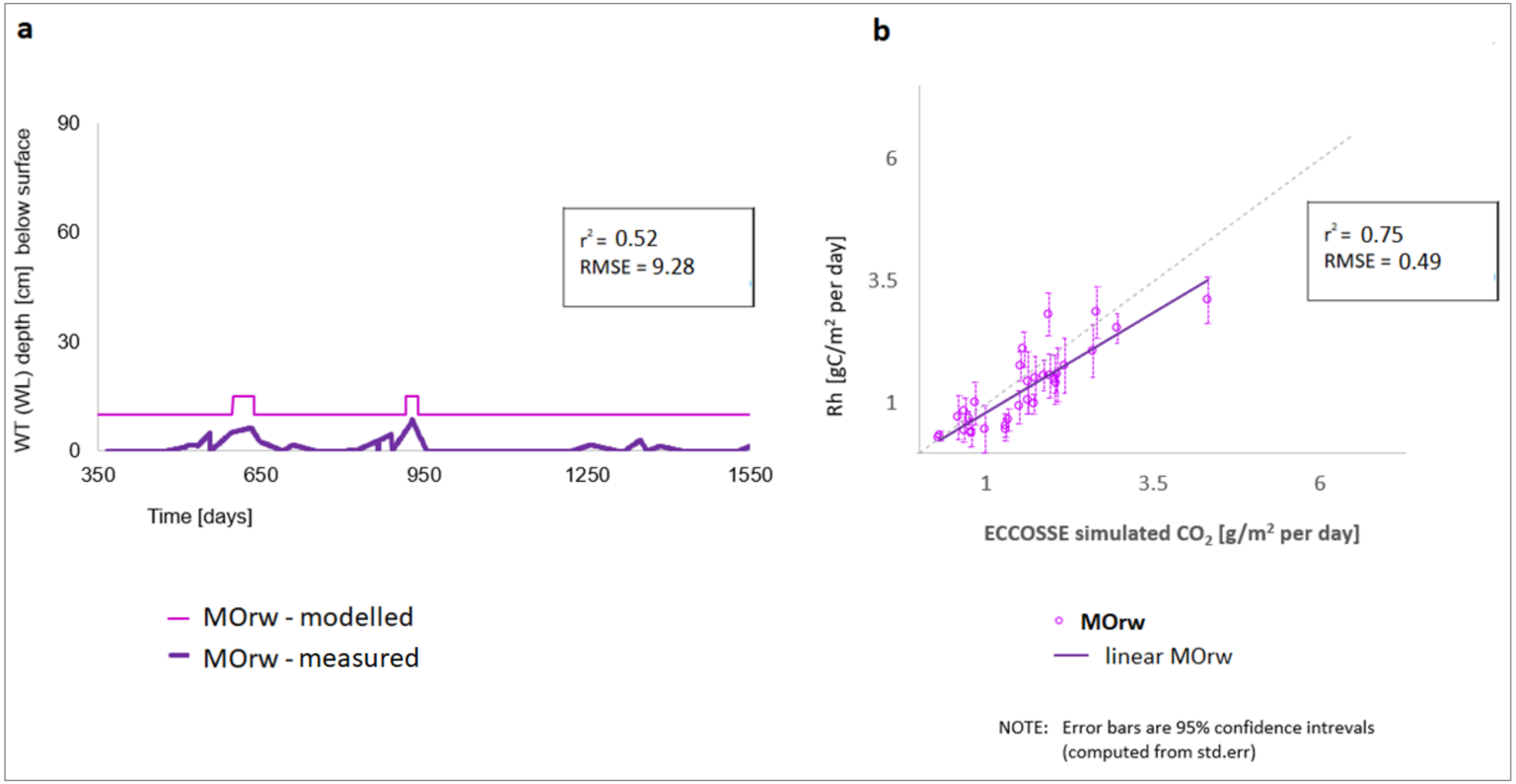
[18] including long-term drainage

[19] Detailed results on modelling CO_2 fluxes from different simulation runs (i.e. inclusion/exclusion of Dfa(i) or long-term drainage periods), as well as results from regression analysis with accompanying model prediction indices, are provided in Premrov et al. (2020c).



NOTE: Error bars are 95% confidence intrevals (computed from std.err)

Figure 5.5 ECOSSE simulated outputs from the rewetted MOrw site: (a) simulated water level (WL) and observed water table (WT) (for the period under rewetted conditions); (b) simulated CO_2 fluxes versus measured Rh. Note: During the simulation run, drainage factor Dfa(i) was applied under drained conditions (i.e. during the drained period prior to rewetting, including the long-term drainage period). r^2 refers to coefficient of determination (regression measured vs. observed), RMSE refers to root mean squared error; further details are provided in Premrov et al. (2020c). Figure adapted from Premrov et al. (2020c).

5.5 Conclusions on using ECOSSE model with improved water table simulation approach

The use of ECOSSE model with improved water table simulation approach (by application of drainage factor Dfa(i)) and the inclusion of a long-term drainage period) successfully predicted WL and CO_2 fluxes and their trends for the two peatland sites under drained conditions (BWdr and MOdr). For the rewetted site (MOrw), the simulation was run under conditions from drained to rewetted, where the application of Dfa(i) was performed only during the long-term drainage period. The prediction of WL for the rewetted period was less successful under rewetted conditions, which indicates a need for further improvement of the water component in the ECOSSE model during rewetting. Despite this, the prediction of CO_2 fluxes at the MOrw rewetted site was successful. Overall, the results from the two Irish drained peatlands demonstrate that the application of Dfa(i) can improve model performance for the simulation of CO_2 fluxes, especially under drained conditions.

6 General conclusions and recommendations

6.1 Peat properties

6.1.1 Heterogeneity of the national peatland resource

The soil properties of the peat soils encountered throughout ROI in this survey were found to vary over a wide range, thereby confirming the pronounced diversity of peat types that are produced under unique conditions at each individual site. Raised bogs, lowland blanket bogs and mountain blanket bogs are the three bog formations in Ireland based on their land form developments. Their genesis has been influenced by local drainage, climate, hydrology, nutrient status and glacial geology. Our results demonstrates that peatland utilisation and management have drastically altered peat properties along a very broad scale from acute to limited changes, compared to their 'natural' counterpart. The main land use categories existing in Ireland are grassland, forest, cutaway (industrial extraction) and cutover (domestic extraction). The variations encountered amongst these LUC reflect the nature and magnitude of the impacts of each use, the intensity of drainage being a key factor. The heterogeneity also demonstrates the difficulties in developing pedo-transfer functions for all possible combination of peatland sites and LUC. Regardless, the recognition of this heterogeneity together with an understanding of the relationships between key edaphic and eco-hydrological properties are critical to develop effective strategies for remedial management of degraded peatland ecosystems.

6.1.2 Overall status

Natural bogs have been found deeper than under any other LUC but this was only statistically different for raised bogs and mountain bogs suggesting a more intensive utilisation compare to the vast lowland blanket bogs. The lower depths under all LUC indicate high rates of subsidence and loss of peat through organic matter decomposition in all LUC, as well as peat removal due to domestic and industrial extraction. The least discrepancies between natural and other LUC peat depths were measured in lowland blanket bogs demonstrating their more extensive utilisation.

Overall, shallower peat depth, greater bulk density and lower carbon content values characterise the degraded peat associated with managed peat soils. This was particularly the case for deep drained grassland peat soils.

In addition, mean N concentration values in the surface peat ranged widely but did not differ across LUC except for grassland which consistently show higher N concentrations. Overall, natural bogs N concentration (1.98%) did not differ to the overall N concentrations across all LUC (2.06%) and these values are much higher than the average value for North-Western Europe of 1.6 ± 0.4 %, provided by Loisel et al. (2014) reflecting the widespread, intensive historical use of Irish peatlands.

6.1.3 Cutover bogs

The properties of cutover bogs peat differ the least from natural sites, displaying the same range of ash content but slightly higher bulk density values showing the impact of the drainage needed to facilitate turf cutting. Despite their shallower peat depth, they still hold the largest carbon store after undrained natural peatlands. These results infer the importance of these degraded ecosystems in sill providing some critical ecosystem services. Therefore they should be identified for immediate management interventions to prevent further degradation, in particular the current on-going loss of their carbon store. The cutover bog at Moyarwood that wasn't included in the rewetting still emitted 5.2 tonnes of CO_2 ha^{-1} yr^{-1} over the five year monitoring period, in accordance with existing country-specific (IPCC Tier 2) emission factors from these domestic sites (Wilson et al. 2015).

6.1.4 Mountain blanket bogs

Our results confirmed that after drainage (regardless of use), changes in the physico-chemical properties of peat occurs; greater bulk density values, degree of decomposition, pH and ash content. From a peatland type perspective, the greatest changes were encountered in mountain blanket bogs whose properties seem severely affected by both grassland and forestry land uses. This may be confounded by the fact that these LUC occur mostly on shallower mountain blanket bogs. On the other hand, our results were surprising in finding that natural and cutover mountain blanket bogs displayed much deeper peat depth than previously estimated. The lesser impact of domestic extraction may be only an artefact of the extensive rather than intensive activity on such sites. The datasets may have also been skewed towards mountain blanket bogs located at a lower elevation (highland mountain bog) rather than high altitude sites where utilisation is rendered difficult.

6.1.5 Grasslands over peat

Deep drained grassland peatlands were at the extreme end of the degradation scale encountered (in comparison to natural bogs) and they also contained the lowest organic matter and total organic carbon contents. However, combined with higher bulk density values, this LUC comprises large SOC densities and still contains a valuable carbon stock, despite the shallower peat depths. However, the high von Post values and high ash content make these peatlands very sensitive to continued OM decomposition and associated C emissions.

6.2 Carbon density

This study presented estimates of carbon densities for all bog types by LUC. These estimates support past studies (Tomlinson 2005, Eaton et al. 2008) for those categories that have typically (a) shallow peat depth, and/or (b) a large number of measurements, such as cutaway peatland sites. New estimates for the cutover categories have proven to be revealing, as the carbon density is similar to natural bogs, which indicates that their peat depth (so far not widely surveyed) is the most critical factor. The discrepancy with past studies is revealed especially for mountain blanket bogs, which seem to have been under-estimated in both their depth and carbon content in previous studies. It is recommended that measuring peat depth in mountain blanket bogs is continued to confirm these results.

Table 6.1. Comparison of carbon density (t C ha^{-1}) across studies for specific land use categories.

	This study	Eaton et al. 2008	Tomlinson 2005
Raised bog – natural	3037	4702	1025-3025
Raised bog – cutaway	1240	1179	495-1240
Raised bog – cutover	2398	1179	495-1240
Lowland blanket bog – natural	1409	1860	575-1440
Lowland blanket bog – cutaway	1396	1860	240-480
Mountain blanket bog – natural	1800	636	540
Mountain blanket bog – cutover	1248	636	270

A recent study on SOC in heavy textured grassland soils included an individual ombrotrophic peat soil which held 748 t C ha^{-1} while being on the shallow end of the range of peat depth in our study (116cm) (Tuohy et al. 2021).

6.3 Carbon stocks

The AUGER project assessed for the first time the total depth of 270 sampling points across the breadth of peatland categories and management. Together with updated areal extent of all peatland categories, we managed to refine the estimates of carbon stock held in both Irish natural and managed peatlands and which is estimated at **2,216 Mt of carbon** (uncertainty range: 2,005-2,320). This stock can be sub divided as follows: 42 % in raised bogs, 42% in lowland blanket bogs and 15% in mountain blanket bogs. Remarkably, natural and cutover peatlands hold together just under half of the national peatland carbon stock. This new estimate is substantially more than previous estimates, which ranged from 1071 Mt (Tomlinson 2005) to 1469 Mt (Eaton et al. 2008), and is due to (1) improved peat depth estimates, (2) improved peat carbon density values for mountain blanket bogs, and (3) inclusion of all LUC that occur on peat. Given that mineral soil carbon stocks have been estimated at c. 1153 Mt for the 0-50 cm layer which is the bulk of the store for these soils (Xu et al. 2011), peatlands store twice as much carbon and would thus represent 2/3 of the total national C stocks based on the work undertaken in this project.

6.4 Water table profiles

Our results confirm the high variability in hydrological regimes in all peatland types, including natural bogs, where different ontogenic development, peat properties (bulk density, degree of decomposition) and allogenic factors (e.g. local climate) produce contrasting hydrological regimes both within and between sites. These relationships become even more complex in drained peatlands. While ground water table can be measured reliably in the field using piezometers and shallow monitoring wells, these point-based techniques are difficult to scale. Recent developments using earth-observation data (satellites or Unmanned Aerial Vehicles (UAV) have provided accurate models of groundwater levels especially in open, tree-less peatlands (Rahman et al. 2017).

This study also supports previous research confirming the importance of the relationship between water table and peat properties when rewetting peatlands, to inform sustainable engineering solutions on a site-by-site approach with a minimum of critical hydrological investigations.

Overall, the water table regime in blanket bogs seems to be sustained by constant precipitation rendering them less sensitive to seasonal variation than raised bogs located in the Midlands, for example. However, this is predicated that the existing precipitation regime will prevail. Peat landslides are common throughout Ireland and their causes are multi-faceted, in many cases, weaknesses related to the nature of the peat cover (Boylan and Long 2010), as well as hydrological and pedological associations with the underlying mineral substrates (Boylan et al. 2008). While it has been suggested that upland peat slides are controlled by slowly changing internal threshold and have not become more common during greater frequency of heavy precipitation events (Dykes et al. 2008), their response to additional climate change stress is of concern. The combination of drought followed by heavy rainfall events may add stress to these ecosystems leading to more risks of landslides. Moreover, human activities and management strategies further contribute to this risk. Serious investigation of the hydrological regime of peatlands is critical in all scenarios.

The influence of forestry on water table drawdown is visible in all bog types but particularly raised bogs. This study also supports previous research that reported the importance of the relationship between water table and peat properties, especially when rewetting cutover peatlands with the aim to bring back the water table regimes in rewetted bogs similar to their natural counterparts (Renou-Wilson et al. 2018b). However, this should be further investigated to inform sustainable engineering solutions. Successful 'plumbing' of degraded bogs is the first critical step towards full recovery of all ecosystem functions.

Finally, it is recommended that, while monitoring of WTL in natural/rewetted sites can be successfully achieved by a single logger, the spatial heterogeneity present in the other LUC warrants the deployment of several loggers. While ground water table can be measured reliably in the field using piezometers and shallow monitoring wells, these point-based techniques are difficult to scale. Recent developments using earth-observation data acquired from Unmanned Aerial Vehicles (UAV) provide accurate models of groundwater levels, especially in open, tree-less peatlands (Rahman et al. 2017).

6.5 Vegetation profiles

Reflecting the variety in peat properties, the vegetation profiles of Irish peatlands can be best characterised as heterogenous reinforcing the 'each peatland site is unique' adage. Except for the extreme case of cutaway peatlands where the vegetation is completely absent, the spatial patterns of vegetation communities are strong indicators of peatland type and conditions, which are unique to their location, as well as their management. Even grassland or forest peatlands display a high level of heterogeneity between sites. The results also support previous studies that have demonstrated the importance of cutover bogs in providing biodiversity values and confirm the successful outcomes of rewetting all types of managed drained peatlands (Renou-Wilson et al. 2018b, Renou-Wilson et al. 2019).

It has been previously shown that the role of vegetation composition (or its absence) is central in determining the GHG dynamics of natural and managed peatlands (Renou-Wilson et al. 2019). While certain assemblages (ecotopes) can be used as proxy for the hydrological regime of a site and thus in predicting GHG dynamics (Couwenberg et al. 2011, Regan et al. 2020), the heterogeneity of vegetation composition (within and between sites), together with their associated local hydrological regimes, makes their modelling difficult for GHG predictions. The complexity of monitoring such spatial heterogeneity and attributing relative emission factors seems very high and can only be modelled using innovative methods. While the development of aerial imagery could help map these mosaic sites, certain barriers are still present, e.g. overlapping spectral signatures of different vegetation communities or non-recognition of existing drainage systems.

6.6 GHG emissions/removals from monitored sites

This study demonstrated that long-term GHG monitoring can provide robust baseline datasets which can allow for the effects of external and internal stressors to be appropriately evaluated (Wilson et al. 2016b), and interannual variation to be suitably appraised; thus, contributing to Tier 2 and 3 levels of reporting of GHG emissions for Ireland while highlighting the key processes that are crucial for future management of Irish peatlands:

- Drained peatlands are a substantial CO_2 source and a small CH_4 source.
- Rewetting at Moyarwood resulted in a sustained and elevated water level.
- Rewetting can rapidly transform carbon dynamics and switch a degraded peatland site to a net carbon sink.
- Under “normal” climatic years, annual NEE values at the rewetted Moyarwood site and the near-natural Clara site were similar.
- Methane emissions can increase substantially after rewetting and may remain elevated for at least 5 years.

In this study, we monitored a limited number of GHG sites which, given the high heterogeneity of peatlands demonstrated in this study, would indicate that more sites must be monitored across a wide geographical range. To this effect, a decision tree was built to determine the most suitable Irish peatland LUC for long-term GHG monitoring (Figure 4.19).

6.7 ECOSSE modelling with improved water table simulation approach

In this study, the use of ECOSSE model with improved water table simulation approach (by application of drainage factor Dfa(i)) and the inclusion of a long-term drainage period) successfully predicted WL and CO_2 fluxes and their trends for the two drained peatland sites at Moyarwood and Blackwater.
For the rewetted site in Moyarwood, the simulation was run under conditions from drained to rewetted, where the application of Dfa(i) was performed only during the long-term drainage period. The prediction of WL for the rewetted period was less successful under rewetted conditions, which indicates a need for further improvement of the water component in the ECOSSE model during rewetting. Despite this, the prediction of CO_2 fluxes at the Moyarwood rewetted site was successful.

Overall, the results from the two Irish drained peatlands demonstrated that the application of Dfa(i) can improve model performance for the simulation of CO_2 fluxes, especially under drained conditions.

The work presented here is hoped to positively contribute towards potential future development of Tier 3 methodology for estimating GHG emissions in peatlands in relation to assessing the effect of different peatland LU/management practices (e.g. drainage and rewetting/restoration) using process-based modelling approaches. As the results demonstrate that ECOSSE model with improved water table simulation approach (i.e. application of seasonally varying drainage factor Dfa(i) parameter) could improve the model performance for the simulation of CO_2 fluxes, it is hoped it will foster future process-based modelling studies of peatlands using the ECOSSE model that would help understanding of the underlying factors and drivers that influence GHG emissions from managed peatlands.

The modelling work from this study provides insights into some of the potential research directions for future process-based modelling of GHG fluxes from managed peatlands. These include improving the model sensitivity in predicting WL at depths < 5 cm, which may be important for modelling peatlands under rewetted conditions. This provides opportunities for further additional improvements and upgrading of ECOSSE model in the future. In addition, further testing of the applicability of the developed drainage factor Dfa where peatlands have undergone drainage, and at peatland types different to the sites used in Premrov et al. (2020c) are also recommended. It is also recommended that further investigations on the model uncertainty and sensitivity analysis are performed. These potential additional studies are important for further assessing the applicability of Dfa in process-based modelling studies of peatlands using the ECOSSE model.

6.8 Implications of new datasets and modelling for policy decisions and future research

- Regardless of their current land use, the heterogeneity of Irish peatland profiles must be fully recognised in future policy decisions with regard to their management. This would also require full recognition of the importance of mapping peatlands to a level appropriate for their effective management.
- Each peatland exhibits unique properties with far-reaching implications for GHG production, cycling of carbon and nutrients, local and regional hydrology and water quality, and biodiversity. Therefore, “one-size-fits-all” management for rewetting bogs is not recommended. A minimum check list of critical parameters must be investigated, and such A toolbox must be developed and updated with feedback from the monitoring of current and existing peatland rewetting projects.

- Our new estimates of national peatland SOC stocks per LUC amount to a total of 2,216 Mt of carbon (uncertainty range: 1,672–2,878). Natural and cutover bogs hold just over half of all the SOC stored in Irish peatlands, which represent two-thirds of the national soil carbon stock. This has major implications for policy decisions and requires an urgent suite of actions to (a) ensure that these carbon stocks remain in the ground, and (b) promote other carbon sinks across all land uses.
- From an IPCC and GHG inventory reporting perspective, this study supports the need to obtain more accurate areal and GHG flux data from cutover bogs (private turbary) as this is not accurately represented in the reporting of ‘managed’ peatlands. Cutover bogs hold large carbon stocks that must be sustainably managed if Ireland wishes to meet its climate change targets.
- This project also demonstrated the critical need to continue the monitoring of GHG fluxes and associated environmental variables (water table levels and vegetation) given the diversity of conditions encountered in Ireland. The number of studies on drainage and rewetting impacts must be extended to a wide range of site types and LUC with further categorisation according to their drainage depth (deep vs shallow), nutrient status and vegetation conditions. The combination of these factors may be present in a mosaic across a peatland site. Thus, new methods must be developed in combination to accurately map peatland habitats and associated properties (eco-hydrological mapping).
- The relatively high degree of uncertainty in current and future local hydro-meteorological variables should also be noted in the context of peatland processes modelling and peatland investigations (to inform planning).
- We have identified the following peatland LUCs for the establishment of long term GHG monitoring capacity: *grassland*, *domestic peat extraction*, and *rewetting*. Ideally the monitoring of these sites should align with ICOS and would incorporate a combination of EC and chamber methodologies to fully capture GHG exchange at the micro- and macro scales in the selected site.
- The use of process orientated models is recommended by the IPCC for countries with a high proportion of peatlands in order to move to the Tier 3 reporting level with a reduction in associated uncertainty. However process models typically require a higher level of site parameter inputs than is used in empirical models but provide a more reliable mechanism for predicting variability in GHG dynamics under future environmental and anthoropogenic changes. While we successfully improve water table simulation approach (by application of drainage factor Dfa(i) in the ECOSSE model and thus predict CO2 emissions from drained peat

soils, the prediction of water table levels for the rewetted period was less successful under rewetted conditions, Further research in improving the water component in the ECOSSE model is critical together with continuous empirical data collection (especially water table levels) from rewetted sites especially. This is critical to support any sustainable peatland management schemes.

- The AUGER project has significantly augmented Irish peatland datasets, not only with edaphic and hydrological properties, carbon density and carbon stocks, but also water table regimes, vegetation profiles, GHG fluxes and carbon balances, thereby giving further insights into the biogeochemical processes that operate in these multi-faceted ecosystems. The project has narrowed the gap between the various research communities working on peat soils and it is hoped that the findings from this project will form a robust platform and a step towards an Irish peatland dataset hub for future collaborative research on peatlands. This project should also represent a step towards standardized multi-scale measurements of peatlands properties and, thus, enhance collaboration between empiricists and modellers to better advance peatland science.

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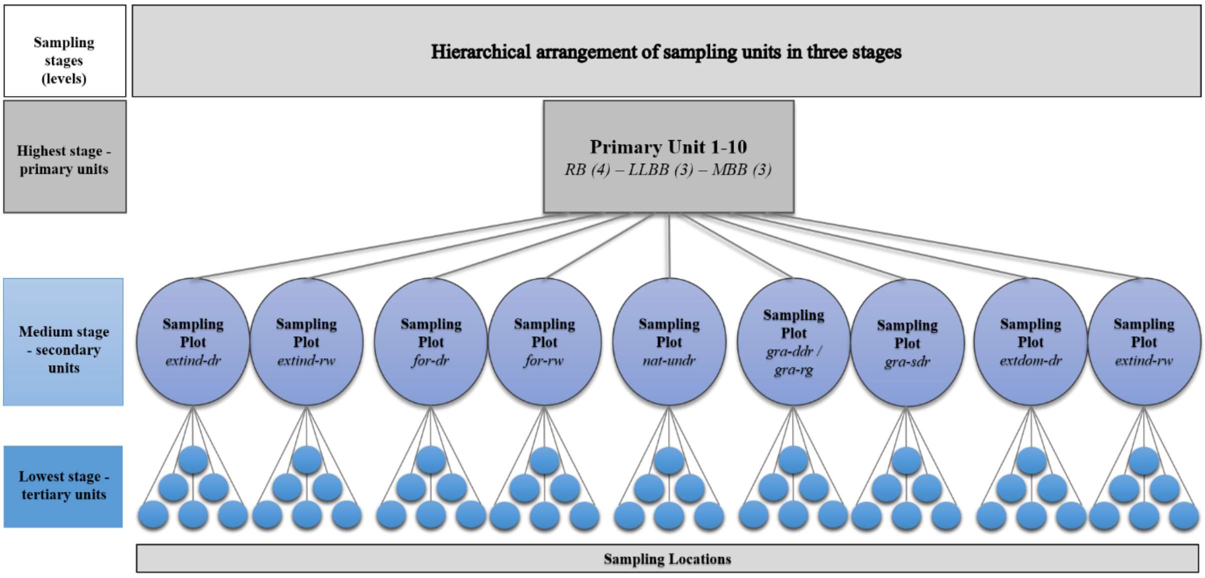
Acronyms and Annotations

C	Carbon
CH_4	Methane
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
DOC	Dissolved organic carbon
EF	Emissions factor
GHG	Greenhouse gas
GPP	Gross primary production
IPCC	Intergovernmental Panel on Climate Change
LUC	Land use category
N_2O	Nitrous oxide
NEE	Net ecosystem exchange
POC	Particulate organic carbon
PPFD	Photosynthetic photon flux density
R_{eco}	Ecosystem respiration
WTL	Water table level

Appendices

Appendix 1: Sampling size selection and statistical evaluation of sampling protocol.

The following factors are taken into account for the determination of the sample sizes of different levels (see schematic below)/



Due to the large spatial extent of each *land-use site types* (=30), and the relatively small sample size feasible per site type, an equal sampling size (n=18) for each *land-use site type* has been chosen. Gruijter et al. (2006) recommends proportional allocation for surveys with more than one target variable. This involves different sample sizes for the different strata (=*land-use site types*); however, due to a large number of strata and limited human resources provided, here we choose an equal sample size per stratum instead.

There are three factors which determine the sample size along with the total budget: the size of the stratum, the costs of sampling per stratum and the variability (variance) of the primary variable in a stratum. Generally, a stratum is allocated a larger sample, if the size of the stratum is larger, the primary variable is more variable, or the stratum is less expensive to sample. Due to the low ratio of sample sizes to stratum sizes, sampling costs and sample sizes per stratum are set to be equal for all *land-use site types* (=strata).

The sample size is calculated using a function that minimizes the variance for given maximum allowable budget Gruijter et al. (2006); The total cost of the survey can be expressed with a cost function:

$$C = co + \sum_{h=1}^{H} ch * nh$$

where *co* is overhead costs and *ch*nh* is the cost of sampling stratum *h*.

In total, and with the provided budget, the **theoretical maximum possible sample size** (sampling points) for all 23 *land-use site types* (13 drained site types and 10 rewetted site types) is: $n_{tot} = 480$. This does not include the costs for laboratory analysis.

n_{tot} is directly dependent on the 'costs per sampling day' and 'daily sample size'. Following the attached sampling protocol, an average daily sample size of $n_{day} = 6$ was realistic and feasible.

Thus, the sample size per sampling site equals $n_{site} = 6$, and the number of sampling sites equals the number of sampling days.

For sites of depths greater than 3.00 meter, only 4 points per sampling site are envisaged, due to time constraints and limitations regarding handling and processing of samples for lab analysis.

It should also be noted that a number of site-types had to be omitted, due to non-existence (rewetted/restored domestic extraction in lowland blanket bogs and mountain blanket bogs, drained and rewetted/restored industrial extraction in mountain blanket bogs, deep-drained (>30 cm WTD) grassland sites on lowland and mountain blanket bogs) and site-types for which a representative site could not be found within the respective Primary Units

In order to assess the appropriateness of the sampling approach, sampling errors were evaluated after the campaign was terminated and all variables were measured in the lab. Margins of errors (% of mean value of respective variables) were calculated for each sampled combination (PLT-LUC-sampling depth) and each measured variable. Medians and boundary values of error ranges (minimum, maximum) across sampling depths for each PLT-LUC combination formed the basis for an evaluation of sampling performance (

Table A2).

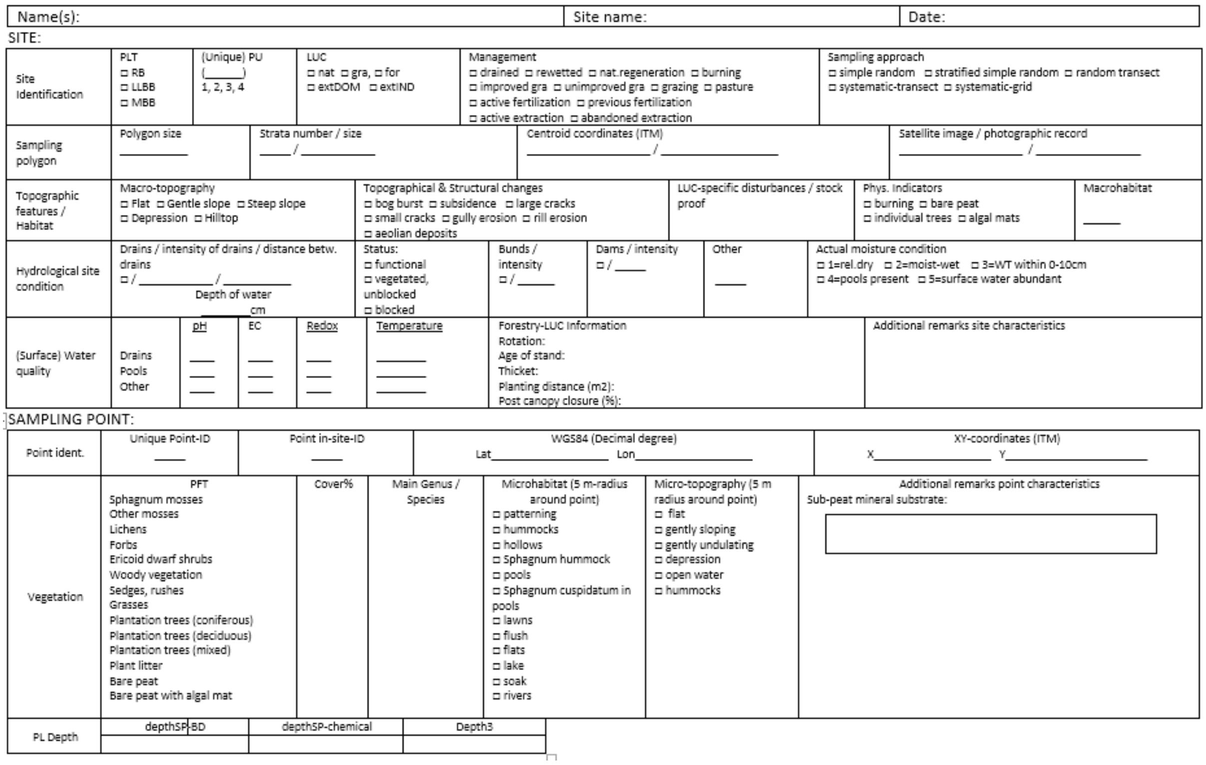
Sample sizes decreased with sampling depths across all sampled strata, with a minimum margin of error of 0%, indicating a sample size of n = 1 (sample at largest sampling depth) and a maximum of 750% for depths with only few sampling points. The median of 5.61% across all sampled points and sampling depths shows the wide range of the skewed error distribution and is an acceptable amount of sampling uncertainty for the survey.

Given that the initial choice of sample sizes for deeper layers was constrained to the inherent uncertainty about the depth distribution across peatlands in Ireland (no prior information on depth distribution in peatlands existed before sampling), the resulting error range highlights the necessity to pursue sampling on a higher resolution for specifically deeper layers. The sample sizes for upper layers (n = 3 – 6) are appropriate for a sampling campaign across existing strata (PLT-LUC). Inherent variability due to factors, such as peatland type and land use category, etc., should be corrected for through the calculation of a quality measure for each stratum, based on prior available information of standard deviations for each stratum, and an adaptation of sample sizes to the stratum sizes (areal extent). Both information was not available before the survey, so that the choice for a calculation of sample sizes for each stratum (PLT-LUC) remained constrained to the available budget.

Table A2: Margins of errors for each sampled stratum, averaged across depth

Peatland Type	Land Use Category	Margin of Error (%) – across all sampling depths												
		Grav. Water Content	**Vol. Water Content**	**Bulk Density**	**pH**	**Electric Conductivity**	**Von Post**	**Organic Matter**	**Ash**	**C**	**N**	**H**	**S**	**O**
Raised Bog	**Natural**	0.53	3.61	7.32	2.08	9.75	0.00	0.15	10.19	0.00	0.00	0.00	0.00	0.00
		18.46	25.88	183.33	9.68	98.68	75.00	6.42	57.91	2.21	35.41	10.11	42.47	11.42
		0.75	5.75	12.86	4.08	14.26	14.29	1.03	27.93	1.02	10.06	1.54	21.31	1.26
	Forestry	0.33	1.37	8.08	3.17	15.61	0.00	0.68	7.33	0.00	0.00	0.00	0.00	0.00
		6.15	22.33	44.58	15.52	40.68	33.33	5.18	121.52	3.61	14.56	4.69	34.92	6.36
		1.66	3.88	13.53	7.12	17.97	14.29	2.46	36.73	0.90	7.79	2.64	10.10	3.00
	Grassland	0.68	2.15	6.71	6.78	3.71	0.00	2.82	23.44	0.00	0.00	0.00	0.00	0.00
		9.10	52.51	61.47	78.95	78.61	16.67	47.15	298.10	12.68	11.72	11.27	28.74	12.93
		2.89	11.90	9.80	9.80	32.54	14.29	7.97	36.21	1.48	6.66	1.93	14.86	6.05
	Domestic extraction	1.09	1.25	12.15	1.19	9.05	0.00	0.10	8.15	0.63	2.19	0.56	5.56	0.68
		2.79	54.08	81.48	11.11	21.88	57.14	12.44	80.80	18.03	43.43	24.50	43.67	18.70
		1.33	3.07	14.66	3.39	12.44	14.29	0.90	30.74	1.73	9.14	1.49	14.29	5.28
	Industrial extraction	0.79	1.90	6.67	3.33	13.46	0.00	1.25	17.76	0.62	8.16	1.57	11.11	2.59
		23.76	51.15	261.11	75.86	301.21	75.00	3.42	43.78	25.09	361.60	101.31	750.00	71.33
		1.51	4.21	8.67	5.51	24.35	7.14	2.12	26.26	1.26	8.68	2.09	13.60	3.05
Lowland Blanket Bog	**Natural**	0.43	10.64	13.92	2.00	6.01	0.00	0.15	7.80	0.00	0.00	0.00	0.00	0.00
		26.09	32.90	210.71	30.00	17.14	75.00	79.10	627.70	2.45	7.45	3.83	18.18	4.12
		0.86	15.32	19.00	2.17	11.76	16.67	0.23	9.78	0.74	4.04	0.70	5.63	0.53
	Forestry	0.87	2.09	8.18	0.00	7.96	0.00	0.35	14.52	0.00	0.00	0.00	0.00	0.00
		4.07	18.62	18.49	4.00	22.07	33.33	7.23	74.03	6.16	14.63	7.45	15.96	6.88
		1.04	5.43	10.90	2.04	16.11	18.33	7.83	26.66	0.56	4.30	1.62	12.11	1.78
	Grassland	1.48	3.11	10.32	1.79	11.47	0.00	4.30	45.42	3.35	3.45	3.63	2.63	3.92
		7.07	10.53	31.63	11.32	29.72	28.57	15.00	61.28	14.76	16.09	13.44	21.00	18.89
		1.81	4.53	14.52	5.01	15.66	18.33	9.26	50.15	4.93	6.53	4.92	14.32	11.12
	Domestic extraction	0.44	5.77	8.33	0.00	8.35	0.00	0.11	8.05	0.49	3.72	1.62	2.47	0.13
		2.40	24.77	25.79	6.00	41.37	28.57	14.42	117.69	22.24	46.20	7.79	19.57	5.38
		0.66	7.98	12.69	2.25	14.29	6.25	0.26	12.79	0.77	9.28	3.33	12.29	0.70
	Industrial extraction	0.91	3.45	5.59	2.04	18.31	0.00	0.97	31.63	0.00	0.00	0.00	0.00	0.00
		26.73	19.12	208.59	4.35	30.32	20.00	91.42	574.36	2.57	16.33	2.51	17.27	2.41
		1.27	4.50	10.55	4.00	23.59	16.67	2.06	57.77	0.12	3.38	0.46	0.00	0.54
Mountain Blanket Bog	**Natural**	0.75	2.68	11.54	4.35	5.59	0.00	0.09	6.80	0.00	0.00	0.00	0.00	0.00
		7.21	27.38	53.91	18.52	39.20	28.57	2.65	76.72	1.50	14.84	4.20	24.53	7.43
		1.17	7.46	21.69	5.77	8.40	14.29	0.21	11.52	0.85	9.54	2.87	15.63	2.47
	Forestry	2.43	4.06	15.68	8.16	23.08	14.29	12.03	42.57	7.59	1.45	7.38	7.69	5.99
		9.02	35.69	49.41	26.67	118.11	42.86	67.36	115.29	33.74	7.66	35.01	61.68	25.78
		4.01	5.22	20.00	12.24	36.56	16.67	14.55	56.78	12.38	5.65	11.42	20.83	13.13
	Grassland	1.27	2.08	8.70	0.00	8.02	14.29	0.40	23.39	0.00	0.00	0.00	0.00	0.00
		6.40	17.05	35.06	8.33	15.07	37.50	17.86	157.31	10.79	21.48	11.02	60.00	30.24
		3.90	4.36	25.68	6.12	12.50	28.57	6.86	59.63	1.30	4.29	1.87	8.11	13.59
	Domestic Extraction	0.55	1.68	7.21	2.08	12.76	0.00	0.11	7.19	0.00	0.00	0.00	0.00	0.00
		15.06	14.96	121.77	18.00	81.74	75.00	18.08	241.32	19.30	9.34	17.96	18.87	18.19
		3.13	6.14	16.38	2.38	17.91	16.67	4.07	105.01	0.76	4.00	2.21	12.82	2.06

Appendix 2: Field sheet used for the national peat soil survey.



Name(s): | Site name: | Date:

SITE:

Site identification
PLT ☐ RB ☐ LLBB ☐ MBB
(Unique) PU (______) 1, 2, 3, 4
LUC ☐ nat ☐ gra, ☐ for ☐ extDOM ☐ extIND
Management ☐ drained ☐ rewetted ☐ nat.regeneration ☐ burning ☐ improved gra ☐ unimproved gra ☐ grazing ☐ pasture ☐ active fertilization ☐ previous fertilization ☐ active extraction ☐ abandoned extraction
Sampling approach ☐ simple random ☐ stratified simple random ☐ random transect ☐ systematic-transect ☐ systematic-grid

Sampling polygon
Polygon size ______
Strata number / size ____ / ______
Centroid coordinates (ITM) ________ / ________
Satellite image / photographic record ________ / ________

Topographic features / Habitat
Macro-topography ☐ Flat ☐ Gentle slope ☐ Steep slope ☐ Depression ☐ Hilltop
Topographical & Structural changes ☐ bog burst ☐ subsidence ☐ large cracks ☐ small cracks ☐ gully erosion ☐ rill erosion ☐ aeolian deposits
LUC-specific disturbances / stock proof
Phys. Indicators ☐ burning ☐ bare peat ☐ individual trees ☐ algal mats
Macrohabitat ____

Hydrological site condition
Drains / intensity of drains / distance betw. drains ☐ / ________ / ________ Depth of water ______cm
Status: ☐ functional ☐ vegetated, unblocked ☐ blocked
Bunds / intensity ☐ / _____
Dams / intensity ☐ / _____
Other ____
Actual moisture condition ☐ 1=rel.dry ☐ 2=moist-wet ☐ 3=WT within 0-10cm ☐ 4=pools present ☐ 5=surface water abundant

(Surface) Water quality

	pH	EC	Redox	Temperature
Drains	____	____	____	______
Pools	____	____	____	______
Other	____	____	____	______

Forestry-LUC Information
Rotation:
Age of stand:
Thicket:
Planting distance (m2):
Post canopy closure (%):

Additional remarks site characteristics

SAMPLING POINT:

Point ident.
Unique Point-ID ____
Point in-site-ID ____
WGS84 (Decimal degree) Lat________ Lon________
XY-coordinates (ITM) X________ Y________

Vegetation

PFT:
Sphagnum mosses
Other mosses
Lichens
Forbs
Ericoid dwarf shrubs
Woody vegetation
Sedges, rushes
Grasses
Plantation trees (coniferous)
Plantation trees (deciduous)
Plantation trees (mixed)
Plant litter
Bare peat
Bare peat with algal mat

Cover%

Main Genus / Species

Microhabitat (5 m-radius around point)
☐ patterning
☐ hummocks
☐ hollows
☐ Sphagnum hummock
☐ pools
☐ Sphagnum cuspidatum in pools
☐ lawns
☐ flush
☐ flats
☐ lake
☐ soak
☐ rivers

Micro-topography (5 m radius around point)
☐ flat
☐ gently sloping
☐ gently undulating
☐ depression
☐ open water
☐ hummocks

Additional remarks point characteristics
Sub-peat mineral substrate:

PL Depth

depthSP-BD	depthSP-chemical	Depth3

Appendix 3: Sites selected for hydrological monitoring for the period November 2017 to December 2019. Eight high-frequency loggers were installed, at two sampling sites, within eight sampling sites.

	Lat	Lon	X (Easting)	Y (Northing)	Elevation (m AOD)*
Knockmoyle (Co. Mayo)					
LLBB-Natural	54.1564535	-9.569419	97533	324173	
LLBB-Forest	54.1545388	-9.6212393	94144	324036	
LLBB-Cutover	54.1547273	-9.6188683	94299	324054	
LLBB-Grassland	54.1427176	-9.6216846	94085	322721	
Scohaboy (Co. Offaly)					
RB-Natural	52.9831475	-8.0519271	196621	192450	74.975
RB-Rewetted	52.9835996	-8.0480808	196820	192512	74.020
RB-Forestry	52.984449	-8.0392027	196824	192490	71.931
RB-Cutover	52.9796974	-8.0468698	196902	192069	73.366

*A differential GPS (Trimble®, accuracy of ± 0.05 m) was used to measure absolute levels above ordnance datum (AOD) for Raised Bog sites only due to Covid-19 this was not possible for the other sites.

Appendix 4: Tabular statistical description of peat properties along the profile for each bog type and management combination.

Raised bogs – Natural

Depth Properties	0-10 cm (N = 14)	10-25 cm (N = 14)	25-50 cm (N = 14)	50-75 cm (N = 14)	75-100 cm (N = 14)	100-150 cm (N = 14)	150-200 cm (N = 14)	200-250 cm (N = 14)	250-300 cm (N = 14)	300-350 cm (N = 14)	350-400 cm (N = 14)	400-450 cm (N = 14)	450-500 cm (N = 14)	500-550 cm (N = 14)	550-600 cm (N = 13)	600-650 cm (N = 11)	650-700 cm (N = 8)	700-750 cm (N = 4)	750-800 cm (N = 4)	800-850 cm (N = 4)	850-900 cm (N = 2)
WC (m %)																					
min, max	87.1, 94.8	90.7, 95.2	92.4, 95.0	92.1, 95.1	93.1, 95.9	93.3, 96.4	93.2, 96.4	91.5, 96.2	91.7, 95.7	91.6, 95.6	91.9, 95.6	91.0, 94.7	90.8, 94.6	91.2, 94.9	89.5, 94.1	91.1, 93.3	88.4, 94.0	90.9, 93.5	90.3, 93.5	89.4, 93.8	88.1, 90.7
median(IQR)	92.1 (91.2, 92.9)	92.5 (91.8, 93.3)	93.8 (92.7, 94.3)	94.4 (93.8, 94.8)	94.8 (94.0, 95.2)	94.7 (94.1, 95.5)	94.7 (94.0, 95.7)	94.0 (92.8, 95.1)	94.0 (93.3, 95.0)	94.0 (92.9, 95.1)	93.6 (93.2, 94.7)	92.9 (92.6, 93.6)	93.1 (92.5, 93.4)	92.8 (91.9, 93.4)	92.2 (91.5, 93.2)	91.7 (91.2, 92.9)	92.4 (91.7, 93.4)	92.3 (91.1, 93.4)	91.8 (91.0, 92.6)	92.4 (91.3, 93.2)	89.4 (88.8, 90.1)
mean(CI)	91.9 (90.9, 92.9)	92.6 (91.9, 93.4)	93.6 (93.1, 94.1)	94.2 (93.6, 94.7)	94.6 (94.1, 95.1)	94.8 (94.2, 95.3)	94.7 (94.2, 95.3)	93.9 (93.1, 94.8)	94.0 (93.3, 94.7)	94.0 (93.2, 94.7)	93.8 (93.2, 94.5)	93.0 (92.4, 93.6)	92.8 (92.2, 93.5)	92.8 (92.2, 93.5)	92.1 (91.2, 92.9)	92.1 (91.4, 92.7)	92.1 (90.6, 93.7)	92.2 (90.1, 94.4)	91.9 (89.7, 94.0)	92.0 (89.0, 95.0)	89.4 (72.9, 105.9)
WC (vol %)																					
min, max	32.9, 118.7	89.1, 118.5	48.6, 117.6	93.7, 123.0	72.7, 121.0	85.0, 122.2	82.7, 123.1	86.6, 120.4	79.5, 122.1	96.0, 121.0	95.0, 122.0	89.0, 122.4	94.0, 121.5	89.1, 123.0	83.2, 120.7	101.1, 121.1	97.5, 121.3	81.9, 117.4	94.9, 120.7	116.9, 127.5	115.4, 117.1
median(IQR)	84.0 (75.2, 101.4)	104.3 (98.8, 111.5)	107.8 (94.3, 111.5)	110.6 (102.8, 116.6)	111.8 (104.8, 117.6)	111.2 (107.8, 114.9)	115.6 (109.1, 117.4)	115.6 (104.1, 118.9)	112.6 (98.4, 117.1)	117.2 (109.9, 118.4)	115.2 (109.7, 118.5)	114.7 (103.0, 116.9)	114.1 (107.4, 118.5)	117.9 (113.7, 120.1)	113.5 (106.6, 117.6)	118.5 (115.9, 120.5)	115.4 (111.8, 119.9)	116.8 (107.7, 117.4)	116.3 (110.8, 117.6)	121.4 (119.4, 123.7)	116.2 (115.8, 116.7)
mean(CI)	84.8 (71.8, 97.8)	104.1 (98.9, 109.3)	99.6 (88.8, 110.5)	108.9 (103.5, 114.3)	109.2 (102.1, 116.2)	110.0 (104.9, 115.1)	110.0 (102.6, 117.4)	110.1 (103.4, 116.9)	108.3 (100.9, 115.7)	112.7 (107.6, 117.9)	113.6 (109.3, 117.9)	109.8 (103.7, 115.9)	112.1 (107.5, 116.8)	115.2 (110.3, 120.1)	110.7 (104.3, 117.1)	116.3 (112.1, 120.5)	114.0 (107.5, 120.5)	108.2 (80.3, 136.2)	112.0 (93.6, 130.5)	121.8 (114.7, 128.8)	116.2 (105.2, 127.3)
BD (g*cm^{-3})																					
min, max	0.024, 0.115	0.053, 0.112	0.032, 0.092	0.050, 0.097	0.047, 0.088	0.043, 0.087	0.043, 0.088	0.048, 0.102	0.054, 0.090	0.054, 0.093	0.053, 0.090	0.060, 0.095	0.068, 0.113	0.065, 0.108	0.072, 0.119	0.085, 0.117	0.077, 0.128	0.082, 0.114	0.084, 0.111	0.078, 0.151	0.118, 0.158
median(IQR)	0.067 (0.058, 0.100)	0.086 (0.067, 0.096)	0.066 (0.060, 0.081)	0.061 (0.057, 0.078)	0.058 (0.052, 0.074)	0.059 (0.053, 0.069)	0.059 (0.052, 0.069)	0.071 (0.061, 0.080)	0.065 (0.057, 0.082)	0.075 (0.059, 0.082)	0.080 (0.063, 0.083)	0.085 (0.075, 0.089)	0.086 (0.075, 0.090)	0.093 (0.075, 0.102)	0.093 (0.084, 0.105)	0.095 (0.090, 0.112)	0.094 (0.081, 0.104)	0.082 (0.082, 0.091)	0.099 (0.093, 0.104)	0.100 (0.089, 0.118)	0.138 (0.128, 0.148)
mean(CI)	0.076 (0.060, 0.092)	0.083 (0.073, 0.094)	0.068 (0.059, 0.078)	0.068 (0.059, 0.077)	0.062 (0.055, 0.070)	0.061 (0.054, 0.068)	0.061 (0.053, 0.068)	0.070 (0.061, 0.079)	0.069 (0.061, 0.077)	0.072 (0.064, 0.080)	0.075 (0.067, 0.082)	0.082 (0.076, 0.088)	0.086 (0.079, 0.094)	0.089 (0.080, 0.098)	0.095 (0.086, 0.104)	0.100 (0.092, 0.108)	0.097 (0.081, 0.113)	0.090 (0.065, 0.115)	0.098 (0.080, 0.117)	0.107 (0.056, 0.158)	0.138 (-0.115, 0.391)
PD (g*cm^{-3})																					
min, max	1.466, 1.503	1.463, 1.491	1.455, 1.488	1.456, 1.475	1.453, 1.463	1.450, 1.468	1.453, 1.474	1.457, 1.481	1.456, 1.500	1.454, 1.517	1.457, 1.547	1.458, 1.533	1.462, 1.554	1.461, 1.583	1.478, 1.580	1.505, 1.670	1.483, 1.626	1.526, 1.563	1.537, 1.563	1.518, 1.597	1.565, 1.576
median(IQR)	1.482 (1.477, 1.489)	1.470 (1.468, 1.474)[13]	1.462 (1.459, 1.466)	1.460 (1.457, 1.464)	1.460 (1.457, 1.462)	1.459 (1.457, 1.464)	1.459 (1.456, 1.462)	1.458 (1.457, 1.464)	1.460 (1.458, 1.465)	1.461 (1.457, 1.475)	1.461 (1.459, 1.490)	1.465 (1.461, 1.499)	1.474 (1.464, 1.516)	1.515 (1.476, 1.528)	1.512 (1.492, 1.573)	1.520 (1.508, 1.557)	1.534 (1.521, 1.573)	1.534 (1.527, 1.547)	1.557 (1.550, 1.560)	1.526 (1.523, 1.545)	1.571 (1.568, 1.573)
mean(CI)	1.484 (1.478, 1.490)	1.471 (1.467, 1.476)	1.464 (1.459, 1.469)	1.461 (1.458, 1.464)	1.459 (1.457, 1.461)	1.460 (1.457, 1.463)	1.460 (1.457, 1.464)	1.462 (1.458, 1.466)	1.466 (1.458, 1.473)	1.470 (1.459, 1.482)	1.478 (1.461, 1.496)	1.481 (1.466, 1.496)	1.491 (1.472, 1.510)	1.508 (1.488, 1.528)	1.528 (1.503, 1.552)	1.543 (1.507, 1.579)	1.547 (1.509, 1.585)	1.539 (1.512, 1.567)	1.553 (1.535, 1.571)	1.542 (1.483, 1.601)	1.571 (1.501, 1.640)
Porosity (vol%)																					
min, max	92.3, 98.4	92.4, 96.4	93.7, 97.8	93.4, 96.6	94.0, 96.8	94.0, 97.1	94.0, 97.0	93.1, 96.7	93.9, 96.4	93.8, 96.3	93.9, 96.4	93.5, 96.1	92.7, 95.5	92.7, 95.8	92.0, 95.3	92.3, 94.5	92.1, 94.9	92.7, 94.7	92.9, 94.5	90.5, 94.9	90.0, 92.4
median(IQR)	95.5 (93.3, 96.1)	93.9 (93.4, 95.2)[13]	95.5 (94.5, 95.9)	95.8 (94.7, 96.1)	96.0 (94.9, 96.5)	96.0 (95.3, 96.3)	96.0 (95.3, 96.5)	95.1 (94.6, 95.8)	95.6 (94.4, 96.1)	95.0 (94.4, 96.0)	94.6 (94.4, 95.7)	94.3 (94.0, 94.9)	94.3 (93.9, 94.9)	93.9 (93.1, 95.1)	94.1 (93.0, 94.6)	93.7 (92.7, 94.2)	93.9 (93.4, 94.7)	94.6 (94.1, 94.7)	93.7 (93.3, 94.0)	93.5 (92.4, 94.2)	91.2 (90.6, 91.8)
mean(CI)	94.9 (93.8, 96.0)	94.2 (93.5, 95.0)	95.3 (94.7, 96.0)	95.3 (94.8, 95.9)	95.7 (95.2, 96.3)	95.8 (95.3, 96.3)	95.8 (95.3, 96.4)	95.2 (94.6, 95.8)	95.3 (94.8, 95.8)	95.1 (94.6, 95.6)	95.0 (94.5, 95.4)	94.5 (94.1, 94.9)	94.2 (93.7, 94.7)	94.1 (93.4, 94.7)	93.8 (93.2, 94.4)	93.5 (92.9, 94.1)	93.8 (92.8, 94.7)	94.2 (92.6, 95.7)	93.7 (92.6, 94.8)	93.1 (90.1, 96.1)	91.2 (75.5, 106.9)
pH																					
min, max	4.1, 4.6	4.2, 4.5	4.2, 4.6	4.4, 4.8	4.3, 5.0	4.5, 5.5	4.6, 5.6	4.6, 5.9	4.7, 6.3	4.7, 6.4	4.8, 6.4	4.8, 6.5	5.0, 6.6	5.1, 6.9	5.1, 6.7	5.2, 7.3	5.4, 7.4	5.4, 5.8	5.5, 5.8	5.8, 6.0	6.1, 6.2
median(IQR)	13; 4.3 (4.2, 4.3)	4.3 (4.3, 4.4)	4.4 (4.4, 4.5)	4.5 (4.4, 4.6)	4.6 (4.5, 4.7)	4.7 (4.6, 4.8)	4.8 (4.7, 5.0)	4.9 (4.8, 5.1)	5.0 (4.9, 5.2)	5.1 (5.0, 5.2)	5.2 (5.0, 5.3)	5.2 (5.0, 5.5)	5.4 (5.2, 5.6)	13; 5.5 (5.2, 5.7)	5.8 (5.5, 6.0)	6.0 (5.5, 6.4)	5.9 (5.6, 6.6)	5.7 (5.6, 5.7)	5.8 (5.6, 5.8)	5.9 (5.8, 6.0)	6.1 (6.1, 6.1)
mean(CI)	4.3 (4.2, 4.4)	4.3 (4.3, 4.4)	4.4 (4.4, 4.5)	4.5 (4.5, 4.6)	4.6 (4.5, 4.7)	4.8 (4.6, 4.9)	4.9 (4.7, 5.1)	5.0 (4.8, 5.2)	5.1 (4.9, 5.3)	5.2 (5.0, 5.5)	5.3 (5.0, 5.6)	5.4 (5.1, 5.7)	5.5 (5.2, 5.8)	5.6 (5.3, 5.9)	5.8 (5.5, 6.1)	6.0 (5.6, 6.5)	6.2 (5.5, 6.8)	5.7 (5.4, 5.9)	5.7 (5.5, 6.0)	5.9 (5.7, 6.1)	6.1 (5.6, 6.6)
EC (mS*cm^{-1})																					
min, max	24.0, 110.5	34.6, 81.2	41.4, 76.5	39.0, 76.8	37.7, 80.2	40.7, 74.1	35.7, 75.2	35.7, 73.4	37.6, 71.3	33.3, 74.1	26.8, 78.4	38.0, 74.2	45.6, 92.6	43.2, 190.7	44.8, 311.0	38.5, 382.0	48.7, 356.0	44.7, 81.1	53.1, 72.6	50.5, 80.8	83.6, 97.7
median(IQR)	54.5 (42.6, 69.0)[13]	65.7 (49.4, 74.6)	60.2 (44.6, 68.8)	58.8 (45.2, 64.2)	54.2 (40.2, 60.8)	51.4 (44.9, 62.5)	52.8 (44.6, 64.1)	57.0 (44.8, 67.6)	54.3 (50.3, 65.3)	55.3 (49.8, 60.5)	55.4 (47.3, 64.1)	62.9 (48.9, 70.2)	60.8 (51.8, 70.4)	68.5 (58.6, 89.6)[12]	79.3 (69.4, 115.3)	97.4 (69.8, 206.6)	7; 213.0 (68.7, 286.5)	53.5 (49.4, 62.4)	61.1 (53.9, 69.2)	56.4 (53.0, 64.5)	90.7 (87.1, 94.2)
mean(CI)	57.8 (44.5, 71.1)	62.9 (54.4, 71.4)	58.5 (51.1, 66.0)	56.4 (48.8, 64.0)	53.1 (45.3, 60.9)	54.8 (48.4, 61.2)	53.9 (46.7, 61.0)	55.2 (47.7, 62.7)	56.4 (50.8, 61.9)	54.7 (49.2, 60.2)	55.3 (47.4, 63.2)	59.4 (51.9, 66.9)	63.5 (54.8, 72.3)	84.2 (56.1, 112.4)	101.0 (59.0, 142.9)	151.2 (68.1, 234.2)	189.7 (72.2, 307.2)	58.2 (32.8, 83.6)	62.0 (46.4, 77.6)	61.0 (39.3, 82.7)	90.7 (1.1, 180.2)
von Post																					
min, max	4, 8	3, 6	3, 6	4, 7	3, 6	3, 6	2, 8	4, 8	4, 9	4, 9	4, 8	4, 8	5, 8	6, 8	5, 8	5, 8	7, 9	7, 7	6, 7	7, 8	7, 8
median(IQR)	6 (4, 7)	5 (4, 6)	5 (4, 5)	5 (5, 6)	5 (4, 5)	5 (4, 6)	5 (4, 6)	6 (5, 7)	6 (5, 8)	6 (5, 8)	7 (5, 8)	8 (5, 8)	7 (6, 8)	8 (6, 8)	7 (7, 8)	8 (6, 8)	8 (7, 8)	7 (7, 7)	7 (7, 7)	7 (7, 7)	8 (7, 8)
mean(CI)	6 (5, 7)	5 (4, 6)	5 (4, 5)	5 (5, 6)	5 (4, 5)	5 (4, 5)	5 (4, 6)	6 (5, 7)	6 (5, 7)	6 (5, 7)	7 (6, 7)	7 (6, 8)	7 (6, 7)	7 (7, 8)	7 (7, 8)	7 (6, 8)	8 (7, 8)	7 (7, 7)	7 (6, 8)	7 (6, 8)	8 (1, 14)
OM (m %)																					
min, max	94.81, 97.83	95.78, 98.10	96.05, 98.76	97.08, 98.70	98.09, 98.95	97.65, 99.17	97.21, 98.96	96.61, 98.61	95.00, 98.64	93.63, 98.83	91.12, 98.62	92.32, 98.53	90.61, 98.15	88.15, 98.29	88.42, 96.87	80.96, 94.63	84.61, 96.47	89.83, 92.93	89.84, 91.96	87.03, 93.59	88.74, 89.65
median(IQR)	96.50 (95.93, 96.92)	97.50 (97.15, 97.72)[13]	98.15 (97.84, 98.43)	98.33 (98.03, 98.56)	98.35 (98.21, 98.63)	98.43 (97.99, 98.64)	98.47 (98.16, 98.64)	98.47 (98.02, 98.57)	98.38 (97.92, 98.53)	98.24 (97.12, 98.60)	98.27 (95.91, 98.45)	97.92 (95.12, 98.24)	97.16 (93.68, 97.99)	93.84 (92.69, 97.03)	94.03 (89.04, 95.69)	93.36 (90.30, 94.35)	92.22 (88.98, 93.33)	92.21 (91.18, 92.83)	90.35 (90.06, 90.92)	92.87 (91.28, 93.18)	89.19 (88.97, 89.42)
mean(CI)	96.36 (95.85, 96.86)	97.40 (97.04, 97.76)	98.00 (97.61, 98.40)	98.24 (97.98, 98.49)	98.43 (98.27, 98.58)	98.35 (98.11, 98.60)	98.33 (98.03, 98.63)	98.19 (97.84, 98.53)	97.87 (97.23, 98.51)	97.50 (96.57, 98.44)	96.82 (95.37, 98.27)	96.59 (95.34, 97.85)	95.76 (94.18, 97.33)	94.38 (92.75, 96.00)	92.75 (90.75, 94.76)	91.47 (88.51, 94.44)	91.18 (88.03, 94.33)	91.80 (89.51, 94.08)	90.63 (89.13, 92.12)	91.59 (86.72, 96.47)	89.19 (83.47, 94.92)
Ash (m %)																					
min, max	2.17, 5.19	1.90, 4.22	1.24, 3.95	1.30, 2.92	1.05, 1.91	0.83, 2.35	1.04, 2.79	1.39, 3.39	1.36, 5.00	1.17, 6.37	1.38, 8.88	1.47, 7.68	1.85, 9.39	1.71, 11.85	3.13, 11.58	5.37, 19.04	3.53, 15.39	7.07, 10.17	8.04, 10.16	6.41, 12.97	10.35, 11.26
median(IQR)	3.50 (3.08, 4.07)	2.50 (2.28, 2.85)[13]	1.85 (1.57, 2.16)	1.67 (1.44, 1.97)	1.65 (1.37, 1.79)	1.57 (1.36, 2.01)	1.53 (1.36, 1.84)	1.53 (1.43, 1.98)	1.62 (1.47, 2.08)	1.76 (1.40, 2.88)	1.73 (1.55, 4.09)	2.08 (1.76, 4.88)	2.84 (2.01, 6.32)	6.16 (2.97, 7.31)	5.97 (4.31, 10.96)	6.64 (5.65, 9.70)	7.78 (6.67, 11.02)	7.79 (7.17, 8.82)	9.65 (9.08, 9.94)	7.13 (6.82, 8.72)	10.81 (10.58, 11.03)
mean(CI)	3.64 (3.14, 4.15)	2.60 (2.24, 2.96)	2.00 (1.60, 2.39)	1.76 (1.51, 2.02)	1.57 (1.42, 1.73)	1.65 (1.40, 1.89)	1.67 (1.37, 1.97)	1.81 (1.47, 2.16)	2.13 (1.49, 2.77)	2.50 (1.56, 3.43)	3.18 (1.73, 4.63)	3.41 (2.15, 4.66)	4.24 (2.67, 5.82)	5.62 (4.00, 7.25)	7.25 (5.24, 9.25)	8.53 (5.56, 11.49)	8.82 (5.67, 11.97)	8.20 (5.92, 10.49)	9.37 (7.88, 10.87)	8.41 (3.53, 13.28)	10.81 (5.08, 16.53)
Carbon (m %)																					
min, max	50.78, 52.24	51.89, 54.39	53.11, 53.90	50.88, 54.45	50.88, 54.45	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	51.12, 57.51	52.58, 55.78	55.78, 55.78	55.78, 55.78	55.78, 55.78	52.10, 52.10
median(IQR)	51.70 (50.90, 52.15)	53.19 (52.21, 53.22)	53.69 (53.61, 53.76)	54.16 (51.66, 54.41)	54.16 (51.66, 54.41)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.66 (55.53, 55.78)	55.78 (55.53, 55.78)	55.78 (54.73, 56.64)	55.61 (54.72, 55.78)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	52.10 (52.10, 52.10)
mean(CI)	51.59 (51.21, 51.96)	53.08 (52.55, 53.60)	53.61 (53.44, 53.78)	53.30 (52.38, 54.23)	53.30 (52.38, 54.23)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.85 (55.29, 56.42)	55.88 (55.27, 56.49)	55.54 (54.31, 56.77)	54.89 (53.69, 56.09)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	52.10 (52.10, 52.10)
Nitrogen (m %)																					
min, max	1.59, 2.32	1.92, 2.14	1.59, 1.88	1.38, 1.52	1.38, 1.52	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 3.68	1.64, 4.07	1.64, 1.64	1.64, 1.64	1.64, 1.64	4.03, 4.03

median(IQR)	2.18 (1.73, 2.20)	1.98 (1.97, 1.98)	1.80 (1.63, 1.86)	1.50 (1.45, 1.52)	1.50 (1.45, 1.52)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.73 (1.64, 2.12)	1.64 (1.64, 1.81)	1.64 (1.51, 1.81)	2.29 (1.64, 3.22)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	4.03 (4.03, 4.03)
mean(CI)	2.04 (1.87, 2.22)	2.00 (1.95, 2.04)	1.76 (1.69, 1.83)	1.47 (1.44, 1.50)	1.47 (1.44, 1.50)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.79 (1.60, 1.97)	1.75 (1.57, 1.94)	1.80 (1.37, 2.23)	2.57 (1.66, 3.48)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	4.03 (4.03, 4.03)
Hydrogen (m%)																					
min, max	5.00, 5.52	5.15, 5.64	5.29, 5.67	5.09, 5.54	5.09, 5.54	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.59, 6.28	5.24, 5.24	5.24, 5.24	5.24, 5.24	6.08, 6.08
median(IQR)	5.42 (5.39, 5.50)	5.51 (5.47, 5.55)	5.51 (5.48, 5.54)	5.47 (5.45, 5.49)	5.47 (5.45, 5.49)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.27 (5.24, 5.29)	5.24 (5.24, 5.29)	5.24 (5.04, 5.28)	5.24 (5.08, 5.50)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	6.08 (6.08, 6.08)
mean(CI)	5.35 (5.24, 5.47)	5.46 (5.36, 5.56)	5.50 (5.42, 5.57)	5.40 (5.30, 5.50)	5.40 (5.30, 5.50)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.21 (5.12, 5.29)	5.20 (5.11, 5.29)	5.17 (5.07, 5.28)	5.34 (4.80, 5.88)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	6.08 (6.08, 6.08)
Sulfur (m %)																					
min, max	0.31, 0.41	0.44, 0.54	0.34, 0.54	0.25, 0.49	0.25, 0.49	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 1.87	0.63, 1.60	0.63, 0.63	0.63, 0.63	0.63, 0.63	3.24, 3.24
median(IQR)	0.32 (0.31, 0.39)	0.47 (0.45, 0.48)	0.43 (0.38, 0.48)	0.38 (0.37, 0.40)	0.38 (0.37, 0.40)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.61 (0.60, 0.63)	0.63 (0.60, 0.63)	0.63 (0.46, 0.93)	1.09 (0.63, 1.57)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	3.24 (3.24, 3.24)
mean(CI)	0.35 (0.33, 0.38)	0.48 (0.46, 0.50)	0.43 (0.39, 0.48)	0.38 (0.33, 0.43)	0.38 (0.33, 0.43)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.49, 0.74)	0.61 (0.48, 0.75)	0.73 (0.43, 1.04)	1.10 (0.68, 1.53)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	3.24 (3.24, 3.24)
Oxygen (m %)																					
min, max	35.21, 38.93	34.74, 37.02	35.80, 37.34	36.51, 39.97	36.51, 39.97	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	25.49, 33.28	23.93, 32.62	32.62, 32.62	32.62, 32.62	32.62, 32.62	23.89, 23.89
median(IQR)	36.64 (36.48, 38.40)	36.56 (36.34, 36.96)	36.72 (35.95, 37.04)	37.02 (36.62, 39.24)	37.02 (36.62, 39.24)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (31.80, 33.05)	32.62 (32.62, 33.05)	33.05 (32.62, 33.16)	29.89 (26.35, 32.62)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	23.89 (23.89, 23.89)
mean(CI)	36.98 (36.17, 37.79)	36.29 (35.78, 36.80)	36.62 (36.25, 36.98)	37.71 (36.85, 38.58)	37.71 (36.85, 38.58)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.54 (32.13, 32.95)	32.62 (32.21, 33.03)	32.27 (30.75, 33.79)	29.08 (25.76, 32.40)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	23.89 (23.89, 23.89)
WC (m %)																					
min, max	90.3, 93.5	91.9, 94.3	92.8, 94.3	93.2, 94.8	93.8, 95.1	93.8, 95.6	93.9, 95.9	92.4, 95.7	92.8, 95.3	92.7, 95.2	92.9, 95.0	92.6, 93.7	91.9, 93.8	91.6, 93.7	90.7, 93.1	91.2, 92.9	90.1, 93.4	92.2, 92.2	91.9, 91.9	92.2, 92.2	89.8, 89.8
median(IQR)	91.7 (91.2, 92.4)	92.3 (92.1, 92.8)	93.7 (93.1, 94.1)	94.5 (94.2, 94.6)	94.7 (94.4, 95.1)	94.7 (94.4, 95.0)	94.6 (94.2, 95.1)	94.0 (93.5, 94.6)	93.9 (93.2, 94.7)	94.0 (92.9, 95.2)	93.4 (93.0, 94.0)	92.8 (92.6, 93.1)	93.0 (92.6, 93.2)	92.8 (92.5, 93.2)	92.2 (91.3, 93.0)	91.8 (91.2, 92.5)	92.4 (91.3, 93.0)	92.3 (92.3, 92.3)	91.8 (91.8, 91.8)	92.5 (92.5, 92.5)	89.8 (89.8, 89.8)
mean(CI)	91.8 (89.6, 93.9)	92.5 (90.7, 94.4)	93.6 (92.6, 94.6)	94.1 (93.1, 95.2)	94.6 (93.6, 95.5)	94.7 (93.5, 95.9)	94.7 (93.3, 96.1)	93.9 (91.7, 96.1)	94.0 (92.1, 95.8)	93.9 (92.0, 95.9)	93.8 (92.3, 95.3)	93.0 (92.2, 93.7)	92.8 (91.6, 94.1)	92.8 (91.5, 94.1)	92.0 (90.1, 94.0)	91.9 (90.5, 93.3)	92.0 (87.8, 96.1)	92.2 (NaN, NaN)	91.9 (NaN, NaN)	92.2 (NaN, NaN)	89.8 (NaN, NaN)
WC (vol %)																					
min, max	68.8, 108.2	98.5, 115.9	86.8, 106.9	102.3, 119.6	96.9, 118.8	104.2, 117.6	100.2, 118.8	93.9, 119.4	92.5, 116.4	110.1, 118.6	105.9, 118.3	102.9, 117.2	109.0, 116.7	109.8, 119.0	98.0, 115.9	108.7, 119.5	112.7, 117.8	108.2, 108.2	112.0, 112.0	121.2, 121.2	116.0, 116.0
median(IQR)	82.6 (75.4, 92.8)	102.0 (100.1, 107.0)	110.6 (106.7, 111.2)	105.7 (101.6, 111.8)	110.1 (105.7, 114.8)	110.8 (108.4, 113.9)	116.5 (112.5, 117.1)	117.1 (110.0, 118.9)	113.1 (106.3, 117.0)	116.4 (114.4, 117.5)	115.3 (111.0, 118.2)	113.6 (110.8, 114.5)	113.5 (112.3, 115.7)	117.1 (116.0, 118.8)	114.0 (108.8, 117.4)	113.7 (110.6, 117.1)	116.4 (114.5, 117.1)	116.8 (116.8, 116.8)	116.3 (116.3, 116.3)	120.9 (120.9, 120.9)	116.0 (116.0, 116.0)
mean(CI)	86.6 (60.0, 113.2)	104.9 (92.3, 117.6)	100.4 (85.7, 115.1)	109.2 (96.7, 121.8)	109.8 (94.9, 124.7)	110.3 (101.2, 119.5)	110.4 (97.0, 123.7)	110.9 (92.5, 129.3)	109.1 (91.4, 126.8)	113.0 (106.8, 119.2)	113.9 (104.6, 123.1)	110.3 (101.0, 119.6)	112.4 (107.3, 117.5)	114.9 (108.8, 121.1)	110.0 (97.0, 123.1)	113.9 (105.8, 122.0)	115.5 (109.1, 121.9)	108.2 (NaN, NaN)	112.0 (NaN, NaN)	121.2 (NaN, NaN)	116.0 (NaN, NaN)
BD (g*cm^{-3})																					
min, max	0.055, 0.104	0.061, 0.100	0.059, 0.083	0.061, 0.087	0.056, 0.079	0.052, 0.078	0.049, 0.078	0.052, 0.080	0.057, 0.085	0.057, 0.087	0.063, 0.083	0.074, 0.090	0.077, 0.099	0.079, 0.104	0.083, 0.110	0.090, 0.113	0.082, 0.123	0.090, 0.090	0.098, 0.098	0.104, 0.104	0.132, 0.132
median(IQR)	0.083 (0.062, 0.101)	0.090 (0.080, 0.094)	0.066 (0.062, 0.075)	0.060 (0.059, 0.066)	0.055 (0.054, 0.061)	0.058 (0.055, 0.063)	0.060 (0.054, 0.067)	0.073 (0.067, 0.075)	0.070 (0.064, 0.075)	0.070 (0.059, 0.082)	0.081 (0.075, 0.082)	0.088 (0.084, 0.089)	0.084 (0.080, 0.091)	0.091 (0.085, 0.095)	0.092 (0.085, 0.101)	0.098 (0.091, 0.107)	0.097 (0.088, 0.110)	0.082 (0.082, 0.082)	0.099 (0.099, 0.099)	0.098 (0.098, 0.098)	0.132 (0.132, 0.132)
mean(CI)	0.079 (0.040, 0.117)	0.085 (0.058, 0.113)	0.069 (0.052, 0.086)	0.069 (0.049, 0.088)	0.063 (0.046, 0.080)	0.062 (0.044, 0.080)	0.062 (0.043, 0.081)	0.071 (0.051, 0.091)	0.070 (0.051, 0.089)	0.073 (0.051, 0.095)	0.075 (0.061, 0.089)	0.083 (0.071, 0.094)	0.087 (0.072, 0.101)	0.089 (0.072, 0.106)	0.095 (0.074, 0.115)	0.100 (0.082, 0.117)	0.101 (0.049, 0.152)	0.090 (NaN, NaN)	0.098 (NaN, NaN)	0.104 (NaN, NaN)	0.132 (NaN, NaN)
PD (g*cm^{-3})																					
min, max	1.477, 1.494	1.468, 1.478	1.459, 1.473	1.460, 1.463	1.457, 1.461	1.457, 1.462	1.456, 1.463	1.457, 1.470	1.458, 1.482	1.455, 1.496	1.459, 1.521	1.461, 1.516	1.464, 1.529	1.469, 1.529	1.482, 1.573	1.507, 1.670	1.511, 1.579	1.539, 1.539	1.553, 1.553	1.538, 1.538	1.569, 1.569
median(IQR)	1.485 (1.479, 1.491)	1.472 (1.470, 1.474)	1.463 (1.461, 1.466)	1.459 (1.459, 1.460)	1.459 (1.458, 1.460)	1.461 (1.460, 1.461)	1.461 (1.458, 1.463)	1.459 (1.457, 1.463)	1.459 (1.458, 1.466)	1.461 (1.459, 1.471)	1.462 (1.459, 1.480)	1.471 (1.461, 1.490)	1.483 (1.466, 1.509)	1.503 (1.484, 1.520)	1.539 (1.500, 1.573)	1.545 (1.513, 1.599)	1.557 (1.538, 1.568)	1.534 (1.534, 1.534)	1.557 (1.557, 1.557)	1.525 (1.525, 1.525)	1.569 (1.569, 1.569)
mean(CI)	1.485 (1.472, 1.498)	1.472 (1.464, 1.479)	1.464 (1.454, 1.474)	1.461 (1.459, 1.464)	1.459 (1.456, 1.462)	1.460 (1.456, 1.463)	1.460 (1.455, 1.465)	1.462 (1.453, 1.471)	1.465 (1.447, 1.483)	1.469 (1.439, 1.499)	1.476 (1.429, 1.524)	1.480 (1.438, 1.522)	1.490 (1.441, 1.540)	1.505 (1.460, 1.550)	1.530 (1.460, 1.601)	1.566 (1.446, 1.686)	1.549 (1.464, 1.634)	1.539 (NaN, NaN)	1.553 (NaN, NaN)	1.538 (NaN, NaN)	1.569 (NaN, NaN)
Porosity (v%)																					
min, max	93.0, 96.3	93.2, 96.0	94.3, 96.0	94.1, 95.8	94.6, 96.2	94.7, 96.4	94.7, 96.6	94.5, 96.4	94.2, 96.1	94.0, 96.1	94.3, 95.7	93.8, 95.0	93.3, 94.9	92.9, 94.8	92.6, 94.7	92.5, 94.3	92.1, 94.6	94.2, 94.2	93.7, 93.7	93.3, 93.3	91.6, 91.6
median(IQR)	94.4 (93.2, 95.8)	93.9 (93.6, 94.6)	95.5 (94.9, 95.7)	95.9 (95.5, 96.0)	96.2 (95.8, 96.3)	96.1 (95.7, 96.2)	95.9 (95.4, 96.3)	95.0 (94.8, 95.4)	95.2 (94.9, 95.6)	95.3 (94.5, 96.0)	94.5 (94.5, 94.8)	94.1 (93.9, 94.4)	94.4 (93.8, 94.7)	94.0 (93.6, 94.5)	94.1 (93.5, 94.5)	93.9 (93.4, 94.1)	93.9 (93.0, 94.3)	94.6 (94.6, 94.6)	93.7 (93.7, 93.7)	93.6 (93.6, 93.6)	91.6 (91.6, 91.6)
mean(CI)	94.7 (92.2, 97.3)	94.2 (92.3, 96.2)	95.3 (94.1, 96.5)	95.3 (94.0, 96.6)	95.7 (94.5, 96.8)	95.7 (94.5, 97.0)	95.8 (94.5, 97.1)	95.1 (93.8, 96.5)	95.2 (93.9, 96.5)	95.1 (93.6, 96.5)	94.9 (94.0, 95.8)	94.4 (93.6, 95.2)	94.2 (93.1, 95.3)	94.0 (92.7, 95.4)	93.8 (92.3, 95.3)	93.6 (92.4, 94.9)	93.5 (90.3, 96.7)	94.2 (NaN, NaN)	93.7 (NaN, NaN)	93.3 (NaN, NaN)	91.6 (NaN, NaN)
pH																					
min, max	4.2, 4.4	4.3, 4.3	4.4, 4.5	4.5, 4.6	4.5, 4.7	4.6, 4.9	4.7, 5.1	4.8, 5.3	4.8, 5.5	4.8, 5.8	4.9, 6.0	4.9, 6.1	5.0, 6.2	5.2, 6.1	5.3, 6.5	5.4, 7.3	5.5, 7.2	5.7, 5.7	5.7, 5.7	5.9, 5.9	6.1, 6.1
median(IQR)	4.3 (4.2, 4.3)	4.4 (4.3, 4.4)	4.4 (4.4, 4.4)	4.5 (4.5, 4.6)	4.6 (4.6, 4.7)	4.8 (4.6, 4.9)	4.9 (4.7, 5.0)	5.0 (4.9, 5.1)	5.1 (4.9, 5.2)	5.1 (5.0, 5.4)	5.2 (5.1, 5.4)	5.2 (5.1, 5.5)	5.4 (5.3, 5.7)	5.6 (5.4, 5.8)	5.8 (5.6, 6.1)	6.1 (5.7, 6.6)	6.3 (5.9, 6.8)	5.7 (5.7, 5.7)	5.8 (5.8, 5.8)	5.8 (5.8, 5.8)	6.1 (6.1, 6.1)
mean(CI)	4.3 (4.1, 4.5)	4.3 (4.3, 4.4)	4.4 (4.4, 4.5)	4.5 (4.4, 4.6)	4.6 (4.5, 4.8)	4.8 (4.5, 5.0)	4.9 (4.6, 5.2)	5.0 (4.7, 5.3)	5.1 (4.6, 5.6)	5.2 (4.5, 5.9)	5.3 (4.5, 6.1)	5.4 (4.6, 6.2)	5.5 (4.7, 6.3)	5.6 (5.0, 6.2)	5.9 (5.1, 6.6)	6.3 (4.9, 7.6)	6.4 (4.2, 8.5)	5.7 (NaN, NaN)	5.7 (NaN, NaN)	5.9 (NaN, NaN)	6.1 (NaN, NaN)
EC (mS*cm^{-1})																					
min, max	36.7, 87.6	49.3, 74.4	46.9, 68.6	44.6, 68.0	41.4, 67.1	45.1, 68.8	43.3, 66.9	45.6, 68.4	47.8, 66.5	48.2, 64.5	39.0, 72.0	43.5, 66.5	49.1, 74.4	51.0, 113.9	57.8, 181.0	58.3, 382.0	62.0, 348.3	58.2, 58.2	62.0, 62.0	60.5, 60.5	93.0, 93.0
median(IQR)	59.3 (49.3, 70.5)	65.8 (54.9, 74.5)	62.1 (54.9, 66.8)	55.3 (49.8, 60.6)	51.3 (46.6, 56.3)	55.2 (47.0, 64.6)	57.6 (48.1, 66.4)	57.5 (49.2, 65.4)	55.9 (52.1, 61.3)	54.8 (52.2, 57.8)	55.3 (49.5, 61.9)	65.7 (58.1, 68.4)	65.5 (58.0, 70.9)	69.7 (62.5, 79.9)	95.0 (68.4, 123.6)	192.9 (90.0, 310.0)	220.0 (139.1, 284.1)	53.5 (53.5, 53.5)	61.1 (61.1, 61.1)	56.2 (56.2, 56.2)	93.0 (93.0, 93.0)
mean(CI)	60.7 (26.3, 95.1)	64.2 (45.4, 83.1)	59.5 (44.7, 74.2)	57.6 (40.7, 74.4)	54.4 (36.1, 72.7)	56.1 (38.1, 74.2)	55.3 (36.6, 74.1)	56.3 (40.6, 72.1)	57.2 (44.5, 70.0)	55.4 (44.6, 66.1)	56.3 (34.5, 78.1)	60.2 (42.5, 77.9)	64.0 (45.0, 82.9)	80.8 (38.9, 122.7)	105.9 (17.4, 194.4)	191.8 (-38.3, 421.9)	210.1 (-146.1, 566.3)	58.2 (NaN, NaN)	62.0 (NaN, NaN)	60.5 (NaN, NaN)	93.0 (NaN, NaN)
von Post																					
min, max	4, 7	4, 6	4, 5	4, 6	4, 5	4, 5	4, 7	4, 8	5, 8	5, 8	5, 8	5, 8	6, 8	6, 8	7, 8	7, 8	7, 8	7, 7	7, 7	7, 7	7, 7
median(IQR)	6 (6, 7)	5 (4, 6)	5 (5, 5)	5 (5, 5)	5 (4, 5)	5 (5, 5)	6 (5, 6)	6 (6, 7)	6 (5, 6)	6 (5, 6)	7 (6, 8)	8 (7, 8)	7 (6, 8)	8 (7, 8)	7 (7, 7)	8 (7, 8)	8 (8, 8)	7 (7, 7)	7 (7, 7)	7 (7, 7)	7 (7, 7)
mean(CI)	6 (4, 8)	5 (4, 6)	5 (4, 5)	5 (4, 6)	5 (4, 6)	5 (4, 6)	5 (3, 8)	6 (4, 8)	6 (4, 9)	6 (4, 9)	7 (5, 9)	7 (5, 9)	7 (5, 9)	7 (6, 8)	7 (7, 8)	7 (6, 8)	8 (7, 9)	7 (NaN, NaN)	7 (NaN, NaN)	7 (NaN, NaN)	7 (NaN, NaN)

OM (m %)																					
min, max	95.58, 96.92	96.82, 97.65	97.26, 98.46	98.08, 98.35	98.26, 98.57	98.19, 98.62	98.07, 98.67	97.54, 98.55	96.52, 98.55	95.33, 98.76	93.28, 98.45	93.73, 98.30	92.61, 97.98	92.6397.59	88.97, 96.53	80.96, 94.45	88.53, 94.09	91.80, 91.80	90.63, 90.63	91.92, 91.92	89.35, 89.35
median(IQR)	96.31 (95.82, 96.75)	97.39 (97.23, 97.55)	98.11 (97.89, 98.26)	98.40 (98.31, 98.45)	98.43 (98.32, 98.54)	98.30 (98.28, 98.38)	98.30 (98.11, 98.51)	98.43 (98.11, 98.56)	98.42 (97.89, 98.49)	98.27 (97.45, 98.47)	98.15 (96.70, 98.45)	97.40 (95.85, 98.23)	96.42 (94.27, 97.89)	94.77 (93.38, 96.36)	91.78 (88.98, 95.02)	91.31 (86.85, 93.98)	90.36 (89.44, 91.88)	92.21 (92.21, 92.21)	90.35 (90.35, 90.35)	92.95 (92.95, 92.95)	89.35 (89.35, 89.35)
mean(CI)	96.27 (95.18, 97.37)	97.38 (96.78, 97.98)	98.03 (97.18, 98.88)	98.22 (98.05, 98.40)	98.43 (98.20, 98.66)	98.36 (98.07, 98.65)	98.35 (97.91, 98.78)	98.21 (97.46, 98.96)	97.94 (96.42, 99.45)	97.60 (95.13, 100.08)	96.98 (93.02, 100.95)	96.69 (93.25, 100.13)	95.85 (91.77, 99.93)	94.66 (90.94, 98.37)	92.53 (86.72, 98.34)	89.56 (79.63, 99.48)	90.99 (83.94, 98.04)	91.80 (NaN, NaN)	90.63 (NaN, NaN)	91.92 (NaN, NaN)	89.35 (NaN, NaN)
Ash (m %)																					
min, max	3.08, 4.42	2.35, 3.18	1.54, 2.74	1.65, 1.92	1.43, 1.74	1.38, 1.81	1.33, 1.93	1.45, 2.46	1.45, 3.48	1.24, 4.67	1.55, 6.72	1.70, 6.27	2.02, 7.39	2.41, 7.37	3.47, 11.03	5.55, 19.04	5.91, 11.47	8.20, 8.20	9.37, 9.37	8.08, 8.08	10.65, 10.65
median(IQR)	3.69 (3.25, 4.18)	2.61 (2.45, 2.77)	1.89 (1.74, 2.11)	1.60 (1.55, 1.69)	1.57 (1.46, 1.68)	1.70 (1.62, 1.72)	1.70 (1.49, 1.89)	1.57 (1.44, 1.89)	1.58 (1.51, 2.11)	1.73 (1.53, 2.55)	1.85 (1.55, 3.30)	2.60 (1.77, 4.15)	3.58 (2.11, 5.73)	5.23 (3.64, 6.62)	8.22 (4.98, 11.02)	8.69 (6.02, 13.15)	9.64 (8.12, 10.56)	7.79 (7.79, 7.79)	9.65 (9.65, 9.65)	7.05 (7.05, 7.05)	10.65 (10.65, 10.65)
mean(CI)	3.73 (2.63, 4.82)	2.62 (2.02, 3.22)	1.97 (1.12, 2.82)	1.78 (1.60, 1.95)	1.57 (1.34, 1.80)	1.64 (1.35, 1.93)	1.65 (1.22, 2.09)	1.79 (1.04, 2.54)	2.06 (0.55, 3.58)	2.40 (-0.08, 4.87)	3.02 (-0.95, 6.98)	3.31 (-0.13, 6.75)	4.15 (0.07, 8.23)	5.34 (1.63, 9.06)	7.47 (1.66, 13.28)	10.44 (0.52, 20.37)	9.01 (1.96, 16.06)	8.20 (NaN, NaN)	9.37 (NaN, NaN)	8.08 (NaN, NaN)	10.65 (NaN, NaN)
Carb. (m %)																					
min, max	50.78, 52.24	51.89, 54.39	53.11, 53.90	50.88, 54.45	50.88, 54.45	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	54.73, 57.51	51.12, 57.51	52.58, 55.78	55.78, 55.78	55.78, 55.78	55.78, 55.78	52.10, 52.10
median(IQR)	51.70 (51.14, 52.17)	53.19 (52.83, 53.51)	53.69 (53.48, 53.80)	54.16 (53.23, 54.34)	54.16 (53.23, 54.34)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.66 (55.33, 56.21)	55.25 (53.83, 56.21)	55.43 (54.00, 55.61)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	55.78 (55.78, 55.78)	52.10 (52.10, 52.10)
mean(CI)	51.61 (50.48, 52.73)	53.16 (51.54, 54.79)	53.59 (53.05, 54.14)	53.41 (50.71, 56.11)	53.41 (50.71, 56.11)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	55.89 (54.02, 57.75)	54.78 (50.49, 59.08)	54.60 (50.24, 58.96)	55.78 (NaN, NaN)	55.78 (NaN, NaN)	55.78 (NaN, NaN)	52.10 (NaN, NaN)
Nitr. (m %)																					
min, max	1.59, 2.32	1.92, 2.14	1.59, 1.88	1.38, 1.52	1.38, 1.52	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 2.22	1.38, 3.68	1.64, 4.07	1.64, 1.64	1.64, 1.64	1.64, 1.64	4.03, 4.03
median(IQR)	2.18 (2.02, 2.23)	1.98 (1.96, 2.02)	1.80 (1.70, 1.86)	1.48 (1.43, 1.50)	1.48 (1.43, 1.50)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 1.91)	1.73 (1.57, 2.28)	2.93 (2.29, 3.50)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	1.64 (1.64, 1.64)	4.03 (4.03, 4.03)
mean(CI)	2.07 (1.55, 2.59)	2.00 (1.85, 2.15)	1.77 (1.56, 1.98)	1.46 (1.36, 1.56)	1.46 (1.36, 1.56)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	1.76 (1.20, 2.32)	2.13 (0.46, 3.80)	2.88 (-0.14, 5.90)	1.64 (NaN, NaN)	1.64 (NaN, NaN)	1.64 (NaN, NaN)	4.03 (NaN, NaN)
Hydr. (m %)																					
min, max	5.00, 5.52	5.15, 5.64	5.29, 5.67	5.09, 5.54	5.09, 5.54	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.94, 5.32	4.59, 6.28	5.24, 5.24	5.24, 5.24	5.24, 5.24	6.08, 6.08
median(IQR)	5.42 (5.29, 5.46)	5.51 (5.39, 5.57)	5.51 (5.43, 5.57)	5.47 (5.36, 5.50)	5.47 (5.36, 5.50)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.27 (5.16, 5.30)	5.20 (5.10, 5.26)	5.24 (4.92, 5.76)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	5.24 (5.24, 5.24)	6.08 (6.08, 6.08)
mean(CI)	5.34 (4.97, 5.71)	5.45 (5.11, 5.79)	5.50 (5.24, 5.75)	5.39 (5.07, 5.72)	5.39 (5.07, 5.72)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.20 (4.92, 5.48)	5.16 (4.90, 5.42)	5.37 (3.25, 7.49)	5.24 (NaN, NaN)	5.24 (NaN, NaN)	5.24 (NaN, NaN)	6.08 (NaN, NaN)
Sulfur (m %)																					
min, max	0.31, 0.41	0.44, 0.54	0.34, 0.54	0.25, 0.49	0.25, 0.49	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 0.93	0.29, 1.87	0.63, 1.60	0.63, 0.63	0.63, 0.63	0.63, 0.63	3.24, 3.24
median(IQR)	0.35 (0.32, 0.39)	0.47 (0.46, 0.49)	0.43 (0.37, 0.49)	0.38 (0.34, 0.42)	0.38 (0.34, 0.42)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.61 (0.52, 0.71)	0.78 (0.54, 1.16)	1.56 (1.09, 1.58)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	0.63 (0.63, 0.63)	3.24 (3.24, 3.24)
mean(CI)	0.36 (0.28, 0.44)	0.48 (0.42, 0.55)	0.43 (0.29, 0.58)	0.38 (0.22, 0.54)	0.38 (0.22, 0.54)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.61 (0.20, 1.03)	0.93 (-0.15, 2.01)	1.26 (-0.10, 2.63)	0.63 (NaN, NaN)	0.63 (NaN, NaN)	0.63 (NaN, NaN)	3.24 (NaN, NaN)
Oxy. (m %)																					
min, max	35.21, 38.93	34.74, 37.02	35.80, 37.34	36.51, 39.97	36.51, 39.97	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	31.53, 33.28	25.49, 33.28	23.93, 32.62	32.62, 32.62	32.62, 32.62	32.62, 32.62	23.89, 23.89
median(IQR)	36.64 (36.16, 37.34)	36.56 (35.94, 36.85)	36.72 (36.26, 37.12)	37.02 (36.85, 37.80)	37.02 (36.85, 37.80)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (32.35, 33.11)	32.83 (30.84, 33.11)	27.16 (25.55, 29.89)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	32.62 (32.62, 32.62)	23.89 (23.89, 23.89)
mean(CI)	36.86 (34.40, 39.31)	36.22 (34.59, 37.86)	36.65 (35.56, 37.74)	37.63 (35.11, 40.14)	37.63 (35.11, 40.14)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	32.62 (31.38, 33.86)	31.11 (25.13, 37.09)	27.90 (16.99, 38.81)	32.62 (NaN, NaN)	32.62 (NaN, NaN)	32.62 (NaN, NaN)	23.89 (NaN, NaN)

Raised bogs – Grassland

Depth Properties	0-10 cm (N = 22)	10-25 cm (N = 22)	25-50 cm (N = 22)	50-75 cm (N = 12)	75-100 cm (N = 10)	100-150 cm (N = 10)	150-200 cm (N = 6)	200-250 cm (N = 2)	250-300 cm (N = 1)
WC (m %)									
min, max	42.8, 82.6	34.2, 83.9	65.8, 88.1	81.2, 89.0	86.5, 90.2	85.9, 88.9	84.2, 88.6	86.0, 86.5	87.8, 87.8
median(IQR)	61.6 (55.0, 65.6)	66.6 (58.6, 76.3)	80.0 (74.2, 85.9)	87.1 (85.6, 88.2)	88.3 (88.2, 89.0)	88.1 (87.1, 88.2)	87.5 (86.1, 88.4)	86.2 (86.1, 86.4)	87.8 (87.8, 87.8)
mean(CI)	63.0 (57.8, 68.2)	65.9 (59.8, 71.9)	79.4 (76.4, 82.5)	86.6 (85.0, 88.1)	88.4 (87.6, 89.2)	87.7 (87.0, 88.3)	87.0 (85.2, 88.9)	86.2 (83.2, 89.3)	87.8 (NaN, NaN)
WC (vol %)									
min, max	29.8, 85.7	39.4, 111.9	56.8, 113.8	86.4, 122.3	94.0, 121.8	112.6, 124.0	106.5, 289.4	108.5, 114.5	116.5, 116.5
median(IQR)	57.5 (43.7, 64.3)	61.3 (55.4, 66.5)	74.7 (65.2, 99.4)	113.1 (94.2, 117.9)	116.9 (115.3, 118.5)	115.8 (113.8, 117.6)	115.7 (112.4, 120.2)	111.5 (110.0, 113.0)	116.5 (116.5, 116.5)
mean(CI)	57.6 (50.1, 65.0)	67.1 (57.3, 76.9)	81.2 (72.4, 90.1)	107.6 (99.2, 115.9)	114.2 (108.3, 120.0)	116.4 (113.9, 118.9)	143.4 (68.1, 218.7)	111.5 (73.2, 149.9)	116.5 (NaN, NaN)
BD (g*cm^{-3})									
min, max	0.168, 0.671	0.183, 0.848	0.106, 0.295	0.140, 0.212	0.124, 0.182	0.141, 0.196	0.149, 0.475	0.177, 0.179	0.162, 0.162
median(IQR)	0.330 (0.228, 0.391)	0.299 (0.227, 0.390)	0.187 (0.167, 0.222)	0.160 (0.146, 0.175)	0.155 (0.136, 0.158)	0.160 (0.156, 0.171)	0.161 (0.155, 0.197)	0.178 (0.177, 0.178)	0.162 (0.162, 0.162)
mean(CI)	0.332 (0.276, 0.389)	0.341 (0.269, 0.413)	0.200 (0.179, 0.221)	0.165 (0.150, 0.180)	0.150 (0.137, 0.163)	0.164 (0.153, 0.175)	0.218 (0.084, 0.352)	0.178 (0.162, 0.193)	0.162 (NaN, NaN)
PD (g*cm^{-3})									
min, max	1.513, 2.290	1.488, 2.323	1.468, 1.741	1.463, 1.625	1.454, 1.647	1.461, 1.660	1.475, 1.862	1.567, 1.644	1.567, 1.567
median(IQR)	1.712 (1.610, 1.949)	1.651 (1.552, 1.843)	1.655 (1.545, 1.698)	1.544 (1.494, 1.571)	1.517 (1.508, 1.548)	1.543 (1.529, 1.565)	1.639 (1.562, 1.721)	1.605 (1.586, 1.625)	1.567 (1.567, 1.567)
mean(CI)	1.783 (1.681, 1.885)	1.755 (1.632, 1.879)	1.622 (1.579, 1.664)	1.536 (1.504, 1.567)	1.527 (1.489, 1.565)	1.549 (1.513, 1.585)	1.650 (1.505, 1.796)	1.605 (1.113, 2.098)	1.567 (NaN, NaN)
Porosity (vol %)									
min, max	70.7, 88.9	62.5, 87.7	83.0, 92.8	86.7, 90.6	88.9, 91.8	88.2, 90.8	74.5, 90.2	88.7, 89.1	89.7, 89.7
median(IQR)	81.2 (78.8, 85.8)	82.1 (79.3, 85.3)	88.3 (86.9, 89.3)	89.7 (88.9, 90.1)	90.0 (89.6, 90.7)	89.5 (88.9, 89.9)	90.0 (88.5, 90.1)	88.9 (88.8, 89.0)	89.7 (89.7, 89.7)
mean(CI)	81.8 (79.7, 84.0)	81.2 (78.7, 83.8)	87.8 (86.7, 88.8)	89.3 (88.5, 90.1)	90.2 (89.5, 90.9)	89.4 (88.9, 90.0)	87.1 (80.6, 93.7)	88.9 (86.5, 91.3)	89.7 (NaN, NaN)
pH									
min, max	4.1, 7.1	3.9, 7.1	3.8, 7.4	4.0, 7.2	4.1, 6.3	4.3, 6.1	4.7, 6.7	5.4, 6.1	6.0, 6.0
median(IQR)	6.3 (5.4, 6.5)	6.3 (4.7, 6.7)	6.5 (4.8, 6.9)	11; 5.2 (4.6, 6.4)	5.5 (4.9, 5.6)	5.9 (5.3, 6.0)	5.9 (5.8, 5.9)	5.7 (5.5, 5.9)	6.0 (6.0, 6.0)
mean(CI)	5.9 (5.5, 6.3)	5.8 (5.3, 6.2)	5.9 (5.4, 6.5)	5.5 (4.7, 6.2)	5.3 (4.8, 5.8)	5.6 (5.2, 6.0)	5.8 (5.2, 6.5)	5.7 (1.3, 10.2)	6.0 (NaN, NaN)
EC (mS*cm^{-1})									
min, max	77.3, 896.0	76.0, 380.0	79.6, 939.0	81.3, 379.0	74.3, 338.0	84.9, 295.0	83.5, 475.0	102.0, 102.6	118.0, 118.0
median(IQR)	394.5 (156.2, 537.8)	225.5 (124.5, 280.5)	245.0 (121.8, 368.0)	11; 141.5 (83.3, 241.5)	126.9 (83.4, 247.2)	130.3 (91.6, 183.4)	140.3 (117.7, 189.9)	102.3 (102.2, 102.4)	118.0 (118.0, 118.0)
mean(CI)	404.2 (289.6, 518.8)	210.1 (169.4, 250.9)	295.6 (200.0, 391.2)	167.3 (100.9, 233.8)	170.0 (96.7, 243.2)	149.7 (100.6, 198.7)	192.6 (41.3, 344.0)	102.3 (98.5, 106.1)	118.0 (NaN, NaN)
von Post									
min, max	4, 9	4, 9	4, 9	4, 7	5, 8	6, 9	6, 9	8, 8	8, 8
median(IQR)	8 (6, 8)	8 (6, 8)	7 (5, 8)	6 (5, 6)	6 (5, 7)	7 (6, 7)	7 (7, 8)	8 (8, 8)	8 (8, 8)
mean(CI)	7 (7, 8)	7 (6, 8)	7 (6, 7)	6 (5, 6)	6 (5, 7)	7 (6, 8)	7 (6, 8)	8 (8, 8)	8 (NaN, NaN)
OM (m %)									
min, max	29.71, 93.96	27.01, 96.02	75.15, 97.65	84.72, 98.13	82.86, 98.85	81.78, 98.26	65.13, 97.07	83.13, 89.54	89.54, 89.54
median(IQR)	77.56 (57.95, 85.98)	82.53 (66.71, 90.75)	82.25 (78.68, 91.31)	91.41 (89.15, 95.55)	93.60 (91.06, 94.34)	91.45 (89.68, 92.65)	83.54 (76.75, 89.94)	86.34 (84.74, 87.94)	89.54 (89.54, 89.54)
mean(CI)	71.65 (63.19, 80.11)	73.95 (63.74, 84.15)	84.98 (81.46, 88.49)	92.08 (89.48, 94.68)	92.81 (89.66, 95.95)	91.03 (88.05, 94.00)	82.64 (70.62, 94.66)	86.34 (45.62, 127.05)	89.54 (NaN, NaN)
Ash (m %)									
min, max	6.04, 70.29	3.98, 72.99	2.35, 24.85	1.87, 15.28	1.15, 17.14	1.74, 18.22	2.93, 34.87	10.46, 16.87	10.46, 10.46
median(IQR)	22.44 (14.02, 42.05)	17.47 (9.25, 33.29)	17.75 (8.69, 21.32)	8.59 (4.45, 10.85)	6.40 (5.66, 8.94)	8.55 (7.35, 10.32)	16.46 (10.06, 23.25)	13.66 (12.06, 15.26)	10.46 (10.46, 10.46)
mean(CI)	28.35 (19.89, 36.81)	26.05 (15.85, 36.26)	15.02 (11.51, 18.54)	7.92 (5.32, 10.52)	7.19 (4.05, 10.34)	8.97 (6.00, 11.95)	17.36 (5.34, 29.38)	13.66 (-27.05, 54.38)	10.46 (NaN, NaN)
Carbon (m %)									
min, max	24.81, 49.60	23.72, 52.53	45.94, 53.89	53.43, 53.93	53.43, 53.93	50.91, 54.16	50.33, 50.91	50.91, 50.91	53.20, 53.20
median(IQR)	41.61 (29.01, 49.53)	45.91 (29.27, 52.00)	48.74 (46.64, 49.97)	53.93 (53.43, 53.93)	53.68 (53.43, 53.93)	52.53 (50.91, 54.16)	50.91 (50.48, 50.91)	50.91 (50.91, 50.91)	53.20 (53.20, 53.20)
mean(CI)	40.64 (36.00, 45.29)	42.75 (37.33, 48.17)	49.43 (48.14, 50.71)	53.72 (53.56, 53.89)	53.68 (53.49, 53.87)	52.53 (51.31, 53.76)	50.72 (50.40, 51.03)	50.91 (50.91, 50.91)	53.20 (NaN, NaN)
Nitrogen (m %)									
min, max	1.99, 3.01	1.59, 2.90	1.64, 3.43	2.17, 2.94	2.17, 2.49	2.63, 2.88	2.36, 2.63	2.63, 2.63	2.93, 2.93
median(IQR)	2.46 (2.04, 2.93)	2.21 (1.69, 2.79)	2.69 (2.30, 3.25)	2.49 (2.17, 2.49)	2.33 (2.17, 2.49)	2.75 (2.63, 2.88)	2.63 (2.43, 2.63)	2.63 (2.63, 2.63)	2.93 (2.93, 2.93)
mean(CI)	2.48 (2.29, 2.67)	2.23 (2.00, 2.46)	2.56 (2.27, 2.86)	2.43 (2.25, 2.61)	2.33 (2.21, 2.45)	2.75 (2.66, 2.85)	2.54 (2.39, 2.69)	2.63 (2.63, 2.63)	2.93 (NaN, NaN)
Hydrogen (m %)									
min, max	2.97, 5.50	2.70, 5.41	4.01, 5.35	5.14, 5.38	5.14, 5.36	4.92, 5.14	4.71, 4.92	4.92, 4.92	5.06, 5.06
median(IQR)	3.77 (3.17, 4.73)	3.97 (3.02, 4.94)	4.99 (4.20, 5.23)	5.36 (5.14, 5.36)	5.25 (5.14, 5.36)	5.03 (4.92, 5.14)	4.92 (4.76, 4.92)	4.92 (4.92, 4.92)	5.06 (5.06, 5.06)
mean(CI)	4.16 (3.73, 4.60)	4.17 (3.70, 4.64)	4.82 (4.57, 5.06)	5.27 (5.20, 5.35)	5.25 (5.17, 5.33)	5.03 (4.95, 5.11)	4.85 (4.74, 4.96)	4.92 (4.92, 4.92)	5.06 (NaN, NaN)
Sulfur (m %)									
min, max	0.33, 0.65	0.37, 0.86	0.45, 1.19	0.57, 1.18	0.57, 0.76	0.71, 0.91	0.71, 1.18	0.71, 0.71	0.77, 0.77
median(IQR)	0.42 (0.34, 0.60)	0.44 (0.38, 0.76)	1.07 (0.50, 1.16)	0.76 (0.57, 0.76)	0.66 (0.57, 0.76)	0.81 (0.71, 0.91)	0.71 (0.71, 1.06)	0.71 (0.71, 0.71)	0.77 (0.77, 0.77)
mean(CI)	0.46 (0.40, 0.52)	0.54 (0.45, 0.63)	0.83 (0.68, 0.98)	0.75 (0.61, 0.89)	0.66 (0.59, 0.74)	0.81 (0.73, 0.89)	0.87 (0.61, 1.12)	0.71 (0.71, 0.71)	0.77 (NaN, NaN)
Oxygen (m %)									
min, max	15.34, 30.39	14.29, 31.77	22.89, 32.36	23.95, 31.78	30.58, 31.78	27.73, 28.12	24.77, 27.73	27.73, 27.73	27.58, 27.58
median(IQR)	24.46 (17.62, 28.64)	24.37 (16.81, 31.08)	23.76 (23.11, 32.16)	30.58 (30.58, 31.78)	31.18 (30.58, 31.78)	27.93 (27.73, 28.12)	27.73 (25.51, 27.73)	27.73 (27.73, 27.73)	27.58 (27.58, 27.58)
mean(CI)	24.27 (21.60, 26.94)	24.83 (21.61, 28.04)	27.39 (25.36, 29.41)	29.98 (28.15, 31.80)	31.18 (30.73, 31.63)	27.93 (27.78, 28.07)	26.74 (25.14, 28.35)	27.73 (27.73, 27.73)	27.58 (NaN, NaN)

Depth Properties	0-10 cm (N = 4, n = 22)	10-25 cm (N = 4, n = 22)	25-50 cm (N = 4, n = 22)	50-75 cm (N = 3, n = 12)	75-100 cm (N = 2, n = 10)	100-150 cm (N = 2, n = 10)	150-200 cm (N = 2, n = 6)	200-250 cm (N = 1, n = 2)	250-300 cm (N = 1, n =1)
WC (m %)									

min, max	51.6, 81.4	50.4, 82.8	72.4, 86.9	85.1, 88.3	88.1, 88.7	87.8, 88.0	87.1, 87.6	86.1, 86.1	87.8, 87.8
median(IQR)	61.5 (58.2, 67.5)	66.3 (61.5, 70.9)	81.5 (78.8, 83.1)	86.1 (85.6, 87.4)	88.7 (88.5, 88.9)	88.1 (88.1, 88.2)	87.8 (87.7, 87.9)	86.1 (86.1, 86.1)	87.8 (87.8, 87.8)
mean(CI)	63.5 (43.1, 83.9)	66.6 (45.5, 87.6)	80.1 (70.7, 89.6)	86.2 (81.6, 90.8)	88.4 (84.1, 92.7)	87.9 (86.2, 89.6)	87.3 (83.8, 90.8)	86.1 (NaN, NaN)	87.8 (NaN, NaN)
WC (vol %)									
min, max	36.8, 81.9	51.7, 104.5	65.7, 111.3	96.1, 118.3	110.6, 117.8	115.4, 116.6	114.1, 136.3	109.9, 109.9	116.5, 116.5
median(IQR)	56.7 (48.7, 66.6)	59.8 (55.4, 72.8)	77.4 (74.3, 86.1)	110.0 (100.8, 114.0)	116.9 (116.8, 117.1)	115.3 (115.0, 115.5)	114.9 (114.5, 115.3)	109.9 (109.9, 109.9)	116.5 (116.5, 116.5)
mean(CI)	57.7 (27.5, 87.9)	68.1 (28.6, 107.5)	83.7 (52.8, 114.6)	108.1 (80.2, 136.0)	114.2 (68.3, 160.0)	116.0 (107.9, 124.1)	125.2 (-16.0, 266.5)	109.9 (NaN, NaN)	116.5 (NaN, NaN)
BD (g*cm^{-3})									
min, max	0.187, 0.482	0.217, 0.533	0.168, 0.250	0.156, 0.193	0.150, 0.150	0.157, 0.163	0.161, 0.206	0.177, 0.177	0.162, 0.162
median(IQR)	0.309 (0.235, 0.386)	0.294 (0.261, 0.357)	0.177 (0.170, 0.200)	0.159 (0.157, 0.176)	0.149 (0.145, 0.153)	0.161 (0.158, 0.163)	0.160 (0.160, 0.160)	0.177 (0.177, 0.177)	0.162 (0.162, 0.162)
mean(CI)	0.323 (0.120, 0.527)	0.333 (0.111, 0.555)	0.197 (0.139, 0.254)	0.172 (0.124, 0.219)	0.150 (0.149, 0.150)	0.160 (0.123, 0.197)	0.183 (-0.106, 0.473)	0.177 (NaN, NaN)	0.162 (NaN, NaN)
PD (g*cm^{-3})									
min, max	1.579, 2.111	1.532, 2.149	1.512, 1.708	1.513, 1.609	1.527, 1.527	1.528, 1.545	1.612, 1.639	1.584, 1.584	1.567, 1.567
median(IQR)	1.676 (1.593, 1.836)	1.616 (1.538, 1.812)	1.597 (1.515, 1.680)	1.548 (1.522, 1.578)	1.514 (1.512, 1.516)	1.537 (1.536, 1.539)	1.603 (1.585, 1.621)	1.584 (1.584, 1.584)	1.567 (1.567, 1.567)
mean(CI)	1.768 (1.382, 2.153)	1.738 (1.283, 2.192)	1.610 (1.461, 1.760)	1.552 (1.427, 1.677)	1.527 (1.523, 1.531)	1.537 (1.431, 1.642)	1.625 (1.451, 1.800)	1.584 (NaN, NaN)	1.567 (NaN, NaN)
Porosity (vol %)									
min, max	77.3, 88.2	75.6, 85.8	85.4, 88.9	88.0, 89.7	90.2, 90.2	89.5, 89.7	87.5, 90.2	88.8, 88.8	89.7, 89.7
median(IQR)	81.8 (79.0, 85.2)	81.9 (80.6, 83.2)	88.8 (87.7, 89.1)	89.7 (88.8, 89.7)	90.1 (89.9, 90.3)	89.6 (89.5, 89.7)	90.0 (89.8, 90.1)	88.8 (88.8, 88.8)	89.7 (89.7, 89.7)
mean(CI)	82.2 (74.5, 89.8)	81.5 (74.6, 88.4)	87.9 (85.2, 90.6)	89.0 (86.8, 91.1)	90.2 (90.1, 90.3)	89.6 (88.0, 91.3)	88.9 (72.0, 105.7)	88.8 (NaN, NaN)	89.7 (NaN, NaN)
pH									
min, max	4.3, 6.5	4.4, 6.7	4.5, 6.9	4.9, 7.1	5.0, 5.6	5.1, 5.8	5.5, 6.3	5.5, 5.5	6.0, 6.0
median(IQR)	6.3 (5.8, 6.4)	5.7 (4.5, 6.6)	5.8 (4.5, 6.9)	5.1 (4.7, 6.1)	5.1 (4.9, 5.3)	5.5 (5.3, 5.7)	6.0 (5.9, 6.1)	5.5 (5.5, 5.5)	6.0 (6.0, 6.0)
mean(CI)	5.8 (4.2, 7.4)	5.7 (3.8, 7.5)	5.8 (3.8, 7.8)	5.8 (2.9, 8.7)	5.3 (1.4, 9.2)	5.5 (0.8, 10.1)	5.9 (0.8, 10.9)	5.5 (NaN, NaN)	6.0 (NaN, NaN)
EC (mS*cm^{-1})									
min, max	95.8, 647.7	93.7, 299.0	104.7, 364.2	143.3, 251.4	116.0, 223.9	91.5, 212.4	118.8, 340.5	102.5, 102.5	118.0, 118.0
median(IQR)	366.2 (275.5, 446.6)	198.8 (126.1, 264.2)	244.5 (134.2, 346.1)	149.3 (116.8, 200.4)	147.7 (114.1, 181.4)	143.6 (115.8, 171.5)	233.7 (180.3, 287.1)	102.5 (102.5, 102.5)	118.0 (118.0, 118.0)
mean(CI)	388.2 (15.5, 761.0)	203.3 (56.3, 350.3)	271.0 (77.6, 464.3)	184.4 (39.0, 329.8)	170.0 (-515.5, 855.5)	152.0 (-616.1, 920.1)	229.6 (-1,178.9, 1,638.2)	102.5 (NaN, NaN)	118.0 (NaN, NaN)
von Post									
min, max	6, 8	6, 8	5, 8	5, 7	6, 6	7, 7	7, 8	8, 8	8, 8
median(IQR)	7 (6, 8)	7 (6, 8)	6 (5, 7)	6 (5, 6)	6 (5, 6)	7 (7, 7)	7 (7, 7)	8 (8, 8)	8 (8, 8)
mean(CI)	7 (5, 10)	7 (5, 9)	7 (4, 9)	6 (3, 8)	6 (1, 11)	7 (5, 9)	7 (4, 11)	8 (NaN, NaN)	8 (NaN, NaN)
OM (m %)									
min, max	44.57, 88.55	41.44, 92.43	77.85, 94.06	86.04, 94.00	92.78, 92.83	91.34, 92.71	83.54, 85.81	88.06, 88.06	89.54, 89.54
median(IQR)	80.52 (67.24, 87.33)	85.44 (69.27, 91.93)	87.04 (80.12, 93.83)	91.09 (88.57, 93.24)	93.90 (93.73, 94.08)	91.94 (91.79, 92.10)	86.50 (85.02, 87.98)	88.06 (88.06, 88.06)	89.54 (89.54, 89.54)
mean(CI)	72.93 (41.05, 104.80)	75.40 (37.84, 112.96)	85.93 (73.57, 98.29)	90.74 (80.37, 101.11)	92.81 (92.46, 93.15)	92.02 (83.32, 100.73)	84.68 (70.26, 99.10)	88.06 (NaN, NaN)	89.54 (NaN, NaN)
Ash (m %)									
min, max	11.45, 55.43	7.57, 58.56	5.94, 22.15	6.00, 13.96	7.17, 7.22	7.29, 8.66	14.19, 16.46	11.94, 11.94	10.46, 10.46
median(IQR)	19.48 (12.67, 32.76)	14.56 (8.07, 30.73)	12.96 (6.17, 19.88)	8.91 (6.76, 11.43)	6.10 (5.92, 6.27)	8.06 (7.90, 8.21)	13.50 (12.02, 14.98)	11.94 (11.94, 11.94)	10.46 (10.46, 10.46)
mean(CI)	27.07 (-4.80, 58.95)	24.60 (-12.96, 62.16)	14.07 (1.71, 26.43)	9.26 (-1.11, 19.63)	7.19 (6.85, 7.54)	7.98 (-0.73, 16.68)	15.32 (0.90, 29.74)	11.94 (NaN, NaN)	10.46 (NaN, NaN)
Carbon (m %)									
min, max	24.81, 49.60	23.72, 52.53	45.94, 53.89	53.43, 53.93	53.43, 53.93	50.91, 54.16	50.33, 50.91	50.91, 50.91	53.20, 53.20
median(IQR)	45.57 (37.41, 49.55)	48.95 (40.36, 52.13)	49.36 (48.04, 50.95)	53.93 (53.68, 53.93)	53.68 (53.55, 53.80)	52.53 (51.72, 53.35)	50.62 (50.48, 50.77)	50.91 (50.91, 50.91)	53.20 (53.20, 53.20)
mean(CI)	41.39 (22.82, 59.96)	43.54 (21.98, 65.10)	49.63 (44.38, 54.89)	53.76 (53.05, 54.48)	53.68 (50.50, 56.86)	52.53 (31.89, 73.18)	50.62 (46.94, 54.30)	50.91 (NaN, NaN)	53.20 (NaN, NaN)
Nitrogen (m %)									
min, max	1.99, 3.01	1.59, 2.90	1.64, 3.43	2.17, 2.94	2.17, 2.49	2.63, 2.88	2.63, 2.88	2.63, 2.63	2.93, 2.93
median(IQR)	2.46 (2.15, 2.78)	2.21 (1.88, 2.56)	2.50 (2.13, 2.88)	2.49 (2.33, 2.71)	2.33 (2.25, 2.41)	2.75 (2.69, 2.82)	2.50 (2.43, 2.56)	2.63 (2.63, 2.63)	2.93 (2.93, 2.93)
mean(CI)	2.48 (1.74, 3.22)	2.23 (1.33, 3.13)	2.51 (1.32, 3.71)	2.53 (1.57, 3.49)	2.33 (0.30, 4.36)	2.75 (1.17, 4.34)	2.50 (0.78, 4.21)	2.63 (NaN, NaN)	2.93 (NaN, NaN)
Hydrogen (m %)									
min, max	2.97, 5.50	2.70, 5.41	4.01, 5.35	5.14, 5.38	5.14, 5.36	4.92, 5.14	4.71, 4.92	4.92, 4.92	5.06, 5.06
median(IQR)	4.25 (3.57, 4.92)	4.46 (3.65, 5.06)	4.99 (4.56, 5.26)	5.36 (5.25, 5.37)	5.25 (5.19, 5.31)	5.03 (4.97, 5.08)	4.81 (4.76, 4.87)	4.92 (4.92, 4.92)	5.06 (5.06, 5.06)
mean(CI)	4.24 (2.48, 6.00)	4.26 (2.35, 6.16)	4.83 (3.87, 5.80)	5.29 (4.96, 5.62)	5.25 (3.85, 6.65)	5.03 (3.63, 6.43)	4.81 (3.48, 6.15)	4.92 (NaN, NaN)	5.06 (NaN, NaN)
Sulfur (m %)									
min, max	0.33, 0.65	0.37, 0.86	0.45, 1.19	0.57, 1.18	0.57, 0.76	0.71, 0.91	0.71, 1.18	0.71, 0.71	0.77, 0.77
median(IQR)	0.42 (0.37, 0.52)	0.44 (0.41, 0.57)	0.78 (0.49, 1.10)	0.76 (0.66, 0.97)	0.66 (0.62, 0.71)	0.81 (0.76, 0.86)	0.94 (0.83, 1.06)	0.71 (0.71, 0.71)	0.77 (0.77, 0.77)
mean(CI)	0.46 (0.23, 0.68)	0.53 (0.17, 0.89)	0.80 (0.19, 1.41)	0.84 (0.06, 1.61)	0.66 (-0.54, 1.87)	0.81 (-0.46, 2.08)	0.94 (-2.04, 3.93)	0.71 (NaN, NaN)	0.77 (NaN, NaN)
Oxygen (m %)									
min, max	15.34, 30.39	14.29, 31.77	22.89, 32.36	23.95, 31.78	30.58, 31.78	27.73, 28.12	24.77, 27.73	27.73, 27.73	27.58, 27.58
median(IQR)	26.55 (22.18, 29.08)	27.73 (21.85, 31.25)	27.96 (23.54, 32.21)	30.58 (27.27, 31.18)	31.18 (30.88, 31.48)	27.93 (27.83, 28.02)	26.25 (25.51, 26.99)	27.73 (27.73, 27.73)	27.58 (27.58, 27.58)
mean(CI)	24.71 (14.01, 35.40)	25.38 (12.47, 38.28)	27.79 (19.56, 36.02)	28.77 (18.29, 39.25)	31.18 (23.56, 38.80)	27.93 (25.45, 30.40)	26.25 (7.44, 45.06)	27.73 (NaN, NaN)	27.58 (NaN, NaN)

Raised bogs – Forestry

Depth Properties	0-10 cm (N = 28)	10-25 cm (N = 28)	25-50 cm (N = 28)	50-75 cm (N = 27)	75-100 cm (N = 25)	100-150 cm (N = 24)	150-200 cm (N = 22)	200-250 cm (N = 16)	250-300 cm (N = 6)	300-350 cm (N = 3)	350-400 cm (N = 3)	400-450 cm (N = 3)	450-500 cm (N = 3)	500-550 cm (N = 3)
WC (m %)														
min, max	45.0, 90.8	52.7, 91.7	52.7, 92.8	70.8, 94.0	74.1, 94.1	83.9, 94.3	80.7, 93.3	85.8, 93.4	90.5, 92.7	92.2, 92.8	92.1, 92.3	92.2, 94.2	93.4, 94.1	91.2, 92.4
median(IQR)	70.8 (66.8, 82.1)	79.6 (73.9, 87.9)	86.2 (76.9, 89.2)	87.1 (82.5, 89.2)	89.1 (86.6, 91.5)	88.1 (87.2, 89.9)	88.2 (86.5, 91.3)	88.5 (87.3, 92.5)	92.1 (91.8, 92.3)	92.2 (92.2, 92.5)	92.2 (92.1, 92.3)	93.8 (93.0, 94.0)	93.7 (93.5, 93.9)	92.2 (91.7, 92.3)
mean(CI)	73.2 (68.8, 77.7)	78.9 (75.0, 82.8)	82.9 (79.3, 86.5)	85.8 (83.4, 88.2)	88.3 (86.4, 90.2)	88.7 (87.4, 90.0)	88.5 (87.1, 89.9)	89.4 (87.9, 90.8)	91.9 (91.1, 92.7)	92.4 (91.6, 93.3)	92.2 (91.9, 92.5)	93.4 (90.8, 96.0)	93.7 (92.9, 94.5)	91.9 (90.3, 93.5)
WC (vol %)														
min, max	4.2, 98.9	14.2, 121.3	14.2, 116.7	35.2, 123.3	48.7, 128.6	106.8, 165.1	68.5, 125.2	91.6, 124.3	110.7, 121.4	115.0, 117.9	115.8, 118.8	116.6, 118.8	116.3, 117.5	117.8, 119.3
median(IQR)	40.4 (31.6, 75.6)	62.8 (44.6, 92.8)	99.4 (54.8, 108.3)	115.2 (92.9, 120.8)	117.1 (111.7, 120.6)	119.6 (113.3, 121.7)	117.6 (113.9, 120.6)	118.4 (116.3, 121.0)	118.5 (115.2, 121.0)	116.6 (115.8, 117.2)	117.0 (116.4, 117.9)	117.3 (116.9, 118.0)	117.3 (116.8, 117.4)	118.1 (118.0, 118.7)
mean(CI)	49.7 (38.6, 60.8)	68.6 (56.3, 80.8)	83.3 (71.1, 95.6)	104.0 (94.3, 113.8)	110.9 (102.7, 119.1)	119.6 (114.9, 124.3)	115.1 (110.0, 120.3)	117.3 (113.2, 121.3)	117.5 (113.0, 122.0)	116.5 (112.9, 120.1)	117.2 (113.5, 120.9)	117.6 (114.8, 120.4)	117.0 (115.4, 118.6)	118.4 (116.5, 120.4)
BD (g*cm^{-3})														
min, max	0.029, 0.241	0.092, 0.245	0.062, 0.218	0.077, 0.215	0.074, 0.208	0.074, 0.299	0.085, 0.266	0.087, 0.190	0.090, 0.116	0.089, 0.099	0.096, 0.102	0.072, 0.100	0.074, 0.083	0.097, 0.115
median(IQR)	0.144 (0.108, 0.190)	0.150 (0.126, 0.175)	0.143 (0.116, 0.171)	0.171 (0.133, 0.184)	0.149 (0.110, 0.166)	0.150 (0.135, 0.175)	0.158 (0.101, 0.177)	0.144 (0.097, 0.172)	0.104 (0.100, 0.105)	0.099 (0.094, 0.099)	0.099 (0.098, 0.101)	0.078 (0.075, 0.089)	0.079 (0.077, 0.081)	0.102 (0.099, 0.108)
mean(CI)	0.146 (0.124, 0.169)	0.150 (0.135, 0.165)	0.144 (0.129, 0.158)	0.159 (0.142, 0.175)	0.140 (0.124, 0.156)	0.153 (0.132, 0.174)	0.150 (0.129, 0.170)	0.139 (0.119, 0.159)	0.103 (0.094, 0.112)	0.096 (0.081, 0.110)	0.099 (0.092, 0.107)	0.083 (0.046, 0.120)	0.079 (0.068, 0.090)	0.104 (0.082, 0.127)
PD (g*cm^{-3})														
min, max	1.459, 1.712	1.454, 2.008	1.454, 1.634	1.454, 1.632	1.451, 1.614	1.453, 1.880	1.456, 1.714	1.455, 1.662	1.458, 1.482	1.467, 1.494	1.480, 1.500	1.464, 1.512	1.502, 1.523	1.539, 1.545
median(IQR)	1.492 (1.478, 1.527)	1.488 (1.466, 1.552)	27; 1.489 (1.463, 1.558)	1.505 (1.475, 1.565)	1.508 (1.485, 1.581)	1.530 (1.502, 1.589)	1.555 (1.481, 1.585)	1.566 (1.461, 1.625)	1.464 (1.460, 1.472)	1.484 (1.476, 1.489)	1.483 (1.482, 1.491)	1.493 (1.478, 1.502)	1.508 (1.505, 1.516)	1.543 (1.541, 1.544)
mean(CI)	1.522 (1.494, 1.550)	1.528 (1.483, 1.572)	1.509 (1.486, 1.532)	1.517 (1.495, 1.539)	1.520 (1.497, 1.543)	1.550 (1.510, 1.589)	1.553 (1.520, 1.587)	1.553 (1.510, 1.596)	1.467 (1.457, 1.477)	1.482 (1.448, 1.515)	1.488 (1.462, 1.513)	1.489 (1.429, 1.550)	1.511 (1.483, 1.539)	1.542 (1.535, 1.550)
Por. (vol %)														
min, max	84.6, 98.3	84.5, 93.8	85.1, 95.9	85.5, 94.7	86.9, 94.9	84.1, 94.9	82.9, 94.7	88.3, 94.1	92.2, 93.8	93.3, 94.0	93.1, 93.6	93.2, 95.2	94.5, 95.1	92.6, 93.7
median(IQR)	90.3 (87.8, 92.8)	90.6 (88.3, 91.8)	27; 90.2 (88.7, 92.1)	89.0 (87.8, 91.0)	90.3 (89.7, 92.7)	90.2 (88.7, 91.3)	89.8 (88.8, 93.1)	91.1 (89.2, 93.4)	92.9 (92.8, 93.1)	93.3 (93.3, 93.7)	93.3 (93.2, 93.4)	94.9 (94.0, 95.0)	94.8 (94.7, 94.9)	93.4 (93.0, 93.5)
mean(CI)	90.4 (88.9, 91.8)	90.1 (89.2, 91.1)	90.5 (89.5, 91.4)	89.6 (88.6, 90.6)	90.9 (89.9, 91.8)	90.2 (89.1, 91.3)	90.4 (89.2, 91.7)	91.1 (90.0, 92.2)	93.0 (92.4, 93.5)	93.5 (92.5, 94.6)	93.3 (92.7, 94.0)	94.4 (91.7, 97.1)	94.8 (94.1, 95.5)	93.2 (91.8, 94.7)
pH														
min, max	3.6, 5.9	3.6, 6.6	3.6, 7.1	3.9, 7.0	4.0, 6.8	4.1, 6.8	4.4, 6.8	4.6, 7.3	4.7, 5.4	5.1, 5.3	5.2, 5.5	5.4, 5.6	5.6, 6.2	6.2, 6.4
median(IQR)	4.2 (4.0, 4.4)	27; 4.0 (3.9, 4.4)	26; 4.1 (3.9, 5.0)	4.3 (4.1, 5.3)	4.8 (4.3, 5.9)	23; 5.5 (4.8, 6.0)	5.5 (4.5, 6.4)	15; 5.5 (4.8, 6.3)	4.9 (4.8, 5.0)	5.2 (5.1, 5.2)	5.3 (5.2, 5.4)	5.4 (5.4, 5.5)	5.6 (5.6, 5.9)	6.3 (6.3, 6.3)

mean(CI)	4.4 (4.1, 4.6)	4.3 (4.0, 4.6)	4.5 (4.2, 4.9)	4.7 (4.4, 5.1)	5.1 (4.7, 5.4)	5.4 (5.1, 5.8)	5.5 (5.1, 5.9)	5.7 (5.2, 6.2)	4.9 (4.7, 5.2)	5.2 (4.9, 5.4)	5.3 (4.9, 5.8)	5.5 (5.1, 5.8)	5.8 (4.9, 6.7)	6.3 (6.1, 6.5)
EC (mS*cm^{-1})														
min, max	42.1, 191.7	47.9, 275	32.3, 307	51.8, 206	43.5, 308	53.2, 192.1	49.2, 210	46.8, 406	43.7, 65.4	52.2, 58.5	56.5, 64.5	56.6, 70.9	63.6, 83.6	96.5, 107.9
median(IQR)	86.0 (61.7, 121.9)	27; 114.4 (69.0, 148.2)	27; 117.9 (62.0, 154.8)	111.0 (70.0, 131.8)	85.9 (75.2, 140.9)	23; 82.6 (73.0, 114.6)	89.6 (76.0, 103.8)	15; 114.6 (63.6, 142.1)	55.5 (51.4, 63.0)	58.3 (55.2, 58.4)	62.0 (59.2, 63.2)	62.9 (59.8, 66.9)	63.8 (63.7, 73.7)	97.4 (97.0, 102.7)
mean(CI)	99.5 (81.8, 117.2)	119.2 (95.9, 142.6)	119.6 (95.2, 144.0)	109.1 (89.8, 128.3)	110.0 (82.6, 137.3)	98.6 (80.8, 116.5)	94.3 (78.9, 109.8)	119.9 (71.7, 168.2)	56.0 (47.1, 64.8)	56.3 (47.4, 65.2)	61.0 (50.8, 71.2)	63.5 (45.7, 81.3)	70.3 (41.8, 98.9)	100.6 (84.9, 116.3)
von Post														
min, max	2, 10	3, 9	3, 8	3, 8	4, 8	4, 8	5, 8	5, 8	6, 8	6, 8	7, 7	6, 7	6, 7	7, 8
median(IQR)	8 (5, 9)	7 (5, 8)	6 (5, 7)	6 (5, 6)	5 (5, 6)	6 (5, 7)	6 (6, 7)	7 (7, 8)	8 (6, 8)	7 (6, 8)	7 (7, 7)	7 (6, 7)	6 (6, 6)	8 (8, 8)
mean(CI)	7 (6, 8)	6 (6, 7)	6 (5, 6)	6 (5, 6)	5 (5, 6)	6 (6, 6)	6 (6, 7)	7 (6, 8)	7 (6, 8)	7 (5, 9)	7 (7, 7)	7 (5, 8)	6 (5, 8)	8 (6, 9)
OM (m %)														
min, max	77.54, 98.43	53.03, 98.86	84.00, 98.87	84.13, 98.82	85.62, 99.07	63.62, 98.89	77.37, 98.70	81.63, 98.76	96.55, 98.55	95.54, 97.75	95.08, 96.68	94.05, 98.03	93.11, 94.90	91.34, 91.82
median(IQR)	95.67 (92.82, 96.86)	96.01 (90.72, 97.82)	27; 95.93 (90.23, 98.09)	94.60 (89.70, 97.08)	94.39 (88.34, 96.26)	92.53 (87.71, 94.89)	90.53 (88.02, 96.64)	89.60 (84.68, 98.27)	98.02 (97.33, 98.39)	96.37 (95.96, 97.06)	96.42 (95.75, 96.55)	95.65 (94.85, 96.84)	94.40 (93.75, 94.65)	91.46 (91.40, 91.64)
mean(CI)	93.24 (90.93, 95.55)	92.76 (89.07, 96.45)	94.30 (92.41, 96.18)	93.63 (91.81, 95.46)	93.35 (91.45, 95.26)	90.95 (87.70, 94.19)	90.64 (87.88, 93.39)	90.66 (87.07, 94.25)	97.79 (96.96, 98.63)	96.55 (93.79, 99.32)	96.06 (93.93, 98.19)	95.91 (90.94, 100.88)	94.14 (91.84, 96.43)	91.54 (90.92, 92.16)
Ash (m %)														
min, max	1.57, 22.46	1.14, 46.97	1.13, 16.00	1.18, 15.87	0.93, 14.38	1.11, 36.38	1.30, 22.63	1.24, 18.37	1.45, 3.45	2.25, 4.46	3.32, 4.92	1.97, 5.95	5.10, 6.89	8.18, 8.66
median(IQR)	4.33 (3.14, 7.18)	3.99 (2.18, 9.28)	27; 4.07 (1.91, 9.77)	5.40 (2.92, 10.30)	5.61 (3.74, 11.66)	7.47 (5.11, 12.29)	9.47 (3.36, 11.98)	10.40 (1.73, 15.32)	1.98 (1.61, 2.67)	3.63 (2.94, 4.04)	3.58 (3.45, 4.25)	4.35 (3.16, 5.15)	5.60 (5.35, 6.25)	8.54 (8.36, 8.60)
mean(CI)	6.76 (4.45, 9.07)	7.24 (3.55, 10.93)	5.70 (3.82, 7.59)	6.37 (4.54, 8.19)	6.65 (4.74, 8.55)	9.05 (5.81, 12.30)	9.36 (6.61, 12.12)	9.34 (5.75, 12.93)	2.21 (1.37, 3.04)	3.45 (0.68, 6.21)	3.94 (1.81, 6.07)	4.09 (-0.88, 9.06)	5.86 (3.57, 8.16)	8.46 (7.84, 9.08)
Carbon (m %)														
min, max	49.41, 56.06	50.62, 56.49	53.51, 56.91	53.18, 57.38	53.18, 57.38	51.54, 58.68	51.54, 58.68	50.14, 58.68	58.68, 58.68	58.68, 58.68	58.68, 58.68	58.68, 58.68	58.68, 58.68	57.14, 57.14
median(IQR)	53.45 (52.36, 54.14)	54.28 (52.15, 54.39)	54.67 (54.45, 54.76)	54.37 (54.03, 55.05)	54.37 (54.03, 55.05)	54.07 (52.25, 55.69)	54.38 (52.25, 57.68)	53.41 (50.97, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	57.14 (57.14, 57.14)
mean(CI)	53.11 (52.28, 53.93)	53.45 (52.66, 54.25)	54.79 (54.36, 55.22)	54.73 (54.16, 55.29)	54.78 (54.17, 55.39)	54.45 (53.28, 55.61)	54.56 (53.30, 55.82)	54.32 (52.35, 56.28)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	57.14 (57.14, 57.14)
Nitrog. (m %)														
min, max	1.49, 2.65	1.42, 2.34	1.36, 2.30	1.15, 2.45	1.15, 2.45	1.43, 2.48	1.43, 2.48	1.43, 2.88	1.43, 1.43	1.43, 1.43	1.43, 1.43	1.43, 1.43	1.43, 1.43	3.00, 3.00
median(IQR)	2.09 (1.58, 2.52)	2.09 (1.48, 2.30)	2.07 (1.58, 2.30)	2.19 (1.93, 2.33)	2.19 (1.93, 2.33)	2.30 (1.95, 2.32)	2.21 (1.60, 2.31)	2.05 (1.43, 2.40)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	3.00 (3.00, 3.00)
mean(CI)	2.06 (1.88, 2.25)	1.93 (1.77, 2.08)	1.92 (1.77, 2.07)	1.98 (1.79, 2.18)	1.96 (1.75, 2.16)	2.08 (1.91, 2.26)	2.06 (1.87, 2.24)	2.06 (1.76, 2.36)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	3.00 (3.00, 3.00)
Hydrog. (m %)														
min, max	4.51, 5.32	4.40, 5.41	4.45, 5.72	4.48, 5.42	4.48, 5.42	4.44, 5.37	4.44, 5.37	4.38, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.57, 5.57
median(IQR)	4.95 (4.53, 4.95)	5.02 (4.51, 5.35)	4.89 (4.74, 5.18)	5.07 (4.77, 5.14)	5.07 (4.77, 5.14)	4.96 (4.71, 5.09)	4.96 (4.71, 5.28)	4.95 (4.43, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.57 (5.57, 5.57)
mean(CI)	4.86 (4.74, 4.98)	4.92 (4.75, 5.09)	4.99 (4.82, 5.17)	4.97 (4.84, 5.11)	4.99 (4.85, 5.14)	4.93 (4.79, 5.07)	4.94 (4.79, 5.09)	4.90 (4.67, 5.13)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.57 (5.57, 5.57)
Sulfur (m %)														
min, max	0.23, 0.54	0.22, 0.47	0.32, 0.63	0.27, 0.94	0.27, 0.94	0.33, 1.51	0.33, 1.51	0.33, 2.45	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.78, 0.78
median(IQR)	0.33 (0.33, 0.47)	0.44 (0.40, 0.46)	0.55 (0.36, 0.58)	0.66 (0.56, 0.72)	0.66 (0.56, 0.72)	0.99 (0.70, 1.05)	0.99 (0.45, 1.05)	1.32 (0.33, 1.72)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.78 (0.78, 0.78)
mean(CI)	0.38 (0.34, 0.43)	0.40 (0.37, 0.44)	0.49 (0.44, 0.54)	0.63 (0.54, 0.72)	0.62 (0.52, 0.72)	0.91 (0.74, 1.09)	0.91 (0.72, 1.11)	1.26 (0.82, 1.70)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.78 (0.78, 0.78)
Oxygen (m %)														
min, max	30.27, 36.62	27.90, 36.97	28.56, 36.48	27.38, 37.49	27.38, 37.49	25.57, 31.64	25.57, 31.64	24.06, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	25.34, 25.34
median(IQR)	32.97 (31.82, 34.26)	31.16 (29.92, 33.72)	32.45 (29.34, 32.97)	30.44 (28.48, 30.77)	30.44 (28.48, 30.77)	27.24 (26.91, 29.17)	27.24 (26.91, 30.82)	26.79 (25.05, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	25.34 (25.34, 25.34)
mean(CI)	33.25 (32.40, 34.11)	31.90 (30.62, 33.18)	31.91 (30.75, 33.06)	31.02 (29.54, 32.51)	31.23 (29.65, 32.81)	28.15 (27.20, 29.11)	28.19 (27.15, 29.23)	27.66 (25.90, 29.42)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	25.34 (25.34, 25.34)

Depth **Properties**	**0-10 cm (N = 5)**	**10-25 cm (N = 5)**	**25-50 cm (N = 5)**	**50-75 cm (N = 5)**	**75-100 cm (N = 5)**	**100-150 cm (N = 5)**	**150-200 cm (N = 5)**	**200-250 cm (N = 4)**	**250-300 cm (N = 1)**	**300-350 cm (N = 1)**	**350-400 cm (N = 1)**	**400-450 cm (N = 1)**	**450-500 cm (N = 1)**	**500-550 cm (N = 1)**
WC (m %)														
min, max	65.3, 89.2	71.4, 90.0	76.1, 91.4	79.7, 92.7	83.0, 93.3	85.8, 93.2	85.9, 92.7	86.9, 92.6	91.9, 91.9	92.4, 92.4	92.2, 92.2	93.4, 93.4	93.7, 93.7	91.7, 91.7
median(IQR)	72.2 (67.1, 78.4)	81.9 (73.6, 84.0)	87.0 (77.3, 87.9)	87.1 (81.2, 87.3)	89.1 (88.3, 90.0)	87.6 (87.4, 89.0)	86.9 (86.4, 88.5)	87.5 (87.2, 89.0)	92.1 (92.1, 92.1)	92.2 (92.2, 92.2)	92.2 (92.2, 92.2)	93.8 (93.8, 93.8)	93.7 (93.7, 93.7)	91.8 (91.8, 91.8)
mean(CI)	73.2 (60.8, 85.5)	78.4 (68.8, 88.1)	83.0 (75.2, 90.9)	85.8 (79.5, 92.2)	88.3 (83.6, 93.0)	88.5 (85.1, 92.0)	88.1 (84.8, 91.5)	88.7 (84.5, 92.9)	91.9 (NaN, NaN)	92.4 (NaN, NaN)	92.2 (NaN, NaN)	93.4 (NaN, NaN)	93.7 (NaN, NaN)	91.7 (NaN, NaN)
WC (vol %)														
min, max	22.5, 78.0	40.7, 96.6	62.3, 109.3	79.2, 119.2	90.7, 124.9	112.6, 126.6	105.8, 121.4	109.9, 120.7	117.5, 117.5	116.5, 116.5	117.2, 117.2	117.6, 117.6	117.0, 117.0	118.5, 118.5
median(IQR)	37.5 (32.6, 81.1)	74.4 (46.7, 92.5)	101.9 (60.8, 104.0)	116.0 (92.8, 120.0)	117.4 (111.7, 118.2)	120.1 (111.5, 121.9)	117.2 (113.8, 121.2)	118.7 (117.9, 119.6)	118.5 (118.5, 118.5)	116.6 (116.6, 116.6)	117.0 (117.0, 117.0)	117.3 (117.3, 117.3)	117.3 (117.3, 117.3)	118.4 (118.4, 118.4)
mean(CI)	50.0 (19.0, 81.1)	67.7 (38.2, 97.2)	83.3 (59.2, 107.3)	104.8 (81.3, 128.2)	112.5 (95.9, 129.2)	119.6 (111.7, 127.4)	115.6 (107.4, 123.8)	116.9 (109.3, 124.5)	117.5 (NaN, NaN)	116.5 (NaN, NaN)	117.2 (NaN, NaN)	117.6 (NaN, NaN)	117.0 (NaN, NaN)	118.5 (NaN, NaN)
BD (g*cm^{-3})														
min, max	0.095, 0.212	0.107, 0.181	0.102, 0.176	0.095, 0.191	0.085, 0.173	0.089, 0.187	0.095, 0.183	0.097, 0.179	0.103, 0.103	0.096, 0.096	0.099, 0.099	0.083, 0.083	0.079, 0.079	0.107, 0.107
median(IQR)	0.161 (0.126, 0.168)	0.154 (0.150, 0.157)	0.163 (0.123, 0.168)	0.174 (0.171, 0.179)	0.152 (0.136, 0.156)	0.159 (0.148, 0.176)	0.166 (0.153, 0.181)	0.158 (0.132, 0.174)	0.104 (0.104, 0.104)	0.099 (0.099, 0.099)	0.099 (0.099, 0.099)	0.078 (0.078, 0.078)	0.079 (0.079, 0.079)	0.106 (0.106, 0.106)

mean(CI)	0.149 (0.091, 0.208)	0.151 (0.117, 0.185)	0.144 (0.103, 0.185)	0.160 (0.113, 0.207)	0.144 (0.099, 0.188)	0.156 (0.108, 0.204)	0.156 (0.112, 0.200)	0.149 (0.090, 0.209)	0.103 (NaN, NaN)	0.096 (NaN, NaN)	0.099 (NaN, NaN)	0.083 (NaN, NaN)	0.079 (NaN, NaN)	0.107 (NaN, NaN)
PD (g*cm^{-3})														
min, max	1.474, 1.592	1.458, 1.634	1.456, 1.563	1.456, 1.570	1.454, 1.596	1.456, 1.616	1.458, 1.625	1.460, 1.636	1.467, 1.467	1.482	1.488, 1.488	1.489, 1.489	1.511, 1.511	1.542, 1.542
median(IQR)	1.513 (1.470, 1.514)	1.494 (1.476, 1.533)	1.484 (1.476, 1.546)	1.506 (1.483, 1.536)	1.508 (1.493, 1.520)	1.528 (1.524, 1.541)	1.555 (1.555, 1.570)	1.592 (1.554, 1.608)	1.464 (1.464, 1.464)	1.484 (1.484, 1.484)	1.483 (1.483, 1.483)	1.493 (1.493, 1.493)	1.508 (1.508, 1.508)	1.544 (1.544, 1.544)
mean(CI)	1.523 (1.459, 1.586)	1.531 (1.441, 1.621)	1.509 (1.453, 1.565)	1.515 (1.459, 1.571)	1.521 (1.457, 1.585)	1.547 (1.474, 1.621)	1.556 (1.479, 1.632)	1.571 (1.449, 1.693)	1.467 (NaN, NaN)	1.482 (NaN, NaN)	1.488 (NaN, NaN)	1.489 (NaN, NaN)	1.511 (NaN, NaN)	1.542 (NaN, NaN)
Por. (vol %)														
min, max	86.7, 93.5	87.8, 92.6	88.1, 93.0	87.1, 93.5	88.8, 94.2	88.4, 93.9	88.3, 93.5	89.0, 93.4	93.0, 93.0	93.5, 93.5	93.3, 93.3	94.4, 94.4	94.8, 94.8	93.1, 93.1
median(IQR)	89.3 (88.6, 91.9)	89.8 (89.5, 90.8)	89.3 (88.7, 91.5)	88.7 (88.4, 89.2)	90.0 (89.7, 90.9)	89.6 (88.6, 90.3)	89.4 (89.3, 90.1)	90.2 (89.2, 91.8)	92.9 (92.9, 92.9)	93.3 (93.3, 93.3)	93.3 (93.3, 93.3)	94.9 (94.9, 94.9)	94.8 (94.8, 94.8)	93.1 (93.1, 93.1)
mean(CI)	90.2 (86.6, 93.8)	90.1 (87.9, 92.3)	90.4 (87.8, 93.0)	89.5 (86.5, 92.4)	90.6 (87.9, 93.3)	90.0 (87.3, 92.8)	90.0 (87.5, 92.5)	90.5 (87.4, 93.7)	93.0 (NaN, NaN)	93.5 (NaN, NaN)	93.3 (NaN, NaN)	94.4 (NaN, NaN)	94.8 (NaN, NaN)	93.1 (NaN, NaN)
pH														
min, max	4.0, 4.6	3.9, 4.9	4.0, 5.2	4.1, 5.4	4.2, 6.0	4.3, 6.1	4.5, 6.4	4.7, 6.3	4.9, 4.9	5.2, 5.2	5.3, 5.3	5.5, 5.5	5.8, 5.8	6.3, 6.3
median(IQR)	4.3 (4.2, 4.4)	4.0 (4.0, 4.3)	4.1 (4.0, 5.1)	4.5 (4.2, 4.9)	4.8 (4.8, 5.0)	5.4 (5.0, 5.9)	5.6 (5.0, 5.8)	6.2 (5.7, 6.4)	4.9 (4.9, 4.9)	5.2 (5.2, 5.2)	5.3 (5.3, 5.3)	5.4 (5.4, 5.4)	5.6 (5.6, 5.6)	6.3 (6.3, 6.3)
mean(CI)	4.4 (4.0, 4.7)	4.3 (3.8, 4.8)	4.5 (3.9, 5.2)	4.7 (4.0, 5.4)	5.0 (4.3, 5.8)	5.4 (4.5, 6.4)	5.5 (4.6, 6.4)	5.8 (4.6, 7.0)	4.9 (NaN, NaN)	5.2 (NaN, NaN)	5.3 (NaN, NaN)	5.5 (NaN, NaN)	5.8 (NaN, NaN)	6.3 (NaN, NaN)
EC (mS*cm^{-1})														
min, max	59.3, 123.3	60.2, 168.9	57.4, 200.5	61.5, 181.9	61.8, 204.6	61.8, 153.0	61.6, 142.4	60.2, 203.5	56.0, 56.0	56.3, 56.3	61.0, 61.0	63.5, 63.5	70.3, 70.3	99.0, 99.0
median(IQR)	102.0 (86.0, 107.3)	114.4 (79.2, 156.2)	115.6 (77.6, 136.3)	116.1 (72.4, 117.7)	85.9 (75.2, 97.8)	80.8 (73.0, 90.6)	89.5 (79.3, 91.3)	118.8 (86.5, 142.6)	55.5 (55.5, 55.5)	58.3 (58.3, 58.3)	62.0 (62.0, 62.0)	62.9 (62.9, 62.9)	63.8 (63.8, 63.8)	97.2 (97.2, 97.2)
mean(CI)	100.3 (69.1, 131.5)	119.6 (65.6, 173.6)	118.5 (50.0, 187.0)	108.0 (48.7, 167.3)	105.3 (34.4, 176.2)	94.8 (49.6, 140.0)	93.7 (56.3, 131.0)	124.5 (26.3, 222.7)	56.0 (NaN, NaN)	56.3 (NaN, NaN)	61.0 (NaN, NaN)	63.5 (NaN, NaN)	70.3 (NaN, NaN)	99.0 (NaN, NaN)
von Post														
min, max	5, 9	5, 8	4, 7	4, 6	4, 6	5, 7	5, 7	6, 8	7, 7	7, 7	7, 7	7, 7	6, 6	8, 8
median(IQR)	8 (5, 9)	6 (5, 8)	6 (5, 7)	6 (5, 6)	6 (5, 6)	6 (5, 7)	6 (6, 7)	7 (7, 8)	8 (8, 8)	7 (7, 7)	7 (7, 7)	7 (7, 7)	6 (6, 6)	8 (8, 8)
mean(CI)	7 (4, 9)	6 (5, 8)	6 (5, 7)	6 (5, 7)	5 (5, 6)	6 (5, 7)	6 (6, 7)	7 (6, 8)	7 (NaN, NaN)	7 (NaN, NaN)	7 (NaN, NaN)	7 (NaN, NaN)	6 (NaN, NaN)	8 (NaN, NaN)
OM (m %)														
min, max	87.40, 97.19	83.95, 98.51	89.83, 98.72	89.26, 98.66	87.09, 98.82	85.47, 98.67	84.71, 98.53	83.81, 98.34	97.79, 97.79	96.55, 96.55	96.06, 96.06	95.91, 95.91	94.14, 94.14	91.53, 91.53
median(IQR)	93.95 (93.92, 97.55)	95.57 (92.30, 97.03)	96.37 (91.27, 97.02)	94.54 (92.10, 96.47)	94.39 (93.37, 95.61)	92.73 (91.64, 93.08)	90.48 (89.29, 90.49)	87.42 (86.13, 90.58)	98.02 (98.02, 98.02)	96.37 (96.37, 96.37)	96.42 (96.42, 96.42)	95.65 (95.65, 95.65)	94.40 (94.40, 94.40)	91.44 (91.44, 91.44)
mean(CI)	93.17 (87.93, 98.41)	92.46 (85.02, 99.89)	94.28 (89.65, 98.91)	93.79 (89.14, 98.44)	93.28 (88.00, 98.57)	91.13 (85.07, 97.20)	90.44 (84.12, 96.75)	89.20 (79.11, 99.29)	97.79 (NaN, NaN)	96.55 (NaN, NaN)	96.06 (NaN, NaN)	95.91 (NaN, NaN)	94.14 (NaN, NaN)	91.53 (NaN, NaN)
Ash (m %)														
min, max	2.81, 12.60	1.49, 16.05	1.28, 10.17	1.34, 10.74	1.18, 12.91	1.33, 14.53	1.47, 15.29	1.66, 16.19	2.21, 2.21	3.45, 3.45	3.94, 3.94	4.09, 4.09	5.86, 5.86	8.47, 8.47
median(IQR)	6.05 (2.45, 6.08)	4.43 (2.97, 7.70)	3.63 (2.98, 8.73)	5.46 (3.53, 7.90)	5.61 (4.39, 6.63)	7.27 (6.92, 8.36)	9.52 (9.51, 10.71)	12.58 (9.42, 13.87)	1.98 (1.98, 1.98)	3.63 (3.63, 3.63)	3.58 (3.58, 3.58)	4.35 (4.35, 4.35)	5.60 (5.60, 5.60)	8.56 (8.56, 8.56)
mean(CI)	6.83 (1.59, 12.07)	7.54 (0.11, 14.98)	5.72 (1.09, 10.35)	6.21 (1.56, 10.86)	6.72 (1.43, 12.00)	8.87 (2.80, 14.93)	9.56 (3.25, 15.88)	10.80 (0.71, 20.89)	2.21 (NaN, NaN)	3.45 (NaN, NaN)	3.94 (NaN, NaN)	4.09 (NaN, NaN)	5.86 (NaN, NaN)	8.47 (NaN, NaN)
Carbon (m %)														
min, max	49.41, 56.06	50.62, 56.49	53.51, 56.91	53.18, 57.38	53.18, 57.38	51.54, 58.68	51.54, 58.68	50.14, 58.68	58.68, 58.68	58.68, 58.68	58.68, 58.68	58.68	58.68, 58.68	57.14, 57.14
median(IQR)	53.45 (52.36, 54.14)	54.28 (52.15, 54.39)	54.67 (54.45, 54.76)	54.37 (54.03, 55.05)	54.37 (54.03, 55.05)	54.07 (52.25, 54.69)	54.07 (52.25, 54.69)	52.19 (50.76, 54.73)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	58.68 (58.68, 58.68)	57.14 (57.14, 57.14)
mean(CI)	53.08 (50.03, 56.13)	53.59 (50.78, 56.39)	54.86 (53.31, 56.41)	54.80 (52.83, 56.78)	54.80 (52.83, 56.78)	54.25 (50.78, 57.71)	54.25 (50.78, 57.71)	53.30 (47.18, 59.42)	58.68 (NaN, NaN)	58.68 (NaN, NaN)	58.68 (NaN, NaN)	58.68 (NaN, NaN)	58.68 (NaN, NaN)	57.14 (NaN, NaN)
Nitrog. (m %)														
min, max	1.49, 2.65	1.42, 2.34	1.36, 2.30	1.15, 2.45	1.15, 2.45	1.43, 2.48	1.43, 2.48	1.43, 2.88	1.43, 1.43	1.43, 1.43	1.43, 1.43	1.43, 1.43	1.43, 1.43	3.00, 3.00
median(IQR)	2.09 (1.58, 2.52)	2.09 (1.48, 2.30)	2.07 (1.58, 2.30)	2.19 (1.93, 2.33)	2.19 (1.93, 2.33)	2.30 (2.12, 2.32)	2.30 (2.12, 2.32)	2.22 (1.89, 2.52)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	1.43 (1.43, 1.43)	3.00 (3.00, 3.00)
mean(CI)	2.07 (1.41, 2.72)	1.93 (1.37, 2.48)	1.92 (1.39, 2.46)	2.01 (1.37, 2.65)	2.01 (1.37, 2.65)	2.13 (1.62, 2.64)	2.13 (1.62, 2.64)	2.19 (1.22, 3.16)	1.43 (NaN, NaN)	1.43 (NaN, NaN)	1.43 (NaN, NaN)	1.43 (NaN, NaN)	1.43 (NaN, NaN)	3.00 (NaN, NaN)
Hydrog. (m %)														
min, max	4.51, 5.32	4.40, 5.41	4.45, 5.72	4.48, 5.42	4.48, 5.42	4.44, 5.37	4.44, 5.37	4.38, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.37, 5.37	5.57, 5.57
median(IQR)	4.95 (4.53, 4.95)	5.02 (4.51, 5.35)	4.89 (4.74, 5.18)	5.07 (4.77, 5.14)	5.07 (4.77, 5.14)	4.96 (4.71, 5.00)	4.96 (4.71, 5.00)	4.69 (4.42, 5.06)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.37 (5.37, 5.37)	5.57 (5.57, 5.57)
mean(CI)	4.85 (4.43, 5.27)	4.94 (4.36, 5.52)	5.00 (4.40, 5.60)	4.98 (4.53, 5.42)	4.98 (4.53, 5.42)	4.90 (4.46, 5.33)	4.90 (4.46, 5.33)	4.78 (4.04, 5.53)	5.37 (NaN, NaN)	5.37 (NaN, NaN)	5.37 (NaN, NaN)	5.37 (NaN, NaN)	5.37 (NaN, NaN)	5.57 (NaN, NaN)
Sulfur (m %)														
min, max	0.23, 0.54	0.22, 0.47	0.32, 0.63	0.27, 0.94	0.27, 0.94	0.33, 1.51	0.33, 1.51	0.33, 2.45	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.33, 0.33	0.78, 0.78
median(IQR)	0.33 (0.33, 0.47)	0.44 (0.40, 0.46)	0.55 (0.36, 0.58)	0.66 (0.56, 0.72)	0.66 (0.56, 0.72)	0.99 (0.83, 1.05)	0.99 (0.83, 1.05)	1.52 (1.07, 1.90)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.33 (0.33, 0.33)	0.78 (0.78, 0.78)
mean(CI)	0.38 (0.23, 0.53)	0.40 (0.27, 0.53)	0.49 (0.32, 0.66)	0.63 (0.33, 0.93)	0.63 (0.33, 0.93)	0.94 (0.41, 1.47)	0.94 (0.41, 1.47)	1.46 (0.05, 2.86)	0.33 (NaN, NaN)	0.33 (NaN, NaN)	0.33 (NaN, NaN)	0.33 (NaN, NaN)	0.33 (NaN, NaN)	0.78 (NaN, NaN)
Oxygen (m %)														
min, max	30.27, 36.62	27.90, 36.97	28.56, 36.48	27.38, 37.49	27.38, 37.49	25.57, 31.64	25.57, 31.64	24.06, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	31.64, 31.64	25.34, 25.34
median(IQR)	32.97 (31.82, 34.26)	31.16 (29.92, 33.72)	32.45 (29.34, 32.97)	30.44 (28.48, 30.77)	30.44 (28.48, 30.77)	27.24 (26.91, 28.35)	27.24 (26.91, 28.35)	25.92 (24.80, 28.00)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	31.64 (31.64, 31.64)	25.34 (25.34, 25.34)
mean(CI)	33.19 (30.19, 36.19)	31.93 (27.57, 36.30)	31.96 (28.03, 35.89)	30.91 (26.03, 35.80)	30.91 (26.03, 35.80)	27.94 (25.10, 30.79)	27.94 (25.10, 30.79)	26.88 (21.53, 32.24)	31.64 (NaN, NaN)	31.64 (NaN, NaN)	31.64 (NaN, NaN)	31.64 (NaN, NaN)	31.64 (NaN, NaN)	25.34 (NaN, NaN)

Raised bogs – Industrial extraction

Depth Properties	0-10 cm (N = 30)	10-25 cm (N = 30)	25-50 cm (N = 30)	50-75 cm (N = 29)	75-100 cm (N = 28)	100-150 cm (N = 25)	150-200 cm (N = 6)	200-250 cm (N = 2)	250-300 cm (N = 1)
WC (m %)									
min, max	68.9, 90.4	76.7, 90.9	79.8, 92.4	80.2, 92.5	79.8, 92.2	85.6, 91.2	85.5, 89.9	87.1, 90.4	83.3, 83.3
median(IQR)	80.6 (76.3, 83.8)	86.5 (82.2, 87.5)	88.4 (87.1, 89.9)	88.4 (85.8, 89.4)	89.7 (88.1, 90.5)	89.2 (87.6, 90.0)	88.1 (87.2, 89.5)	88.8 (87.9, 89.6)	83.3 (83.3, 83.3)
mean(CI)	79.8 (77.7, 81.9)	85.0 (83.6, 86.4)	87.8 (86.6, 88.9)	87.5 (86.2, 88.7)	88.8 (87.7, 90.0)	88.8 (88.1, 89.5)	88.1 (86.3, 89.8)	88.8 (67.6, 109.9)	83.3 (NaN, NaN)
WC (vol %)									
min, max	45.0, 107.8	67.8, 127.9	87.5, 127.9	101.9, 125.1	83.9, 128.1	87.8, 129.2	110.0, 122.3	108.2, 117.3	11.8, 11.8
median(IQR)	73.3 (63.6, 92.4)	108.5 (98.1, 115.2)	116.9 (110.5, 120.3)	117.3 (114.4, 119.7)	120.3 (114.5, 122.3)	120.2 (116.8, 123.6)	119.1 (113.6, 120.9)	112.8 (110.5, 115.0)	11.8 (11.8, 11.8)
mean(CI)	76.4 (69.3, 83.6)	105.1 (99.4, 110.8)	113.6 (109.7, 117.5)	115.8 (113.7, 118.0)	115.3 (110.8, 119.8)	119.1 (115.9, 122.3)	117.3 (111.9, 122.6)	112.8 (55.0, 170.5)	11.8 (NaN, NaN)
BD (gcm-3)									
min, max	0.095, 0.320	0.105, 0.275	0.093, 0.222	0.094, 0.253	0.097, 0.217	0.113, 0.195	0.126, 0.186	0.114, 0.174	0.024, 0.024
median(IQR)	0.183 (0.167, 0.208)	0.175 (0.157, 0.212)	0.150 (0.134, 0.175)	0.157 (0.142, 0.199)	0.134 (0.124, 0.155)	0.142 (0.134, 0.167)	0.163 (0.143, 0.176)	0.144 (0.129, 0.159)	0.024 (0.024, 0.024)
mean(CI)	0.186 (0.170, 0.202)	0.183 (0.167, 0.199)	0.156 (0.144, 0.168)	0.166 (0.150, 0.183)	0.143 (0.131, 0.155)	0.150 (0.140, 0.160)	0.159 (0.134, 0.183)	0.144 (-0.232, 0.520)	0.024 (NaN, NaN)
PD (gcm-3)									
min, max	1.456, 1.612	1.454, 1.590	1.460, 1.583	1.462, 1.971	1.455, 1.595	1.460, 1.729	1.467, 1.562	1.547, 1.552	1.703, 1.703
median(IQR)	1.533 (1.476, 1.590)	1.525 (1.472, 1.560)	1.526 (1.483, 1.546)	28; 1.531 (1.491, 1.550)	27; 1.539 (1.496, 1.547)	24; 1.569 (1.517, 1.593)	1.534 (1.511, 1.557)	1.550 (1.549, 1.551)	1.703 (1.703, 1.703)
mean(CI)	1.530 (1.510, 1.551)	1.519 (1.502, 1.536)	1.518 (1.504, 1.532)	1.539 (1.503, 1.575)	1.530 (1.514, 1.546)	1.565 (1.539, 1.591)	1.528 (1.489, 1.566)	1.550 (1.522, 1.578)	1.703 (NaN, NaN)
Porosity (vol %)									
min, max	80.0, 93.8	81.3, 93.0	85.0, 93.7	82.9, 93.7	85.7, 93.5	87.4, 93.0	87.8, 91.9	88.8, 92.6	98.6, 98.6
median(IQR)	88.1 (86.4, 89.3)	88.5 (86.4, 89.9)	90.2 (88.8, 91.2)	28; 89.9 (87.0, 90.8)	27; 91.5 (90.4, 92.0)	24; 90.8 (89.0, 91.4)	89.2 (88.7, 90.5)	90.7 (89.7, 91.7)	98.6 (98.6, 98.6)
mean(CI)	87.9 (86.8, 88.9)	87.9 (86.8, 89.0)	89.7 (88.9, 90.5)	89.1 (88.0, 90.3)	90.7 (89.8, 91.5)	90.4 (89.7, 91.0)	89.6 (88.0, 91.2)	90.7 (66.2, 115.2)	98.6 (NaN, NaN)
pH									
min, max	4.2, 6.8	4.3, 6.3	4.4, 6.3	4.5, 6.6	4.5, 6.7	4.9, 7.2	5.2, 6.2	5.5, 6.2	5.8, 5.8
median(IQR)	5.2 (4.5, 6.0)	5.3 (4.8, 6.0)	5.4 (4.9, 5.7)	5.5 (5.0, 5.9)	27; 5.7 (5.2, 6.1)	24; 6.1 (5.7, 6.2)	5.5 (5.3, 5.5)	5.8 (5.6, 6.0)	5.8 (5.8, 5.8)
mean(CI)	5.3 (5.0, 5.6)	5.3 (5.1, 5.6)	5.3 (5.1, 5.5)	5.5 (5.2, 5.7)	5.6 (5.4, 5.9)	6.0 (5.7, 6.2)	5.5 (5.2, 5.9)	5.8 (1.4, 10.2)	5.8 (NaN, NaN)
EC (mScm-1)									
min, max	36.9, 388.0	33.9, 170.8	40.2, 164.5	29.6, 181.5	47.1, 265.0	52.2, 595.0	61.8, 134.8	88.5, 143.5	81.6, 81.6
median(IQR)	71.9 (63.5, 101.8)	64.5 (56.9, 85.0)	64.7 (54.3, 91.6)	60.2 (53.3, 88.8)	27; 74.3 (57.7, 103.7)	24; 84.3 (64.5, 109.8)	89.2 (79.8, 106.9)	116.0 (102.2, 129.8)	81.6 (81.6, 81.6)
mean(CI)	98.9 (68.4, 129.4)	75.2 (64.0, 86.4)	74.3 (64.2, 84.3)	74.3 (62.2, 86.3)	87.9 (70.4, 105.4)	119.1 (70.4, 167.9)	94.1 (67.0, 121.2)	116.0 (-233.4, 465.4)	81.6 (NaN, NaN)
von Post									
min, max	5, 10	6, 10	5, 8	5, 8	5, 8	5, 8	6, 8	7, 8	8, 8
median(IQR)	7 (7, 9)	7 (6, 7)	7 (6, 7)	6 (6, 7)	7 (7, 7)	7 (6, 7)	8 (7, 8)	8 (7, 8)	8 (8, 8)
mean(CI)	8 (7, 8)	7 (7, 7)	6 (6, 7)	6 (6, 7)	7 (7, 7)	7 (6, 7)	7 (6, 8)	8 (1, 14)	8 (NaN, NaN)
OM (mass %)									
min, max	85.77, 98.65	87.63, 98.83	88.14, 98.31	56.12, 98.15	87.18, 98.77	76.08, 98.37	89.92, 97.76	90.76, 91.12	78.30, 78.30
median(IQR)	92.27 (87.63, 97.04)	92.94 (90.11, 97.36)	92.86 (91.22, 96.47)	28; 92.47 (90.87, 95.77)	27; 91.81 (91.14, 95.36)	24; 89.38 (87.33, 93.66)	92.23 (90.32, 94.10)	90.94 (90.85, 91.03)	78.30 (78.30, 78.30)
mean(CI)	92.52 (90.83, 94.22)	93.48 (92.05, 94.90)	93.58 (92.41, 94.75)	91.81 (88.83, 94.80)	92.53 (91.21, 93.84)	89.70 (87.54, 91.86)	92.76 (89.59, 95.93)	90.94 (88.63, 93.25)	78.30 (NaN, NaN)
Ash (mass %)									
min, max	1.35, 14.23	1.17, 12.37	1.69, 11.86	1.85, 43.88	1.23, 12.82	1.63, 23.92	2.24, 10.08	8.88, 9.24	21.70, 21.70
median(IQR)	7.73 (2.96, 12.37)	7.06 (2.64, 9.89)	7.14 (3.53, 8.78)	28; 7.53 (4.23, 9.13)	27; 8.19 (4.64, 8.86)	24; 10.62 (6.34, 12.67)	7.77 (5.90, 9.68)	9.06 (8.97, 9.15)	21.70 (21.70, 21.70)
mean(CI)	7.48 (5.78, 9.17)	6.52 (5.10, 7.95)	6.42 (5.25, 7.59)	8.19 (5.20, 11.17)	7.47 (6.16, 8.79)	10.30 (8.14, 12.46)	7.24 (4.07, 10.41)	9.06 (6.75, 11.37)	21.70 (NaN, NaN)
Carbon (mass %)									
min, max	51.48, 58.27	54.06, 58.60	54.58, 58.26	53.62, 56.13	53.62, 56.13	50.32, 55.28	53.25, 55.28	53.14, 55.28	47.34, 47.34
median(IQR)	55.38 (52.36, 56.09)	55.54 (54.24, 55.79)	55.19 (54.96, 55.67)	55.42 (55.07, 55.67)	55.42 (55.07, 55.67)	54.33 (53.04, 54.56)	54.56 (54.56, 55.10)	54.21 (53.68, 54.75)	47.34 (47.34, 47.34)
mean(CI)	54.72 (53.77, 55.66)	55.65 (55.03, 56.26)	55.73 (55.23, 56.23)	55.17 (54.84, 55.51)	55.16 (54.82, 55.51)	53.33 (52.57, 54.09)	54.58 (53.80, 55.36)	54.21 (40.61, 67.81)	47.34 (NaN, NaN)
Nitrogen (mass %)									
min, max	1.24, 2.42	1.17, 2.42	1.22, 2.30	1.29, 2.59	1.29, 2.59	1.69, 3.31	1.69, 2.51	1.69, 3.04	2.05, 2.05
median(IQR)	1.97 (1.75, 2.40)	2.10 (1.58, 2.23)	2.22 (1.81, 2.25)	2.10 (1.82, 2.53)	2.10 (1.82, 2.53)	2.65 (2.18, 2.98)	2.18 (1.81, 2.18)	2.37 (2.03, 2.70)	2.05 (2.05, 2.05)
mean(CI)	1.96 (1.79, 2.12)	1.90 (1.73, 2.07)	1.96 (1.80, 2.12)	2.09 (1.91, 2.27)	2.12 (1.94, 2.30)	2.63 (2.41, 2.86)	2.07 (1.73, 2.41)	2.37 (-6.21, 10.94)	2.05 (NaN, NaN)
Hydrogen (mass %)									
min, max	4.62, 5.37	4.89, 5.53	4.83, 5.45	4.81, 5.42	4.81, 5.42	4.39, 5.48	4.81, 5.43	4.90, 5.75	4.29, 4.29
median(IQR)	5.03 (4.76, 5.14)	5.01 (4.90, 5.30)	5.01 (4.98, 5.27)	4.96 (4.89, 5.28)	4.96 (4.89, 5.28)	5.24 (4.90, 5.43)	5.16 (4.90, 5.43)	5.33 (5.11, 5.54)	4.29 (4.29, 4.29)
mean(CI)	4.98 (4.88, 5.09)	5.13 (5.03, 5.22)	5.11 (5.02, 5.19)	5.08 (4.98, 5.17)	5.08 (4.98, 5.18)	5.17 (5.01, 5.33)	5.15 (4.83, 5.47)	5.33 (-0.08, 10.73)	4.29 (NaN, NaN)
Sulfur (mass %)									
min, max	0.23, 0.68	0.21, 0.73	0.25, 0.88	0.29, 1.05	0.29, 1.05	0.47, 2.14	0.47, 1.29	0.47, 1.84	0.94, 0.94
median(IQR)	0.56 (0.49, 0.59)	0.58 (0.52, 0.64)	0.55 (0.55, 0.88)	0.90 (0.64, 0.92)	0.90 (0.64, 0.92)	1.62 (1.22, 2.01)	1.22 (0.66, 1.22)	1.16 (0.81, 1.50)	0.94 (0.94, 0.94)
mean(CI)	0.51 (0.45, 0.57)	0.54 (0.47, 0.60)	0.62 (0.53, 0.71)	0.78 (0.68, 0.88)	0.79 (0.70, 0.89)	1.60 (1.37, 1.83)	0.98 (0.56, 1.40)	1.16 (-7.55, 9.86)	0.94 (NaN, NaN)
Oxygen (mass %)									
min, max	27.91, 33.16	27.76, 33.66	27.59, 33.34	27.24, 32.37	27.24, 32.37	24.42, 29.73	27.10, 29.73	26.57, 29.73	23.88, 23.88
median(IQR)	28.65 (28.09, 33.05)	28.61 (28.47, 32.56)	29.80 (28.47, 31.44)	28.13 (27.47, 29.78)	28.13 (27.47, 29.78)	25.24 (24.99, 29.59)	29.59 (29.59, 29.70)	28.15 (27.36, 28.94)	23.88 (23.88, 23.88)
mean(CI)	30.17 (29.26, 31.09)	30.21 (29.30, 31.13)	30.13 (29.34, 30.91)	28.97 (28.22, 29.72)	28.94 (28.17, 29.72)	26.57 (25.59, 27.54)	29.22 (28.13, 30.31)	28.15 (8.07, 48.23)	23.88 (NaN, NaN)

Depth Properties	0-10 cm (N = 5; n = 30)	10-25 cm (N = 5; n = 30)	25-50 cm (N = 5; n = 30)	50-75 cm (N = 5, n = 29)	75-100 cm (N = 5, n = 28)	100-150 cm (N = 5, n = 25)	150-200 cm (N = 3, n = 6)	200-250 cm (N = 2, n = 2)	250-300 cm (N = 1, n = 1)
WC (m %)									
min, max	71.8, 84.3	80.3, 88.2	82.5, 90.1	82.9, 91.0	84.2, 91.4	87.6, 90.6	87.7, 89.4	87.1, 90.4	83.3, 83.3
median(IQR)	82.5 (76.5, 83.6)	86.1 (84.6, 87.0)	88.6 (88.0, 89.5)	88.4 (87.9, 89.2)	89.5 (88.9, 90.4)	88.5 (88.4, 89.9)	87.9 (87.8, 88.9)	88.8 (87.9, 89.6)	83.3 (83.3, 83.3)
mean(CI)	79.8 (73.2, 86.4)	85.0 (81.1, 88.9)	87.8 (84.0, 91.6)	87.5 (83.8, 91.2)	88.9 (85.4, 92.3)	88.8 (87.4, 90.3)	88.3 (86.0, 90.7)	88.8 (67.6, 109.9)	83.3 (NaN, NaN)
WC (vol %)									
min, max	58.3, 93.4	95.6, 116.2	97.8, 119.0	110.1, 118.8	105.1, 123.0	113.6, 124.1	116.9, 121.4	108.2, 117.3	11.8, 11.8
median(IQR)	75.8 (65.6, 89.0)	105.9 (104.9, 112.7)	117.9 (116.7, 118.9)	116.8 (116.3, 118.4)	119.7 (110.5, 121.5)	120.6 (116.3, 121.1)	119.2 (117.9, 120.3)	112.8 (110.5, 115.0)	11.8 (11.8, 11.8)
mean(CI)	76.4 (57.5, 95.4)	105.1 (94.0, 116.2)	113.6 (102.6, 124.6)	115.8 (111.6, 119.9)	115.1 (104.9, 125.3)	119.0 (113.4, 124.6)	119.1 (113.6, 124.7)	112.8 (55.0, 170.5)	11.8 (NaN, NaN)
BD (gcm-3)									
min, max	0.143, 0.229	0.151, 0.237	0.128, 0.206	0.115, 0.226	0.113, 0.193	0.125, 0.163	0.138, 0.170	0.114, 0.174	0.024, 0.024
median(IQR)	0.191 (0.174, 0.192)	0.167 (0.154, 0.202)	0.149 (0.141, 0.159)	0.158 (0.144, 0.163)	0.138 (0.131, 0.146)	0.153 (0.140, 0.162)	0.164 (0.149, 0.167)	0.144 (0.129, 0.159)	0.024 (0.024, 0.024)
mean(CI)	0.186 (0.147, 0.224)	0.183 (0.136, 0.230)	0.156 (0.120, 0.193)	0.165 (0.115, 0.216)	0.143 (0.105, 0.180)	0.150 (0.131, 0.169)	0.157 (0.115, 0.200)	0.144 (-0.232, 0.520)	0.024 (NaN, NaN)
PD (gcm-3)									
min, max	1.465, 1.594	1.466, 1.556	1.483, 1.547	1.489, 1.567	1.484, 1.574	1.510, 1.626	1.503, 1.562	1.547, 1.552	1.703, 1.703
median(IQR)	1.533 (1.477, 1.591)	1.545 (1.472, 1.562)	1.526 (1.479, 1.544)	1.519 (1.491, 1.542)	1.539 (1.486, 1.543)	1.559 (1.508, 1.570)	1.521 (1.512, 1.542)	1.550 (1.549, 1.551)	1.703 (1.703, 1.703)
mean(CI)	1.530 (1.458, 1.603)	1.519 (1.464, 1.574)	1.518 (1.478, 1.557)	1.531 (1.495, 1.567)	1.529 (1.487, 1.572)	1.559 (1.501, 1.617)	1.529 (1.455, 1.604)	1.550 (1.522, 1.578)	1.703 (NaN, NaN)
Porosity (vol %)									
min, max	85.6, 91.0	83.9, 90.4	86.1, 91.7	84.8, 92.5	87.2, 92.7	89.4, 92.4	89.1, 90.9	88.8, 92.6	98.6, 98.6
median(IQR)	87.6 (87.0, 88.2)	88.6 (86.8, 90.0)	90.1 (89.8, 90.8)	89.9 (88.9, 90.7)	91.3 (90.8, 91.5)	89.7 (89.3, 91.0)	89.1 (89.1, 90.1)	90.7 (89.7, 91.7)	98.6 (98.6, 98.6)
mean(CI)	87.9 (85.4, 90.3)	87.9 (84.6, 91.3)	89.7 (87.1, 92.3)	89.1 (85.6, 92.6)	90.7 (88.1, 93.3)	90.4 (88.9, 91.9)	89.7 (87.1, 92.3)	90.7 (66.2, 115.2)	98.6 (NaN, NaN)
pH									
min, max	4.4, 6.3	4.7, 5.9	4.6, 5.9	4.6, 6.1	4.9, 6.2	5.3, 6.4	5.2, 6.2	5.5, 6.2	5.8, 5.8
median(IQR)	5.2 (4.8, 6.0)	5.3 (4.8, 5.9)	5.5 (5.0, 5.8)	5.6 (5.1, 6.0)	5.8 (5.2, 6.1)	6.1 (5.6, 6.1)	5.5 (5.4, 5.8)	5.8 (5.6, 6.0)	5.8 (5.8, 5.8)
mean(CI)	5.3 (4.3, 6.3)	5.3 (4.7, 6.0)	5.3 (4.7, 6.0)	5.5 (4.7, 6.2)	5.6 (4.9, 6.3)	5.9 (5.4, 6.5)	5.6 (4.4, 6.9)	5.8 (1.4, 10.2)	5.8 (NaN, NaN)
EC (mScm-1)									
min, max	55.3, 144.0	53.5, 110.5	52.6, 110.2	52.7, 111.3	55.6, 126.9	58.6, 212.8	68.0, 107.3	88.5, 143.5	81.6,
median(IQR)	79.0 (67.3, 101.3)	64.2 (59.3, 85.9)	59.7 (55.0, 91.1)	55.9 (55.2, 91.2)	76.8 (60.0, 107.0)	72.9 (69.4, 97.9)	93.9 (80.9, 100.4)	116.0 (102.2, 129.8)	81.6 (81.6, 81.6)
mean(CI)	98.9 (48.2, 149.6)	75.2 (45.6, 104.8)	74.3 (43.0, 105.5)	73.2 (40.0, 106.5)	86.6 (46.6, 126.5)	110.9 (35.4, 186.4)	89.7 (40.1, 139.4)	116.0 (-233.4, 465.4)	81.6 (NaN, NaN)
von Post									
min, max	6, 9	6, 8	6, 7	6, 7	6, 7	6, 7	7, 8	7, 8	8, 8
median(IQR)	8 (6, 9)	7 (7, 7)	6 (6, 6)	6 (6, 6)	7 (7, 7)	7 (6, 7)	7 (7, 8)	8 (7, 8)	8 (8, 8)
mean(CI)	8 (6, 9)	7 (6, 8)	6 (6, 7)	6 (6, 7)	7 (6, 8)	7 (6, 7)	7 (6, 9)	8 (1, 14)	8 (NaN, NaN)
OM (mass %)									
min, max	87.24, 97.96	90.44, 97.83	91.13, 96.44	89.49, 95.93	88.96, 96.37	84.60, 94.23	89.92, 94.83	90.76, 91.12	78.30, 78.30
median(IQR)	92.27 (87.49, 96.91)	91.32 (89.88, 97.35)	92.86 (91.42, 96.81)	93.47 (91.58, 95.81)	91.80 (91.48, 96.17)	90.14 (89.29, 94.40)	93.30 (91.61, 94.07)	90.94 (90.85, 91.03)	78.30 (78.30, 78.30)
mean(CI)	92.52 (86.52, 98.53)	93.48 (88.92, 98.04)	93.58 (90.33, 96.82)	92.47 (89.53, 95.42)	92.62 (89.12, 96.12)	90.14 (85.36, 94.92)	92.61 (86.43, 98.80)	90.94 (88.63, 93.25)	78.30 (NaN, NaN)
Ash (mass %)									
min, max	2.04, 12.76	2.17, 9.56	3.56, 8.87	4.07, 10.51	3.63, 11.04	5.77, 15.40	5.17, 10.08	8.88, 9.24	21.70, 21.70
median(IQR)	7.73 (3.09, 12.51)	8.68 (2.65, 10.12)	7.14 (3.19, 8.58)	6.53 (4.19, 8.42)	8.20 (3.83, 8.52)	9.86 (5.60, 10.71)	6.70 (5.93, 8.39)	9.06 (8.97, 9.15)	21.70 (21.70, 21.70)
mean(CI)	7.48 (1.47, 13.48)	6.52 (1.96, 11.08)	6.42 (3.18, 9.67)	7.53 (4.58, 10.47)	7.38 (3.88, 10.88)	9.86 (5.08, 14.64)	7.39 (1.20, 13.57)	9.06 (6.75, 11.37)	21.70 (NaN, NaN)
Carbon (mass %)									
min, max	51.48, 58.27	54.06, 58.60	54.58, 58.26	53.62, 56.13	53.62, 56.13	50.32, 55.28	53.25, 55.28	53.14, 55.28	47.34, 47.34
median(IQR)	55.38 (52.36, 56.09)	55.54 (54.24, 55.79)	55.19 (54.96, 55.67)	55.42 (55.07, 55.67)	55.42 (55.07, 55.67)	54.33 (53.04, 54.56)	54.56 (53.91, 54.92)	54.21 (53.68, 54.75)	47.34 (47.34, 47.34)
mean(CI)	54.72 (51.26, 58.17)	55.65 (53.39, 57.91)	55.73 (53.91, 57.55)	55.18 (54.00, 56.37)	55.18 (54.00, 56.37)	53.51 (51.08, 55.93)	54.36 (51.81, 56.92)	54.21 (40.61, 67.81)	47.34 (NaN, NaN)
Nitrogen (mass %)									
min, max	1.24, 2.42	1.17, 2.42	1.22, 2.30	1.29, 2.59	1.29, 2.59	1.69, 3.31	1.69, 2.51	1.69, 3.04	2.05, 2.05
median(IQR)	1.97 (1.75, 2.40)	2.10 (1.58, 2.23)	2.22 (1.81, 2.25)	2.10 (1.82, 2.53)	2.10 (1.82, 2.53)	2.65 (2.18, 2.98)	2.18 (1.94, 2.34)	2.37 (2.03, 2.70)	2.05 (2.05, 2.05)
mean(CI)	1.96 (1.35, 2.57)	1.90 (1.26, 2.54)	1.96 (1.39, 2.53)	2.07 (1.40, 2.73)	2.07 (1.40, 2.73)	2.56 (1.76, 3.36)	2.13 (1.10, 3.15)	2.37 (-6.21, 10.94)	2.05 (NaN, NaN)
Hydrogen (mass %)									
min, max	4.62, 5.37	4.89, 5.53	4.83, 5.45	4.81, 5.42	4.81, 5.42	4.39, 5.48	4.81, 5.43	4.90, 5.75	4.29, 4.29
median(IQR)	5.03 (4.76, 5.14)	5.01 (4.90, 5.30)	5.01 (4.98, 5.27)	4.96 (4.89, 5.28)	4.96 (4.89, 5.28)	5.24 (4.90, 5.43)	4.90 (4.86, 5.16)	5.33 (5.11, 5.54)	4.29 (4.29, 4.29)
mean(CI)	4.98 (4.61, 5.36)	5.13 (4.78, 5.47)	5.11 (4.80, 5.42)	5.07 (4.74, 5.40)	5.07 (4.74, 5.40)	5.09 (4.53, 5.65)	5.05 (4.21, 5.88)	5.33 (-0.08, 10.73)	4.29 (NaN, NaN)
Sulfur (mass %)									
min, max	0.23, 0.68	0.21, 0.73	0.25, 0.88	0.29, 1.05	0.29, 1.05	0.47, 2.14	0.47, 1.29	0.47, 1.84	0.94, 0.94
median(IQR)	0.56 (0.49, 0.59)	0.58 (0.52, 0.64)	0.55 (0.55, 0.88)	0.90 (0.64, 0.92)	0.90 (0.64, 0.92)	1.62 (1.22, 2.01)	1.22 (0.84, 1.25)	1.16 (0.81, 1.50)	0.94 (0.94, 0.94)
mean(CI)	0.51 (0.30, 0.72)	0.54 (0.29, 0.78)	0.62 (0.29, 0.95)	0.76 (0.39, 1.13)	0.76 (0.39, 1.13)	1.49 (0.65, 2.33)	0.99 (-0.14, 2.12)	1.16 (-7.55, 9.86)	0.94 (NaN, NaN)
Oxygen (mass %)									
min, max	27.91, 33.16	27.76, 33.66	27.59, 33.34	27.24, 32.37	27.24, 32.37	24.42, 29.73	27.10, 29.73	26.57, 29.73	23.88, 23.88
median(IQR)	28.65 (28.09, 33.05)	28.61 (28.47, 32.56)	29.80 (28.47, 31.44)	28.13 (27.47, 29.78)	28.13 (27.47, 29.78)	25.24 (24.99, 29.59)	29.59 (28.34, 29.66)	28.15 (27.36, 28.94)	23.88 (23.88, 23.88)
mean(CI)	30.17 (26.83, 33.51)	30.21 (26.87, 33.56)	30.13 (27.26, 33.00)	29.00 (26.35, 31.64)	29.00 (26.35, 31.64)	26.79 (23.52, 30.06)	28.81 (25.13, 32.48)	28.15 (8.07, 48.23)	23.88 (NaN, NaN)

Raised bogs – Domestic extraction

Depth Properties	0-10 cm (N = 23)	10-25 cm (N = 23)	25-50 cm (N = 23)	50-75 cm (N = 23)	75-100 cm (N = 23)	100-150 cm (N = 23)	150-200 cm (N = 23)	200-250 cm (N = 22)	250-300 cm (N = 19)	300-350 cm (N = 13)	350-400 cm (N = 11)	400-450 cm (N = 9)	450-500 cm (N = 3)
WC (m %)													
min, max	75.2, 95.2	84.1, 92.9	84.2, 93.9	85.9, 95.1	87.6, 95.0	87.4, 95.4	87.2, 95.7	87.2, 95.6	80.6, 94.7	88.5, 93.7	82.1, 93.8	82.7, 90.4	88.5, 90.5
median(IQR)	85.0 (83.9, 88.2)	89.1 (86.1, 90.6)	90.7 (89.0, 92.6)	91.2 (90.3, 92.7)	92.0 (91.0, 92.9)	91.5 (89.2, 92.6)	91.0 (89.6, 92.2)	89.8 (88.4, 91.1)	89.5 (88.1, 90.9)	90.4 (89.1, 93.0)	90.0 (87.8, 92.1)	88.4 (88.0, 90.1)	89.8 (89.2, 90.2)
mean(CI)	85.6 (83.7, 87.5)	88.6 (87.3, 89.8)	90.4 (89.2, 91.6)	90.9 (89.8, 92.0)	91.6 (90.7, 92.6)	91.3 (90.2, 92.3)	91.2 (90.1, 92.2)	90.3 (89.1, 91.5)	89.4 (87.6, 91.1)	90.9 (89.7, 92.0)	89.6 (87.3, 91.9)	88.3 (86.5, 90.1)	89.6 (87.1, 92.1)
WC (vol %)													
min, max	50.8, 106.3	85.7, 125.3	87.8, 120.2	94.0, 125.7	108.7, 126.7	107.2, 125.2	110.0, 181.6	112.5, 126.8	111.1, 128.3	113.0, 122.4	104.8, 122.6	109.1, 123.3	118.6, 171.7
median(IQR)	88.5 (70.3, 95.7)	106.2 (99.6, 112.3)	106.8 (96.7, 113.5)	116.9 (113.3, 119.3)	117.6 (114.3, 120.0)	120.1 (117.0, 120.8)	119.4 (117.4, 120.9)	119.3 (118.7, 121.7)	119.2 (117.6, 121.5)	119.1 (117.7, 120.4)	119.4 (114.6, 120.2)	118.9 (116.4, 121.1)	121.3 (119.9, 146.5)
mean(CI)	83.3 (76.2, 90.4)	105.5 (101.0, 110.0)	105.7 (101.5, 110.0)	115.5 (112.6, 118.3)	117.3 (115.2, 119.4)	118.8 (117.1, 120.5)	121.3 (115.5, 127.2)	119.8 (118.3, 121.3)	119.2 (117.3, 121.2)	118.6 (116.9, 120.3)	117.1 (113.4, 120.7)	117.4 (113.6, 121.2)	137.2 (62.9, 211.4)
BD (g*cm^{-3})													
min, max	0.054, 0.236	0.067, 0.211	0.062, 0.200	0.058, 0.196	0.063, 0.167	0.055, 0.173	0.055, 0.177	0.054, 0.179	0.067, 0.269	0.080, 0.159	0.069, 0.242	0.116, 0.243	0.124, 0.222
median(IQR)	0.131 (0.111, 0.172)	0.126 (0.112, 0.167)	0.106 (0.087, 0.132)	0.109 (0.090, 0.128)	0.100 (0.090, 0.112)	0.111 (0.096, 0.139)	0.120 (0.104, 0.142)	0.136 (0.116, 0.162)	0.135 (0.120, 0.168)	0.127 (0.088, 0.140)	0.136 (0.100, 0.166)	0.151 (0.134, 0.165)	0.138 (0.131, 0.180)
mean(CI)	0.139 (0.118, 0.161)	0.137 (0.120, 0.154)	0.114 (0.097, 0.131)	0.116 (0.100, 0.133)	0.107 (0.095, 0.120)	0.115 (0.100, 0.130)	0.118 (0.103, 0.133)	0.130 (0.112, 0.147)	0.144 (0.117, 0.171)	0.120 (0.104, 0.137)	0.139 (0.105, 0.172)	0.157 (0.128, 0.185)	0.162 (0.029, 0.294)
PD (g*cm^{-3})													
min, max	1.459, 1.515	1.452, 1.502	1.451, 1.479	1.452, 1.464	1.450, 1.479	1.450, 1.500	1.452, 1.525	1.451, 1.561	1.452, 2.003	1.463, 1.570	1.504, 2.053	1.557, 1.959	1.547, 1.594
median(IQR)	1.476 (1.472, 1.491)	1.469 (1.463, 1.480)	1.457 (1.454, 1.461)	1.456 (1.454, 1.458)	1.455 (1.454, 1.459)	1.457 (1.454, 1.468)	1.462 (1.457, 1.492)	1.485 (1.458, 1.529)	1.500 (1.462, 1.553)	1.496 (1.476, 1.533)	1.527 (1.513, 1.541)	1.623 (1.560, 1.816)	1.578 (1.563, 1.586)
mean(CI)	1.480 (1.474, 1.487)	1.471 (1.466, 1.477)	1.459 (1.456, 1.462)	1.456 (1.455, 1.458)	1.458 (1.455, 1.461)	1.464 (1.457, 1.471)	1.474 (1.464, 1.485)	1.494 (1.476, 1.511)	1.542 (1.477, 1.607)	1.508 (1.485, 1.531)	1.573 (1.465, 1.680)	1.692 (1.573, 1.811)	1.573 (1.514, 1.633)
Porosity (vol %)													
min, max	84.0, 96.3	85.6, 95.4	86.2, 95.7	86.5, 96.0	88.7, 95.7	88.5, 96.3	88.4, 96.2	88.4, 96.3	84.9, 95.4	89.4, 94.5	87.7, 95.5	86.6, 93.8	86.0, 92.0
median(IQR)	91.1 (88.4, 92.5)	91.5 (88.6, 92.4)	92.7 (90.9, 94.1)	92.5 (91.2, 93.8)	93.2 (92.3, 93.8)	92.4 (90.6, 93.4)	91.8 (90.5, 92.8)	91.0 (89.5, 92.0)	91.0 (88.8, 91.8)	91.6 (90.5, 94.0)	91.2 (89.1, 93.4)	90.7 (89.7, 92.0)	91.3 (88.7, 91.6)
mean(CI)	90.6 (89.2, 92.0)	90.7 (89.6, 91.8)	92.2 (91.0, 93.4)	92.0 (90.9, 93.2)	92.6 (91.8, 93.5)	92.2 (91.2, 93.2)	92.0 (91.0, 93.0)	91.4 (90.2, 92.5)	90.8 (89.5, 92.2)	92.1 (91.0, 93.1)	91.3 (89.6, 93.0)	90.7 (89.1, 92.3)	89.8 (81.7, 97.8)
pH													
min, max	3.9, 4.5	3.8, 4.5	3.8, 4.5	4.1, 4.6	4.3, 5.0	4.3, 5.6	4.5, 6.0	4.7, 6.2	4.7, 6.2	5.0, 6.1	5.2, 6.4	5.6, 6.1	6.0, 6.5
median(IQR)	4.2 (4.1, 4.3)	22; 4.1 (4.0, 4.3)	4.2 (4.1, 4.3)	4.3 (4.2, 4.5)	4.5 (4.4, 4.6)	4.6 (4.5, 4.8)	4.8 (4.6, 5.2)	4.9 (4.8, 5.4)	5.1 (4.9, 5.6)	5.3 (5.1, 5.9)	5.8 (5.5, 5.9)	5.9 (5.8, 6.1)	6.4 (6.2, 6.5)
mean(CI)	4.2 (4.1, 4.2)	4.1 (4.0, 4.2)	4.2 (4.1, 4.3)	4.3 (4.3, 4.4)	4.5 (4.5, 4.6)	4.7 (4.6, 4.8)	4.9 (4.8, 5.1)	5.1 (4.9, 5.3)	5.3 (5.1, 5.5)	5.4 (5.2, 5.7)	5.7 (5.5, 6.0)	5.9 (5.8, 6.1)	6.3 (5.6, 7.0)
EC (mS*cm^{-1})													
min, max	34.8, 108.8	35.9, 120.0	38.0, 84.8	32.7, 92.3	34.2, 67.4	33.8, 67.1	38.7, 84.5	26.3, 95.3	43.1, 99.1	48.2, 109.0	48.2, 112.0	58.4, 127.5	101.3, 120.5
median(IQR)	60.2 (49.5, 70.6)	22; 51.4 (44.5, 68.6)	54.0 (46.8, 64.7)	49.2 (44.5, 63.6)	48.6 (40.8, 53.1)	47.7 (41.3, 57.5)	47.0 (43.7, 57.5)	53.9 (50.8, 64.7)	56.3 (51.5, 73.7)	65.6 (56.6, 72.6)	76.3 (65.8, 87.5)	88.6 (64.5, 98.7)	109.2 (105.2, 114.8)
mean(CI)	62.2 (53.8, 70.6)	58.4 (49.9, 66.9)	55.9 (50.5, 61.2)	53.9 (48.1, 59.6)	48.5 (44.1, 52.9)	48.6 (44.2, 53.0)	52.8 (46.9, 58.8)	59.5 (52.0, 66.9)	62.0 (54.6, 69.4)	69.3 (58.7, 79.9)	77.1 (65.6, 88.6)	86.4 (67.5, 105.3)	110.3 (86.4, 134.3)
von Post													
min, max	2, 9	3, 7	2, 7	3, 6	3, 7	4, 6	2, 8	4, 9	4, 9	5, 8	6, 9	5, 8	5, 8
median(IQR)	6 (5, 6)	5 (4, 6)	5 (5, 5)	5 (5, 5)	5 (5, 6)	5 (5, 6)	6 (5, 7)	7 (5, 7)	7 (5, 8)	6 (6, 7)	7 (7, 8)	8 (7, 8)	8 (6, 8)
mean(CI)	6 (5, 6)	5 (5, 5)	5 (4, 5)	5 (5, 5)	5 (5, 5)	5 (5, 6)	6 (5, 6)	6 (6, 7)	6 (6, 7)	6 (6, 7)	7 (7, 8)	7 (7, 8)	7 (3, 11)
OM (m %)													
min, max	93.83, 98.44	94.91, 98.99	96.78, 99.06	98.05, 99.02	96.78, 99.14	95.05, 99.14	92.96, 99.01	90.01, 99.09	53.49, 99.03	89.22, 98.06	49.34, 94.73	57.11, 90.36	87.25, 91.15
median(IQR)	97.04 (95.81, 97.36)	97.57 (96.70, 98.14)	98.62 (98.29, 98.88)	98.66 (98.52, 98.82)	98.72 (98.40, 98.85)	98.58 (97.66, 98.85)	98.15 (95.72, 98.62)	96.27 (92.67, 98.51)	95.03 (90.70, 98.22)	95.40 (92.34, 96.99)	92.83 (91.63, 93.95)	84.88 (68.92, 90.11)	88.57 (87.91, 89.86)
mean(CI)	96.67 (96.15, 97.20)	97.41 (96.97, 97.84)	98.45 (98.19, 98.71)	98.65 (98.54, 98.75)	98.50 (98.24, 98.76)	98.03 (97.46, 98.59)	97.17 (96.30, 98.04)	95.58 (94.16, 97.00)	91.56 (86.21, 96.92)	94.37 (92.46, 96.28)	89.01 (80.13, 97.90)	79.20 (69.35, 89.05)	88.99 (84.06, 93.92)
Ash (m %)													
min, max	1.56, 6.17	1.01, 5.09	0.94, 3.22	0.98, 1.95	0.86, 3.22	0.86, 4.95	0.99, 7.04	0.91, 9.99	0.97, 46.51	1.94, 10.78	5.27, 50.66	9.64, 42.89	8.85, 12.75
median(IQR)	2.96 (2.64, 4.19)	2.43 (1.86, 3.30)	1.38 (1.12, 1.71)	1.34 (1.18, 1.48)	1.28 (1.15, 1.60)	1.42 (1.15, 2.34)	1.85 (1.38, 4.28)	3.73 (1.49, 7.33)	4.97 (1.78, 9.30)	4.60 (3.01, 7.66)	7.17 (6.05, 8.37)	15.12 (9.89, 31.08)	11.43 (10.14, 12.09)
mean(CI)	3.33 (2.80, 3.85)	2.59 (2.16, 3.03)	1.55 (1.29, 1.81)	1.35 (1.25, 1.46)	1.50 (1.24, 1.76)	1.97 (1.41, 2.54)	2.83 (1.96, 3.70)	4.42 (3.00, 5.84)	8.44 (3.08, 13.79)	5.63 (3.72, 7.54)	10.99 (2.10, 19.87)	20.80 (10.95, 30.65)	11.01 (6.08, 15.94)
Carbon (m %)													
min, max	52.29, 54.38	53.51, 55.66	54.40, 58.08	54.72, 58.22	54.72, 58.22	50.67, 56.87	50.67, 56.87	50.67, 56.87	50.67, 56.87	50.67, 56.87	29.18, 56.87	42.63, 56.87	49.38, 56.16
median(IQR)	53.54 (52.32, 54.09)	54.28 (53.60, 54.34)	54.69 (54.57, 55.30)	55.49 (55.20, 55.52)	55.49 (55.20, 55.52)	55.17 (54.47, 56.73)	55.17 (54.47, 56.73)	55.17 (54.47, 56.80)	56.59 (54.47, 56.87)	56.59 (50.67, 56.59)	56.59 (50.67, 56.59)	49.38 (42.63, 49.38)	56.16 (52.77, 56.16)
mean(CI)	53.44 (53.05, 53.82)	54.34 (54.00, 54.68)	55.45 (54.83, 56.08)	55.90 (55.35, 56.46)	55.90 (55.35, 56.46)	54.96 (54.00, 55.91)	54.96 (54.00, 55.91)	54.95 (53.94, 55.95)	54.98 (53.81, 56.16)	54.39 (52.68, 56.09)	52.00 (46.54, 57.45)	48.04 (43.51, 52.58)	53.90 (44.18, 63.62)
Nitrogen (m %)													
min, max	1.68, 1.99	1.58, 2.19	1.07, 2.23	1.17, 1.96	1.17, 1.96	1.14, 2.14	1.14, 2.14	1.14, 2.14	1.14, 2.14	1.14, 2.34	1.14, 2.05	2.05, 2.31	2.19, 3.02
median(IQR)	1.82 (1.78, 1.87)	1.75 (1.61, 2.03)	1.41 (1.37, 1.45)	1.33 (1.29, 1.41)	1.33 (1.29, 1.41)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.57 (1.14, 2.05)	1.57 (1.14, 1.81)	2.19 (2.19, 2.31)	3.02 (2.60, 3.02)
mean(CI)	1.83 (1.79, 1.87)	1.81 (1.71, 1.91)	1.48 (1.32, 1.65)	1.42 (1.31, 1.54)	1.42 (1.31, 1.54)	1.75 (1.60, 1.91)	1.75 (1.60, 1.91)	1.74 (1.57, 1.90)	1.73 (1.54, 1.91)	1.61 (1.37, 1.86)	1.54 (1.29, 1.80)	2.21 (2.13, 2.29)	2.74 (1.55, 3.93)
Hydrogen (m %)													
min, max	5.16, 5.60	5.32, 5.48	5.15, 5.69	5.10, 5.73	5.10, 5.73	4.94, 5.28	4.94, 5.28	4.94, 5.28	4.94, 5.28	4.65, 5.28	2.83, 5.28	3.68, 5.28	4.84, 5.78
median(IQR)	5.45 (5.36, 5.53)	5.38 (5.36, 5.43)	5.36 (5.23, 5.51)	5.59 (5.26, 5.60)	5.59 (5.26, 5.60)	5.20 (4.96, 5.28)	5.20 (4.96, 5.28)	5.20 (4.96, 5.28)	5.27 (4.96, 5.28)	5.27 (4.94, 5.27)	5.27 (4.94, 5.27)	4.84 (3.68, 4.84)	5.78 (5.31, 5.78)
mean(CI)	5.43 (5.36, 5.49)	5.39 (5.37, 5.42)	5.38 (5.30, 5.46)	5.45 (5.35, 5.56)	5.45 (5.35, 5.56)	5.14 (5.07, 5.20)	5.14 (5.07, 5.20)	5.14 (5.08, 5.21)	5.15 (5.07, 5.22)	5.12 (4.99, 5.24)	4.93 (4.45, 5.41)	4.42 (3.87, 4.98)	5.47 (4.12, 6.81)
Sulfur (m %)													
min, max	0.24, 0.39	0.30, 0.46	0.21, 0.60	0.20, 0.55	0.20, 0.55	0.30, 0.64	0.30, 0.64	0.30, 0.64	0.30, 0.64	0.30, 0.82	0.30, 0.60	0.53, 1.26	1.26, 1.74
median(IQR)	0.28 (0.28, 0.29)	0.34 (0.34, 0.37)	0.33 (0.22, 0.38)	0.28 (0.24, 0.34)	0.28 (0.24, 0.34)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.30, 0.60)	0.42 (0.30, 0.47)	0.60 (0.53, 1.26)	1.74 (1.50, 1.74)
mean(CI)	0.30 (0.28, 0.32)	0.36 (0.34, 0.38)	0.35 (0.29, 0.40)	0.32 (0.27, 0.37)	0.32 (0.27, 0.37)	0.48 (0.42, 0.54)	0.48 (0.42, 0.54)	0.47 (0.41, 0.53)	0.48 (0.41, 0.54)	0.45 (0.35, 0.55)	0.42 (0.34, 0.50)	0.79 (0.52, 1.06)	1.58 (0.89, 2.27)
Oxygen (m %)													
min, max	34.31, 38.11	34.43, 36.03	33.87, 37.36	32.89, 36.97	32.89, 36.97	29.05, 40.41	29.05, 40.41	29.05, 40.41	29.05, 40.41	28.85, 40.41	14.94, 40.41	20.85, 29.05	23.23, 26.39
median(IQR)	35.75 (34.68, 36.42)	35.32 (35.28, 35.79)	36.16 (34.65, 36.61)	36.27 (35.04, 36.43)	36.27 (35.04, 36.43)	31.65 (29.76, 33.53)	31.65 (29.76, 33.53)	31.65 (29.41, 33.53)	31.65 (29.05, 33.53)	33.53 (29.05, 40.41)	33.53 (31.29, 40.41)	26.39 (20.85, 26.39)	23.23 (23.23, 24.81)
mean(CI)	35.68 (35.09, 36.28)	35.37 (35.12, 35.61)	35.73 (35.16, 36.29)	35.48 (34.83, 36.14)	35.48 (34.83, 36.14)	32.57 (30.84, 34.29)	32.57 (30.84, 34.29)	32.66 (30.86, 34.46)	32.88 (30.80, 34.97)	34.11 (31.24, 36.98)	33.53 (28.43, 38.62)	24.52 (21.73, 27.31)	24.28 (19.75, 28.82)

Depth Properties	0-10 cm (N = 5; n = 23)	10-25 cm (N = 5; n = 23)	25-50 cm (N = 5; n= 23)	50-75 cm (N = 5; n = 23)	75-100 cm (N = 5; n = 23)	100-150 cm (N = 5; n = 23)	150-200 cm (N = 5; n = 23)	200-250 cm (N = 5; n =22)	250-300 cm (N = 5; n = 19)	300-350 cm (N = 5; n = 13)	350-400 cm (N = 4; n = 11)	400-450 cm (N = 3; n = 9)	450-500 cm (N = 2; n = 3)
WC (m %)													
min, max	80.6, 91.7	85.1, 92.3	86.2, 93.2	87.0, 93.9	88.3, 94.2	88.1, 94.7	88.8, 95.3	88.0, 95.2	86.7, 94.0	88.6, 93.3	82.1, 92.7	86.1, 90.2	88.5, 90.1
median(IQR)	86.0 (83.8, 86.9)	89.2 (86.2, 89.8)	91.1 (89.7, 92.3)	91.3 (90.5, 92.6)	92.0 (91.8, 92.4)	92.0 (91.1, 92.1)	90.8 (90.6, 92.0)	89.7 (89.1, 91.0)	89.4 (88.0, 90.5)	90.1 (89.1, 90.2)	89.0 (86.4, 90.8)	88.4 (88.2, 89.3)	89.3 (88.9, 89.7)
mean(CI)	85.8 (80.7, 90.9)	88.7 (85.2, 92.1)	90.5 (87.2, 93.9)	91.1 (87.8, 94.4)	91.8 (89.1, 94.5)	91.5 (88.5, 94.5)	91.4 (88.3, 94.5)	90.6 (87.0, 94.1)	89.7 (86.2, 93.2)	90.3 (88.0, 92.5)	88.2 (81.0, 95.5)	88.3 (83.2, 93.4)	89.3 (79.2, 99.5)
WC (vol %)													
min, max	77.9, 89.7	102.8, 109.4	97.0, 110.2	112.3, 118.7	115.1, 118.9	115.6, 121.0	116.3, 131.9	117.6, 123.8	114.1, 122.8	115.8, 122.4	110.9, 121.0	114.5, 120.3	120.0, 171.7
median(IQR)	91.6 (87.5, 91.8)	106.4 (104.2, 109.6)	105.2 (105.0, 109.3)	116.1 (115.6, 118.0)	117.4 (117.3, 119.5)	119.3 (118.3, 120.2)	119.8 (119.1, 120.1)	120.2 (118.9, 120.3)	119.3 (117.9, 119.6)	119.3 (118.4, 120.1)	117.3 (113.6, 120.3)	120.3 (117.8, 120.4)	145.8 (132.9, 158.7)
mean(CI)	83.7 (78.3, 89.2)	105.8 (102.8, 108.7)	105.6 (99.1, 112.2)	115.6 (112.6, 118.6)	117.3 (115.4, 119.2)	118.7 (116.1, 121.4)	121.1 (113.4, 128.8)	120.0 (117.0, 123.1)	118.6 (114.5, 122.6)	119.0 (115.9, 122.1)	116.4 (108.4, 124.4)	118.3 (110.1, 126.4)	145.8 (-182.0, 473.7)
BD (g*cm^{-3})													
min, max	0.078, 0.190	0.093, 0.184	0.078, 0.176	0.076, 0.178	0.073, 0.155	0.064, 0.162	0.059, 0.161	0.059, 0.169	0.076, 0.184	0.085, 0.149	0.089, 0.242	0.130, 0.193	0.132, 0.222
median(IQR)	0.130 (0.129, 0.173)	0.120 (0.118, 0.171)	0.100 (0.084, 0.124)	0.103 (0.090, 0.121)	0.102 (0.092, 0.107)	0.103 (0.103, 0.115)	0.118 (0.104, 0.124)	0.136 (0.119, 0.143)	0.140 (0.128, 0.157)	0.130 (0.129, 0.149)	0.149 (0.122, 0.185)	0.150 (0.140, 0.159)	0.177 (0.154, 0.200)
mean(CI)	0.138 (0.085, 0.191)	0.136 (0.090, 0.182)	0.112 (0.063, 0.162)	0.114 (0.065, 0.163)	0.105 (0.067, 0.143)	0.112 (0.068, 0.156)	0.115 (0.068, 0.161)	0.127 (0.075, 0.179)	0.137 (0.088, 0.187)	0.129 (0.096, 0.162)	0.157 (0.054, 0.260)	0.158 (0.077, 0.238)	0.177 (-0.400, 0.754)
PD (g*cm^{-3})													
min, max	1.468, 1.488	1.469, 1.477	1.454, 1.467	1.453, 1.459	1.452, 1.468	1.452, 1.490	1.452, 1.514	1.453, 1.533	1.456, 1.579	1.479, 1.570	1.512, 2.053	1.569, 1.779	1.564, 1.594
median(IQR)	1.478 (1.472, 1.488)	1.470 (1.464, 1.471)	1.455 (1.454, 1.459)	1.456 (1.454, 1.456)	1.456 (1.454, 1.458)	1.456 (1.455, 1.457)	1.464 (1.458, 1.470)	1.499 (1.458, 1.506)	1.510 (1.464, 1.557)	1.533 (1.490, 1.565)	1.538 (1.523, 1.675)	1.596 (1.583, 1.680)	1.579 (1.572, 1.587)
mean(CI)	1.480 (1.469, 1.491)	1.472 (1.468, 1.476)	1.459 (1.452, 1.465)	1.456 (1.453, 1.459)	1.458 (1.450, 1.465)	1.463 (1.444, 1.482)	1.472 (1.442, 1.503)	1.492 (1.449, 1.536)	1.521 (1.448, 1.594)	1.528 (1.474, 1.582)	1.660 (1.242, 2.078)	1.667 (1.405, 1.929)	1.579 (1.387, 1.771)
Porosity (vol %)													
min, max	87.2, 94.7	87.5, 93.7	87.9, 94.7	87.8, 94.8	89.4, 95.0	89.1, 95.6	89.3, 96.0	89.0, 95.9	88.3, 94.8	90.5, 94.3	88.2, 94.1	88.4, 91.7	86.0, 91.6
median(IQR)	91.2 (88.3, 91.4)	91.9 (88.4, 92.0)	93.1 (91.5, 94.2)	92.9 (91.6, 93.8)	93.0 (92.7, 93.7)	92.9 (92.1, 92.9)	91.9 (91.5, 92.8)	90.8 (90.4, 91.8)	91.1 (90.2, 91.2)	91.3 (90.5, 91.6)	90.3 (88.9, 92.1)	91.1 (90.1, 91.4)	88.8 (87.4, 90.2)
mean(CI)	90.7 (87.2, 94.2)	90.8 (87.6, 93.9)	92.3 (88.9, 95.7)	92.1 (88.8, 95.5)	92.8 (90.2, 95.4)	92.4 (89.5, 95.3)	92.2 (89.2, 95.3)	91.6 (88.2, 94.9)	91.1 (88.1, 94.0)	91.6 (89.6, 93.5)	90.7 (86.5, 95.0)	90.5 (85.9, 95.1)	88.8 (53.6, 124.0)
pH													
min, max	4.1, 4.4	4.1, 4.4	4.1, 4.4	4.2, 4.5	4.4, 4.7	4.4, 5.1	4.6, 5.4	4.7, 5.5	4.8, 5.7	5.0, 6.0	5.4, 6.4	5.7, 6.1	6.0, 6.5
median(IQR)	4.2 (4.1, 4.2)	4.1 (4.1, 4.2)	4.2 (4.2, 4.2)	4.4 (4.3, 4.4)	4.5 (4.4, 4.7)	4.7 (4.5, 4.7)	4.8 (4.6, 5.2)	4.9 (4.8, 5.4)	5.5 (5.0, 5.5)	5.7 (5.3, 5.9)	5.9 (5.7, 6.1)	6.0 (5.8, 6.1)	6.2 (6.1, 6.3)
mean(CI)	4.2 (4.0, 4.3)	4.1 (4.0, 4.3)	4.2 (4.0, 4.4)	4.3 (4.2, 4.5)	4.5 (4.3, 4.7)	4.7 (4.4, 5.0)	4.9 (4.5, 5.3)	5.1 (4.6, 5.5)	5.3 (4.8, 5.8)	5.6 (5.1, 6.1)	5.9 (5.2, 6.6)	5.9 (5.3, 6.5)	6.2 (3.5, 9.0)
EC (mS*cm^{-1})													
min, max	42.7, 84.0	47.3, 72.0	50.2, 65.9	43.1, 75.0	39.4, 54.8	37.6, 60.9	44.6, 75.9	49.4, 89.0	50.5, 87.8	53.1, 109.0	61.6, 100.2	63.3, 108.3	104.9, 120.5
median(IQR)	59.0 (54.6, 66.8)	52.5 (46.4, 60.6)	56.4 (50.2, 57.9)	53.8 (46.6, 58.0)	50.8 (49.6, 51.3)	45.1 (45.0, 52.4)	45.3 (44.3, 47.4)	53.9 (50.9, 58.9)	56.9 (52.1, 57.7)	71.2 (65.1, 85.1)	82.8 (74.4, 90.4)	101.4 (82.9, 102.2)	112.7 (108.8, 116.6)
mean(CI)	62.1 (43.2, 81.1)	58.5 (47.3, 69.7)	56.5 (49.0, 64.0)	55.0 (39.5, 70.5)	49.2 (41.4, 57.0)	49.1 (38.4, 59.7)	52.2 (35.8, 68.7)	59.6 (39.0, 80.2)	62.1 (43.1, 81.1)	76.1 (49.3, 102.9)	81.9 (56.1, 107.6)	91.0 (30.7, 151.2)	112.7 (13.7, 211.7)
von Post													
min, max	4, 6	5, 6	4, 6	4, 5	5, 6	4, 6	4, 7	5, 7	6, 7	5, 8	8, 9	7, 8	5, 8
median(IQR)	6 (6, 6)	5 (4, 5)	5 (5, 5)	5 (5, 5)	5 (5, 5)	5 (5, 6)	6 (5, 6)	7 (5, 7)	5 (5, 7)	6 (6, 7)	7 (7, 8)	8 (8, 8)	6 (6, 7)
mean(CI)	5 (4, 7)	5 (5, 6)	5 (4, 6)	5 (4, 5)	5 (5, 5)	5 (5, 6)	6 (4, 7)	6 (5, 7)	6 (5, 7)	7 (5, 8)	8 (6, 9)	7 (6, 9)	6 (-13, 26)
OM (m %)													
min, max	96.00, 97.71	96.97, 97.64	97.79, 98.88	98.42, 98.91	97.70, 98.98	95.85, 99.00	93.89, 98.98	92.34, 98.94	88.49, 98.67	89.22, 96.76	49.34, 94.08	72.00, 89.33	87.25, 89.75
median(IQR)	96.86 (96.04, 97.34)	97.49 (97.42, 98.00)	98.72 (98.44, 98.83)	98.66 (98.65, 98.85)	98.70 (98.54, 98.81)	98.67 (98.57, 98.74)	98.03 (97.48, 98.51)	95.13 (94.55, 98.48)	94.25 (90.33, 98.02)	92.34 (89.63, 95.84)	91.91 (80.58, 93.14)	87.08 (80.19, 88.21)	88.50 (87.88, 89.13)
mean(CI)	96.73 (95.82, 97.64)	97.37 (97.01, 97.73)	98.45 (97.90, 99.01)	98.67 (98.41, 98.93)	98.53 (97.90, 99.16)	98.10 (96.52, 99.68)	97.33 (94.80, 99.86)	95.67 (92.07, 99.27)	93.28 (87.25, 99.30)	92.72 (88.28, 97.16)	81.82 (47.31, 116.34)	81.24 (59.58, 102.90)	88.50 (72.61, 104.40)
Ash (m %)													
min, max	2.29, 4.00	2.36, 3.03	1.12, 2.21	1.09, 1.58	1.02, 2.30	1.00, 4.15	1.02, 6.11	1.06, 7.66	1.33, 11.51	3.24, 10.78	5.92, 50.66	10.67, 28.00	10.25, 12.75
median(IQR)	3.14 (2.66, 3.96)	2.51 (2.00, 2.58)	1.28 (1.17, 1.56)	1.34 (1.15, 1.35)	1.30 (1.19, 1.46)	1.33 (1.26, 1.43)	1.97 (1.49, 2.52)	4.87 (1.52, 5.45)	5.75 (1.98, 9.67)	7.66 (4.16, 10.37)	8.09 (6.86, 19.42)	12.92 (11.79, 19.81)	11.50 (10.87, 12.12)
mean(CI)	3.27 (2.36, 4.18)	2.63 (2.27, 2.99)	1.55 (0.99, 2.10)	1.33 (1.07, 1.59)	1.47 (0.84, 2.10)	1.90 (0.32, 3.48)	2.67 (0.14, 5.20)	4.33 (0.73, 7.93)	6.72 (0.70, 12.75)	7.28 (2.84, 11.72)	18.18 (-16.34, 52.69)	18.76 (-2.90, 40.42)	11.50 (-4.40, 27.39)
Carbon (m %)													
min, max	52.29, 54.38	53.51, 55.66	54.40, 58.08	54.72, 58.22	54.72, 58.22	50.67, 56.87	50.67, 56.87	50.67, 56.87	50.67, 56.87	50.67, 56.87	29.18, 56.87	42.63, 56.87	49.38, 56.16
median(IQR)	53.54 (52.32, 54.09)	54.28 (53.60, 54.34)	54.69 (54.57, 55.30)	55.49 (55.20, 55.52)	55.49 (55.20, 55.52)	55.17 (54.47, 56.59)	55.17 (54.47, 56.59)	55.17 (54.47, 56.59)	55.17 (54.47, 56.59)	54.47 (52.89, 56.59)	53.63 (45.30, 56.66)	49.38 (46.01, 53.12)	52.77 (51.08, 54.46)
mean(CI)	53.32 (52.11, 54.54)	54.28 (53.21, 55.35)	55.41 (53.51, 57.31)	55.83 (54.12, 57.54)	55.83 (54.12, 57.54)	54.75 (51.66, 57.84)	54.75 (51.66, 57.84)	54.75 (51.66, 57.84)	54.75 (51.66, 57.84)	54.30 (51.07, 57.53)	48.33 (27.51, 69.14)	49.63 (31.93, 67.32)	52.77 (9.70, 95.84)
Nitrogen (m %)													
min, max	1.68, 1.99	1.58, 2.19	1.07, 2.23	1.17, 1.96	1.17, 1.96	1.14, 2.14	1.14, 2.14	1.14, 2.14	1.14, 2.14	1.14, 2.34	1.14, 2.05	2.05, 2.31	2.19, 3.02
median(IQR)	1.82 (1.78, 1.87)	1.75 (1.65, 2.03)	1.41 (1.37, 1.45)	1.33 (1.29, 1.41)	1.33 (1.29, 1.41)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.63 (1.57, 2.05)	1.81 (1.46, 2.05)	2.19 (2.12, 2.25)	2.60 (2.40, 2.81)
mean(CI)	1.83 (1.69, 1.97)	1.84 (1.52, 2.16)	1.51 (0.97, 2.04)	1.43 (1.05, 1.81)	1.43 (1.05, 1.81)	1.71 (1.20, 2.21)	1.71 (1.20, 2.21)	1.71 (1.20, 2.21)	1.71 (1.20, 2.21)	1.75 (1.17, 2.32)	1.70 (1.01, 2.40)	2.18 (1.86, 2.51)	2.60 (-2.67, 7.88)
Hydrogen (m %)													
min, max	5.16, 5.60	5.32, 5.48	5.15, 5.69	5.10, 5.73	5.10, 5.73	4.94, 5.28	4.94, 5.28	4.94, 5.28	4.94, 5.28	4.65, 5.28	2.83, 5.28	3.68, 5.28	4.84, 5.78
median(IQR)	5.45 (5.36, 5.53)	5.38 (5.36, 5.43)	5.36 (5.31, 5.51)	5.59 (5.43, 5.60)	5.59 (5.43, 5.60)	5.20 (4.96, 5.27)	5.20 (4.96, 5.27)	5.20 (4.96, 5.27)	5.20 (4.96, 5.27)	5.20 (4.94, 5.27)	5.11 (4.41, 5.27)	4.84 (4.26, 5.06)	5.31 (5.08, 5.54)
mean(CI)	5.42 (5.21, 5.63)	5.39 (5.32, 5.47)	5.40 (5.15, 5.66)	5.49 (5.19, 5.79)	5.49 (5.19, 5.79)	5.13 (4.92, 5.34)	5.13 (4.92, 5.34)	5.13 (4.92, 5.34)	5.13 (4.92, 5.34)	5.07 (4.73, 5.40)	4.58 (2.71, 6.45)	4.60 (2.55, 6.65)	5.31 (-0.66, 11.28)
Sulfur (m %)													
min, max	0.24, 0.39	0.30, 0.46	0.21, 0.60	0.20, 0.55	0.20, 0.55	0.30, 0.64	0.30, 0.64	0.30, 0.64	0.30, 0.64	0.30, 0.82	0.30, 0.60	0.53, 1.26	1.26, 1.74
median(IQR)	0.28 (0.28, 0.29)	0.34 (0.34, 0.37)	0.33 (0.22, 0.38)	0.28 (0.24, 0.34)	0.28 (0.24, 0.34)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.42 (0.33, 0.60)	0.47 (0.39, 0.55)	0.60 (0.56, 0.93)	1.50 (1.38, 1.62)
mean(CI)	0.30 (0.23, 0.37)	0.36 (0.29, 0.44)	0.35 (0.15, 0.54)	0.32 (0.15, 0.49)	0.32 (0.15, 0.49)	0.46 (0.27, 0.65)	0.46 (0.27, 0.65)	0.46 (0.27, 0.65)	0.46 (0.27, 0.65)	0.49 (0.23, 0.76)	0.46 (0.25, 0.67)	0.80 (-0.20, 1.80)	1.50 (-1.55, 4.55)
Oxygen (m %)													
min, max	34.31, 38.11	34.43, 36.03	33.87, 37.36	32.89, 36.97	32.89, 36.97	29.05, 40.41	29.05, 40.41	29.05, 40.41	29.05, 40.41	28.85, 40.41	14.94, 40.41	20.85, 29.05	23.23, 26.39
median(IQR)	35.75 (34.68, 36.42)	35.32 (35.28, 35.79)	36.16 (34.65, 36.61)	36.27 (35.04, 36.43)	36.27 (35.04, 36.43)	31.65 (30.47, 33.53)	31.65 (30.47, 33.53)	31.65 (30.47, 33.53)	31.65 (30.47, 33.53)	31.65 (29.05, 33.53)	31.29 (25.52, 35.25)	26.39 (23.62, 27.72)	24.81 (24.02, 25.60)
mean(CI)	35.85 (33.97, 37.74)	35.37 (34.61, 36.13)	35.73 (33.95, 37.51)	35.52 (33.49, 37.55)	35.52 (33.49, 37.55)	33.02 (27.50, 38.54)	33.02 (27.50, 38.54)	33.02 (27.50, 38.54)	33.02 (27.50, 38.54)	32.70 (26.83, 38.57)	29.48 (12.36, 46.61)	25.43 (15.04, 35.82)	24.81 (4.73, 44.89)

Mountain blanket bogs – Natural

Depth Properties	0-10 cm (N = 14)	10-25 cm (N = 14)	25-50 cm (N = 14)	50-75 cm (N = 14)	75-100 cm (N = 14)	100-150 cm (N = 14)	150-200 cm (N = 11)	200-250 cm (N = 10)	250-300 cm (N = 8)	300-350 cm (N = 8)	350-400 cm (N = 7)	400-450 cm (N = 7)	450-500 cm (N = 6)	500-550 cm (N = 2)	550-600 cm (N = 1)
WC (m %)															
min, max	88.8, 94.9	90.5, 95.2	90.4, 95.0	90.6, 95.3	90.1, 95.3	89.2, 94.7	88.4, 95.3	87.9, 96.3	91.1, 95.6	90.1, 95.4	92.9, 94.8	92.0, 94.7	79.7, 92.9	89.6, 90.6	88.4, 88.4
median(IQR)	91.7 (91.1, 93.1)	92.8 (91.2, 93.9)	93.1 (92.0, 94.5)	92.9 (91.8, 94.5)	93.8 (91.8, 94.6)	93.6 (90.7, 94.1)	94.2 (91.5, 95.2)	94.2 (92.5, 94.7)	94.6 (94.4, 94.8)	93.8 (93.3, 94.6)	93.9 (93.4, 94.6)	92.8 (92.5, 93.9)	92.3 (89.9, 92.6)	90.1 (89.9, 90.4)	88.4 (88.4, 88.4)
mean(CI)	91.9 (91.0, 92.8)	92.7 (91.8, 93.6)	93.1 (92.3, 94.0)	93.1 (92.2, 94.0)	93.1 (92.1, 94.2)	92.5 (91.3, 93.6)	93.1 (91.5, 94.8)	93.1 (91.1, 95.1)	94.3 (93.1, 95.4)	93.7 (92.3, 95.1)	93.9 (93.2, 94.6)	93.2 (92.2, 94.1)	89.9 (84.5, 95.3)	90.1 (83.7, 96.6)	88.4 (NaN, NaN)
WC (vol %)															
min, max	43.6, 102.0	57.4, 112.0	91.3, 119.1	67.0, 122.3	92.2, 122.4	81.1, 123.4	98.0, 121.7	82.5, 126.0	90.7, 121.9	102.6, 122.2	116.0, 124.8	108.0, 122.0	100.1, 120.1	111.9, 116.8	121.9, 121.9
median(IQR)	68.9 (58.8, 82.0)	97.7 (94.4, 101.4)	107.5 (98.6, 113.7)	116.7 (111.5, 121.2)	118.6 (112.5, 120.5)	119.3 (113.4, 120.1)	116.3 (109.4, 118.3)	111.4 (101.2, 121.2)	118.8 (116.7, 119.9)	117.9 (115.6, 119.0)	118.8 (117.1, 121.6)	119.1 (110.8, 121.6)	117.5 (104.3, 118.7)	114.3 (113.1, 115.6)	121.9 (121.9, 121.9)
mean(CI)	71.0 (59.9, 82.1)	95.1 (87.4, 102.9)	106.8 (101.7, 111.9)	110.0 (100.1, 119.8)	114.2 (108.8, 119.6)	112.5 (104.1, 120.9)	113.1 (107.4, 118.7)	109.9 (100.1, 119.8)	115.3 (106.8, 123.9)	116.1 (111.0, 121.2)	119.6 (116.3, 122.8)	116.3 (110.5, 122.1)	112.3 (102.4, 122.3)	114.3 (83.0, 145.6)	121.9 (NaN, NaN)
BD (g*cm^{-3})															
min, max	0.026, 0.101	0.029, 0.105	0.051, 0.099	0.041, 0.120	0.050, 0.131	0.050, 0.146	0.052, 0.153	0.032, 0.166	0.048, 0.117	0.057, 0.124	0.064, 0.094	0.064, 0.100	0.079, 0.254	0.121, 0.130	0.160, 0.160
median(IQR)	0.060 (0.048, 0.089)	0.075 (0.058, 0.098)	0.083 (0.066, 0.088)	0.083 (0.065, 0.103)	0.080 (0.061, 0.105)	0.077 (0.068, 0.119)	0.072 (0.059, 0.098)	0.075 (0.061, 0.083)	0.068 (0.062, 0.072)	0.078 (0.061, 0.087)	0.077 (0.068, 0.086)	0.095 (0.074, 0.096)	0.100 (0.091, 0.134)	0.125 (0.123, 0.127)	0.160 (0.160, 0.160)
mean(CI)	0.064 (0.050, 0.078)	0.076 (0.062, 0.091)	0.078 (0.069, 0.087)	0.082 (0.068, 0.097)	0.085 (0.069, 0.101)	0.093 (0.074, 0.113)	0.084 (0.061, 0.107)	0.085 (0.054, 0.115)	0.071 (0.054, 0.088)	0.079 (0.060, 0.097)	0.077 (0.067, 0.088)	0.086 (0.072, 0.099)	0.128 (0.058, 0.197)	0.125 (0.068, 0.182)	0.160 (NaN, NaN)
PD (g*cm^{-3})															
min, max	1.460, 1.493	1.467, 1.487	1.459, 1.476	1.455, 1.470	1.454, 1.464	1.455, 1.464	1.454, 1.462	1.456, 1.489	1.454, 1.461	1.454, 1.464	1.457, 1.460	1.454, 1.485	1.459, 1.539	1.467, 1.467	1.469, 1.469
median(IQR)	1.479 (1.475, 1.487)	1.474 (1.472, 1.480)	1.464 (1.462, 1.466)	1.459 (1.457, 1.462)	1.460 (1.456, 1.463)	1.460 (1.457, 1.462)	1.459 (1.458, 1.461)	1.460 (1.458, 1.461)	1.461 (1.457, 1.461)	1.458 (1.456, 1.460)	1.457 (1.457, 1.458)	1.456 (1.455, 1.461)	1.472 (1.464, 1.479)	1.467 (1.467, 1.467)	1.469 (1.469, 1.469)
mean(CI)	1.479 (1.473, 1.484)	1.476 (1.472, 1.479)	1.465 (1.462, 1.468)	1.460 (1.457, 1.462)	1.459 (1.457, 1.462)	1.459 (1.458, 1.461)	1.459 (1.457, 1.461)	1.462 (1.456, 1.469)	1.459 (1.457, 1.461)	1.459 (1.456, 1.461)	1.458 (1.457, 1.459)	1.461 (1.451, 1.471)	1.481 (1.450, 1.512)	1.467 (1.465, 1.469)	1.469 (NaN, NaN)
Por. (vol %)															
min, max	93.2, 98.3	92.9, 98.0	93.3, 96.5	91.8, 97.2	91.0, 96.6	90.0, 96.6	89.5, 96.4	88.9, 97.8	92.0, 96.7	91.5, 96.1	93.6, 95.6	93.1, 95.6	83.5, 94.6	91.2, 91.8	89.1, 89.1
median(IQR)	95.9 (94.0, 96.7)	94.9 (93.3, 96.0)	94.3 (94.0, 95.5)	94.4 (92.9, 95.6)	94.6 (92.8, 95.8)	94.7 (91.9, 95.4)	95.0 (93.3, 96.0)	94.9 (94.3, 95.9)	95.3 (95.1, 95.7)	94.6 (94.0, 95.9)	94.7 (94.1, 95.3)	93.6 (93.4, 94.9)	93.3 (90.9, 93.8)	91.5 (91.3, 91.6)	89.1 (89.1, 89.1)
mean(CI)	95.7 (94.7, 96.6)	94.8 (93.8, 95.8)	94.7 (94.0, 95.3)	94.4 (93.4, 95.3)	94.2 (93.1, 95.3)	93.6 (92.3, 94.9)	94.2 (92.7, 95.8)	94.2 (92.1, 96.3)	95.2 (94.0, 96.3)	94.6 (93.3, 95.9)	94.7 (93.9, 95.4)	94.1 (93.2, 95.1)	91.4 (87.0, 95.8)	91.5 (87.6, 95.3)	89.1 (NaN, NaN)
pH															
min, max	3.6, 4.7	3.6, 4.4	3.7, 4.8	4.0, 4.8	4.0, 5.1	4.0, 5.1	4.1, 5.2	4.2, 5.5	4.8, 5.6	4.8, 5.6	4.9, 5.6	4.8, 5.6	5.0, 5.5	5.3, 5.5	5.2, 5.2
median(IQR)	4.2 (3.7, 4.5)	4.2 (3.9, 4.3)	4.4 (3.9, 4.5)	4.5 (4.1, 4.6)	4.6 (4.1, 4.8)	4.8 (4.2, 4.9)	4.9 (4.5, 5.1)	5.0 (4.7, 5.2)	5.1 (5.0, 5.2)	5.1 (5.0, 5.3)	5.1 (5.0, 5.4)	5.3 (5.0, 5.4)	5.2 (5.1, 5.4)	5.4 (5.4, 5.5)	5.2 (5.2, 5.2)
mean(CI)	4.1 (3.9, 4.4)	4.1 (4.0, 4.3)	4.2 (4.0, 4.4)	4.4 (4.2, 4.6)	4.5 (4.3, 4.7)	4.6 (4.3, 4.8)	4.8 (4.5, 5.1)	4.9 (4.6, 5.2)	5.1 (4.9, 5.4)	5.1 (4.9, 5.4)	5.2 (4.9, 5.5)	5.2 (5.0, 5.5)	5.2 (5.0, 5.5)	5.4 (4.4, 6.4)	5.2 (NaN, NaN)
EC (mS*cm^{-1})															
min, max	25.6, 79.8	45.0, 99.5	66.3, 100.0	57.3, 91.6	49.9, 79.8	55.6, 97.8	60.0, 82.0	55.9, 81.5	62.3, 85.3	64.2, 84.5	68.3, 80.8	56.2, 79.7	56.1, 123.2	99.2, 105.5	125.8, 125.8
median(IQR)	59.3 (40.6, 75.4)	72.2 (67.2, 80.0)	78.5 (70.8, 88.7)	66.5 (61.6, 71.3)	66.2 (60.7, 69.1)	64.9 (62.6, 68.9)	68.7 (63.2, 72.8)	72.8 (65.0, 78.0)	72.6 (70.9, 77.9)	72.7 (64.6, 74.9)	6; 75.4 (74.0, 77.1)	68.3 (63.3, 71.9)	76.4 (65.4, 89.0)	102.3 (100.8, 103.9)	125.8 (125.8, 125.8)
mean(CI)	56.6 (45.2, 67.9)	73.6 (64.9, 82.3)	79.7 (73.4, 86.0)	68.2 (62.9, 73.5)	65.0 (60.3, 69.8)	66.9 (61.2, 72.7)	68.6 (64.1, 73.0)	71.2 (65.1, 77.3)	74.0 (68.1, 80.0)	71.7 (65.7, 77.6)	75.2 (71.0, 79.4)	67.8 (60.6, 75.0)	81.2 (55.8, 106.5)	102.3 (62.3, 142.4)	125.8 (NaN, NaN)
von Post															
min, max	2, 7	3, 6	4, 7	5, 9	5, 9	5, 9	5, 9	6, 9	6, 9	5, 9	5, 9	6, 9	6, 10	10, 10	10, 10
median(IQR)	5 (4, 5)	5 (4, 6)	6 (5, 6)	6 (6, 6)	6 (5, 7)	7 (7, 8)	8 (7, 8)	8 (7, 9)	8 (7, 9)	8 (6, 9)	7 (7, 8)	8 (7, 9)	9 (8, 9)	10 (10, 10)	10 (10, 10)
mean(CI)	4 (4, 5)	5 (4, 6)	6 (5, 6)	6 (5, 7)	6 (6, 7)	7 (6, 8)	7 (7, 8)	8 (7, 9)	8 (7, 9)	8 (6, 9)	7 (6, 9)	8 (7, 9)	8 (7, 10)	10 (10, 10)	10 (NaN, NaN)
OM (m %)															
min, max	95.58, 98.39	96.11, 97.75	96.99, 98.44	97.53, 98.75	98.03, 98.86	98.02, 98.78	98.20, 98.86	95.94, 98.67	98.24, 98.83	98.01, 98.82	98.32, 98.61	96.31, 98.84	91.84, 98.40	97.77, 97.80	97.57, 97.57
median(IQR)	96.77 (96.14, 97.10)	97.23 (96.71, 97.40)	98.05 (97.86, 98.21)	98.44 (98.21, 98.61)	98.39 (98.10, 98.67)	98.36 (98.18, 98.59)	98.42 (98.28, 98.51)	98.37 (98.29, 98.48)	98.29 (98.27, 98.55)	98.50 (98.33, 98.64)	98.56 (98.50, 98.59)	98.64 (98.29, 98.73)	97.38 (96.80, 98.05)	97.79 (97.78, 97.79)	97.57 (97.57, 97.57)
mean(CI)	96.79 (96.32, 97.25)	97.06 (96.77, 97.35)	97.96 (97.72, 98.19)	98.37 (98.18, 98.56)	98.39 (98.22, 98.57)	98.39 (98.25, 98.54)	98.43 (98.29, 98.57)	98.14 (97.57, 98.71)	98.42 (98.24, 98.60)	98.47 (98.25, 98.69)	98.53 (98.43, 98.62)	98.26 (97.44, 99.08)	96.65 (94.08, 99.21)	97.79 (97.62, 97.95)	97.57 (NaN, NaN)
Ash (m %)															
min, max	1.61, 4.42	2.25, 3.89	1.56, 3.01	1.25, 2.47	1.14, 1.97	1.22, 1.98	1.14, 1.80	1.33, 4.06	1.17, 1.76	1.18, 1.99	1.39, 1.68	1.16, 3.69	1.60, 8.16	2.20, 2.23	2.43, 2.43
median(IQR)	3.23 (2.90, 3.86)	2.77 (2.60, 3.29)	1.95 (1.79, 2.14)	1.56 (1.39, 1.79)	1.61 (1.33, 1.90)	1.64 (1.41, 1.82)	1.58 (1.49, 1.72)	1.63 (1.52, 1.71)	1.71 (1.45, 1.73)	1.50 (1.36, 1.67)	1.44 (1.41, 1.50)	1.36 (1.27, 1.71)	2.62 (1.95, 3.20)	2.21 (2.21, 2.22)	2.43 (2.43, 2.43)
mean(CI)	3.21 (2.75, 3.68)	2.94 (2.65, 3.23)	2.04 (1.81, 2.28)	1.63 (1.44, 1.82)	1.61 (1.43, 1.78)	1.61 (1.46, 1.75)	1.57 (1.43, 1.71)	1.86 (1.29, 2.43)	1.58 (1.40, 1.76)	1.53 (1.31, 1.75)	1.47 (1.38, 1.57)	1.74 (0.92, 2.56)	3.35 (0.79, 5.92)	2.21 (2.05, 2.38)	2.43 (NaN, NaN)
Carbon (m %)															
min, max	51.54, 53.34	52.90, 54.09	54.62, 55.54	55.25, 57.02	55.25, 57.02	57.14, 58.89	57.14, 58.89	57.14, 59.17	57.14, 58.89	57.14, 58.89	57.14, 58.89	57.14, 58.89	58.16, 58.89	58.89, 58.89	62.68, 62.68
median(IQR)	53.21 (51.96, 53.34)	53.28 (52.99, 54.09)	55.34 (54.80, 55.54)	56.16 (55.48, 57.02)	56.16 (55.48, 57.02)	58.89 (57.58, 58.89)	58.89 (57.14, 58.89)	58.89 (57.14, 58.89)	58.02 (57.14, 58.89)	58.02 (57.14, 58.89)	57.14 (57.14, 58.89)	57.14 (57.14, 58.89)	58.52 (58.16, 58.89)	58.89 (58.89, 58.89)	62.68 (62.68, 62.68)
mean(CI)	52.79 (52.31, 53.26)	53.52 (53.21, 53.83)	55.22 (54.99, 55.45)	56.27 (55.83, 56.71)	56.27 (55.83, 56.71)	58.39 (57.92, 58.86)	58.25 (57.66, 58.85)	58.25 (57.56, 58.93)	58.02 (57.23, 58.80)	58.02 (57.23, 58.80)	57.89 (57.02, 58.76)	57.89 (57.02, 58.76)	58.52 (58.11, 58.94)	58.89 (58.89, 58.89)	62.68 (NaN, NaN)
Nitrogen (m %)															
min, max	1.61, 2.22	2.21, 2.68	1.84, 2.68	1.41, 2.44	1.41, 2.44	1.29, 1.75	1.29, 1.75	1.17, 1.75	1.41, 1.75	1.41, 1.75	1.41, 1.75	1.41, 1.75	1.35, 1.75	1.75, 1.75	1.28, 1.28
median(IQR)	2.10 (1.73, 2.22)	2.36 (2.21, 2.60)	2.23 (1.84, 2.57)	2.12 (1.41, 2.36)	2.12 (1.41, 2.36)	1.41 (1.29, 1.66)	1.41 (1.35, 1.75)	1.41 (1.41, 1.75)	1.58 (1.41, 1.75)	1.58 (1.41, 1.75)	1.41 (1.41, 1.75)	1.41 (1.41, 1.75)	1.55 (1.35, 1.75)	1.75 (1.75, 1.75)	1.28 (1.28, 1.28)
mean(CI)	2.01 (1.86, 2.17)	2.39 (2.27, 2.50)	2.19 (1.98, 2.40)	1.91 (1.64, 2.18)	1.91 (1.64, 2.18)	1.46 (1.34, 1.57)	1.50 (1.36, 1.64)	1.50 (1.33, 1.67)	1.58 (1.43, 1.73)	1.58 (1.43, 1.73)	1.56 (1.39, 1.72)	1.56 (1.39, 1.72)	1.55 (1.32, 1.78)	1.75 (1.75, 1.75)	1.28 (NaN, NaN)
Hydrog. (m %)															
min, max	5.37, 5.84	5.58, 5.99	5.59, 6.17	5.56, 6.21	5.56, 6.21	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.51, 5.92	5.92, 5.92	5.33, 5.33
median(IQR)	5.62 (5.37, 5.79)	5.68 (5.61, 5.91)	5.67 (5.61, 6.04)	5.61 (5.56, 6.06)	5.61 (5.56, 6.06)	5.84 (5.55, 5.90)	5.84 (5.46, 5.92)	5.88 (5.46, 5.92)	5.69 (5.46, 5.92)	5.69 (5.46, 5.92)	5.46 (5.46, 5.92)	5.46 (5.46, 5.92)	5.71 (5.51, 5.92)	5.92 (5.92, 5.92)	5.33 (5.33, 5.33)
mean(CI)	5.58 (5.46, 5.69)	5.74 (5.64, 5.84)	5.79 (5.64, 5.94)	5.76 (5.59, 5.93)	5.76 (5.59, 5.93)	5.75 (5.64, 5.87)	5.73 (5.58, 5.88)	5.73 (5.56, 5.89)	5.69 (5.48, 5.90)	5.69 (5.48, 5.90)	5.66 (5.43, 5.88)	5.66 (5.43, 5.88)	5.71 (5.48, 5.95)	5.92 (5.92, 5.92)	5.33 (NaN, NaN)
Sulfur (m %)															
min, max	0.26, 0.45	0.37, 0.59	0.28, 0.74	0.26, 0.74	0.26, 0.74	0.22, 0.57	0.22, 0.57	0.20, 0.57	0.56, 0.57	0.56, 0.57	0.56, 0.57	0.56, 0.57	0.41, 0.56	0.56, 0.56	0.49, 0.49
median(IQR)	0.37 (0.29, 0.43)	0.54 (0.37, 0.58)	0.70 (0.28, 0.73)	0.71 (0.26, 0.73)	0.71 (0.26, 0.73)	0.56 (0.22, 0.57)	0.56 (0.39, 0.57)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.57 (0.56, 0.57)	0.57 (0.56, 0.57)	0.48 (0.41, 0.56)	0.56 (0.56, 0.56)	0.49 (0.49, 0.49)
mean(CI)	0.36 (0.32, 0.40)	0.48 (0.42, 0.54)	0.53 (0.40, 0.66)	0.53 (0.39, 0.66)	0.53 (0.39, 0.66)	0.42 (0.31, 0.52)	0.47 (0.36, 0.58)	0.49 (0.38, 0.60)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.57 (0.56, 0.57)	0.57 (0.56, 0.57)	0.48 (0.40, 0.57)	0.56 (0.56, 0.56)	0.49 (NaN, NaN)
Oxygen (m %)															
min, max	34.87, 38.73	33.96, 35.64	32.94, 34.85	32.73, 34.36	32.73, 34.36	31.24, 33.52	31.24, 33.52	30.84, 33.52	31.24, 33.52	31.24, 33.52	31.24, 33.52	31.24, 33.52	27.44, 31.24	31.24, 31.24	27.71, 27.71
median(IQR)	35.24 (34.87, 37.86)	34.96 (34.21, 35.47)	34.20 (33.25, 34.85)	34.16 (33.09, 34.36)	34.16 (33.09, 34.36)	32.27 (31.50, 33.21)	32.27 (31.24, 33.52)	31.24 (31.24, 33.52)	32.38 (31.24, 33.52)	32.38 (31.24, 33.52)	33.52 (31.24, 33.52)	33.52 (31.24, 33.52)	29.34 (27.44, 31.24)	31.24 (31.24, 31.24)	27.71 (27.71, 27.71)
mean(CI)	36.08 (35.07, 37.09)	34.87 (34.49, 35.25)	34.12 (33.64, 34.59)	33.84 (33.41, 34.26)	33.84 (33.41, 34.26)	32.33 (31.82, 32.85)	32.35 (31.66, 33.04)	32.07 (31.17, 32.97)	32.38 (31.36, 33.40)	32.38 (31.36, 33.40)	32.54 (31.42, 33.67)	32.54 (31.42, 33.67)	29.34 (27.16, 31.52)	31.24 (31.24, 31.24)	27.71 (NaN, NaN)

Depth Properties	0-10 cm (N = 3, n = 14)	10-25 cm (N = 3, n = 14)	25-50 cm (N = 3, n = 14)	50-75 cm (N = 3, n = 14)	75-100 cm (N = 3, n = 14)	100-150 cm (N = 3, n = 14)	150-200 cm (N = 3, n = 11)	200-250 cm (N = 3, n = 10)	250-300 cm (N = 2, n = 8)	300-350 cm (N = 2, n = 8)	350-400 cm (N = 2, n = 7)	400-450 cm (N = 2, n = 7)	450-500 cm (N = 2, n = 6)	500-550 cm (N = 1, n =2)	550-600 cm (N = 1, n = 1)
WC (m %)															

min, max	90.8, 93.9	91.4, 94.4	92.0, 94.7	91.6, 94.5	91.3, 94.8	90.4, 94.1	89.6, 95.0	88.3, 94.3	94.0, 94.6	93.6, 93.7	93.6, 94.4	92.8, 93.8	90.9, 92.2	90.4, 90.4	88.4, 88.4
median(IQR)	91.5 (91.3, 92.6)	93.4 (92.3, 94.0)	93.5 (92.9, 94.1)	94.1 (92.9, 94.4)	94.2 (92.8, 94.5)	94.1 (92.4, 94.1)	93.9 (92.0, 94.6)	94.2 (91.2, 94.4)	94.6 (94.6, 94.6)	94.1 (93.9, 94.4)	94.0 (93.7, 94.3)	93.2 (92.9, 93.6)	92.5 (92.4, 92.7)	90.4 (90.4, 90.4)	88.4 (88.4, 88.4)
mean(CI)	92.1 (88.1, 96.1)	93.0 (89.1, 96.8)	93.3 (90.0, 96.7)	93.3 (89.6, 97.1)	93.5 (88.8, 98.1)	92.8 (87.5, 98.2)	92.9 (85.8, 100.0)	92.3 (83.6, 100.9)	94.3 (90.3, 98.2)	93.7 (93.2, 94.1)	94.0 (88.6, 99.4)	93.3 (86.7, 99.8)	91.5 (83.0, 100.1)	90.4 (NaN, NaN)	88.4 (NaN, NaN)
WC (vol %)															
min, max	58.5, 86.5	81.7, 103.0	103.4, 114.4	93.4, 119.9	104.0, 120.1	95.0, 119.9	109.5, 117.0	106.9, 123.2	113.1, 117.6	115.8, 116.4	117.7, 120.9	114.6, 116.2	110.0, 116.9	115.7, 115.7	121.9, 121.9
median(IQR)	60.5 (58.7, 73.7)	97.2 (91.5, 99.1)	103.0 (103.0, 109.5)	118.5 (108.0, 119.4)	119.1 (112.0, 119.5)	119.8 (104.9, 120.0)	116.5 (113.5, 116.7)	111.9 (108.5, 117.6)	119.2 (118.8, 119.6)	118.2 (117.6, 118.7)	119.6 (118.7, 120.5)	116.2 (114.8, 117.6)	115.3 (113.5, 117.2)	115.7 (115.7, 115.7)	121.9 (121.9, 121.9)
mean(CI)	68.5 (29.6, 107.3)	93.8 (66.6, 121.0)	107.3 (91.9, 122.6)	109.3 (74.6, 143.9)	113.7 (92.5, 135.0)	111.3 (76.2, 146.5)	112.8 (103.2, 122.4)	112.7 (90.1, 135.3)	115.3 (87.2, 143.5)	116.1 (112.3, 120.0)	119.3 (98.7, 139.9)	115.4 (105.1, 125.6)	113.5 (69.6, 157.4)	115.7 (NaN, NaN)	121.9 (NaN, NaN)
BD (gcm-3)															
min, max	0.040, 0.087	0.049, 0.098	0.058, 0.089	0.054, 0.105	0.057, 0.112	0.059, 0.127	0.058, 0.129	0.064, 0.164	0.065, 0.076	0.079, 0.079	0.070, 0.083	0.076, 0.090	0.094, 0.117	0.123, 0.123	0.160, 0.160
median(IQR)	0.054 (0.046, 0.073)	0.069 (0.059, 0.084)	0.082 (0.070, 0.085)	0.077 (0.066, 0.091)	0.074 (0.065, 0.093)	0.076 (0.068, 0.099)	0.077 (0.068, 0.103)	0.077 (0.069, 0.120)	0.068 (0.068, 0.069)	0.075 (0.071, 0.079)	0.077 (0.072, 0.081)	0.082 (0.076, 0.088)	0.093 (0.089, 0.096)	0.123 (0.123, 0.123)	0.160 (0.160, 0.160)
mean(CI)	0.060 (-0.000, 0.120)	0.073 (0.013, 0.133)	0.076 (0.036, 0.117)	0.079 (0.016, 0.142)	0.081 (0.011, 0.150)	0.087 (-0.001, 0.175)	0.087 (-0.006, 0.180)	0.098 (-0.042, 0.239)	0.071 (-0.000, 0.142)	0.079 (0.075, 0.083)	0.076 (-0.011, 0.164)	0.083 (-0.007, 0.173)	0.106 (-0.042, 0.253)	0.123 (NaN, NaN)	0.160 (NaN, NaN)
PD (gcm-3)															
min, max	1.466, 1.486	1.472, 1.481	1.461, 1.470	1.457, 1.464	1.456, 1.463	1.458, 1.461	1.456, 1.460	1.459, 1.483	1.458, 1.460	1.457, 1.460	1.457, 1.458	1.457, 1.466	1.462, 1.485	1.467, 1.467	1.469, 1.469
median(IQR)	1.479 (1.472, 1.483)	1.475 (1.473, 1.478)	1.464 (1.463, 1.466)	1.460 (1.458, 1.461)	1.461 (1.458, 1.462)	1.461 (1.459, 1.461)	1.460 (1.458, 1.460)	1.460 (1.460, 1.471)	1.460 (1.460, 1.460)	1.459 (1.458, 1.459)	1.458 (1.457, 1.458)	1.458 (1.457, 1.459)	1.470 (1.466, 1.474)	1.467 (1.467, 1.467)	1.469 (1.469, 1.469)
mean(CI)	1.478 (1.453, 1.503)	1.476 (1.465, 1.487)	1.465 (1.455, 1.476)	1.460 (1.451, 1.469)	1.460 (1.450, 1.470)	1.460 (1.456, 1.463)	1.459 (1.452, 1.465)	1.467 (1.435, 1.500)	1.459 (1.450, 1.468)	1.459 (1.443, 1.474)	1.458 (1.453, 1.463)	1.462 (1.401, 1.523)	1.474 (1.325, 1.622)	1.467 (NaN, NaN)	1.469 (NaN, NaN)
Por. (vol %)															
min, max	94.1, 97.3	93.4, 96.7	93.9, 96.1	92.8, 96.3	92.3, 96.1	91.3, 95.9	91.1, 96.1	89.0, 95.6	94.8, 95.5	94.6, 94.6	94.3, 95.2	93.8, 94.8	92.2, 93.6	91.6, 91.6	89.1, 89.1
median(IQR)	96.3 (95.1, 96.9)	95.3 (94.3, 96.0)	94.4 (94.2, 95.3)	94.8 (93.8, 95.5)	95.0 (93.6, 95.5)	94.8 (93.2, 95.3)	94.8 (92.9, 95.4)	94.7 (91.8, 95.3)	95.3 (95.3, 95.4)	94.9 (94.6, 95.1)	94.7 (94.4, 95.0)	94.4 (94.0, 94.8)	93.7 (93.5, 93.9)	91.6 (91.6, 91.6)	89.1 (89.1, 89.1)
mean(CI)	95.9 (91.9, 100.0)	95.1 (90.9, 99.2)	94.8 (92.0, 97.6)	94.6 (90.3, 98.9)	94.5 (89.7, 99.3)	94.0 (88.0, 100.1)	94.0 (87.6, 100.5)	93.3 (83.9, 102.7)	95.2 (90.3, 100.0)	94.6 (94.3, 94.9)	94.8 (88.8, 100.7)	94.3 (88.4, 100.2)	92.9 (83.8, 101.9)	91.6 (NaN, NaN)	89.1 (NaN, NaN)
pH															
min, max	3.7, 4.5	3.9, 4.3	3.9, 4.5	4.1, 4.7	4.1, 4.8	4.1, 5.0	4.2, 5.1	4.3, 5.3	5.0, 5.3	4.9, 5.4	5.0, 5.5	5.1, 5.5	5.1, 5.4	5.4, 5.4	5.2, 5.2
median(IQR)	4.5 (4.1, 4.5)	4.3 (4.1, 4.3)	4.5 (4.2, 4.5)	4.6 (4.3, 4.6)	4.7 (4.4, 4.8)	4.8 (4.5, 4.9)	4.9 (4.5, 5.0)	4.9 (4.6, 5.1)	5.1 (5.0, 5.2)	5.2 (5.1, 5.3)	5.2 (5.1, 5.4)	5.3 (5.2, 5.4)	5.3 (5.2, 5.4)	5.4 (5.4, 5.4)	5.2 (5.2, 5.2)
mean(CI)	4.2 (3.1, 5.3)	4.2 (3.6, 4.8)	4.3 (3.4, 5.2)	4.4 (3.6, 5.3)	4.6 (3.6, 5.5)	4.7 (3.5, 5.8)	4.7 (3.6, 5.9)	4.8 (3.7, 6.0)	5.1 (2.8, 7.5)	5.1 (2.5, 7.8)	5.2 (2.1, 8.4)	5.3 (2.6, 8.0)	5.3 (3.2, 7.4)	5.4 (NaN, NaN)	5.2 (NaN, NaN)
EC (mScm-1)															
min, max	38.0, 72.8	69.8, 76.9	76.8, 84.8	66.5, 72.1	57.0, 73.7	63.0, 74.2	64.9, 71.7	57.4, 78.0	69.2, 78.9	67.0, 76.3		76.0, 71.2	71.6, 89.7	104.0, 104.0	125.8, 125.8
median(IQR)	48.7 (43.0, 61.5)	71.4 (69.5, 72.3)	76.6 (75.0, 80.2)	66.8 (66.1, 68.2)	65.3 (60.3, 69.1)	64.8 (64.1, 66.8)	68.2 (64.4, 69.7)	70.3 (63.9, 74.1)	74.9 (72.8, 77.0)	69.5 (67.0, 72.0)	75.3 (74.6, 76.0)	68.8 (68.6, 69.1)	79.1 (75.3, 82.9)	104.0 (104.0, 104.0)	125.8 (125.8, 125.8)
mean(CI)	53.9 (10.1, 97.6)	73.1 (64.2, 82.0)	80.0 (69.3, 90.6)	68.4 (60.5, 76.3)	65.1 (44.3, 85.9)	67.6 (52.9, 82.2)	68.4 (59.9, 76.9)	68.5 (42.7, 94.4)	74.0 (12.1, 136.0)	71.7 (12.2, 131.1)	75.2 (64.6, 85.8)	69.3 (45.4, 93.3)	80.6 (-33.9, 195.2)	104.0 (NaN, NaN)	125.8 (NaN, NaN)
von Post															
min, max	3, 5	4, 6	5, 6	6, 7	6, 8	6, 8	7, 8	7, 8	7, 9	6, 9	6, 9	7, 9	8, 9	10, 10	10, 10
median(IQR)	4 (4, 5)	6 (5, 6)	6 (6, 6)	6 (6, 6)	6 (6, 7)	7 (7, 8)	7 (7, 8)	7 (7, 8)	8 (7, 8)	8 (7, 8)	8 (8, 8)	8 (8, 8)	8 (8, 9)	10 (10, 10)	10 (10, 10)
mean(CI)	4 (1, 7)	5 (2, 7)	6 (4, 7)	6 (4, 8)	6 (4, 9)	7 (5, 10)	7 (5, 10)	7 (5, 10)	8 (-6, 22)	8 (-10, 25)	8 (-6, 21)	8 (-4, 20)	8 (-2, 19)	10 (NaN, NaN)	10 (NaN, NaN)
OM (m %)															
min, max	96.21, 97.81	96.60, 97.31v	97.56, 98.27	98.01, 98.63	98.07, 98.71	98.28, 98.51	98.32, 98.70	96.49, 98.40	98.36, 98.48	98.37, 98.57	98.50, 98.56	97.81, 98.61	96.26, 98.19	97.79, 97.79	97.57, 97.57
median(IQR)	96.79 (96.48, 97.32)	97.11 (96.85, 97.25)	98.01 (97.82, 98.13)	98.38 (98.26, 98.53)	98.25 (98.16, 98.49)	98.28 (98.25, 98.43)	98.35 (98.33, 98.54)	98.34 (97.41, 98.36)	98.35 (98.31, 98.38)	98.47 (98.43, 98.51)	98.55 (98.54, 98.56)	98.50 (98.42, 98.57)	97.52 (97.17, 97.86)	97.79 (97.79, 97.79)	97.57 (97.57, 97.57)
mean(CI)	96.88 (94.82, 98.95)	97.02 (96.09, 97.96)	97.91 (97.03, 98.78)	98.33 (97.57, 99.10)	98.34 (97.52, 99.16)	98.37 (98.07, 98.67)	98.46 (97.95, 98.97)	97.73 (95.05, 100.41)	98.42 (97.65, 99.18)	98.47 (97.19, 99.75)	98.53 (98.13, 98.93)	98.21 (93.18, 103.25)	97.23 (84.96, 109.49)	97.79 (NaN, NaN)	97.57 (NaN, NaN)
Ash (m %)															
min, max	2.19, 3.79	2.69, 3.40	1.73, 2.44	1.37, 1.99	1.29, 1.93	1.49, 1.72	1.30, 1.68	1.60, 3.51	1.52, 1.64	1.43, 1.63	1.44, 1.50	1.39, 2.19	1.81, 3.74	2.21, 2.21	2.43, 2.43
median(IQR)	3.21 (2.68, 3.52)	2.89 (2.75, 3.15)	1.99 (1.87, 2.18)	1.62 (1.47, 1.74)	1.75 (1.51, 1.84)	1.72 (1.57, 1.75)	1.65 (1.46, 1.67)	1.66 (1.64, 2.59)	1.65 (1.62, 1.69)	1.53 (1.49, 1.57)	1.45 (1.44, 1.46)	1.50 (1.43, 1.58)	2.48 (2.14, 2.83)	2.21 (2.21, 2.21)	2.43 (2.43, 2.43)
mean(CI)	3.12 (1.05, 5.18)	2.98 (2.04, 3.91)	2.09 (1.22, 2.97)	1.67 (0.90, 2.43)	1.66 (0.84, 2.48)	1.63 (1.33, 1.93)	1.54 (1.03, 2.05)	2.27 (-0.41, 4.95)	1.58 (0.82, 2.35)	1.53 (0.25, 2.81)	1.47 (1.07, 1.87)	1.79 (-3.25, 6.82)	2.77 (-9.49, 15.04)	2.21 (NaN, NaN)	2.43 (NaN, NaN)
Carbon (m %)															
min, max	51.54, 53.34	52.90, 54.09	54.62, 55.54	55.25, 57.02	55.25, 57.02	57.14, 58.89	57.14, 58.89	57.14, 59.17	57.14, 58.89	57.14, 58.89	57.14, 58.89	57.14, 58.89	58.16, 58.89	58.89, 58.89	62.68, 62.68
median(IQR)	53.21 (52.38, 53.28)	53.28 (53.09, 53.69)	55.34 (54.98, 55.44)	56.16 (55.70, 56.59)	56.16 (55.70, 56.59)	58.89 (58.02, 58.89)	58.89 (58.02, 58.89)	58.89 (58.02, 59.03)	58.02 (57.58, 58.45)	58.02 (57.58, 58.45)	58.02 (57.58, 58.45)	58.02 (57.58, 58.45)	58.52 (58.34, 58.71)	58.89 (58.89, 58.89)	62.68 (62.68, 62.68)
mean(CI)	52.70 (50.20, 55.19)	53.42 (51.91, 54.93)	55.17 (53.96, 56.37)	56.14 (53.94, 58.34)	56.14 (53.94, 58.34)	58.31 (55.80, 60.82)	58.31 (55.80, 60.82)	58.40 (55.67, 61.13)	58.02 (46.90, 69.13)	58.02 (46.90, 69.13)	58.02 (46.90, 69.13)	58.02 (46.90, 69.13)	58.52 (53.89, 63.16)	58.89 (NaN, NaN)	62.68 (NaN, NaN)
Nitrog. (m %)															
min, max	1.61, 2.22	2.21, 2.68	1.84, 2.68	1.41, 2.44	1.41, 2.44	1.29, 1.75	1.29, 1.75	1.17, 1.75	1.41, 1.75	1.41, 1.75	1.41, 1.75	1.41, 1.75v	1.35, 1.75	1.75, 1.75	1.28, 1.28
median(IQR)	2.10 (1.85, 2.16)	2.36 (2.29, 2.52)	2.23 (2.04, 2.46)	2.12 (1.77, 2.28)	2.12 (1.77, 2.28)	1.41 (1.35, 1.58)	1.41 (1.35, 1.58)	1.41 (1.29, 1.58)	1.58 (1.49, 1.66)	1.58 (1.49, 1.66)	1.58 (1.49, 1.66)	1.58 (1.49, 1.66)	1.55 (1.45, 1.65)	1.75 (1.75, 1.75)	1.28 (1.28, 1.28)
mean(CI)	1.98 (1.17, 2.78)	2.42 (1.82, 3.01)	2.25 (1.21, 3.29)	1.99 (0.68, 3.30)	1.99 (0.68, 3.30)	1.48 (0.89, 2.08)	1.48 (0.89, 2.08)	1.44 (0.72, 2.17)	1.58 (-0.58, 3.74)	1.58 (-0.58, 3.74)	1.58 (-0.58, 3.74)	1.58 (-0.58, 3.74)	1.55 (-0.99, 4.09)	1.75 (NaN, NaN)	1.28 (NaN, NaN)
Hydrog.(m %)															
min, max	5.37, 5.84	5.58, 5.99	5.59, 6.17	5.56, 6.21	5.56, 6.21	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.46, 5.92	5.51, 5.92	5.92, 5.92	5.33, 5.33
median(IQR)	5.62 (5.50, 5.73)	5.68 (5.63, 5.83)	5.67 (5.63, 5.92)	5.61 (5.58, 5.91)	5.61 (5.58, 5.91)	5.84 (5.65, 5.88)	5.84 (5.65, 5.88)	5.88 (5.67, 5.90)	5.69 (5.57, 5.80)	5.69 (5.57, 5.80)	5.69 (5.57, 5.80)	5.69 (5.57, 5.80)	5.71 (5.61, 5.82)	5.92 (5.92, 5.92)	5.33 (5.33, 5.33)
mean(CI)	5.61 (5.03, 6.19)	5.75 (5.22, 6.28)	5.81 (5.03, 6.59)	5.79 (4.89, 6.69)	5.79 (4.89, 6.69)	5.74 (5.13, 6.35)	5.74 (5.13, 6.35)	5.75 (5.12, 6.39)	5.69 (2.77, 8.61)	5.69 (2.77, 8.61)	5.69 (2.77, 8.61)	5.69 (2.77, 8.61)	5.71 (3.11, 8.32)	5.92 (NaN, NaN)	5.33 (NaN, NaN)
Sulfur (m %)															
min, max	0.26, 0.45	0.37, 0.59	0.28, 0.74	0.26, 0.74	0.26, 0.74	0.22, 0.57	0.22, 0.57	0.20, 0.57	0.56, 0.57	0.56, 0.57	0.56, 0.57	0.56, 0.57	0.41, 0.56	0.56, 0.56	0.49, 0.49
median(IQR)	0.37 (0.32, 0.41)	0.54 (0.46, 0.56)	0.70 (0.49, 0.72)	0.71 (0.48, 0.72)	0.71 (0.48, 0.72)	0.56 (0.39, 0.56)	0.56 (0.39, 0.56)	0.56 (0.38, 0.56)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.56 (0.56, 0.57)	0.48 (0.45, 0.52)	0.56 (0.56, 0.56)	0.49 (0.49, 0.49)
mean(CI)	0.36 (0.12, 0.60)	0.50 (0.21, 0.79)	0.57 (-0.06, 1.21)	0.57 (-0.10, 1.24)	0.57 (-0.10, 1.24)	0.45 (-0.04, 0.94)	0.45 (-0.04, 0.94)	0.44 (-0.08, 0.97)	0.56 (0.50, 0.63)	0.56 (0.50, 0.63)	0.56 (0.50, 0.63)	0.56 (0.50, 0.63)	0.48 (-0.47, 1.44)	0.56 (NaN, NaN)	0.49 (NaN, NaN)
Oxyg. (m %)															
min, max	34.87, 38.73	33.96, 35.64	32.94, 34.85	32.73, 34.36	32.73, 34.36	31.24, 33.52	31.24, 33.52	30.84, 33.52	31.24, 33.52	31.24, 33.52	31.24, 33.52	31.24, 33.52	27.44, 31.24	31.24, 31.24	27.71, 27.71
median(IQR)	35.24 (35.05, 36.98)	34.96 (34.46, 35.30)	34.20 (33.57, 34.53)	34.16 (33.44, 34.26)	34.16 (33.44, 34.26)	32.27 (31.76, 32.90)	32.27 (31.76, 32.90)	31.24 (31.04, 32.38)	32.38 (31.81, 32.95)	32.38 (31.81, 32.95)	32.38 (31.81, 32.95)	32.38 (31.81, 32.95)	29.34 (28.39, 30.29)	31.24 (31.24, 31.24)	27.71 (27.71, 27.71)
mean(CI)	36.28 (30.99, 41.57)	34.85 (32.75, 36.95)	34.00 (31.58, 36.41)	33.75 (31.54, 35.96)	33.75 (31.54, 35.96)	32.34 (29.51, 35.18)	32.34 (29.51, 35.18)	31.87 (28.28, 35.46)	32.38 (17.89, 46.87)	32.38 (17.89, 46.87)	32.38 (17.89, 46.87)	32.38 (17.89, 46.87)	29.34 (5.20, 53.48)	31.24 (NaN, NaN)	27.71 (NaN, NaN)

Mountain blanket bogs – Grassland

Depth Properties	0-10 cm (N = 12)	10-25 cm (N = 12)	25-50 cm (N = 11)	50-75 cm (N = 7)	75-100 cm (N = 7)	100-150 cm (N = 6)	150-200 cm (N = 3)	200-250 cm (N = 1)
WC (m %)								
min, max	80.4, 91.5	70.5, 89.8	89.8, 89.9	86.7, 91.3	78.4, 90.5	84.8, 87.9	85.1, 88.9	89.6, 89.6
median(IQR)	86.6 (85.9, 88.1)	84.1 (71.6, 88.1)	85.7 (80.8, 89.0)	88.7 (88.2, 89.3)	86.7 (86.1, 88.0)	86.4 (86.0, 86.9)	87.5 (86.3, 88.2)	89.6 (89.6, 89.6)
mean(CI)	86.8 (85.1, 88.6)	81.2 (76.0, 86.4)	84.6 (81.3, 87.9)	88.8 (87.5, 90.1)	86.3 (82.7, 89.8)	86.4 (85.3, 87.5)	87.2 (82.4, 92.0)	89.6 (NaN, NaN)
WC (vol %)								
min, max	34.5, 87.6	81.4, 100.8	87.9, 113.3	111.8, 120.2	103.7, 119.4	109.5, 121.4	111.7, 126.2	121.3, 121.3
median(IQR)	59.0 (53.6, 72.3)	90.5 (83.8, 94.3)	99.0 (97.9, 105.9)	114.7 (114.3, 116.2)	115.4 (113.7, 118.3)	117.5 (115.7, 120.4)	118.3 (115.0, 122.2)	121.3 (121.3, 121.3)
mean(CI)	60.4 (50.2, 70.7)	90.1 (86.3, 94.0)	101.4 (96.6, 106.3)	115.4 (113.0, 117.8)	114.6 (109.6, 119.6)	117.1 (112.5, 121.7)	118.7 (100.8, 136.7)	121.3 (NaN, NaN)
BD (gcm-3)								
min, max	0.040, 0.146	0.095, 0.392	0.110, 0.304	0.114, 0.178	0.125, 0.285	0.161, 0.200	0.148, 0.196	0.141, 0.141
median(IQR)	0.090 (0.066, 0.127)	0.169 (0.117, 0.359)	0.153 (0.126, 0.248)	0.146 (0.137, 0.152)	0.178 (0.156, 0.189)	0.188 (0.175, 0.194)	0.180 (0.164, 0.188)	0.141 (0.141, 0.141)
mean(CI)	0.095 (0.071, 0.119)	0.222 (0.144, 0.299)	0.190 (0.138, 0.241)	0.145 (0.127, 0.163)	0.183 (0.135, 0.230)	0.184 (0.169, 0.200)	0.174 (0.114, 0.235)	0.141 (NaN, NaN)
PD (gcm-3)								
min, max	1.478, 1.890	1.471, 2.057	1.457, 1.924	1.453, 1.477	1.451, 1.685	1.456, 1.568	1.459, 1.463	1.463, 1.463
median(IQR)	1.534 (1.482, 1.599)	1.659 (1.474, 1.966)	1.464 (1.461, 1.823)	1.458 (1.456, 1.458)	1.459 (1.457, 1.462)	1.460 (1.458, 1.462)	1.460 (1.460, 1.462)	1.463 (1.463, 1.463)
mean(CI)	1.572 (1.493, 1.650)	1.720 (1.554, 1.887)	1.631 (1.496, 1.766)	1.459 (1.452, 1.467)	1.490 (1.411, 1.570)	1.477 (1.431, 1.524)	1.461 (1.456, 1.466)	1.463 (NaN, NaN)
Porosity (vol %)								
min, max	90.6, 97.5	80.7, 93.6	83.7, 92.5	87.8, 92.3	80.4, 91.4	86.3, 88.9	86.6, 89.9	90.4, 90.4
median(IQR)	93.9 (91.7, 96.0)	89.8 (81.9, 92.1)	89.5 (86.6, 91.4)	89.9 (89.5, 90.6)	88.1 (87.1, 90.0)	87.6 (86.7, 88.2)	87.7 (87.2, 88.8)	90.4 (90.4, 90.4)
mean(CI)	93.9 (92.4, 95.5)	87.8 (84.5, 91.0)	88.7 (86.5, 90.9)	90.0 (88.8, 91.3)	87.7 (84.4, 91.1)	87.5 (86.5, 88.6)	88.1 (84.0, 92.2)	90.4 (NaN, NaN)
pH								
min, max	4.5, 5.1	5.1, 5.5	4.1, 5.8	4.1, 4.9	4.1, 4.9	4.1, 4.5	4.2, 4.3	4.5, 4.5
median(IQR)	4.8 (4.6, 5.1)	4.9 (4.5, 5.4)	4.4 (4.3, 5.4)	4.2 (4.2, 4.2)	4.2 (4.2, 4.3)	4.2 (4.2, 4.3)	2; 4.3 (4.3, 4.3)	4.4 (4.4, 4.4)
mean(CI)	4.8 (4.7, 5.0)	4.9 (4.6, 5.2)	4.8 (4.4, 5.2)	4.3 (4.0, 4.6)	4.3 (4.1, 4.6)	4.2 (4.1, 4.4)	4.3 (4.2, 4.3)	4.4 (NaN, NaN)
EC (mScm-1)								
min, max	34.7, 67.7	41.1, 74.1	49.3, 68.7	50.6, 78.8	51.8, 77.8	65.1, 83.2	65.7, 70.1	54.8, 54.8
median(IQR)	43.5 (38.0, 53.8)	48.9 (46.5, 59.0)	56.9 (54.2, 64.7)	65.6 (57.3, 72.2)	66.7 (61.2, 72.5)	77.1 (68.5, 78.6)	2; 67.9 (66.8, 69.0)	54.8 (54.8, 54.8)
mean(CI)	47.1 (39.9, 54.2)	52.8 (46.3, 59.4)	58.6 (54.0, 63.3)	64.9 (55.1, 74.6)	66.3 (58.0, 74.5)	74.5 (66.8, 82.2)	67.9 (58.4, 77.4)	54.8 (NaN, NaN)
von Post								
min, max	2, 7	3, 9	4, 10	4, 9	4, 9	5, 8	7, 9	8, 8
median(IQR)	4 (4, 5)	6 (5, 8)	8 (5, 10)	5 (5, 6)	7 (6, 7)	8 (6, 8)	7 (7, 8)	8 (8, 8)
mean(CI)	4 (3, 5)	6 (5, 8)	7 (6, 9)	6 (4, 7)	6 (5, 8)	7 (6, 8)	8 (5, 11)	8 (NaN, NaN)
OM (m %)								
min, max	62.79, 96.89	49.00, 97.46	59.99, 98.59	96.90, 98.96	79.75, 99.12	89.39, 98.71	98.12, 98.44	98.10, 98.10
median(IQR)	92.27 (86.85, 96.51)	81.88 (56.52, 97.15)	97.98 (68.32, 98.28)	98.55 (98.48, 98.68)	98.43 (98.20, 98.57)	98.32 (98.17, 98.51)	98.31 (98.21, 98.37)	98.10 (98.10, 98.10)
mean(CI)	89.10 (82.60, 95.59)	76.82 (63.10, 90.54)	84.22 (73.03, 95.41)	98.39 (97.76, 99.02)	95.83 (89.27, 102.40)	96.91 (93.04, 100.78)	98.29 (97.89, 98.68)	98.10 (NaN, NaN)
Ash (m %)								
min, max	3.11, 37.21	2.54, 51.00	1.41, 40.01	1.04, 3.10	0.88, 20.25	1.29, 10.61	1.56, 1.88	1.88, 1.90
median(IQR)	7.73 (3.49, 13.15)	18.12 (2.85, 43.48)	2.02 (1.72, 31.68)	1.45 (1.32, 1.52)	1.57 (1.43, 1.80)	1.68 (1.49, 1.83)	1.69 (1.63, 1.79)	1.90 (1.90, 1.90)
mean(CI)	10.90 (4.41, 17.40)	23.18 (9.46, 36.90)	15.78 (4.59, 26.97)	1.61 (0.98, 2.24)	4.17 (-2.40, 10.73)	3.09 (-0.78, 6.96)	1.71 (1.32, 2.11)	1.90 (NaN, NaN)
Carbon (m %)								
min, max	45.96, 47.58	35.30, 49.00	42.80, 53.87	52.42, 60.80	50.49, 52.42	53.51, 53.51	53.51, 53.51	57.65, 57.65
median(IQR)	46.77 (45.96, 47.58)	42.15 (35.30, 49.00)	53.87 (42.80, 53.87)	52.42 (52.42, 52.42)	52.42 (52.42, 52.42)	53.51 (53.51, 53.51)	53.51 (53.51, 53.51)	57.65 (57.65, 57.65)
mean(CI)	46.77 (46.23, 47.31)	42.15 (37.60, 46.70)	48.84 (44.95, 52.72)	53.62 (50.69, 56.55)	52.14 (51.47, 52.82)	53.51 (53.51, 53.51)	53.51 (53.51, 53.51)	57.65 (NaN, NaN)
Nitrogen (m %)								
min, max	2.25, 2.85	1.70, 1.84	1.53, 1.74	1.36, 2.28	1.36, 1.87	1.25, 1.25	1.25, 1.25	1.79, 1.79
median(IQR)	2.55 (2.25, 2.85)	1.77 (1.70, 1.84)	1.53 (1.53, 1.74)	1.36 (1.36, 1.36)	1.36 (1.36, 1.36)	1.25 (1.25, 1.25)	1.25 (1.25, 1.25)	1.79 (1.79, 1.79)
mean(CI)	2.55 (2.35, 2.75)	1.77 (1.72, 1.82)	1.63 (1.55, 1.70)	1.49 (1.17, 1.81)	1.43 (1.25, 1.61)	1.25 (1.25, 1.25)	1.25 (1.25, 1.25)	1.79 (NaN, NaN)
Hydrogen (m %)								
min, max	5.25, 5.46	3.93, 5.51	4.53, 5.38	5.40, 6.32	5.09, 5.40	5.43, 5.43	5.43, 5.43	5.68, 5.68
median(IQR)	5.36 (5.25, 5.46)	4.72 (3.93, 5.51)	5.38 (4.53, 5.38)	5.40 (5.40, 5.40)	5.40 (5.40, 5.40)	5.43 (5.43, 5.43)	5.43 (5.43, 5.43)	5.68 (5.68, 5.68)
mean(CI)	5.36 (5.29, 5.42)	4.72 (4.20, 5.24)	4.99 (4.70, 5.29)	5.53 (5.21, 5.85)	5.36 (5.25, 5.46)	5.43 (5.43, 5.43)	5.43 (5.43, 5.43)	5.68 (NaN, NaN)
Sulfur (m %)								
min, max	0.32, 0.42	0.30, 0.33	0.29, 0.40	0.26, 0.87	0.26, 0.59	0.26, 0.26	0.26, 0.26	0.33, 0.33
median(IQR)	0.37 (0.32, 0.42)	0.32 (0.30, 0.33)	0.29 (0.29, 0.40)	0.26 (0.26, 0.26)	0.26 (0.26, 0.26)	0.26 (0.26, 0.26)	0.26 (0.26, 0.26)	0.33 (0.33, 0.33)
mean(CI)	0.37 (0.34, 0.40)	0.32 (0.31, 0.32)	0.34 (0.30, 0.38)	0.35 (0.13, 0.56)	0.31 (0.19, 0.42)	0.26 (0.26, 0.26)	0.26 (0.26, 0.26)	0.33 (NaN, NaN)
Oxygen (m %)								
min, max	26.87, 40.69	15.12, 40.44	17.58, 37.02	26.65, 39.02	21.64, 39.02	36.60, 36.60	36.60, 36.60	32.32, 32.32
median(IQR)	33.78 (26.87, 40.69)	27.78 (15.12, 40.44)	37.02 (17.58, 37.02)	39.02 (39.02, 39.02)	39.02 (39.02, 39.02)	36.60 (36.60, 36.60)	36.60 (36.60, 36.60)	32.32 (32.32, 32.32)
mean(CI)	33.78 (29.19, 38.37)	27.78 (19.38, 36.18)	28.18 (21.36, 35.00)	37.25 (32.93, 41.58)	36.54 (30.46, 42.61)	36.60 (36.60, 36.60)	36.60 (36.60, 36.60)	32.32 (NaN, NaN)

Depth Properties	0-10 cm (N = 2, n = 12)	10-25 cm (N = 2, n = 12)	25-50 cm (N = 2, n = 11)	50-75 cm (N = 2, n = 7)	75-100 cm (N = 2, n = 7)	100-150 cm (N = 1, n = 6)	150-200 cm (N = 1, n = 3)	200-250 cm (N = 1, n = 1)
WC (m %)								
min, max	86.0, 87.6	74.0, 88.3	80.5, 88.3	88.4, 91.3	86.2, 86.9	86.6, 86.6	88.0, 88.0	89.6, 89.6
median(IQR)	87.3 (86.6, 87.9)	79.9 (75.7, 84.1)	84.3 (82.0, 86.7)	89.9 (89.2, 90.6)	86.7 (86.6, 86.8)	86.4 (86.4, 86.4)	88.1 (88.1, 88.1)	89.6 (89.6, 89.6)
mean(CI)	86.8 (76.8, 96.9)	81.2 (-9.7, 172.1)	84.4 (35.2, 133.6)	89.9 (71.4, 108.3)	86.5 (82.0, 91.1)	86.6 (NaN, NaN)	88.0 (NaN, NaN)	89.6 (NaN, NaN)
WC (vol %)								
min, max	49.3, 71.6	89.5, 90.8	97.4, 106.8	114.6, 120.2	114.1, 117.8	117.6, 117.6	120.8, 21.3	121.3, 121.3
median(IQR)	62.2 (56.4, 67.9)	89.5 (88.4, 90.6)	102.4 (100.2, 104.7)	117.3 (115.9, 118.7)	116.3 (115.5, 117.0)	117.7 (117.7, 117.7)	120.9 (120.9, 120.9)	121.3 (121.3, 121.3)
mean(CI)	60.4 (-81.8, 202.7)	90.1 (82.1, 98.2)	102.1 (42.0, 162.2)	117.4 (81.9, 152.9)	116.0 (92.5, 139.4)	117.6 (NaN, NaN)	120.8 (NaN, NaN)	121.3 (NaN, NaN)
BD (gcm-3)								
min, max	0.073, 0.116	0.119, 0.324	0.129, 0.259	0.114, 0.151	0.178, 0.183	0.183, 0.183	0.165, 0.165	0.141, 0.141
median(IQR)	0.095 (0.080, 0.110)	0.241 (0.178, 0.303)	0.195 (0.160, 0.230)	0.131 (0.123, 0.140)	0.179 (0.178, 0.180)	0.187 (0.187, 0.187)	0.165 (0.165, 0.165)	0.141 (0.141, 0.141)
mean(CI)	0.095 (-0.182, 0.371)	0.222 (-1.087, 1.530)	0.194 (-0.629, 1.017)	0.133 (-0.097, 0.362)	0.181 (0.145, 0.216)	0.183 (NaN, NaN)	0.165 (NaN, NaN)	0.141 (NaN, NaN)
PD (gcm-3)								
min, max	1.485, 1.659	1.475, 1.966	1.461, 1.832	1.456, 1.477	1.458, 1.685	1.476, 1.476	1.460, 1.460	1.463, 1.463
median(IQR)	1.544 (1.513, 1.576)	1.722 (1.598, 1.846)	1.657 (1.559, 1.755)	1.467 (1.462, 1.472)	1.572 (1.515, 1.628)	1.460 (1.460, 1.460)	1.460 (1.460, 1.460)	1.463 (1.463, 1.463)
mean(CI)	1.572 (0.469, 2.675)	1.720 (-1.402, 4.843)	1.646 (-0.711, 4.003)	1.467 (1.334, 1.600)	1.571 (0.129, 3.014)	1.476 (NaN, NaN)	1.460 (NaN, NaN)	1.463 (NaN, NaN)
Porosity (vol %)								
min, max	92.2, 95.7	83.6, 92.0	85.9, 91.2	89.7, 92.3	87.4, 89.4	87.6, 87.6	88.7, 88.7	90.4, 90.4
median(IQR)	93.9 (92.7, 95.0)	86.9 (84.3, 89.5)	88.7 (87.4, 90.1)	91.0 (90.4, 91.6)	88.5 (88.1, 89.0)	87.7 (87.7, 87.7)	88.7 (88.7, 88.7)	90.4 (90.4, 90.4)
mean(CI)	93.9 (71.4, 116.5)	87.8 (34.6, 140.9)	88.6 (55.3, 121.8)	91.0 (74.5, 107.4)	88.4 (75.6, 101.3)	87.6 (NaN, NaN)	88.7 (NaN, NaN)	90.4 (NaN, NaN)
pH								
min, max	4.6, 5.0	4.5, 5.4	4.2, 5.4	4.2, 4.9	4.2, 4.9	4.2, 4.2	4.3, 4.3	4.5, 4.5
median(IQR)	4.8 (4.7, 4.9)	4.9 (4.7, 5.2)	4.8 (4.5, 5.1)	4.6 (4.4, 4.8)	4.6 (4.4, 4.7)	4.2 (4.2, 4.2)	4.3 (4.3, 4.3)	4.4 (4.4, 4.4)
mean(CI)	4.8 (2.0, 7.6)	4.9 (-1.0, 10.8)	4.8 (-2.7, 12.4)	4.6 (-0.2, 9.4)	4.6 (0.5, 8.6)	4.2 (NaN, NaN)	4.3 (NaN, NaN)	4.4 (NaN, NaN)
EC (mScm-1)								
min, max	38.3, 55.8	51.7, 54.0	57.6, 60.3	62.5, 78.8	66.2, 66.7	74.0, 74.0	66.6, 66.6	54.8, 54.8
median(IQR)	47.2 (42.6, 51.8)	50.7 (49.5, 51.9)	56.9 (56.4, 57.4)	70.5 (66.3, 74.6)	67.0 (66.9, 67.2)	76.8 (76.8, 76.8)	66.6 (66.6, 66.6)	54.8 (54.8, 54.8)
mean(CI)	47.1 (-64.1, 158.3)	52.8 (38.0, 67.7)	58.9 (41.4, 76.5)	70.7 (-32.7, 174.0)	66.5 (63.3, 69.6)	74.0 (NaN, NaN)	66.6 (NaN, NaN)	54.8 (NaN, NaN)
von Post								
min, max	4, 4	4, 8	6, 10	5, 9	6, 9	7, 7	7, 7	8, 8
median(IQR)	4 (4, 4)	6 (5, 7)	7 (6, 9)	7 (6, 8)	8 (7, 8)	7 (7, 7)	7 (7, 7)	8 (8, 8)
mean(CI)	4 (3, 5)	6 (-18, 31)	8 (-18, 33)	7 (-16, 30)	8 (-12, 27)	7 (NaN, NaN)	7 (NaN, NaN)	8 (NaN, NaN)
OM (m %)								
min, max	81.92, 96.28	56.51, 97.13	67.61, 98.27	96.90, 98.64	79.75, 98.51	97.06, 97.06	98.35, 98.35	98.10, 98.10
median(IQR)	91.37 (88.79, 93.95)	76.69 (66.45, 86.94)	82.09 (74.00, 90.18)	97.74 (97.32, 98.17)	89.09 (84.42, 93.76)	98.32 (98.32, 98.32)	98.36 (98.36, 98.36)	98.10 (98.10, 98.10)
mean(CI)	89.10 (-2.08, 180.28)	76.82 (-181.26, 334.90)	82.94 (-111.84, 277.73)	97.77 (86.74, 108.79)	89.13 (-30.06, 208.32)	97.06 (NaN, NaN)	98.35 (NaN, NaN)	98.10 (NaN, NaN)
Ash (m %)								
min, max	3.72, 18.08	2.87, 43.49	1.73, 32.39	1.36, 3.10	1.49, 20.25	2.94, 2.94	1.65, 1.65	1.90, 1.90
median(IQR)	8.63 (6.05, 11.21)	23.31 (13.06, 33.55)	17.91 (9.82, 26.00)	2.26 (1.83, 2.68)	10.91 (6.24, 15.58)	1.68 (1.68, 1.68)	1.64 (1.64, 1.64)	1.90 (1.90, 1.90)
mean(CI)	10.90 (-80.28, 102.08)	23.18 (-234.90, 281.26)	17.06 (-177.73, 211.84)	2.23 (-8.79, 13.26)	10.87 (-108.32, 130.06)	2.94 (NaN, NaN)	1.65 (NaN, NaN)	1.90 (NaN, NaN)
Carbon (m %)								
min, max	45.96, 47.58	35.30, 49.00	42.80, 53.87	52.42, 60.80	50.49, 52.42	53.51, 53.51	53.51, 53.51	57.65, 57.65
median(IQR)	46.77 (46.36, 47.18)	42.15 (38.72, 45.58)	48.33 (45.57, 51.10)	56.61 (54.52, 58.70)	51.45 (50.97, 51.94)	53.51 (53.51, 53.51)	53.51 (53.51, 53.51)	57.65 (57.65, 57.65)
mean(CI)	46.77 (36.48, 57.06)	42.15 (-44.89, 129.19)	48.33 (-21.99, 118.66)	56.61 (3.37, 109.85)	51.45 (39.19, 63.72)	53.51 (NaN, NaN)	53.51 (NaN, NaN)	57.65 (NaN, NaN)
Nitrogen (m %)								
min, max	2.25, 2.85	1.70, 1.84	1.53, 1.74	1.36, 2.28	1.36, 1.87	1.25, 1.25	1.25, 1.25	1.79, 1.79
median(IQR)	2.55 (2.40, 2.70)	1.77 (1.73, 1.81)	1.64 (1.58, 1.69)	1.82 (1.59, 2.05)	1.62 (1.49, 1.74)	1.25 (1.25, 1.25)	1.25 (1.25, 1.25)	1.79 (1.79, 1.79)
mean(CI)	2.55 (-1.26, 6.36)	1.77 (0.88, 2.66)	1.64 (0.30, 2.97)	1.82 (-4.02, 7.66)	1.62 (-1.63, 4.86)	1.25 (NaN, NaN)	1.25 (NaN, NaN)	1.79 (NaN, NaN)
Hydrogen (m %)								
min, max	5.25, 5.46	3.93, 5.51	4.53, 5.38	5.40, 6.32	5.09, 5.40	5.43, 5.43	5.43, 5.43	5.68, 5.68
median(IQR)	5.36 (5.30, 5.41)	4.72 (4.33, 5.12)	4.96 (4.74, 5.17)	5.86 (5.63, 6.09)	5.25 (5.17, 5.32)	5.43 (5.43, 5.43)	5.43 (5.43, 5.43)	5.68 (5.68, 5.68)
mean(CI)	5.36 (4.02, 6.69)	4.72 (-5.32, 14.76)	4.96 (-0.45, 10.36)	5.86 (0.02, 11.70)	5.25 (3.28, 7.21)	5.43 (NaN, NaN)	5.43 (NaN, NaN)	5.68 (NaN, NaN)
Sulfur (m %)								
min, max	0.32, 0.42	0.30, 0.33	0.29, 0.40	0.26, 0.87	0.26, 0.59	0.26, 0.26	0.26, 0.26	0.33, 0.33
median(IQR)	0.37 (0.34, 0.40)	0.32 (0.31, 0.32)	0.34 (0.32, 0.37)	0.56 (0.41, 0.72)	0.42 (0.34, 0.51)	0.26 (0.26, 0.26)	0.26 (0.26, 0.26)	0.33 (0.33, 0.33)
mean(CI)	0.37 (-0.27, 1.01)	0.32 (0.12, 0.51)	0.34 (-0.35, 1.04)	0.56 (-3.31, 4.44)	0.42 (-1.67, 2.52)	0.26 (NaN, NaN)	0.26 (NaN, NaN)	0.33 (NaN, NaN)
Oxygen (m %)								
min, max	26.87, 40.69	15.12, 40.44	17.58, 37.02	26.65, 39.02	21.64, 39.02	36.60, 36.60	36.60, 36.60	32.32, 32.32
median(IQR)	33.78 (30.32, 37.23)	27.78 (21.45, 34.11)	27.30 (22.44, 32.16)	32.84 (29.74, 35.93)	30.33 (25.98, 34.67)	36.60 (36.60, 36.60)	36.60 (36.60, 36.60)	32.32 (32.32, 32.32)
mean(CI)	33.78 (-54.02, 121.58)	27.78 (-133.08, 188.64)	27.30 (-96.20, 150.80)	32.84 (-45.75, 111.42)	30.33 (-80.09, 140.75)	36.60 (NaN, NaN)	36.60 (NaN, NaN)	32.32 (NaN, NaN)

Mountain blanket bogs – Forestry

Depth Properties	0-10 cm (N = 18)	10-25 cm (N = 18)	25-50 cm (N = 15)	50-75 cm (N = 9)	75-100 cm (N = 4)	100-150 cm (N = 1)
WC (m %)						
min, max	50.5, 91.8	66.4, 89.3	75.7, 89.5	80.1, 88.8	79.9, 89.3	88.8, 88.8
median(IQR)	83.8 (79.3, 86.3)	84.6 (79.1, 86.4)	86.6 (82.9, 87.6)	87.4 (85.9, 88.0)	83.9 (80.3, 87.9)	88.8 (88.8, 88.8)
mean(CI)	81.4 (76.8, 86.1)	82.2 (78.8, 85.5)	85.1 (83.0, 87.3)	86.4 (84.3, 88.5)	84.3 (76.6, 91.9)	88.8 (NaN, NaN)
WC (vol %)						
min, max	18.3, 94.4	74.2, 117.6	88.8, 119.7	105.7, 128.2	72.0, 126.2	118.1, 118.1
median(IQR)	71.1 (45.9, 85.8)	106.6 (98.9, 109.1)	109.6 (103.6, 113.7)	118.4 (113.9, 120.6)	116.0 (104.3, 119.3)	118.1 (118.1, 118.1)
mean(CI)	66.0 (54.3, 77.8)	103.4 (97.9, 108.8)	108.3 (103.9, 112.7)	117.5 (112.2, 122.7)	107.6 (69.1, 146.0)	118.1 (NaN, NaN)
BD (g*cm^{-3})						
min, max	0.026, 0.797	0.131, 0.455	0.141, 0.345	0.149, 0.262	0.151, 0.279	0.149, 0.149
median(IQR)	0.142 (0.096, 0.185)	0.197 (0.175, 0.244)	0.166 (0.157, 0.198)	0.185 (0.152, 0.195)	0.175 (0.165, 0.206)	0.149 (0.149, 0.149)
mean(CI)	0.170 (0.086, 0.254)	0.225 (0.180, 0.270)	0.190 (0.159, 0.221)	0.185 (0.155, 0.214)	0.195 (0.104, 0.286)	0.149 (NaN, NaN)
PD (g*cm^{-3})						
min, max	1.470, 2.400	1.472, 2.276	1.460, 2.157	1.459, 1.905	1.506, 2.256	1.812, 1.812
median(IQR)	1.659 (1.516, 2.019)	1.654 (1.495, 2.017)	1.566 (1.470, 1.731)	1.634 (1.497, 1.861)	1.891 (1.700, 2.077)	1.812 (1.812, 1.812)
mean(CI)	1.769 (1.616, 1.921)	1.748 (1.617, 1.880)	1.651 (1.531, 1.771)	1.674 (1.537, 1.812)	1.886 (1.372, 2.401)	1.812 (NaN, NaN)
Porosity (vol %)						
min, max	66.8, 98.2	79.0, 91.4	84.0, 92.0	86.3, 91.7	87.7, 91.4	91.8, 91.8
median(IQR)	92.1 (89.5, 94.2)	88.4 (86.9, 89.0)	88.9 (87.6, 90.2)	89.5 (87.3, 89.8)	89.9 (88.5, 91.1)	91.8 (91.8, 91.8)
mean(CI)	91.0 (87.6, 94.4)	87.5 (85.9, 89.1)	88.6 (87.3, 89.8)	89.0 (87.6, 90.4)	89.7 (86.8, 92.6)	91.8 (NaN, NaN)
pH						
min, max	4.0, 6.6	3.8, 6.6	4.0, 6.6	4.1, 6.5	4.5, 6.6	6.5, 6.5
median(IQR)	17; 4.5 (4.2, 5.5)	4.2 (4.1, 5.5)	4.3 (4.2, 5.9)	6.1 (4.3, 6.3)	6.4 (5.9, 6.5)	6.5 (6.5, 6.5)
mean(CI)	4.9 (4.4, 5.3)	4.8 (4.3, 5.3)	4.9 (4.4, 5.5)	5.5 (4.7, 6.3)	6.0 (4.4, 7.6)	6.5 (NaN, NaN)
EC (mS*cm^{-1})						
min, max	28.2, 337.0	29.2, 174.2	41.5, 341.0	37.5, 205.0	67.0, 328.0	77.8, 77.8
median(IQR)	17; 94.2 (73.6, 137.0)	79.0 (72.5, 137.7)	80.7 (73.8, 90.1)	101.8 (73.0, 147.4)	128.2 (75.3, 215.8)	77.8 (77.8, 77.8)
mean(CI)	123.1 (79.6, 166.6)	99.2 (76.4, 122.1)	103.7 (62.4, 145.0)	112.7 (71.4, 153.9)	162.9 (-29.6, 355.3)	77.8 (NaN, NaN)
von Post						
min, max	2, 9	5, 9	5, 9	5, 10	5, 9	5, 5
median(IQR)	6 (4, 7)	6 (6, 7)	6 (5, 7)	6 (5, 7)	6 (5, 8)	5 (5, 5)
mean(CI)	6 (4, 7)	6 (6, 7)	6 (6, 7)	7 (5, 8)	7 (3, 10)	5 (NaN, NaN)
OM (m %)						
min, max	20.69, 97.52	30.88, 97.36	40.74, 98.34	61.57, 98.43	32.52, 94.54	69.23, 69.23
median(IQR)	81.92 (52.13, 93.70)	82.33 (52.29, 95.46)	89.62 (75.96, 97.53)	83.95 (65.24, 95.31)	62.70 (47.33, 78.49)	69.23 (69.23, 69.23)
mean(CI)	72.84 (60.24, 85.43)	74.51 (63.66, 85.35)	82.53 (72.61, 92.46)	80.65 (69.28, 92.02)	63.12 (20.60, 105.64)	69.23 (NaN, NaN)
Ash (m %)						
min, max	2.48, 79.31	2.64, 69.12	1.66, 59.26	1.57, 38.43	5.46, 67.48	30.77, 30.77
median(IQR)	18.08 (6.30, 47.87)	17.67 (4.54, 47.71)	10.38 (2.47, 24.04)	16.05 (4.69, 34.76)	37.30 (21.51, 52.67)	30.77 (30.77, 30.77)
mean(CI)	27.16 (14.57, 39.76)	25.49 (14.65, 36.34)	17.47 (7.54, 27.39)	19.35 (7.98, 30.72)	36.88 (-5.64, 79.40)	30.77 (NaN, NaN)
Carbon (m %)						
min, max	28.05, 51.60	34.89, 49.91	42.16, 59.60	39.72, 60.35	39.72, 58.56	40.77, 40.77
median(IQR)	39.57 (28.05, 51.60)	40.55 (34.89, 49.91)	43.64 (42.90, 59.60)	39.72 (39.72, 42.67)	39.72 (39.72, 44.43)	40.77 (40.77, 40.77)
mean(CI)	39.74 (34.82, 44.66)	41.78 (38.61, 44.95)	48.57 (44.08, 53.05)	44.63 (37.74, 51.52)	44.43 (29.44, 59.42)	40.77 (NaN, NaN)
Nitrogen (m %)						
min, max	1.50, 1.97	2.00, 2.14	2.01, 2.24	2.04, 2.49	2.04, 2.24	1.60, 1.60
median(IQR)	1.83 (1.50, 1.97)	2.06 (2.00, 2.14)	2.11 (2.01, 2.17)	2.04 (2.04, 2.05)	2.04 (2.04, 2.09)	1.60 (1.60, 1.60)
mean(CI)	1.77 (1.67, 1.87)	2.07 (2.04, 2.10)	2.11 (2.06, 2.16)	2.09 (1.98, 2.21)	2.09 (1.93, 2.25)	1.60 (NaN, NaN)
Hydrogen (m %)						
min, max	3.16, 5.47	4.00, 5.37	4.31, 6.02	3.89, 5.93	3.89, 5.81	3.82, 3.82
median(IQR)	4.25 (3.16, 5.47)	4.05 (4.00, 5.37)	4.81 (4.31, 6.02)	3.89 (3.89, 4.57)	3.89 (3.89, 4.37)	3.82 (3.82, 3.82)
mean(CI)	4.29 (3.81, 4.78)	4.47 (4.15, 4.80)	5.01 (4.59, 5.44)	4.42 (3.74, 5.10)	4.37 (2.84, 5.90)	3.82 (NaN, NaN)
Sulfur (m %)						
min, max	0.20, 0.30	0.34, 0.75	0.38, 0.80	0.47, 1.28	0.46, 1.28	1.00, 1.00
median(IQR)	0.28 (0.20, 0.30)	0.35 (0.34, 0.75)	0.44 (0.41, 0.80)	1.28 (0.67, 1.28)	1.28 (1.07, 1.28)	1.00 (1.00, 1.00)
mean(CI)	0.26 (0.24, 0.28)	0.48 (0.38, 0.58)	0.57 (0.46, 0.68)	1.03 (0.74, 1.32)	1.07 (0.42, 1.73)	1.00 (NaN, NaN)
Oxygen (m %)						
min, max	18.95, 35.27	21.68, 30.51	23.32, 29.63	20.25, 28.82	20.25, 27.38	21.32, 21.32
median(IQR)	23.65 (18.95, 35.27)	22.69 (21.68, 30.51)	26.09 (23.32, 29.63)	20.25 (20.25, 25.87)	20.25 (20.25, 22.03)	21.32 (21.32, 21.32)
mean(CI)	25.96 (22.45, 29.47)	24.96 (22.94, 26.98)	26.16 (24.62, 27.70)	22.78 (19.79, 25.77)	22.03 (16.36, 27.71)	21.32 (NaN, NaN)

Depth Properties	0-10 cm (N = 3, n = 18)	10-25 cm (N = 3, n = 18)	25-50 cm (N = 3, n = 15)	50-75 cm (N = 3, n = 9)	75-100 cm (N = 2, n = 4)	100-150 cm (N = 1, n = 1)
WC (m %)						
min, max	76.5, 87.3	76.8, 85.8	82.0, 87.9	84.6, 88.5	83.1, 87.4	88.8, 88.8
median(IQR)	82.5 (81.3, 84.5)	85.8 (83.0, 86.6)	87.1 (84.6, 87.4)	87.3 (85.9, 87.9)	84.7 (83.4, 86.0)	88.8 (88.8, 88.8)
mean(CI)	81.4 (67.8, 95.1)	82.2 (70.3, 94.1)	85.1 (77.7, 92.4)	86.5 (81.7, 91.4)	85.3 (58.4, 112.1)	88.8 (NaN, NaN)
WC (vol %)						
min, max	57.0, 84.0	97.2, 110.0	101.7, 114.5	115.5, 120.6	111.3, 117.0	118.1, 118.1
median(IQR)	63.4 (57.7, 73.9)	106.3 (103.3, 109.0)	108.6 (106.1, 112.7)	117.8 (116.7, 119.2)	117.0 (117.0, 117.0)	118.1 (118.1, 118.1)
mean(CI)	66.0 (27.3, 104.8)	104.0 (88.1, 119.9)	108.3 (92.5, 124.2)	118.4 (111.9, 124.8)	114.2 (78.4, 149.9)	118.1 (NaN, NaN)
BD (g*cm^{-3})						
min, max	0.087, 0.292	0.174, 0.296	0.158, 0.224	0.150, 0.220	0.169, 0.223	0.149, 0.149
median(IQR)	0.120 (0.094, 0.158)	0.188 (0.171, 0.208)	0.161 (0.161, 0.190)	0.186 (0.168, 0.203)	0.190 (0.180, 0.201)	0.149 (0.149, 0.149)
mean(CI)	0.170 (-0.097, 0.438)	0.226 (0.069, 0.383)	0.191 (0.108, 0.274)	0.185 (0.098, 0.272)	0.196 (-0.145, 0.536)	0.149 (NaN, NaN)
PD (g*cm^{-3})						
min, max	1.500, 2.006	1.581, 1.881	1.465, 1.755	1.465, 1.738	1.506, 2.063	1.812, 1.812
median(IQR)	1.758 (1.628, 1.882)	1.694 (1.589, 1.780)	1.686 (1.576, 1.709)	1.728 (1.597, 1.736)	1.798 (1.652, 1.944)	1.812 (1.812, 1.812)
mean(CI)	1.769 (1.137, 2.400)	1.745 (1.367, 2.123)	1.654 (1.248, 2.059)	1.644 (1.259, 2.028)	1.785 (-1.755, 5.324)	1.812 (NaN, NaN)
Porosity (vol %)						
min, max	86.3, 94.2	84.6, 89.1	87.1, 89.3	87.3, 89.8	88.8, 89.4	91.8, 91.8
median(IQR)	93.5 (91.9, 94.6)	88.8 (87.9, 89.2)	89.0 (87.9, 89.7)	89.5 (88.4, 89.6)	89.4 (89.1, 89.7)	91.8 (91.8, 91.8)
mean(CI)	91.0 (80.7, 101.3)	87.4 (81.4, 93.4)	88.6 (85.5, 91.7)	88.8 (85.5, 92.1)	89.1 (85.2, 93.0)	91.8 (NaN, NaN)
pH						
min, max	4.2, 5.8	4.2, 5.8	4.2, 5.8	4.3, 6.0	4.5, 6.5	6.5, 6.5
median(IQR)	4.5 (4.4, 5.3)	4.2 (4.2, 5.2)	4.5 (4.3, 5.3)	5.4 (4.8, 5.8)	5.5 (5.0, 6.0)	6.5 (6.5, 6.5)
mean(CI)	4.8 (2.7, 6.9)	4.8 (2.6, 7.0)	4.9 (2.7, 7.0)	5.2 (3.1, 7.4)	5.5 (-7.4, 18.3)	6.5 (NaN, NaN)
EC (mS*cm^{-1})						
min, max	69.9, 187.7	70.5, 143.4	66.1, 151.8	37.5, 145.4	67.0, 151.1	77.8, 77.8
median(IQR)	91.3 (82.8, 123.4)	74.6 (73.8, 113.2)	81.1 (73.2, 101.6)	69.0 (53.3, 106.6)	101.4 (84.2, 118.6)	77.8 (77.8, 77.8)
mean(CI)	122.3 (-26.6, 271.2)	98.4 (0.6, 196.2)	98.9 (-16.2, 213.9)	84.0 (-53.9, 221.9)	109.0 (-425.2, 643.3)	77.8 (NaN, NaN)
von Post						
min, max	4, 8	6, 7	5, 8	6, 9	6, 9	5, 5
median(IQR)	6 (5, 7)	6 (6, 6)	6 (5, 6)	6 (6, 7)	7 (6, 8)	5 (5, 5)
mean(CI)	6 (1, 10)	6 (6, 7)	6 (3, 9)	7 (3, 11)	7 (-15, 29)	5 (NaN, NaN)
OM (m %)						
min, max	53.22, 95.02	63.52, 88.36	73.99, 97.90	75.38, 97.93	48.50, 94.54	69.23, 69.23
median(IQR)	73.70 (63.45, 84.44)	78.98 (71.93, 87.68)	79.68 (77.75, 88.78)	76.18 (75.57, 87.05)	70.41 (58.35, 82.48)	69.23 (69.23, 69.23)
mean(CI)	72.84 (20.64, 125.04)	74.79 (43.54, 106.03)	82.34 (48.86, 115.83)	83.16 (51.38, 114.94)	71.52 (-220.97, 364.02)	69.23 (NaN, NaN)
Ash (m %)						
min, max	4.98, 46.78	11.64, 36.48	2.10, 26.01	2.07, 24.62	5.46, 51.50	30.77, 30.77
median(IQR)	26.30 (15.56, 36.55)	21.02 (12.32, 28.07)	20.32 (11.22, 22.25)	23.82 (12.95, 24.43)	29.59 (17.52, 41.65)	30.77 (30.77, 30.77)
mean(CI)	27.16 (-25.04, 79.36)	25.21 (-6.03, 56.46)	17.66 (-15.83, 51.14)	16.84 (-14.94, 48.62)	28.48 (-264.02, 320.97)	30.77 (NaN, NaN)
Carbon (m %)						
min, max	28.05, 51.60	34.89, 49.91	42.16, 59.60	39.72, 60.35	39.72, 58.56	40.77, 40.77
median(IQR)	39.57 (33.81, 45.59)	40.55 (37.72, 45.23)	43.64 (42.90, 51.62)	42.67 (41.20, 51.51)	49.14 (44.43, 53.85)	40.77 (40.77, 40.77)
mean(CI)	39.74 (10.49, 68.99)	41.78 (22.94, 60.63)	48.47 (24.44, 72.49)	47.58 (19.86, 75.30)	49.14 (-70.55, 168.83)	40.77 (NaN, NaN)
Nitrogen (m %)						
min, max	1.50, 1.97	2.00, 2.14	2.01, 2.24	2.04, 2.49	2.04, 2.24	1.60, 1.60
median(IQR)	1.83 (1.66, 1.90)	2.06 (2.03, 2.10)	2.11 (2.06, 2.17)	2.05 (2.04, 2.27)	2.14 (2.09, 2.19)	1.60 (1.60, 1.60)
mean(CI)	1.77 (1.17, 2.37)	2.07 (1.89, 2.24)	2.12 (1.83, 2.41)	2.19 (1.55, 2.83)	2.14 (0.87, 3.41)	1.60 (NaN, NaN)
Hydrogen (m %)						
min, max	3.16, 5.47	4.00, 5.37	4.31, 6.02	3.89, 5.93	3.89, 5.81	3.82, 3.82
median(IQR)	4.25 (3.71, 4.86)	4.05 (4.03, 4.71)	4.81 (4.56, 5.41)	4.57 (4.23, 5.25)	4.85 (4.37, 5.33)	3.82 (3.82, 3.82)
mean(CI)	4.29 (1.42, 7.16)	4.47 (2.54, 6.40)	5.05 (2.86, 7.23)	4.80 (2.22, 7.38)	4.85 (-7.35, 17.05)	3.82 (NaN, NaN)
Sulfur (m %)						
min, max	0.20, 0.30	0.34, 0.75	0.38, 0.80	0.47, 1.28	0.46, 1.28	1.00, 1.00
median(IQR)	0.28 (0.24, 0.29)	0.35 (0.34, 0.55)	0.44 (0.41, 0.62)	0.67 (0.57, 0.98)	0.87 (0.66, 1.07)	1.00 (1.00, 1.00)
mean(CI)	0.26 (0.13, 0.39)	0.48 (-0.10, 1.06)	0.54 (-0.02, 1.10)	0.81 (-0.24, 1.85)	0.87 (-4.34, 6.08)	1.00 (NaN, NaN)
Oxygen (m %)						
min, max	18.95, 35.27	21.68, 30.51	23.32, 29.63	20.25, 28.82	20.25, 27.38	21.32, 21.32
median(IQR)	23.65 (21.30, 29.46)	22.69 (22.19, 26.60)	26.09 (24.70, 27.86)	25.87 (23.06, 27.34)	23.81 (22.03, 25.60)	21.32 (21.32, 21.32)
mean(CI)	25.96 (5.09, 46.83)	24.96 (12.95, 36.97)	26.35 (18.49, 34.20)	24.98 (14.16, 35.80)	23.81 (-21.48, 69.11)	21.32 (NaN, NaN)

Mountain blanket bogs – Domestic extraction

Depth **Properties**	**0-10 cm (N = 18)**	**10-25 cm (N = 18)**	**25-50 cm (N = 18)**	**50-75 cm (N = 16)**	**75-100 cm (N = 15)**	**100-150 cm (N = 15)**	**150-200 cm (N = 12)**	**200-250 cm (N = 4)**	**250-300 cm (N = 2)**
WC (m %)									
min, max	63.9, 92.0	52.7, 93.1	75.9, 93.4	80.3, 94.3	89.6, 93.2	87.4, 93.5	85.9, 91.7	85.9, 90.0	88.0, 90.1
median(IQR)	86.7 (85.9, 88.9)	90.1 (88.1, 91.5)	91.6 (90.2, 92.4)	91.8 (90.8, 92.0)	91.5 (91.1, 91.8)	90.2 (88.8, 91.4)	89.0 (86.5, 91.0)	88.9 (87.3, 90.0)	89.0 (88.5, 89.6)
mean(CI)	86.0 (83.1, 89.0)	87.3 (82.6, 91.9)	89.4 (86.6, 92.2)	91.1 (89.5, 92.7)	91.5 (91.0, 92.0)	90.1 (89.2, 91.1)	88.8 (87.4, 90.2)	88.4 (85.3, 91.6)	89.0 (75.7, 102.4)
WC (vol %)									
min, max	39.1, 120.8	71.6, 124.2	85.0, 121.9	98.5, 128.3	109.2, 124.1	109.0, 126.2	105.3, 162.1	100.1, 121.1	117.6, 120.4
median(IQR)	89.3 (77.1, 98.1)	113.0 (103.9, 118.4)	112.1 (94.6, 119.1)	122.2 (118.9, 124.3)	120.1 (116.9, 121.0)	118.4 (117.2, 122.2)	116.2 (111.9, 120.2)	113.1 (108.3, 116.6)	119.0 (118.3, 119.7)
mean(CI)	85.7 (75.2, 96.1)	109.0 (102.4, 115.5)	107.5 (101.0, 114.1)	119.8 (115.7, 123.9)	119.0 (117.0, 121.0)	119.1 (116.7, 121.5)	118.8 (109.4, 128.2)	111.8 (97.8, 125.9)	119.0 (101.2, 136.8)
BD (g*cm^{-3})									
min, max	0.074, 0.221	0.087, 0.643	0.068, 0.287	0.076, 0.241	0.086, 0.135	0.075, 0.169	0.103, 0.190	0.123, 0.199	0.133, 0.161
median(IQR)	0.135 (0.108, 0.146)	0.125 (0.109, 0.149)	0.102 (0.088, 0.128)	0.110 (0.104, 0.115)	0.113 (0.105, 0.118)	0.129 (0.115, 0.152)	0.156 (0.114, 0.174)	0.134 (0.127, 0.154)	0.147 (0.140, 0.154)
mean(CI)	0.132 (0.114, 0.149)	0.160 (0.097, 0.223)	0.128 (0.093, 0.163)	0.116 (0.097, 0.135)	0.111 (0.103, 0.119)	0.131 (0.117, 0.146)	0.150 (0.129, 0.171)	0.148 (0.092, 0.203)	0.147 (-0.032, 0.326)
PD (g*cm^{-3})									
min, max	1.467, 2.238	1.457, 2.400	1.453, 1.800	1.454, 1.848	1.451, 1.459	1.453, 1.486	1.454, 1.475	1.457, 1.716	1.459, 1.463
median(IQR)	1.480 (1.476, 1.487)	1.465 (1.461, 1.471)	1.458 (1.456, 1.464)	1.458 (1.456, 1.459)	1.458 (1.456, 1.459)	1.458 (1.456, 1.460)	1.464 (1.459, 1.469)	1.462 (1.459, 1.527)	1.461 (1.460, 1.462)
mean(CI)	1.525 (1.436, 1.613)	1.518 (1.409, 1.628)	1.493 (1.446, 1.540)	1.482 (1.430, 1.534)	1.457 (1.455, 1.458)	1.460 (1.456, 1.464)	1.464 (1.460, 1.469)	1.524 (1.321, 1.728)	1.461 (1.437, 1.484)
Porosity (vol %)									
min, max	87.6, 95.1	73.2, 94.1	83.0, 95.3	86.9, 94.8	90.7, 94.1	88.4, 94.8	87.0, 92.9	88.4, 91.6	89.0, 90.9
median(IQR)	90.9 (90.1, 92.7)	91.4 (89.9, 92.6)	93.0 (91.3, 93.9)	92.4 (92.1, 92.8)	92.3 (91.9, 92.8)	91.2 (89.6, 92.1)	89.3 (88.1, 92.2)	90.8 (90.0, 91.3)	90.0 (89.5, 90.4)
mean(CI)	91.4 (90.4, 92.3)	90.0 (87.6, 92.5)	91.6 (89.7, 93.5)	92.2 (91.4, 93.1)	92.4 (91.9, 92.9)	91.0 (90.0, 92.0)	89.8 (88.3, 91.2)	90.4 (88.2, 92.7)	90.0 (77.9, 102.1)
pH									
min, max	3.8, 4.6	3.7, 4.5	3.6, 4.7	3.9, 4.7	4.0, 4.8	4.0, 4.9	4.2, 5.0	4.8, 4.9	4.9, 5.0
median(IQR)	4.3 (4.1, 4.4)	4.2 (4.1, 4.3)	4.3 (4.0, 4.4)	4.3 (4.1, 4.6)	4.5 (4.3, 4.7)	4.5 (4.4, 4.7)	4.7 (4.5, 4.8)	4.8 (4.8, 4.8)	5.0 (4.9, 5.0)
mean(CI)	4.2 (4.1, 4.3)	4.2 (4.1, 4.3)	4.2 (4.1, 4.4)	4.4 (4.2, 4.5)	4.5 (4.3, 4.6)	4.5 (4.4, 4.7)	4.7 (4.5, 4.8)	4.8 (4.7, 4.9)	5.0 (4.0, 5.9)
EC (mS*cm^{-1})									
min, max	28.0, 113.9	31.9, 112.1	35.4, 102.9	33.8, 84.6	36.2, 76.3	38.0, 78.5	36.9, 76.7	35.7, 71.7	62.5, 71.1
median(IQR)	52.1 (39.2, 73.1)	71.8 (37.6, 85.9)	68.8 (43.2, 91.7)	61.7 (54.7, 71.8)	59.4 (43.9, 63.8)	55.8 (45.7, 68.5)	58.8 (46.6, 67.5)	68.1 (59.7, 69.2)	66.8 (64.7, 68.9)
mean(CI)	59.4 (47.6, 71.2)	67.4 (54.2, 80.6)	68.1 (56.0, 80.3)	61.8 (53.5, 70.0)	55.8 (48.5, 63.1)	57.2 (50.0, 64.5)	57.6 (49.3, 65.9)	60.9 (34.0, 87.7)	66.8 (12.2, 121.4)
von Post									
min, max	1, 9	4, 9	3, 9	4, 8	4, 9	5, 9	5, 10	5, 10	7, 8
median(IQR)	6 (4, 7)	6 (5, 7)	6 (5, 7)	6 (5, 7)	6 (4, 8)	7 (6, 8)	8 (6, 8)	8 (7, 8)	8 (7, 8)
mean(CI)	6 (5, 6)	6 (5, 7)	6 (5, 7)	6 (5, 7)	6 (5, 7)	7 (6, 8)	7 (6, 8)	8 (4, 11)	8 (1, 14)
OM (m %)									
min, max	34.06, 97.80	20.69, 98.56	70.23, 98.93	66.30, 98.88	98.45, 99.06	96.20, 98.92	97.12, 98.88	77.18, 98.56	98.13, 98.43
median(IQR)	96.65 (96.14, 97.02)	97.93 (97.44, 98.23)	98.54 (98.03, 98.65)	98.54 (98.44, 98.69)	98.53 (98.47, 98.69)	98.52 (98.31, 98.67)	97.98 (97.60, 98.41)	98.19 (92.81, 98.42)	98.28 (98.21, 98.36)
mean(CI)	93.02 (85.69, 100.34)	93.52 (84.47, 102.56)	95.62 (91.74, 99.51)	96.56 (92.26, 100.86)	98.61 (98.51, 98.72)	98.34 (97.98, 98.70)	97.98 (97.63, 98.34)	93.03 (76.21, 109.85)	98.28 (96.35, 100.21)
Ash (m %)									
min, max	2.20, 65.94	1.44, 79.31	1.07, 29.77	1.12, 33.70	0.94, 1.55	1.08, 3.80	1.12, 2.88	1.44, 22.82	1.57, 1.87
median(IQR)	3.35 (2.98, 3.86)	2.07 (1.77, 2.56)	1.46 (1.35, 1.97)	1.46 (1.31, 1.56)	1.47 (1.31, 1.53)	1.48 (1.33, 1.69)	2.02 (1.59, 2.40)	1.81 (1.58, 7.19)	1.72 (1.64, 1.79)
mean(CI)	6.98 (-0.34, 14.31)	6.48 (-2.56, 15.53)	4.38 (0.49, 8.26)	3.44 (-0.86, 7.74)	1.39 (1.28, 1.49)	1.66 (1.30, 2.02)	2.02 (1.66, 2.37)	6.97 (-9.85, 23.79)	1.72 (-0.21, 3.65)
Carbon (m %)									
min, max	52.90, 54.83	54.51, 56.38	55.94, 57.40	57.06, 58.76	57.06, 58.76	50.88, 60.72	50.47, 60.72	46.83, 60.72	60.44, 60.44
median(IQR)	54.46 (52.90, 54.83)	55.20 (54.51, 56.38)	56.62 (55.94, 57.40)	57.56 (57.06, 58.76)	57.56 (57.06, 58.76)	58.84 (58.84, 60.72)	59.78 (58.84, 60.72)	60.72 (57.25, 60.72)	60.44 (60.44, 60.44)
mean(CI)	54.06 (53.64, 54.49)	55.36 (54.97, 55.76)	56.65 (56.35, 56.96)	57.82 (57.41, 58.24)	57.84 (57.40, 58.28)	58.00 (55.90, 60.10)	59.08 (57.26, 60.91)	57.25 (46.20, 68.30)	60.44 (60.44, 60.44)
Nitrogen (m %)									
min, max	2.04, 2.56	2.11, 2.52	1.86, 2.35	1.47, 2.17	1.47, 2.17	1.33, 1.60	1.26, 1.60	1.43, 1.49	1.28, 1.28
median(IQR)	2.34 (2.04, 2.56)	2.19 (2.11, 2.52)	2.00 (1.86, 2.35)	1.64 (1.60, 2.17)	1.64 (1.64, 2.17)	1.49 (1.49, 1.60)	1.49 (1.49, 1.60)	1.49 (1.47, 1.49)	1.28 (1.28, 1.28)
mean(CI)	2.31 (2.20, 2.42)	2.27 (2.18, 2.36)	2.07 (1.96, 2.18)	1.80 (1.63, 1.96)	1.82 (1.65, 1.99)	1.50 (1.45, 1.56)	1.52 (1.45, 1.58)	1.48 (1.43, 1.52)	1.28 (1.28, 1.28)
Hydrogen (m %)									
min, max	5.42, 5.86	5.29, 5.87	5.21, 5.97	5.22, 5.97	5.22, 5.97	5.09, 5.59	5.59, 5.59	4.40, 5.59	5.34, 5.34
median(IQR)	5.61 (5.42, 5.86)	5.67 (5.29, 5.87)	5.73 (5.21, 5.97)	5.81 (5.22, 5.97)	5.81 (5.22, 5.97)	5.33 (5.33, 5.59)	5.46 (5.33, 5.59)	5.59 (5.29, 5.59)	5.34 (5.34, 5.34)
mean(CI)	5.63 (5.54, 5.72)	5.61 (5.49, 5.73)	5.64 (5.47, 5.80)	5.65 (5.46, 5.83)	5.64 (5.44, 5.84)	5.39 (5.28, 5.49)	5.43 (5.31, 5.55)	5.29 (4.35, 6.24)	5.34 (5.34, 5.34)
Sulfur (m %)									
min, max	0.31, 0.38	0.34, 0.64	0.27, 0.69	0.26, 0.63	0.26, 0.63	0.18, 0.44	0.22, 0.44	0.37, 0.44	0.36, 0.36
median(IQR)	0.35 (0.31, 0.38)	0.54 (0.34, 0.64)	0.64 (0.27, 0.69)	0.52 (0.46, 0.63)	0.52 (0.52, 0.63)	0.37 (0.37, 0.44)	0.37 (0.37, 0.44)	0.37 (0.37, 0.39)	0.36 (0.36, 0.36)
mean(CI)	0.35 (0.33, 0.36)	0.51 (0.44, 0.57)	0.53 (0.44, 0.63)	0.50 (0.42, 0.58)	0.51 (0.43, 0.59)	0.36 (0.31, 0.41)	0.39 (0.35, 0.43)	0.39 (0.33, 0.44)	0.36 (0.36, 0.36)
Oxygen (m %)									
min, max	32.90, 36.00	32.66, 35.14	32.09, 34.56	31.21, 33.92	31.21, 33.92	29.04, 31.85	25.27, 31.85	23.55, 30.05	30.92, 30.92
median(IQR)	33.95 (32.90, 36.00)	34.47 (32.66, 35.14)	33.97 (32.09, 34.56)	33.58 (31.21, 33.92)	33.58 (31.21, 33.92)	30.05 (30.05, 31.85)	30.05 (30.05, 31.85)	30.05 (28.43, 30.05)	30.92 (30.92, 30.92)
mean(CI)	34.28 (33.62, 34.94)	34.09 (33.55, 34.63)	33.54 (33.00, 34.08)	32.82 (32.13, 33.51)	32.77 (32.04, 33.50)	30.57 (29.93, 31.20)	30.40 (29.23, 31.58)	28.43 (23.25, 33.60)	30.92 (30.92, 30.92)

Depth **Properties**	**0-10 cm (N = 3, n = 18)**	**10-25 cm (N = 3, n = 18)**	**25-50 cm (N = 3, n = 18)**	**50-75 cm (N = 3, n = 16)**	**75-100 cm (N = 3, n = 15)**	**100-150 cm (N = 3, n = 15)**	**150-200 cm (N = 3, n = 12)**	**200-250 cm (N = 2, n = 4)**	**250-300 ,cm (N = 1, n = 2)**
WC (m %)									
min, max	83.2, 88.1	80.5, 91.7	87.0, 92.0	90.4, 92.4	90.6, 92.0	88.2, 90.6	85.9, 90.3	85.9, 89.9	89.4, 89.4
median(IQR)	86.5 (86.4, 87.7)	89.7 (87.1, 90.8)	91.5 (91.3, 92.0)	91.8 (91.2, 92.2)	91.5 (91.2, 91.8)	90.6 (89.5, 90.6)	88.8 (87.4, 89.6)	87.9 (86.9, 88.9)	89.4 (89.4, 89.4)
mean(CI)	86.0 (79.7, 92.4)	87.3 (72.5, 102.1)	90.2 (83.4, 97.0)	91.5 (88.9, 94.0)	91.3 (89.7, 93.0)	89.8 (86.3, 93.3)	88.4 (82.8, 94.1)	87.9 (62.4, 113.3)	89.4 (NaN, NaN)
WC (vol %)									
min, max	69.8, 93.8	96.8, 117.6	96.9, 119.6	120.0, 121.8	117.5, 120.3	117.7, 119.2	115.6, 119.0	112.5, 121.1	119.5, 119.5
median(IQR)	90.9 (79.1, 92.3)	113.0 (105.9, 115.2)	112.1 (102.8, 116.1)	122.3 (122.3, 122.6)	120.3 (119.6, 120.6)	118.2 (117.6, 118.8)	115.8 (115.6, 118.7)	117.0 (114.9, 119.0)	119.5 (119.5, 119.5)
mean(CI)	85.7 (51.5, 119.9)	109.0 (82.0, 136.0)	107.4 (79.0, 135.9)	120.9 (118.7, 123.2)	119.1 (115.5, 122.6)	118.7 (116.5, 120.8)	116.8 (112.0, 121.6)	116.8 (62.1, 171.5)	119.5 (NaN, NaN)
BD (g*cm^{-3})									
min, max	0.125, 0.141	0.101, 0.243	0.092, 0.149	0.098, 0.128	0.103, 0.123	0.124, 0.158	0.125, 0.190	0.127, 0.199	0.142, 0.142
median(IQR)	0.130 (0.121, 0.137)	0.135 (0.119, 0.157)	0.096 (0.090, 0.103)	0.111 (0.104, 0.117)	0.114 (0.107, 0.117)	0.125 (0.123, 0.141)	0.153 (0.131, 0.172)	0.163 (0.145, 0.181)	0.142 (0.142, 0.142)
mean(CI)	0.132 (0.111, 0.153)	0.160 (-0.024, 0.344)	0.118 (0.045, 0.190)	0.113 (0.075, 0.150)	0.113 (0.088, 0.139)	0.135 (0.087, 0.184)	0.154 (0.071, 0.237)	0.163 (-0.299, 0.625)	0.142 (NaN, NaN)
PD (g*cm^{-3})									
min, max	1.475, 1.609	1.463, 1.626	1.458, 1.529	1.456, 1.482	1.454, 1.458	1.456, 1.462	1.459, 1.467	1.459, 1.716	1.460, 1.460
median(IQR)	1.485 (1.481, 1.485)	1.465 (1.464, 1.469)	1.458 (1.457, 1.460)	1.456 (1.456, 1.457)	1.458 (1.455, 1.458)	1.458 (1.457, 1.459)	1.460 (1.459, 1.464)	1.587 (1.523, 1.652)	1.460 (1.460, 1.460)
mean(CI)	1.525 (1.341, 1.708)	1.518 (1.288, 1.749)	1.482 (1.381, 1.583)	1.465 (1.430, 1.500)	1.456 (1.451, 1.462)	1.459 (1.452, 1.466)	1.462 (1.453, 1.472)	1.587 (-0.047, 3.222)	1.460 (NaN, NaN)
Porosity (vol %)									
min, max	90.4, 92.1	86.3, 93.1	90.6, 93.7	91.4, 93.3	91.5, 92.9	89.2, 91.5	87.0, 91.5	88.4, 91.3	90.3, 90.3
median(IQR)	91.2 (90.7, 91.9)	90.8 (89.3, 91.8)	93.4 (92.9, 93.8)	92.4 (92.0, 92.9)	92.2 (91.9, 92.6)	91.4 (90.4, 91.6)	89.5 (88.3, 91.0)	89.9 (89.1, 90.6)	90.3 (90.3, 90.3)
mean(CI)	91.4 (89.2, 93.5)	90.0 (81.5, 98.6)	92.2 (88.3, 96.1)	92.3 (90.0, 94.6)	92.2 (90.5, 94.0)	90.7 (87.3, 94.1)	89.5 (83.9, 95.1)	89.9 (71.2, 108.5)	90.3 (NaN, NaN)
pH									
min, max	4.0, 4.4	3.9, 4.3	3.9, 4.5	4.0, 4.7	4.1, 4.7	4.1, 4.8	4.2, 4.9	4.8, 4.8	4.9, 4.9
median(IQR)	4.3 (4.1, 4.4)	4.3 (4.1, 4.3)	4.3 (4.1, 4.4)	4.3 (4.1, 4.5)	4.4 (4.3, 4.6)	4.5 (4.3, 4.6)	4.6 (4.4, 4.7)	4.8 (4.8, 4.8)	4.9 (4.9, 4.9)
mean(CI)	4.2 (3.7, 4.7)	4.2 (3.6, 4.7)	4.2 (3.5, 4.9)	4.3 (3.5, 5.1)	4.4 (3.6, 5.2)	4.5 (3.6, 5.3)	4.5 (3.7, 5.4)	4.8 (4.6, 5.0)	4.9 (NaN, NaN)
EC (mS*cm^{-1})									
min, max	39.5, 83.5	35.0, 93.5	39.2, 93.7	46.8, 81.7	42.5, 69.5	43.6, 71.7	44.3, 67.1	35.7, 69.6	65.4, 65.4
median(IQR)	51.1 (44.5, 63.9)	71.8 (53.0, 80.2)	68.9 (53.6, 80.7)	62.7 (53.9, 72.7)	62.8 (51.2, 66.1)	67.9 (56.1, 68.2)	65.3 (54.3, 66.8)	52.1 (43.9, 60.2)	65.4 (65.4, 65.4)
mean(CI)	59.4 (3.9, 114.9)	67.4 (-6.6, 141.3)	67.6 (-0.3, 135.6)	64.1 (20.7, 107.4)	58.1 (23.3, 92.9)	59.7 (23.7, 95.8)	58.9 (27.5, 90.3)	52.7 (-162.9, 268.3)	65.4 (NaN, NaN)
von Post									
min, max	4, 6	4, 7	4, 7	5, 7	4, 8	6, 8	6, 8	5, 8	8, 8
median(IQR)	6 (5, 6)	7 (6, 7)	6 (5, 6)	6 (6, 7)	6 (5, 7)	6 (6, 7)	6 (6, 7)	6 (6, 7)	8 (8, 8)
mean(CI)	6 (3, 8)	6 (3, 9)	6 (2, 10)	6 (3, 9)	6 (2, 11)	7 (3, 11)	7 (4, 10)	7 (-13, 26)	8 (NaN, NaN)
OM (m %)									
min, max	86.01, 97.09	84.65, 98.08	92.66, 98.55	96.56, 98.65	98.52, 98.85	98.21, 98.67	97.79, 98.41	77.18, 98.45	98.33, 98.33
median(IQR)	96.29 (96.25, 96.65)	97.91 (97.58, 98.04)	98.55 (98.35, 98.57)	98.65 (98.57, 98.67)	98.54 (98.51, 98.75)	98.51 (98.46, 98.60)	98.31 (98.05, 98.40)	87.82 (82.50, 93.14)	98.33 (98.33, 98.33)
mean(CI)	93.02 (77.87, 108.16)	93.52 (74.44, 112.60)	96.55 (88.18, 104.91)	97.91 (95.01, 100.80)	98.65 (98.22, 99.09)	98.42 (97.84, 98.99)	98.15 (97.36, 98.94)	87.81 (-47.27, 222.90)	98.33 (NaN, NaN)
Ash (m %)									
min, max	2.91, 13.99	1.92, 15.35	1.45, 7.34	1.35, 3.44	1.15, 1.48	1.33, 1.79	1.59, 2.21	1.55, 22.82	1.67, 1.67
median(IQR)	3.71 (3.35, 3.75)	2.09 (1.96, 2.42)	1.45 (1.43, 1.65)	1.35 (1.33, 1.43)	1.46 (1.25, 1.49)	1.49 (1.40, 1.54)	1.69 (1.60, 1.95)	12.18 (6.86, 17.50)	1.67 (1.67, 1.67)
mean(CI)	6.98 (-8.16, 22.13)	6.48 (-12.60, 25.56)	3.45 (-4.91, 11.82)	2.09 (-0.80, 4.99)	1.35 (0.91, 1.78)	1.58 (1.01, 2.16)	1.85 (1.06, 2.64)	12.19 (-122.90, 147.27)	1.67 (NaN, NaN)
Carbon (m %)									
min, max	52.90, 54.83	54.51, 56.38	55.94, 57.40	57.06, 58.76	57.06, 58.76	50.88, 60.72	50.47, 60.72	46.83, 60.72	60.44, 60.44
median(IQR)	54.46 (53.68, 54.64)	55.20 (54.86, 55.79)	56.62 (56.28, 57.01)	57.56 (57.31, 58.16)	57.56 (57.31, 58.16)	58.84 (54.86, 59.78)	58.84 (54.66, 59.78)	53.77 (50.30, 57.25)	60.44 (60.44, 60.44)
mean(CI)	54.06 (51.52, 56.61)	55.36 (53.01, 57.71)	56.65 (54.84, 58.47)	57.79 (55.62, 59.96)	57.79 (55.62, 59.96)	56.81 (43.84, 69.79)	56.68 (43.12, 70.23)	53.77 (-34.47, 142.02)	60.44 (NaN, NaN)
Nitrogen (m %)									
min, max	2.04, 2.56	2.11, 2.52	1.86, 2.35	1.47, 2.17	1.47, 2.17	1.33, 1.60	1.26, 1.60	1.43, 1.49	1.28, 1.28
median(IQR)	2.34 (2.19, 2.45)	2.19 (2.15, 2.35)	2.00 (1.93, 2.17)	1.64 (1.55, 1.90)	1.64 (1.55, 1.90)	1.49 (1.41, 1.54)	1.49 (1.38, 1.54)	1.46 (1.45, 1.47)	1.28 (1.28, 1.28)
mean(CI)	2.31 (1.66, 2.96)	2.27 (1.73, 2.81)	2.07 (1.44, 2.70)	1.76 (0.85, 2.67)	1.76 (0.85, 2.67)	1.47 (1.14, 1.81)	1.45 (1.02, 1.88)	1.46 (1.08, 1.84)	1.28 (NaN, NaN)
Hydrogen (m %)									
min, max	5.42, 5.86	5.29, 5.87	5.21, 5.97	5.22, 5.97	5.22, 5.97	5.09, 5.59	4.99, 5.59	4.40, 5.59	5.34, 5.34
median(IQR)	5.61 (5.52, 5.74)	5.67 (5.48, 5.77)	5.73 (5.47, 5.85)	5.81 (5.51, 5.89)	5.81 (5.51, 5.89)	5.33 (5.21, 5.46)	5.33 (5.16, 5.46)	5.00 (4.70, 5.29)	5.34 (5.34, 5.34)
mean(CI)	5.63 (5.08, 6.18)	5.61 (4.88, 6.34)	5.64 (4.67, 6.60)	5.67 (4.69, 6.65)	5.67 (4.69, 6.65)	5.34 (4.72, 5.96)	5.30 (4.56, 6.05)	5.00 (-2.57, 12.56)	5.34 (NaN, NaN)
Sulfur (m %)									
min, max	0.31, 0.38	0.34, 0.64	0.27, 0.69	0.26, 0.63	0.26, 0.63	0.18, 0.44	0.22, 0.44	0.37, 0.44	0.36, 0.36
median(IQR)	0.35 (0.33, 0.36)	0.54 (0.44, 0.59)	0.64 (0.46, 0.66)	0.52 (0.39, 0.57)	0.52 (0.39, 0.57)	0.37 (0.28, 0.40)	0.37 (0.29, 0.40)	0.40 (0.39, 0.42)	0.36 (0.36, 0.36)
mean(CI)	0.35 (0.26, 0.43)	0.51 (0.13, 0.89)	0.53 (-0.04, 1.10)	0.47 (-0.00, 0.94)	0.47 (-0.00, 0.94)	0.33 (-0.00, 0.66)	0.34 (0.06, 0.62)	0.40 (-0.04, 0.85)	0.36 (NaN, NaN)
Oxygen (m %)									
min, max	32.90, 36.00	32.66, 35.14	32.09, 34.56	31.21, 33.92	31.21, 33.92	29.04, 31.85	25.27, 31.85	23.55, 30.05	30.92, 30.92
median(IQR)	33.95 (33.42, 34.98)	34.47 (33.56, 34.80)	33.97 (33.03, 34.27)	33.58 (32.39, 33.75)	33.58 (32.39, 33.75)	30.05 (29.55, 30.95)	30.05 (27.66, 30.95)	26.80 (25.18, 28.43)	30.92 (30.92, 30.92)
mean(CI)	34.28 (30.37, 38.20)	34.09 (30.90, 37.28)	33.54 (30.34, 36.74)	32.90 (29.24, 36.57)	32.90 (29.24, 36.57)	30.31 (26.78, 33.85)	29.06 (20.61, 37.50)	26.80 (-14.50, 68.10)	30.92 (NaN, NaN)

Lowland blanket bogs – Natural

Depth Properties	0-10 cm (N = 17)	10-25 cm (N = 17)	25-50 cm (N = 17)	50-75 cm (N = 17)	75-100 cm (N = 17)	100-150 cm (N = 17)	150-200 cm (N = 16)	200-250 cm (N = 14)	250-300 cm (N = 10)	300-350 cm (N = 3)	350-400 cm (N = 2)	400-450 cm (N = 1)
WC (m %)												
min, max	88.6, 94.6	90.0, 95.1	90.3, 95.0	89.7, 94.4	91.2, 94.1	90.7, 93.3	89.8, 94.2	86.8, 93.4	88.7, 92.9	78.1, 91.0	87.5, 91.1	87.0, 87.0
median(IQR)	92.5 (90.7, 93.7)	92.9 (91.3, 94.3)	92.8 (92.0, 93.4)	92.6 (92.1, 93.5)	92.7 (92.5, 93.2)	92.2 (91.6, 92.9)	92.2 (91.8, 92.7)	91.6 (90.6, 92.1)	89.8 (89.3, 90.3)	89.9 (84.0, 90.5)	89.3 (88.4, 90.2)	87.0 (87.0, 87.0)
mean(CI)	92.2 (91.2, 93.2)	92.6 (91.8, 93.4)	92.8 (92.2, 93.4)	92.6 (92.0, 93.2)	92.7 (92.3, 93.1)	92.2 (91.8, 92.6)	92.2 (91.6, 92.8)	91.1 (90.0, 92.2)	90.1 (89.2, 91.1)	86.3 (68.5, 104.2)	89.3 (66.0, 112.6)	87.0 (NaN, NaN)
WC (vol %)												
min, max	21.2, 95.8	42.9, 123.4	55.2, 124.4	61.5, 126.2	65.7, 125.2	67.7, 280.9	54.6, 124.5	71.6, 124.4	51.6, 116.7	88.4, 107.0	113.7, 119.7	117.9, 117.9
median(IQR)	58.6 (46.2, 77.3)	88.3 (58.4, 116.9)	90.7 (67.9, 117.2)	93.8 (77.9, 122.1)	92.6 (84.6, 123.3)	122.4 (73.8, 195.6)	94.7 (82.8, 121.0)	93.2 (79.9, 116.4)	91.2 (81.0, 106.5)	104.3 (96.4, 105.6)	116.7 (115.2, 118.2)	117.9 (117.9, 117.9)
mean(CI)	62.6 (51.0, 74.2)	86.4 (70.6, 102.2)	90.1 (76.2, 103.9)	96.2 (84.2, 108.2)	99.6 (89.0, 110.2)	136.3 (101.0, 171.6)	98.1 (86.3, 109.9)	96.6 (85.6, 107.7)	91.2 (77.5, 104.9)	99.9 (75.0, 124.8)	116.7 (78.3, 155.1)	117.9 (NaN, NaN)
BD (g*cm^{-3})												
min, max	0.013, 0.123	0.024, 0.130	0.039, 0.108	0.043, 0.117	0.055, 0.115	0.059, 0.251	0.052, 0.134	0.062, 0.157	0.055, 0.138	0.087, 0.293	0.117, 0.163	0.177, 0.177
median(IQR)	0.046 (0.035, 0.062)	0.060 (0.040, 0.112)	0.062 (0.049, 0.093)	0.070 (0.057, 0.100)	0.070 (0.060, 0.096)	0.093 (0.075, 0.155)	0.076 (0.064, 0.101)	0.086 (0.068, 0.123)	0.100 (0.081, 0.123)	0.120 (0.104, 0.206)	0.140 (0.128, 0.151)	0.177 (0.177, 0.177)
mean(CI)	0.056 (0.040, 0.073)	0.073 (0.053, 0.093)	0.071 (0.057, 0.084)	0.077 (0.065, 0.090)	0.079 (0.069, 0.090)	0.114 (0.085, 0.142)	0.084 (0.070, 0.098)	0.096 (0.077, 0.114)	0.100 (0.081, 0.119)	0.167 (-0.108, 0.441)	0.140 (-0.155, 0.435)	0.177 (NaN, NaN)
PD (g*cm^{-3})												
min, max	1.464, 1.488	1.461, 1.479	1.457, 1.478	1.454, 1.468	1.454, 1.467	1.455, 1.472	1.456, 1.474	1.455, 1.468	1.460, 1.497	1.466, 1.692	1.508, 1.642	1.730, 1.730
median(IQR)	1.477 (1.472, 1.479)	1.467 (1.465, 1.471)	1.464 (1.460, 1.467)	1.463 (1.459, 1.465)	1.461 (1.458, 1.463)	1.461 (1.458, 1.463)	1.462 (1.458, 1.465)	1.461 (1.460, 1.465)	1.465 (1.462, 1.469)	1.494 (1.480, 1.593)	1.575 (1.542, 1.609)	1.730 (1.730, 1.730)
mean(CI)	1.476 (1.473, 1.479)	1.468 (1.466, 1.471)	1.464 (1.461, 1.467)	1.462 (1.460, 1.464)	1.461 (1.459, 1.463)	1.461 (1.459, 1.463)	1.463 (1.460, 1.466)	1.462 (1.460, 1.464)	1.468 (1.460, 1.476)	1.551 (1.244, 1.857)	1.575 (0.725, 2.425)	1.730 (NaN, NaN)
Porosity (vol %)												
min, max	91.6, 99.1	91.1, 98.4	92.6, 97.3	92.0, 97.1	92.1, 96.2	82.8, 95.9	90.9, 96.5	89.3, 95.8	90.6, 96.2	82.7, 94.1	90.1, 92.3	89.8, 89.8
median(IQR)	96.8 (95.8, 97.6)	95.9 (92.4, 97.3)	95.8 (93.6, 96.7)	95.2 (93.1, 96.1)	95.2 (93.5, 95.9)	93.6 (89.4, 94.8)	94.8 (93.1, 95.6)	94.1 (91.6, 95.4)	93.2 (91.7, 94.5)	92.0 (87.3, 93.0)	91.2 (90.6, 91.7)	89.8 (89.8, 89.8)
mean(CI)	96.2 (95.1, 97.3)	95.0 (93.6, 96.4)	95.2 (94.3, 96.1)	94.7 (93.9, 95.6)	94.6 (93.9, 95.3)	92.2 (90.2, 94.2)	94.3 (93.3, 95.2)	93.5 (92.2, 94.8)	93.2 (91.9, 94.5)	89.6 (74.5, 104.6)	91.2 (77.2, 105.1)	89.8 (NaN, NaN)
pH												
min, max	4.4, 5.0	4.3, 4.8	4.3, 4.8	4.4, 4.9	4.5, 5.0	4.5, 5.0	4.7, 5.1	4.7, 5.2	4.9, 5.2	4.9, 5.1	4.9, 5.1	5.2, 5.2
median(IQR)	4.6 (4.5, 4.6)	4.5 (4.4, 4.6)	4.5 (4.5, 4.7)	4.6 (4.5, 4.8)	4.7 (4.6, 4.8)	4.8 (4.7, 4.9)	4.9 (4.8, 5.0)	5.0 (4.9, 5.0)	9; 5.0 (5.0, 5.1)	4.9 (4.9, 5.0)	5.0 (4.9, 5.1)	5.2 (5.2, 5.2)
mean(CI)	4.6 (4.5, 4.7)	4.5 (4.4, 4.6)	4.5 (4.5, 4.6)	4.6 (4.6, 4.7)	4.7 (4.7, 4.8)	4.8 (4.7, 4.9)	4.9 (4.8, 5.0)	4.9 (4.9, 5.0)	5.0 (4.9, 5.1)	5.0 (4.7, 5.3)	5.0 (3.5, 6.5)	5.2 (NaN, NaN)
EC (mS*cm^{-1})												
min, max	31.8, 71.7	46.3, 96.6	37.3, 111.5	44.9, 93.7	41.3, 91.1	42.6, 83.6	46.5, 77.6	48.2, 70.5	48.9, 75.8	57.3, 62.7	62.1, 63.8	48.7, 48.7
median(IQR)	48.1 (42.2, 63.3)	60.6 (54.6, 66.1)	70.3 (54.6, 82.6)	68.3 (54.1, 83.3)	16; 55.5 (48.9, 69.0)	62.0 (55.1, 74.3)	61.5 (54.9, 64.2)	58.2 (56.9, 63.7)	62.9 (59.9, 66.9)	58.6 (58.0, 60.7)	63.0 (62.5, 63.4)	48.7 (48.7, 48.7)
mean(CI)	51.7 (45.2, 58.2)	62.8 (56.8, 68.9)	70.5 (61.2, 79.8)	67.2 (58.9, 75.5)	58.7 (51.0, 66.4)	63.0 (56.9, 69.2)	60.0 (55.7, 64.3)	59.9 (56.4, 63.5)	63.7 (58.1, 69.4)	59.5 (52.5, 66.5)	63.0 (52.1, 73.8)	48.7 (NaN, NaN)
von Post												
min, max	2, 6	3, 6	4, 7	4, 7	4, 6	4, 8	5, 8	5, 8	7, 8	7, 9	7, 8	8, 8
median(IQR)	4 (3, 4)	4 (4, 5)	5 (5, 6)	5 (5, 6)	5 (5, 6)	16; 6 (5, 7)	7 (5, 7)	6 (5, 7)	9; 7 (7, 8)	8 (8, 8)	8 (7, 8)	8 (8, 8)
mean(CI)	4 (3, 4)	4 (4, 5)	5 (5, 6)	6 (5, 6)	5 (5, 6)	6 (6, 7)	6 (6, 7)	6 (6, 7)	7 (7, 8)	8 (6, 10)	8 (1, 14)	8 (NaN, NaN)
OM (m %)												
min, max	96.05, 98.05	96.77, 98.24	96.90, 98.56	97.65, 98.86	97.81, 98.82	97.35, 98.73	97.20, 98.65	97.65, 98.74	95.26, 98.37	79.14, 97.88	83.29, 94.34	76.06, 76.06
median(IQR)	96.97 (96.81, 97.32)	97.77 (97.45, 97.95)	98.01 (97.80, 98.34)	98.13 (97.97, 98.45)	98.26 (98.08, 98.52)	98.25 (98.10, 98.48)	98.21 (97.97, 98.48)	98.25 (97.93, 98.38)	97.96 (97.63, 98.20)	95.51 (87.33, 96.70)	88.81 (86.05, 91.58)	76.06 (76.06, 76.06)
mean(CI)	97.05 (96.82, 97.29)	97.66 (97.44, 97.88)	98.01 (97.79, 98.24)	98.16 (97.99, 98.33)	98.29 (98.13, 98.44)	98.26 (98.10, 98.43)	98.13 (97.89, 98.38)	98.16 (97.98, 98.35)	97.66 (97.01, 98.32)	90.85 (65.50, 116.19)	88.81 (18.57, 159.06)	76.06 (NaN, NaN)
Ash (m %)												
min, max	1.95, 3.95	1.76, 3.23	1.44, 3.10	1.14, 2.35	1.18, 2.19	1.27, 2.65	1.35, 2.80	1.26, 2.35	1.63, 4.74	2.12, 20.86	5.66, 16.71	23.94, 23.94
median(IQR)	3.03 (2.68, 3.19)	2.23 (2.05, 2.55)	1.99 (1.66, 2.20)	1.87 (1.55, 2.03)	1.74 (1.48, 1.92)	1.75 (1.52, 1.90)	1.79 (1.52, 2.03)	1.75 (1.62, 2.07)	2.04 (1.80, 2.37)	4.49 (3.30, 12.67)	11.19 (8.42, 13.95)	23.94 (23.94, 23.94)
mean(CI)	2.95 (2.71, 3.18)	2.34 (2.12, 2.56)	1.99 (1.76, 2.21)	1.84 (1.67, 2.01)	1.71 (1.56, 1.87)	1.74 (1.57, 1.90)	1.87 (1.62, 2.11)	1.84 (1.65, 2.02)	2.34 (1.68, 2.99)	9.15 (-16.19, 34.50)	11.19 (-59.06, 81.43)	23.94 (NaN, NaN)
Carbon (m %)												
min, max	51.44, 52.35	52.83, 54.94	54.47, 57.23	56.11, 58.11	56.11, 58.11	57.07, 58.95	57.07, 58.95	57.07, 58.95	57.07, 61.79	57.07, 57.07	57.07, 57.07	42.14, 42.14
median(IQR)	51.56 (51.44, 52.35)	53.16 (52.83, 54.94)	54.76 (54.47, 57.23)	56.13 (56.11, 58.11)	56.13 (56.11, 58.11)	58.25 (57.07, 58.95)	58.25 (57.95, 58.95)	58.25 (57.37, 58.78)	61.26 (58.12, 61.26)	57.07 (57.07, 57.07)	57.07 (57.07, 57.07)	42.14 (42.14, 42.14)
mean(CI)	51.80 (51.59, 52.02)	53.67 (53.17, 54.17)	55.55 (54.88, 56.21)	56.82 (56.32, 57.33)	56.82 (56.32, 57.33)	58.15 (57.75, 58.55)	58.22 (57.82, 58.62)	58.11 (57.68, 58.54)	60.06 (58.58, 61.53)	57.07 (57.07, 57.07)	57.07 (57.07, 57.07)	42.14 (NaN, NaN)
Nitrogen (m %)												
min, max	1.83, 2.09	2.25, 2.50	2.28, 2.47	2.07, 2.45	2.07, 2.45	1.56, 2.12	1.56, 2.12	1.56, 2.12	1.34, 1.84	1.84, 1.84	1.84, 1.84	2.02, 2.02
median(IQR)	1.85 (1.83, 2.09)	2.48 (2.25, 2.50)	2.46 (2.28, 2.47)	2.16 (2.07, 2.45)	2.16 (2.07, 2.45)	1.84 (1.56, 2.12)	1.84 (1.56, 2.12)	1.84 (1.63, 2.12)	1.74 (1.74, 1.82)	1.84 (1.84, 1.84)	1.84 (1.84, 1.84)	2.02 (2.02, 2.02)
mean(CI)	1.91 (1.85, 1.97)	2.42 (2.36, 2.48)	2.40 (2.35, 2.45)	2.23 (2.14, 2.32)	2.23 (2.14, 2.32)	1.84 (1.72, 1.96)	1.84 (1.71, 1.97)	1.88 (1.74, 2.02)	1.73 (1.63, 1.83)	1.84 (1.84, 1.84)	1.84 (1.84, 1.84)	2.02 (NaN, NaN)
Hydrogen (m %)												
min, max	5.49, 5.74	5.66, 5.74	5.66, 5.83	5.63, 5.77	5.63, 5.77	5.50, 5.84	5.50, 5.84	5.50, 5.84	5.58, 6.24	5.58, 5.58	5.58, 5.58	4.77, 4.77
median(IQR)	5.67 (5.49, 5.74)	5.72 (5.66, 5.74)	5.67 (5.66, 5.83)	5.70 (5.63, 5.77)	5.70 (5.63, 5.77)	5.58 (5.50, 5.84)	5.58 (5.50, 5.84)	5.58 (5.52, 5.84)	6.24 (5.65, 6.24)	5.58 (5.58, 5.58)	5.58 (5.58, 5.58)	4.77 (4.77, 4.77)
mean(CI)	5.63 (5.57, 5.69)	5.71 (5.69, 5.73)	5.72 (5.68, 5.76)	5.70 (5.67, 5.73)	5.70 (5.67, 5.73)	5.64 (5.56, 5.72)	5.65 (5.56, 5.73)	5.67 (5.58, 5.76)	6.00 (5.78, 6.23)	5.58 (5.58, 5.58)	5.58 (5.58, 5.58)	4.77 (NaN, NaN)
Sulfur (m %)												
min, max	0.24, 0.50	0.42, 0.52	0.64, 0.82	0.72, 1.03	0.72, 1.03	0.74, 0.90	0.74, 0.90	0.74, 0.90	0.65, 0.80	0.80, 0.80	0.80, 0.80	1.19, 1.19
median(IQR)	0.29 (0.24, 0.50)	0.51 (0.42, 0.52)	0.65 (0.64, 0.82)	0.82 (0.72, 1.03)	0.82 (0.72, 1.03)	0.80 (0.74, 0.90)	0.80 (0.74, 0.90)	0.80 (0.74, 0.88)	0.65 (0.65, 0.79)	0.80 (0.80, 0.80)	0.80 (0.80, 0.80)	1.19 (1.19, 1.19)
mean(CI)	0.33 (0.28, 0.39)	0.48 (0.46, 0.51)	0.71 (0.66, 0.75)	0.86 (0.80, 0.93)	0.86 (0.80, 0.93)	0.81 (0.78, 0.85)	0.82 (0.78, 0.85)	0.80 (0.76, 0.84)	0.71 (0.65, 0.76)	0.80 (0.80, 0.80)	0.80 (0.80, 0.80)	1.19 (NaN, NaN)
Oxygen (m %)												
min, max	37.04, 37.95	33.94, 36.27	32.26, 34.47	31.30, 33.73	31.30, 33.73	30.99, 31.31	30.99, 31.31	30.99, 31.31	27.53, 30.99	30.99, 30.99	30.99, 30.99	27.70, 27.70
median(IQR)	37.37 (37.04, 37.95)	35.97 (33.94, 36.27)	33.94 (32.26, 34.47)	32.79 (31.30, 33.73)	32.79 (31.30, 33.73)	31.14 (30.99, 31.31)	31.14 (31.10, 31.31)	31.14 (31.03, 31.31)	27.53 (27.53, 30.23)	30.99 (30.99, 30.99)	30.99 (30.99, 30.99)	27.70 (27.70, 27.70)
mean(CI)	37.46 (37.25, 37.66)	35.34 (34.79, 35.89)	33.50 (33.00, 34.00)	32.54 (32.02, 33.07)	32.54 (32.02, 33.07)	31.16 (31.09, 31.22)	31.17 (31.10, 31.24)	31.17 (31.09, 31.25)	28.61 (27.43, 29.79)	30.99 (30.99, 30.99)	30.99 (30.99, 30.99)	27.70 (NaN, NaN)

Depth Properties	0-10 cm (N = 3, n = 17)	10-25 cm (N = 3, n = 17)	25-50 cm (N = 3, n = 17)	50-75 cm (N = 3, n = 17)	75-100 cm (N = 3, n = 17)	100-150 cm (N = 3, n = 17)	150-200 cm (N = 3, n = 16)	200-250 cm (N = 3, n = 14)	250-300 cm (N = 3, n = 10)	300-350 cm (N = 1, n = 3)	350-400 cm (N = 1, n = 2)	400-450 cm (N = 1, n = 1)
WC (m %)												
min, max	90.6, 93.7	91.0, 93.6	92.4, 93.7	92.4, 93.1	92.5, 93.1	91.4, 92.8	91.5, 92.6	90.0, 92.5	90.1, 90.3	89.3, 89.3	88.8, 88.8	87.0, 87.0
median(IQR)	93.1 (91.8, 93.6)	93.1 (92.1, 93.5)	92.7 (92.6, 93.2)	92.4 (92.4, 93.2)	92.8 (92.7, 93.0)	92.3 (91.9, 92.6)	92.2 (92.0, 92.3)	90.6 (90.6, 91.5)	90.1 (89.7, 90.2)	90.4 (90.4, 90.4)	88.8 (88.8, 88.8)	87.0 (87.0, 87.0)
mean(CI)	92.3 (88.4, 96.2)	92.6 (89.2, 96.1)	92.8 (91.0, 94.6)	92.7 (91.6, 93.7)	92.7 (91.7, 93.7)	92.2 (90.3, 94.0)	92.2 (90.7, 93.7)	91.0 (87.7, 94.4)	90.2 (89.9, 90.5)	89.3 (NaN, NaN)	88.8 (NaN, NaN)	87.0 (NaN, NaN)
WC (vol %)												
min, max	47.9, 85.1	64.8, 119.6	67.0, 120.8	78.1, 123.0	80.9, 124.4	72.9, 231.2	77.9, 122.2	86.8, 121.1	79.4, 116.7	98.3, 98.3	116.0, 116.0	117.9, 117.9
median(IQR)	58.6 (52.6, 75.7)	62.1 (61.8, 91.2)	78.4 (70.7, 100.1)	82.2 (80.0, 102.3)	92.6 (88.6, 108.7)	122.5 (97.9, 179.7)	90.3 (84.1, 106.4)	91.1 (86.0, 106.2)	99.9 (90.5, 108.3)	104.3 (104.3, 104.3)	116.0 (116.0, 116.0)	117.9 (117.9, 117.9)
mean(CI)	62.1 (12.0, 112.1)	85.6 (11.9, 159.4)	89.6 (20.3, 158.9)	95.6 (36.0, 155.2)	99.2 (43.1, 155.3)	141.6 (-60.0, 343.2)	97.4 (41.2, 153.6)	98.4 (49.4, 147.4)	99.3 (52.7, 145.9)	98.3 (NaN, NaN)	116.0 (NaN, NaN)	117.9 (NaN, NaN)
BD (g*cm^{-3})												
min, max	0.036, 0.090	0.043, 0.118	0.054, 0.099	0.063, 0.102	0.066, 0.101	0.069, 0.191	0.061, 0.113	0.069, 0.127	0.086, 0.128	0.121, 0.121	0.146, 0.146	0.177, 0.177
median(IQR)	0.037 (0.037, 0.069)	0.046 (0.043, 0.080)	0.055 (0.048, 0.076)	0.062 (0.057, 0.082)	0.068 (0.064, 0.082)	0.093 (0.081, 0.139)	0.076 (0.070, 0.093)	0.095 (0.081, 0.111)	0.114 (0.099, 0.121)	0.107 (0.107, 0.107)	0.146 (0.146, 0.146)	0.177 (0.177, 0.177)
mean(CI)	0.055 (-0.021, 0.131)	0.072 (-0.027, 0.171)	0.070 (0.007, 0.132)	0.076 (0.022, 0.131)	0.079 (0.029, 0.128)	0.118 (-0.041, 0.277)	0.083 (0.015, 0.150)	0.098 (0.027, 0.170)	0.108 (0.055, 0.161)	0.121 (NaN, NaN)	0.146 (NaN, NaN)	0.177 (NaN, NaN)
PD (g*cm^{-3})												
min, max	1.473, 1.478	1.465, 1.471	1.461, 1.467	1.459, 1.465	1.458, 1.463	1.459, 1.462	1.459, 1.468	1.460, 1.466	1.462, 1.471	1.499, 1.499	1.592, 1.592	1.730, 1.730
median(IQR)	1.476 (1.475, 1.478)	1.468 (1.467, 1.469)	1.460 (1.460, 1.464)	1.460 (1.460, 1.462)	1.460 (1.458, 1.462)	1.460 (1.459, 1.461)	1.459 (1.459, 1.464)	1.461 (1.460, 1.464)	1.466 (1.464, 1.467)	1.483 (1.483, 1.483)	1.592 (1.592, 1.592)	1.730 (1.730, 1.730)
mean(CI)	1.476 (1.470, 1.482)	1.468 (1.461, 1.475)	1.464 (1.456, 1.472)	1.462 (1.456, 1.469)	1.461 (1.454, 1.467)	1.461 (1.457, 1.465)	1.462 (1.450, 1.474)	1.462 (1.454, 1.471)	1.466 (1.454, 1.478)	1.499 (NaN, NaN)	1.592 (NaN, NaN)	1.730 (NaN, NaN)
Porosity (vol %)												
min, max	93.9, 97.6	92.0, 97.1	93.2, 96.3	93.0, 95.7	93.0, 95.5	86.9, 95.3	92.3, 95.8	91.4, 95.2	91.3, 94.2	92.1, 92.1	90.9, 90.9	89.8, 89.8
median(IQR)	97.5 (95.3, 97.5)	96.9 (94.5, 97.1)	96.3 (94.8, 96.7)	95.7 (94.4, 96.1)	95.3 (94.4, 95.6)	93.6 (90.5, 94.4)	94.8 (93.7, 95.2)	93.5 (92.4, 94.4)	92.2 (91.7, 93.2)	92.8 (92.8, 92.8)	90.9 (90.9, 90.9)	89.8 (89.8, 89.8)
mean(CI)	96.3 (91.1, 101.4)	95.1 (88.3, 101.8)	95.2 (90.9, 99.5)	94.8 (91.1, 98.5)	94.6 (91.2, 98.0)	91.9 (81.0, 102.9)	94.4 (89.8, 98.9)	93.3 (88.4, 98.1)	92.6 (89.0, 96.3)	92.1 (NaN, NaN)	90.9 (NaN, NaN)	89.8 (NaN, NaN)
pH												
min, max	4.5, 4.8	4.4, 4.6	4.4, 4.7	4.5, 4.8	4.6, 4.9	4.7, 4.9	4.8, 5.0	4.8, 5.0	4.9, 5.1	5.0, 5.0	5.0, 5.0	5.2, 5.2
median(IQR)	4.6 (4.6, 4.7)	4.4 (4.4, 4.5)	4.5 (4.4, 4.6)	4.6 (4.5, 4.7)	4.7 (4.7, 4.8)	4.8 (4.7, 4.8)	4.9 (4.8, 5.0)	4.9 (4.9, 4.9)	5.0 (5.0, 5.1)	4.9 (4.9, 4.9)	5.0 (5.0, 5.0)	5.2 (5.2, 5.2)
mean(CI)	4.6 (4.3, 5.0)	4.5 (4.3, 4.7)	4.5 (4.3, 4.8)	4.6 (4.3, 5.0)	4.7 (4.4, 5.0)	4.8 (4.5, 5.1)	4.9 (4.6, 5.2)	4.9 (4.6, 5.2)	5.0 (4.8, 5.2)	5.0 (NaN, NaN)	5.0 (NaN, NaN)	5.2 (NaN, NaN)
EC (mS*cm^{-1})												
min, max	46.2, 61.4	60.2, 67.5	62.1, 85.1	56.8, 85.0	47.7, 74.5	55.7, 75.9	53.6, 62.9	58.5, 64.7	59.5, 65.5	58.4, 58.4	62.7, 62.7	48.7, 48.7
median(IQR)	46.9 (44.5, 55.4)	59.4 (58.6, 61.4)	65.9 (63.1, 74.3)	56.7 (56.6, 71.4)	56.7 (52.5, 66.2)	56.7 (56.5, 65.8)	62.2 (57.0, 62.3)	60.0 (58.7, 64.7)	62.5 (62.1, 63.2)	58.1 (58.1, 58.1)	62.7 (62.7, 62.7)	48.7 (48.7, 48.7)
mean(CI)	52.3 (32.2, 72.3)	62.7 (52.5, 73.0)	70.1 (37.8, 102.3)	66.6 (26.9, 106.3)	59.5 (25.5, 93.4)	62.6 (34.0, 91.3)	59.3 (46.8, 71.8)	61.1 (53.0, 69.1)	63.0 (55.3, 70.7)	58.4 (NaN, NaN)	62.7 (NaN, NaN)	48.7 (NaN, NaN)
von Post												
min, max	3, 4	4, 5	5, 6	5, 6	5, 6	6, 7	6, 7	5, 7	7, 8	8, 8	7, 7	8, 8
median(IQR)	4 (4, 4)	4 (4, 4)	5 (5, 5)	5 (5, 6)	5 (5, 6)	6 (6, 7)	7 (6, 7)	6 (6, 7)	7 (7, 7)	8 (8, 8)	7 (7, 7)	8 (8, 8)
mean(CI)	4 (3, 5)	4 (3, 6)	5 (5, 6)	6 (4, 7)	5 (5, 6)	6 (5, 8)	6 (5, 8)	6 (4, 9)	7 (7, 8)	8 (NaN, NaN)	7 (NaN, NaN)	8 (NaN, NaN)
OM (m %)												
min, max	96.89, 97.27	97.48, 97.94	97.73, 98.29	97.96, 98.39	98.07, 98.49	98.19, 98.43	97.70, 98.39	97.81, 98.32	97.42, 98.22	95.10, 95.10	87.43, 87.43	76.06, 76.06
median(IQR)	97.00 (96.89, 97.08)	97.69 (97.64, 97.81)	98.32 (98.04, 98.35)	98.31 (98.14, 98.33)	98.36 (98.22, 98.48)	98.31 (98.25, 98.46)	98.39 (98.04, 98.41)	98.30 (98.06, 98.32)	97.86 (97.75, 98.04)	96.46 (96.46, 96.46)	87.43 (87.43, 87.43)	76.06 (76.06, 76.06)
mean(CI)	97.05 (96.55, 97.55)	97.67 (97.08, 98.26)	98.01 (97.32, 98.71)	98.18 (97.64, 98.71)	98.30 (97.77, 98.83)	98.27 (97.95, 98.60)	98.16 (97.17, 99.16)	98.15 (97.43, 98.86)	97.83 (96.84, 98.82)	95.10 (NaN, NaN)	87.43 (NaN, NaN)	76.06 (NaN, NaN)
Ash (m %)												
min, max	2.73, 3.11	2.06, 2.52	1.71, 2.27	1.61, 2.04	1.51, 1.93	1.57, 1.81	1.61, 2.30	1.68, 2.19	1.78, 2.58	4.90, 4.90	12.57, 12.57	23.94, 23.94
median(IQR)	3.00 (2.92, 3.11)	2.31 (2.19, 2.36)	1.68 (1.65, 1.96)	1.69 (1.67, 1.86)	1.64 (1.52, 1.78)	1.69 (1.54, 1.75)	1.61 (1.59, 1.96)	1.70 (1.68, 1.94)	2.14 (1.96, 2.25)	3.54 (3.54, 3.54)	12.57 (12.57, 12.57)	23.94 (23.94, 23.94)
mean(CI)	2.95 (2.45, 3.45)	2.33 (1.74, 2.92)	1.99 (1.29, 2.68)	1.82 (1.29, 2.36)	1.70 (1.17, 2.23)	1.73 (1.40, 2.05)	1.84 (0.84, 2.83)	1.85 (1.14, 2.57)	2.17 (1.18, 3.16)	4.90 (NaN, NaN)	12.57 (NaN, NaN)	23.94 (NaN, NaN)
Carbon (m %)												
min, max	51.44, 52.35	52.83, 54.94	54.47, 57.23	56.11, 58.11	56.11, 58.11	57.07, 58.95	57.07, 58.95	57.07, 58.95	57.07, 61.79	57.07, 57.07	57.07, 57.07	42.14, 42.14
median(IQR)	51.56 (51.50, 51.95)	53.16 (52.99, 54.05)	54.76 (54.61, 55.99)	56.13 (56.12, 57.12)	56.13 (56.12, 57.12)	58.25 (57.66, 58.60)	58.25 (57.66, 58.60)	58.25 (57.66, 58.60)	61.26 (59.16, 61.52)	57.07 (57.07, 57.07)	57.07 (57.07, 57.07)	42.14 (42.14, 42.14)
mean(CI)	51.78 (50.56, 53.01)	53.64 (50.82, 56.46)	55.49 (51.72, 59.25)	56.78 (53.93, 59.64)	56.78 (53.93, 59.64)	58.09 (55.73, 60.45)	58.09 (55.73, 60.45)	58.09 (55.73, 60.45)	60.04 (53.62, 66.46)	57.07 (NaN, NaN)	57.07 (NaN, NaN)	42.14 (NaN, NaN)
Nitrogen (m %)												
min, max	1.83, 2.09	2.25, 2.50	2.28, 2.47	2.07, 2.45	2.07, 2.45	1.56, 2.12	1.56, 2.12	1.56, 2.12	1.34, 1.84	1.84, 1.84	1.84, 1.84	2.02, 2.02
median(IQR)	1.85 (1.84, 1.97)	2.48 (2.37, 2.49)	2.46 (2.37, 2.46)	2.16 (2.12, 2.31)	2.16 (2.12, 2.31)	1.84 (1.70, 1.98)	1.84 (1.70, 1.98)	1.84 (1.70, 1.98)	1.74 (1.54, 1.79)	1.84 (1.84, 1.84)	1.84 (1.84, 1.84)	2.02 (2.02, 2.02)
mean(CI)	1.92 (1.56, 2.28)	2.41 (2.06, 2.76)	2.40 (2.14, 2.67)	2.23 (1.73, 2.72)	2.23 (1.73, 2.72)	1.84 (1.14, 2.54)	1.84 (1.14, 2.54)	1.84 (1.14, 2.54)	1.64 (0.98, 2.30)	1.84 (NaN, NaN)	1.84 (NaN, NaN)	2.02 (NaN, NaN)
Hydrogen (m %)												
min, max	5.49, 5.74	5.66, 5.74	5.66, 5.83	5.63, 5.77	5.63, 5.77	5.50, 5.84	5.50, 5.84	5.50, 5.84	5.58, 6.24	5.58, 5.58	5.58, 5.58	4.77, 4.77
median(IQR)	5.67 (5.58, 5.71)	5.72 (5.69, 5.73)	5.67 (5.66, 5.75)	5.70 (5.66, 5.73)	5.70 (5.66, 5.73)	5.58 (5.54, 5.71)	5.58 (5.54, 5.71)	5.58 (5.54, 5.71)	5.85 (5.71, 6.04)	5.58 (5.58, 5.58)	5.58 (5.58, 5.58)	4.77 (4.77, 4.77)
mean(CI)	5.63 (5.31, 5.95)	5.71 (5.60, 5.81)	5.72 (5.48, 5.96)	5.70 (5.53, 5.87)	5.70 (5.53, 5.87)	5.64 (5.20, 6.08)	5.64 (5.20, 6.08)	5.64 (5.20, 6.08)	5.89 (5.07, 6.71)	5.58 (NaN, NaN)	5.58 (NaN, NaN)	4.77 (NaN, NaN)
Sulfur (m %)												
min, max	0.24, 0.50	0.42, 0.52	0.64, 0.82	0.72, 1.03	0.72, 1.03	0.74, 0.90	0.74, 0.90	0.74, 0.90	0.65, 0.80	0.80, 0.80	0.80, 0.80	1.19, 1.19
median(IQR)	0.29 (0.26, 0.40)	0.51 (0.46, 0.52)	0.65 (0.64, 0.73)	0.82 (0.77, 0.92)	0.82 (0.77, 0.92)	0.80 (0.77, 0.85)	0.80 (0.77, 0.85)	0.80 (0.77, 0.85)	0.75 (0.70, 0.78)	0.80 (0.80, 0.80)	0.80 (0.80, 0.80)	1.19 (1.19, 1.19)
mean(CI)	0.34 (0.00, 0.69)	0.48 (0.35, 0.62)	0.70 (0.45, 0.95)	0.86 (0.46, 1.25)	0.86 (0.46, 1.25)	0.81 (0.61, 1.01)	0.81 (0.61, 1.01)	0.81 (0.61, 1.01)	0.73 (0.54, 0.92)	0.80 (NaN, NaN)	0.80 (NaN, NaN)	1.19 (NaN, NaN)
Oxygen (m %)												
min, max	37.04, 37.95	33.94, 36.27	32.26, 34.47	31.30, 33.73	31.30, 33.73	30.99, 31.31	30.99, 31.31	30.99, 31.31	27.53, 30.99	30.99, 30.99	30.99, 30.99	27.70, 27.70
median(IQR)	37.37 (37.20, 37.66)	35.97 (34.95, 36.12)	33.94 (33.10, 34.20)	32.79 (32.05, 33.26)	32.79 (32.05, 33.26)	31.14 (31.06, 31.23)	31.14 (31.06, 31.23)	31.14 (31.06, 31.23)	27.96 (27.75, 29.48)	30.99 (30.99, 30.99)	30.99 (30.99, 30.99)	27.70 (27.70, 27.70)
mean(CI)	37.45 (36.31, 38.60)	35.39 (32.24, 38.54)	33.56 (30.69, 36.42)	32.61 (29.56, 35.65)	32.61 (29.56, 35.65)	31.15 (30.75, 31.54)	31.15 (30.75, 31.54)	31.15 (30.75, 31.54)	28.83 (24.14, 33.51)	30.99 (NaN, NaN)	30.99 (NaN, NaN)	27.70 (NaN, NaN)

Lowland blanket bogs – Grassland

Depth Properties	0-10 cm (N = 21)	10-25 cm (N = 21)	25-50 cm (N = 21)	50-75 cm (N = 20)	75-100 cm (N = 13)	100-150 cm (N = 12)	150-200 cm (N = 9)	200-250 cm (N = 4)
WC (m %)								
min, max	49.3, 90.7	65.8, 89.3	79.8, 91.5	78.5, 90.3	81.4, 92.3	84.7, 91.3	84.4, 90.9	87.2, 91.0
median(IQR)	82.4 (67.1, 88.0)	81.6 (70.3, 87.5)	87.7 (86.2, 89.5)	88.6 (87.3, 89.5)	89.6 (88.6, 91.0)	87.8 (86.5, 89.4)	87.9 (86.0, 88.0)	88.1 (87.8, 89.0)
mean(CI)	77.8 (72.3, 83.3)	79.8 (76.0, 83.6)	87.5 (86.2, 88.8)	87.5 (85.9, 89.0)	89.2 (87.5, 90.9)	87.8 (86.5, 89.1)	87.5 (86.0, 89.0)	88.6 (86.0, 91.2)
WC (vol %)								
min, max	44.1, 97.8	78.8, 119.4	77.6, 119.4	75.1, 123.8	103.7, 126.0	101.2, 124.3	108.9, 122.7	115.3, 132.9
median(IQR)	73.3 (57.1, 74.9)	93.3 (86.8, 97.2)	114.6 (105.7, 116.3)	118.4 (108.5, 120.4)	121.9 (115.5, 122.8)	115.9 (111.2, 120.4)	120.2 (119.5, 122.0)	119.0 (116.0, 124.5)
mean(CI)	68.5 (61.9, 75.2)	94.3 (89.9, 98.6)	109.1 (104.3, 114.0)	112.2 (105.8, 118.6)	118.2 (113.4, 122.9)	114.8 (110.0, 119.6)	118.9 (115.3, 122.6)	121.6 (108.7, 134.4)
BD (g*cm^{-3})								
min, max	0.051, 0.604	0.095, 0.501	0.110, 0.234	0.118, 0.315	0.102, 0.236	0.115, 0.209	0.121, 0.222	0.115, 0.182
median(IQR)	0.176 (0.090, 0.329)	0.203 (0.146, 0.358)	0.155 (0.126, 0.171)	0.147 (0.137, 0.160)	0.135 (0.117, 0.155)	0.151 (0.138, 0.181)	0.169 (0.164, 0.178)	0.165 (0.150, 0.173)
mean(CI)	0.215 (0.147, 0.283)	0.248 (0.192, 0.303)	0.155 (0.140, 0.171)	0.161 (0.138, 0.183)	0.143 (0.122, 0.165)	0.160 (0.140, 0.179)	0.170 (0.147, 0.193)	0.157 (0.111, 0.203)
PD (g*cm^{-3})								
min, max	1.472, 2.350	1.462, 2.046	1.456, 1.831	1.456, 1.945	1.456, 1.863	1.473, 2.028	1.488, 1.872	1.522, 1.640
median(IQR)	1.506 (1.488, 2.012)	1.492 (1.478, 1.899)	1.483 (1.470, 1.596)	1.504 (1.480, 1.621)	1.536 (1.499, 1.582)	1.584 (1.520, 1.743)	1.586 (1.525, 1.807)	1.587 (1.546, 1.625)
mean(CI)	1.727 (1.589, 1.866)	1.663 (1.562, 1.764)	1.544 (1.497, 1.592)	1.582 (1.515, 1.649)	1.578 (1.500, 1.657)	1.654 (1.543, 1.766)	1.665 (1.541, 1.788)	1.584 (1.496, 1.672)
Porosity (vol %)								
min, max	74.3, 96.6	74.5, 93.6	85.8, 92.5	83.8, 91.9	87.3, 93.0	87.8, 92.3	87.5, 92.0	88.9, 92.6
median(IQR)	89.0 (83.0, 94.0)	86.2 (82.0, 90.1)	90.1 (89.2, 91.4)	90.7 (89.6, 91.2)	91.6 (90.5, 92.2)	90.4 (90.0, 91.0)	90.2 (89.0, 91.0)	89.5 (89.3, 90.3)
mean(CI)	88.4 (85.6, 91.2)	85.7 (83.3, 88.1)	90.0 (89.2, 90.8)	90.0 (89.0, 90.9)	91.0 (90.0, 92.0)	90.4 (89.6, 91.2)	89.8 (88.5, 91.0)	90.1 (87.4, 92.8)
pH								
min, max	4.1, 5.3	4.1, 5.7	4.1, 5.9	4.2, 5.9	4.4, 6.0	5.0, 6.2	5.2, 5.8	4.8, 5.6
median(IQR)	4.8 (4.4, 5.0)	4.7 (4.3, 5.0)	4.7 (4.3, 4.9)	4.9 (4.4, 5.1)	5.1 (5.0, 5.7)	5.4 (5.3, 5.7)	5.5 (5.4, 5.8)	5.4 (5.2, 5.5)
mean(CI)	4.7 (4.6, 4.9)	4.7 (4.5, 5.0)	4.8 (4.5, 5.0)	4.9 (4.6, 5.2)	5.2 (5.0, 5.5)	5.5 (5.3, 5.7)	5.6 (5.4, 5.7)	5.3 (4.7, 5.9)
EC (mS*cm^{-1})								
min, max	25.4, 131.2	29.5, 101.7	31.2, 86.8	37.9, 225.0	37.6, 121.4	39.4, 83.0	43.2, 65.7	47.2, 60.7
median(IQR)	51.2 (45.7, 83.7)	62.4 (58.3, 67.9)	54.1 (51.2, 60.6)	50.5 (47.0, 61.2)	51.5 (42.4, 58.4)	51.2 (47.4, 58.3)	46.4 (43.4, 50.4)	55.0 (53.0, 56.5)
mean(CI)	61.7 (49.2, 74.2)	61.7 (54.4, 68.9)	55.8 (49.5, 62.2)	64.6 (45.4, 83.8)	58.0 (44.2, 71.8)	54.7 (46.4, 63.0)	50.2 (43.3, 57.1)	54.5 (45.7, 63.3)
von Post								
min, max	2, 9	3, 9	3, 8	3, 9	3, 8	4, 8	5, 8	6, 8
median(IQR)	5 (3, 7)	5 (3, 7)	5 (3, 5)	19; 4 (4, 5)	5 (4, 5)	6 (5, 6)	6 (6, 6)	3; 8 (7, 8)
mean(CI)	5 (4, 6)	5 (4, 6)	5 (4, 5)	5 (4, 5)	5 (4, 6)	6 (5, 6)	6 (6, 7)	7 (5, 9)
OM (m %)								
min, max	24.80, 97.39	49.91, 98.17	67.72, 98.68	58.26, 98.64	65.04, 98.64	51.41, 97.31	64.29, 96.00	83.50, 93.25
median(IQR)	94.57 (52.75, 96.06)	95.67 (62.04, 96.82)	96.49 (87.10, 97.56)	94.71 (85.01, 96.71)	92.04 (88.27, 95.10)	88.09 (74.92, 93.43)	87.92 (69.71, 93.00)	87.87 (84.73, 91.26)
mean(CI)	76.27 (64.83, 87.71)	81.57 (73.20, 89.94)	91.38 (87.46, 95.31)	88.28 (82.75, 93.80)	88.58 (82.10, 95.07)	82.28 (73.05, 91.51)	81.44 (71.20, 91.67)	88.12 (80.84, 95.40)
Ash (m %)								
min, max	2.61, 75.20	1.83, 50.09	1.32, 32.28	1.36, 41.74	1.36, 34.96	2.69, 48.59	4.00, 35.71	6.75, 16.50
median(IQR)	5.43 (3.94, 47.25)	4.33 (3.18, 37.96)	3.51 (2.44, 12.90)	5.29 (3.29, 14.99)	7.96 (4.90, 11.73)	11.91 (6.57, 25.08)	12.08 (7.00, 30.29)	12.13 (8.74, 15.27)
mean(CI)	23.73 (12.29, 35.17)	18.43 (10.06, 26.80)	8.62 (4.69, 12.54)	11.72 (6.20, 17.25)	11.42 (4.93, 17.90)	17.72 (8.49, 26.95)	18.56 (8.33, 28.80)	11.88 (4.60, 19.16)
Carbon (m %)								
min, max	25.94, 52.23	32.74, 56.00	46.19, 57.67	45.89, 56.96	45.89, 56.96	48.66, 56.74	48.66, 56.95	42.48, 51.62
median(IQR)	51.22 (25.94, 52.23)	53.06 (36.64, 56.00)	54.92 (51.11, 57.67)	56.10 (51.95, 56.96)	51.95 (51.95, 56.10)	49.77 (48.66, 52.35)	50.89 (48.66, 50.89)	51.62 (49.33, 51.62)
mean(CI)	41.26 (35.58, 46.93)	46.31 (41.81, 50.80)	53.37 (51.58, 55.16)	53.58 (51.74, 55.42)	52.03 (49.54, 54.51)	51.24 (49.04, 53.43)	51.25 (48.64, 53.86)	49.33 (42.06, 56.61)
Nitrogen (m %)								
min, max	1.88, 2.24	2.06, 2.46	2.11, 2.77	2.04, 2.75	2.04, 2.75	1.92, 2.37	1.92, 2.37	1.65, 2.00
median(IQR)	1.95 (1.88, 2.24)	2.34 (2.06, 2.46)	2.75 (2.11, 2.77)	2.70 (2.06, 2.71)	2.70 (2.06, 2.70)	2.21 (2.01, 2.37)	1.98 (1.92, 2.37)	1.65 (1.65, 1.74)
mean(CI)	2.03 (1.96, 2.10)	2.25 (2.17, 2.34)	2.54 (2.41, 2.67)	2.42 (2.26, 2.58)	2.40 (2.20, 2.61)	2.17 (2.04, 2.31)	2.13 (1.96, 2.31)	1.74 (1.46, 2.02)
Hydrogen (m %)								
min, max	2.89, 5.82	3.49, 5.82	4.72, 6.07	4.69, 6.14	4.69, 6.14	4.77, 5.42	4.77, 5.42	4.11, 4.58
median(IQR)	5.50 (2.89, 5.82)	5.52 (3.79, 5.82)	5.74 (5.01, 6.07)	5.58 (5.03, 5.72)	5.03 (5.03, 5.58)	4.82 (4.77, 5.02)	4.88 (4.77, 4.88)	4.58 (4.46, 4.58)
mean(CI)	4.54 (3.93, 5.15)	4.82 (4.36, 5.28)	5.48 (5.24, 5.72)	5.42 (5.18, 5.67)	5.16 (4.90, 5.43)	4.96 (4.78, 5.14)	4.95 (4.74, 5.16)	4.46 (4.09, 4.84)
Sulfur (m %)								
min, max	0.31, 0.47	0.38, 0.60	0.45, 1.24	0.53, 1.58	0.53, 1.58	1.00, 1.63	0.92, 1.63	1.50, 1.56
median(IQR)	0.33 (0.31, 0.47)	0.59 (0.38, 0.60)	0.67 (0.45, 1.24)	0.71 (0.66, 1.58)	1.21 (0.71, 1.58)	1.25 (1.19, 1.34)	1.25 (1.25, 1.63)	1.50 (1.50, 1.52)
mean(CI)	0.37 (0.34, 0.40)	0.52 (0.48, 0.57)	0.83 (0.68, 0.98)	1.00 (0.79, 1.21)	1.21 (0.96, 1.46)	1.28 (1.13, 1.43)	1.30 (1.09, 1.52)	1.52 (1.47, 1.56)
Oxygen (m %)								
min, max	16.33, 35.91	18.99, 33.80	24.98, 31.57	23.54, 29.23	23.54, 29.23	19.93, 27.99	19.93, 27.87	21.76, 28.04
median(IQR)	35.72 (16.33, 35.91)	32.68 (18.99, 33.80)	31.39 (24.98, 31.57)	26.80 (23.54, 27.41)	25.67 (23.54, 26.80)	23.90 (19.93, 27.90)	27.09 (19.93, 27.87)	28.04 (26.47, 28.04)
mean(CI)	27.84 (23.52, 32.15)	27.59 (24.51, 30.67)	29.15 (27.81, 30.49)	26.26 (25.23, 27.29)	25.22 (24.10, 26.34)	23.93 (21.28, 26.58)	24.17 (21.07, 27.27)	26.47 (21.47, 31.47)

Depth Properties	0-10 cm (N = 4, n = 21)	10-25 cm (N = 4, n = 21)	25-50 cm (N = 4, n = 21)	50-75 cm (N = 4, n = 20)	75-100 cm (N = 4, n = 13)	100-150 cm (N = 3, n = 12)	150-200 cm (N = 3, n = 9)	200-250 cm (N = 2, n = 4)
WC (m %)								
min, max	62.6, 86.7	71.2	83.3	84.2	86.2	87.5	86.7	88.0
median(IQR)	78.2 (68.1, 87.2)	76.4 (70.0, 84.3)	87.5 (86.6, 88.3)	88.7 (87.5, 89.1)	88.7 (87.2, 90.2)	88.2 (87.8, 88.2)	88.2 (88.1, 88.2)	89.5 (88.8, 90.3)
mean(CI)	75.9 (56.6, 95.2)	78.7 (64.6, 92.8)	87.0 (82.5, 91.5)	86.9 (83.6, 90.1)	88.4 (84.6, 92.2)	87.9 (86.8, 89.0)	87.9 (85.3, 90.5)	89.5 (70.9, 108.1)
WC (vol %)								
min, max	61.3, 74.1	84.5, 99.9	97.0, 115.7	102.4, 120.9	108.2, 122.5	103.9, 119.2	115.3, 121.6	116.3, 124.1
median(IQR)	66.7 (60.3, 73.4)	93.0 (90.3, 94.8)	110.7 (104.7, 115.5)	116.5 (110.3, 119.6)	118.9 (113.7, 122.3)	118.8 (111.0, 119.4)	121.4 (118.3, 121.9)	120.0 (118.1, 121.8)
mean(CI)	67.8 (57.3, 78.3)	93.1 (82.9, 103.2)	107.8 (93.8, 121.9)	111.0 (98.4, 123.6)	115.4 (105.9, 125.0)	113.8 (92.5, 135.1)	119.2 (110.8, 127.5)	120.2 (70.5, 169.8)
BD (g*cm^{-3})								
min, max	0.109, 0.366	0.125, 0.381	0.129, 0.193	0.146, 0.210	0.118, 0.186	0.136, 0.170	0.153, 0.186	0.115, 0.169
median(IQR)	0.217 (0.101, 0.336)	0.271 (0.169, 0.366)	0.151 (0.137, 0.168)	0.146 (0.141, 0.162)	0.147 (0.123, 0.170)	0.151 (0.144, 0.162)	0.161 (0.158, 0.165)	0.141 (0.128, 0.154)
mean(CI)	0.234 (0.012, 0.456)	0.260 (0.064, 0.455)	0.159 (0.113, 0.206)	0.167 (0.121, 0.214)	0.151 (0.100, 0.201)	0.157 (0.111, 0.202)	0.165 (0.118, 0.211)	0.142 (-0.195, 0.479)
PD (g*cm^{-3})								
min, max	1.489, 2.062	1.479, 1.928	1.468, 1.662	1.488, 1.673	1.476, 1.638	1.526, 1.756	1.521, 1.733	1.554, 1.569
median(IQR)	1.752 (1.492, 2.037)	1.704 (1.486, 1.936)	1.543 (1.473, 1.615)	1.546 (1.483, 1.610)	1.547 (1.521, 1.567)	1.539 (1.530, 1.658)	1.542 (1.531, 1.677)	1.567 (1.560, 1.574)
mean(CI)	1.761 (1.265, 2.258)	1.696 (1.308, 2.084)	1.556 (1.400, 1.712)	1.593 (1.462, 1.725)	1.576 (1.465, 1.687)	1.624 (1.329, 1.919)	1.622 (1.357, 1.887)	1.561 (1.463, 1.659)
Porosity (vol %)								
min, max	81.7, 92.7	79.9, 91.6	88.4, 91.3	87.5, 90.8	88.7, 92.0	89.4, 91.1	88.5, 91.2	89.3, 91.2
median(IQR)	88.7 (84.0, 93.2)	84.7 (81.4, 88.6)	90.2 (89.4, 90.7)	90.6 (89.5, 91.1)	90.6 (89.2, 91.9)	90.8 (90.4, 90.8)	89.9 (89.4, 90.6)	90.9 (90.1, 91.8)
mean(CI)	87.6 (78.6, 96.5)	85.3 (76.9, 93.6)	89.8 (87.8, 91.8)	89.6 (87.3, 92.0)	90.5 (87.9, 93.2)	90.4 (88.1, 92.7)	89.9 (86.5, 93.2)	90.9 (69.9, 111.9)
pH								
min, max	4.3, 5.1	4.2, 5.4	4.2, 5.5	4.3, 5.6	4.4, 5.6	5.2, 5.7	5.3, 5.6	5.4, 5.5
median(IQR)	4.9 (4.7, 5.0)	4.7 (4.6, 4.9)	4.7 (4.5, 4.9)	4.8 (4.6, 5.1)	5.1 (4.9, 5.3)	5.4 (5.3, 5.5)	5.5 (5.4, 5.6)	5.5 (5.4, 5.5)
mean(CI)	4.8 (4.2, 5.3)	4.7 (4.0, 5.5)	4.7 (3.9, 5.6)	4.8 (3.9, 5.7)	5.0 (4.2, 5.8)	5.4 (4.8, 6.1)	5.5 (5.1, 5.9)	5.4 (4.9, 6.0)
EC (mS*cm^{-1})								
min, max	45.8, 88.6	44.2, 66.9	43.3, 60.6	47.1, 98.8	42.0, 69.0	47.7, 60.3	43.3, 55.6	50.5, 60.7
median(IQR)	46.7 (41.0, 57.5)	62.3 (55.1, 63.5)	54.7 (49.0, 55.7)	49.3 (47.4, 58.3)	51.3 (45.1, 56.7)	55.5 (52.3, 55.9)	46.4 (44.8, 51.4)	56.3 (54.1, 58.5)
mean(CI)	60.1 (29.0, 91.2)	59.5 (43.0, 76.0)	54.6 (42.1, 67.1)	62.6 (23.8, 101.4)	52.6 (33.8, 71.4)	54.4 (38.6, 70.2)	48.3 (32.3, 64.3)	55.6 (-8.9, 120.1)
von Post								
min, max	2, 9	3, 7	3, 6	4, 6	4, 6	5, 6	6, 7	7, 7
median(IQR)	5 (3, 8)	6 (4, 8)	5 (4, 5)	5 (5, 5)	5 (5, 5)	5 (5, 6)	6 (6, 6)	1; 7 (7, 7)
mean(CI)	5 (1, 10)	6 (2, 9)	5 (3, 7)	5 (3, 6)	5 (4, 6)	6 (4, 7)	6 (5, 8)	7 (NA, NA)
OM (m %)								
min, max	48.58, 95.97	59.70, 96.78	81.67, 97.67	80.70, 96.01	83.60, 97.00	73.87, 92.85	75.75, 93.31	89.33, 90.60
median(IQR)	74.20 (50.66, 95.72)	78.20 (59.04, 96.23)	91.53 (85.55, 97.28)	91.27 (85.93, 96.42)	91.12 (89.50, 93.29)	91.83 (81.98, 92.59)	91.58 (80.40, 92.45)	89.51 (88.96, 90.05)
mean(CI)	73.46 (32.43, 114.50)	78.84 (46.75, 110.92)	90.41 (77.53, 103.28)	87.34 (76.47, 98.21)	88.77 (79.63, 97.92)	84.79 (60.42, 109.15)	84.96 (63.07, 106.85)	89.97 (81.87, 98.06)
Ash (m %)								
min, max	4.03, 51.42	3.22, 40.30	2.33, 18.33	3.99, 19.30	3.00, 16.40	7.15, 26.13	6.69, 24.25	9.40, 10.67
median(IQR)	25.80 (4.28, 49.34)	21.80 (3.77, 40.96)	8.47 (2.72, 14.45)	8.73 (3.58, 14.07)	8.88 (6.71, 10.50)	8.17 (7.41, 18.02)	8.42 (7.55, 19.60)	10.49 (9.95, 11.04)
mean(CI)	26.54 (-14.50, 67.57)	21.16 (-10.92, 53.25)	9.59 (-3.28, 22.47)	12.66 (1.79, 23.53)	11.23 (2.08, 20.37)	15.21 (-9.15, 39.58)	15.04 (-6.85, 36.93)	10.03 (1.94, 18.13)
Carbon (m %)								
min, max	25.94, 52.23	32.74, 56.00	46.19, 57.67	45.89, 56.96	45.89, 56.96	48.66, 56.74	48.66, 56.95	42.48, 51.62
median(IQR)	40.62 (28.99, 51.47)	44.85 (35.66, 53.80)	53.02 (49.88, 55.61)	54.03 (50.44, 56.32)	54.03 (50.44, 56.32)	50.89 (49.77, 53.81)	50.89 (49.77, 53.92)	47.05 (44.77, 49.33)
mean(CI)	39.85 (17.86, 61.84)	44.61 (26.11, 63.11)	52.47 (44.55, 60.39)	52.73 (44.68, 60.77)	52.73 (44.68, 60.77)	52.10 (41.73, 62.46)	52.17 (41.51, 62.82)	47.05 (-11.02, 105.12)
Nitrogen (m %)								
min, max	1.88, 2.24	2.06, 2.46	2.11, 2.77	2.04, 2.75	2.04, 2.75	1.92, 2.37	1.92, 2.37	1.65, 2.00
median(IQR)	2.01 (1.93, 2.11)	2.20 (2.06, 2.37)	2.64 (2.42, 2.75)	2.38 (2.05, 2.71)	2.38 (2.05, 2.71)	2.04 (1.98, 2.21)	1.98 (1.95, 2.17)	1.82 (1.74, 1.91)
mean(CI)	2.04 (1.78, 2.29)	2.23 (1.91, 2.55)	2.54 (2.05, 3.03)	2.39 (1.77, 3.01)	2.39 (1.77, 3.01)	2.11 (1.53, 2.69)	2.09 (1.48, 2.70)	1.82 (-0.40, 4.05)
Hydrogen (m %)								
min, max	2.89, 5.82	3.49, 5.82	4.72, 6.07	4.69, 6.14	4.69, 6.14	4.77, 5.42	4.77, 5.42	4.11, 4.58
median(IQR)	4.43 (3.24, 5.58)	4.65 (3.72, 5.59)	5.38 (4.94, 5.82)	5.30 (4.95, 5.72)	5.30 (4.95, 5.72)	4.88 (4.82, 5.15)	4.88 (4.82, 5.15)	4.35 (4.23, 4.46)
mean(CI)	4.39 (2.03, 6.75)	4.65 (2.77, 6.54)	5.38 (4.39, 6.38)	5.36 (4.35, 6.37)	5.36 (4.35, 6.37)	5.02 (4.16, 5.89)	5.02 (4.16, 5.89)	4.35 (1.36, 7.33)
Sulfur (m %)								
min, max	0.31, 0.47	0.38, 0.60	0.45, 1.24	0.53, 1.58	0.53, 1.58	1.00, 1.63	0.92, 1.63	1.50, 1.56
median(IQR)	0.34 (0.32, 0.38)	0.55 (0.48, 0.59)	0.88 (0.62, 1.12)	0.96 (0.66, 1.30)	0.96 (0.66, 1.30)	1.25 (1.12, 1.44)	1.25 (1.08, 1.44)	1.53 (1.52, 1.54)
mean(CI)	0.36 (0.25, 0.48)	0.52 (0.36, 0.68)	0.86 (0.28, 1.44)	1.01 (0.25, 1.77)	1.01 (0.25, 1.77)	1.29 (0.51, 2.08)	1.27 (0.38, 2.15)	1.53 (1.15, 1.91)
Oxygen (m %)								
min, max	16.33, 35.91	18.99, 33.80	24.98, 31.57	23.54, 29.23	23.54, 29.23	19.93, 27.99	19.93, 27.87	21.76, 28.04
median(IQR)	27.33 (18.29, 35.77)	27.44 (21.40, 32.96)	29.78 (27.37, 31.44)	26.23 (25.14, 27.41)	26.23 (25.14, 27.41)	27.87 (23.90, 27.93)	27.09 (23.51, 27.48)	24.90 (23.33, 26.47)
mean(CI)	26.72 (9.94, 43.51)	26.92 (15.09, 38.74)	29.03 (24.07, 33.99)	26.31 (22.54, 30.08)	26.31 (22.54, 30.08)	25.26 (13.79, 36.74)	24.96 (14.09, 35.83)	24.90 (-15.00, 64.80)

Lowland blanket bogs – Forestry

Depth Properties	0-10 cm (N = 24)	10-25 cm (N = 24)	25-50 cm (N = 24)	50-75 cm (N = 24)	75-100 cm (N = 21)	100-150 cm (N = 16)	150-200 cm (N = 13)	200-250 cm (N = 11)	250-300 cm (N = 9)	300-350 cm (N = 4)
WC (m %)										
min, max	64.3, 94.0	86.2, 93.5	85.2, 94.0	84.9, 93.8	85.8, 93.4	76.4, 93.3	88.9, 92.5	90.2, 94.1	87.6, 91.7	89.7, 91.6
median(IQR)	88.7 (86.6, 90.6)	91.0 (90.2, 92.6)	92.0 (91.1, 93.1)	92.4 (91.2, 92.7)	92.0 (91.1, 92.7)	91.8 (89.6, 92.2)	91.4 (89.5, 91.6)	91.7 (91.1, 92.1)	90.9 (89.5, 91.1)	89.9 (89.9, 90.4)
mean(CI)	86.0 (82.5, 89.5)	91.0 (90.2, 91.8)	91.7 (90.9, 92.6)	91.5 (90.6, 92.5)	91.5 (90.8, 92.3)	90.1 (87.8, 92.4)	90.8 (90.0, 91.6)	91.8 (91.0, 92.6)	90.2 (89.0, 91.4)	90.3 (88.9, 91.7)
WC (vol %)										
min, max	11.7, 99.3	63.0, 129.6	62.9, 129.0	88.8, 126.8	101.8, 126.3	82.2, 125.4	113.7, 126.6	115.8, 126.2	83.0, 124.1	118.6, 124.9
median(IQR)	56.7 (38.0, 71.5)	100.6 (86.8, 108.5)	104.8 (96.7, 112.3)	119.1 (107.1, 123.7)	119.9 (116.8, 124.6)	120.5 (95.3, 122.3)	120.8 (116.7, 123.4)	120.9 (117.6, 123.9)	118.2 (115.5, 123.1)	123.0 (121.9, 123.5)
mean(CI)	53.7 (43.8, 63.7)	96.8 (89.5, 104.2)	102.2 (95.3, 109.2)	114.9 (110.3, 119.5)	119.4 (116.5, 122.2)	111.5 (102.9, 120.1)	119.8 (117.4, 122.3)	120.7 (118.1, 123.4)	114.6 (104.5, 124.6)	122.4 (118.2, 126.6)
BD (g*cm^{-3})										
min, max	0.048, 0.103	0.069, 0.126	0.059, 0.186	0.070, 0.207	0.080, 0.169	0.089, 0.256	0.099, 0.146	0.073, 0.134	0.104, 0.150	0.113, 0.140
median(IQR)	0.067 (0.060, 0.076)	0.092 (0.077, 0.110)	0.090 (0.072, 0.098)	0.098 (0.085, 0.108)	0.104 (0.094, 0.118)	0.103 (0.098, 0.118)	0.119 (0.107, 0.141)	0.113 (0.101, 0.120)	0.121 (0.114, 0.134)	0.137 (0.130, 0.138)
mean(CI)	0.070 (0.064, 0.076)	0.094 (0.087, 0.102)	0.093 (0.080, 0.105)	0.107 (0.092, 0.122)	0.110 (0.100, 0.119)	0.119 (0.097, 0.141)	0.122 (0.111, 0.132)	0.108 (0.096, 0.121)	0.123 (0.111, 0.135)	0.132 (0.111, 0.152)
PD (g*cm^{-3})										
min, max	1.459, 1.533	1.456, 1.498	1.452, 1.492	1.453, 1.513	1.452, 1.721	1.454, 1.654	1.461, 1.482	1.464, 1.526	1.472, 1.707	1.489, 1.559
median(IQR)	22; 1.475 (1.468, 1.487)	1.468 (1.462, 1.474)	1.462 (1.455, 1.468)	1.460 (1.456, 1.477)	1.462 (1.455, 1.480)	1.461 (1.458, 1.464)	1.468 (1.464, 1.471)	1.478 (1.469, 1.487)	1.497 (1.479, 1.673)	1.505 (1.501, 1.519)
mean(CI)	1.479 (1.472, 1.486)	1.469 (1.465, 1.473)	1.463 (1.459, 1.467)	1.468 (1.461, 1.475)	1.489 (1.459, 1.519)	1.477 (1.450, 1.505)	1.469 (1.465, 1.474)	1.482 (1.470, 1.493)	1.564 (1.485, 1.642)	1.515 (1.465, 1.564)
Porosity (vol %)										
min, max	93.0, 96.7	91.4, 95.3	87.5, 95.9	86.1, 95.2	88.6, 94.5	84.6, 93.9	90.0, 93.3	90.9, 95.2	91.0, 93.4	90.7, 92.4
median(IQR)	22; 95.5 (94.9, 95.9)	93.7 (92.5, 94.7)	93.8 (93.2, 95.1)	93.3 (92.6, 94.2)	92.9 (92.3, 93.5)	93.0 (91.9, 93.3)	91.9 (90.5, 92.8)	92.4 (91.9, 93.1)	91.9 (91.7, 92.8)	91.1 (90.9, 91.5)
mean(CI)	95.3 (94.9, 95.7)	93.6 (93.0, 94.1)	93.7 (92.8, 94.5)	92.7 (91.7, 93.7)	92.6 (92.0, 93.2)	92.0 (90.7, 93.3)	91.7 (91.0, 92.4)	92.7 (91.8, 93.6)	92.1 (91.4, 92.8)	91.3 (90.1, 92.5)
pH										
min, max	3.9, 4.7	4.0, 4.7	4.1, 4.9	4.3, 5.1	4.5, 5.3	4.6, 5.4	4.6, 5.4	4.7, 5.4	4.9, 5.3	4.9, 5.0
median(IQR)	4.4 (4.3, 4.6)	4.3 (4.2, 4.4)	4.4 (4.4, 4.6)	4.6 (4.5, 4.9)	4.8 (4.6, 5.1)	4.8 (4.7, 5.1)	4.9 (4.8, 5.3)	5.0 (4.9, 5.3)	5.0 (5.0, 5.2)	5.0 (5.0, 5.0)
mean(CI)	4.4 (4.3, 4.5)	4.3 (4.2, 4.4)	4.5 (4.4, 4.5)	4.7 (4.6, 4.8)	4.9 (4.7, 5.0)	4.9 (4.7, 5.0)	5.0 (4.8, 5.2)	5.1 (4.9, 5.2)	5.1 (5.0, 5.2)	5.0 (4.9, 5.1)
EC (mS*cm^{-1})										
min, max	32.2, 178.1	23.0, 107.7	18.3, 108.4	20.3, 126.1	20.9, 78.4	39.2, 67.8	43.2, 74.2	47.9, 97.4	52.1, 80.8	60.3, 80.0
median(IQR)	53.7 (47.6, 84.1)	73.0 (46.0, 89.6)	64.4 (39.6, 77.3)	56.9 (37.8, 68.1)	55.8 (47.6, 65.3)	54.2 (50.1, 59.6)	54.8 (50.0, 58.5)	57.6 (54.4, 58.4)	55.4 (54.2, 70.3)	71.6 (67.9, 74.5)
mean(CI)	67.5 (52.6, 82.4)	68.5 (57.3, 79.7)	60.3 (49.3, 71.3)	55.3 (44.9, 65.6)	52.3 (44.0, 60.6)	54.0 (49.7, 58.3)	55.7 (50.1, 61.3)	59.2 (50.3, 68.0)	61.3 (53.6, 69.1)	70.8 (57.9, 83.8)
von Post										
min, max	1, 6	2, 7	3, 8	3, 9	2, 10	3, 9	3, 9	2, 10	2, 10	4, 6
median(IQR)	4 (3, 5)	5 (4, 5)	5 (5, 6)	6 (5, 8)	6 (5, 8)	6 (5, 7)	7 (5, 8)	6 (4, 8)	7 (6, 9)	5 (5, 5)
mean(CI)	4 (3, 5)	5 (4, 5)	6 (5, 6)	6 (5, 7)	6 (5, 7)	6 (5, 7)	6 (5, 8)	6 (4, 8)	7 (5, 9)	5 (4, 6)
OM (m %)										
min, max	92.29, 98.42	95.25, 98.71	95.72, 99.00	93.95, 98.95	76.75, 98.99	82.28, 98.85	96.54, 98.26	92.91, 98.03	77.97, 97.36	90.14, 95.96
median(IQR)	22; 97.12 (96.11, 97.67)	97.72 (97.16, 98.21)	98.17 (97.69, 98.76)	98.34 (96.93, 98.69)	98.18 (96.70, 98.75)	98.26 (98.05, 98.52)	97.70 (97.42, 98.01)	96.87 (96.08, 97.64)	95.28 (80.71, 96.82)	94.64 (93.49, 94.98)
mean(CI)	96.77 (96.16, 97.39)	97.59 (97.24, 97.95)	98.09 (97.74, 98.43)	97.71 (97.15, 98.27)	95.95 (93.50, 98.41)	96.92 (94.64, 99.20)	97.56 (97.20, 97.92)	96.57 (95.58, 97.55)	89.78 (83.28, 96.27)	93.84 (89.79, 97.89)
Ash (m %)										
min, max	1.58, 7.71	1.29, 4.75	1.00, 4.28	1.05, 6.05	1.01, 23.25	1.15, 17.72	1.74, 3.46	1.97, 7.09	2.64, 22.03	4.04, 9.86
median(IQR)	22; 2.88 (2.33, 3.89)	2.28 (1.79, 2.84)	1.83 (1.24, 2.31)	1.66 (1.31, 3.07)	1.82 (1.25, 3.30)	1.74 (1.48, 1.95)	2.30 (1.99, 2.58)	3.13 (2.36, 3.92)	4.72 (3.18, 19.29)	5.36 (5.02, 6.51)
mean(CI)	3.23 (2.61, 3.84)	2.41 (2.05, 2.76)	1.91 (1.57, 2.26)	2.29 (1.73, 2.85)	4.05 (1.59, 6.50)	3.08 (0.80, 5.36)	2.44 (2.08, 2.80)	3.43 (2.45, 4.42)	10.22 (3.73, 16.72)	6.16 (2.11, 10.21)
Carbon (m %)										
min, max	52.75, 53.17	54.23, 55.61	56.32, 57.04	57.10, 59.22	57.10, 58.98	57.48, 59.65	58.65, 59.65	58.65, 59.65	50.55, 59.65	57.04, 57.04
median(IQR)	52.87 (52.77, 53.01)	54.35 (54.31, 54.67)	57.00 (56.83, 57.01)	58.56 (57.89, 59.04)	57.25 (57.10, 58.15)	58.65 (58.36, 59.65)	59.19 (58.65, 59.65)	59.65 (58.65, 59.65)	59.65 (50.55, 59.65)	57.04 (57.04, 57.04)
mean(CI)	52.91 (52.84, 52.99)	54.63 (54.39, 54.88)	56.84 (56.71, 56.97)	58.36 (58.00, 58.72)	57.79 (57.46, 58.13)	58.73 (58.27, 59.20)	59.15 (58.85, 59.46)	59.20 (58.84, 59.55)	56.62 (53.12, 60.11)	57.04 (57.04, 57.04)
Nitrogen (m %)										
min, max	1.53, 2.72	2.31, 2.92	2.15, 2.80	1.95, 2.88	1.95, 2.57	1.68, 2.02	1.68, 1.95	1.68, 1.85	1.22, 1.85	1.97, 1.97
median(IQR)	1.73 (1.62, 2.04)	2.46 (2.38, 2.62)	2.25 (2.21, 2.40)	2.04 (2.01, 2.26)	2.05 (1.95, 2.05)	1.85 (1.68, 1.89)	1.85 (1.68, 1.85)	1.85 (1.68, 1.85)	1.85 (1.22, 1.85)	1.97 (1.97, 1.97)
mean(CI)	1.93 (1.73, 2.13)	2.54 (2.44, 2.64)	2.36 (2.25, 2.47)	2.23 (2.06, 2.39)	2.14 (2.03, 2.25)	1.83 (1.76, 1.90)	1.78 (1.72, 1.84)	1.77 (1.71, 1.83)	1.64 (1.40, 1.88)	1.97 (1.97, 1.97)
Hydrogen (m %)										
min, max	5.20, 5.81	5.51, 5.99	5.60, 6.20	5.52, 6.14	5.52, 5.97	5.29, 5.68	5.29, 5.86	5.29, 5.43	4.43, 5.43	5.18, 5.18
median(IQR)	5.26 (5.22, 5.41)	5.61 (5.54, 5.74)	5.78 (5.65, 5.97)	5.72 (5.54, 5.95)	5.55 (5.52, 5.89)	5.43 (5.29, 5.49)	5.43 (5.29, 5.43)	5.43 (5.29, 5.43)	5.43 (4.43, 5.43)	5.18 (5.18, 5.18)
mean(CI)	5.38 (5.27, 5.49)	5.68 (5.60, 5.76)	5.84 (5.74, 5.94)	5.77 (5.66, 5.89)	5.71 (5.61, 5.80)	5.44 (5.36, 5.52)	5.40 (5.30, 5.49)	5.37 (5.32, 5.42)	5.10 (4.71, 5.48)	5.18 (5.18, 5.18)
Sulfur (m %)										
min, max	0.19, 0.38	0.41, 0.60	0.46, 0.75	0.44, 0.89	0.44, 0.89	0.62, 1.14	0.70,	0.70, 1.14	0.89, 1.14	1.27, 1.27
median(IQR)	0.25 (0.20, 0.32)	0.45 (0.43, 0.50)	0.49 (0.47, 0.58)	0.52 (0.50, 0.62)	0.53 (0.44, 0.89)	0.70 (0.68, 1.14)	0.98 (0.70, 1.14)	1.14 (0.70, 1.14)	1.14 (0.89, 1.14)	1.27 (1.27, 1.27)
mean(CI)	0.27 (0.23, 0.30)	0.48 (0.45, 0.51)	0.55 (0.50, 0.60)	0.59 (0.52, 0.67)	0.61 (0.52, 0.69)	0.84 (0.72, 0.97)	0.92 (0.79, 1.06)	0.94 (0.79, 1.09)	1.06 (0.96, 1.15)	1.27 (1.27, 1.27)
Oxygen (m %)										
min, max	34.09, 37.83	33.19, 35.47	30.31, 34.13	27.55, 33.63	22.96, 33.63	26.78, 30.92	28.70, 30.92	29.43, 30.92	24.45, 29.43	26.36, 26.36
median(IQR)	36.45 (35.37, 37.28)	34.16 (33.72, 34.69)	32.34 (31.59, 33.03)	30.96 (29.45, 32.29)	31.84 (30.08, 33.63)	29.43 (28.77, 30.92)	29.43 (29.43, 30.92)	29.43 (29.43, 30.92)	29.43 (24.45, 29.43)	26.36 (26.36, 26.36)
mean(CI)	36.20 (35.59, 36.81)	34.24 (33.89, 34.60)	32.28 (31.69, 32.87)	30.77 (29.81, 31.74)	29.90 (28.01, 31.80)	29.33 (28.44, 30.21)	30.06 (29.55, 30.58)	30.11 (29.58, 30.63)	27.77 (25.86, 29.68)	26.36 (26.36, 26.36)

Depth Properties	0-10 cm (N = 4, n = 24)	10-25 cm (N = 4, n = 24)	25-50 cm (N = 4, n = 24)	50-75 cm (N = 4, n = 24)	75-100 cm (N = 4, n = 21)	100-150 cm (N = 3, n = 16)	150-200 cm (N = 3, n = 13)	200-250 cm (N = 2, n = 11)	250-300 cm (N = 2, n = 9)	300-350 cm (N = 1, n =4)
WC (m %)										
min, max	74.5, 90.9	89.0, 92.8	89.5, 93.4	89.5, 92.8	89.3, 92.8	87.5, 91.9	89.5, 91.9	91.5, 92.1	90.1, 90.8	90.4, 90.4
median(IQR)	89.1 (84.9, 89.7)	90.8 (90.6, 91.3)	92.0 (91.4, 92.4)	92.5 (91.6, 92.7)	91.9 (91.1, 92.4)	92.2 (90.6, 92.2)	89.7 (89.6, 90.8)	91.9 (91.8, 92.0)	90.9 (90.8, 91.0)	89.9 (89.9, 89.9)
mean(CI)	86.0 (73.7, 98.3)	91.0 (88.5, 93.5)	91.7 (89.1, 94.3)	91.7 (89.4, 94.0)	91.4 (89.0, 93.8)	90.4 (84.1, 96.7)	90.4 (87.2, 93.7)	91.8 (87.6, 96.0)	90.4 (86.0, 94.9)	90.4 (NaN, NaN)
WC (vol %)										
min, max	25.6, 75.2	76.8, 106.3	85.3, 110.8	99.9, 123.4	110.6, 124.5	93.2, 123.2	116.1, 123.2	117.8, 123.4	113.4, 117.9	122.6, 122.6
median(IQR)	55.9 (47.4, 59.7)	103.4 (93.6, 105.7)	105.7 (99.4, 108.2)	119.2 (113.2, 121.8)	121.0 (116.9, 123.8)	120.0 (107.1, 121.6)	122.1 (119.1, 122.7)	120.5 (118.9, 122.2)	119.7 (118.9, 120.5)	123.0 (123.0, 123.0)
mean(CI)	53.0 (20.4, 85.6)	96.8 (75.4, 118.3)	101.7 (83.3, 120.1)	115.1 (98.4, 131.8)	119.0 (109.0, 129.1)	110.1 (72.0, 148.1)	120.5 (110.9, 130.0)	120.6 (84.9, 156.3)	115.6 (87.1, 144.2)	122.6 (NaN, NaN)
BD (g*cm^{-3})										
min, max	0.060, 0.075	0.078, 0.103	0.075, 0.123	0.084, 0.139	0.092, 0.132	0.100, 0.134	0.108	0.101, 0.115	0.120, 0.123	0.131, 0.131
median(IQR)	0.065 (0.063, 0.068)	0.101 (0.090, 0.107)	0.085 (0.076, 0.099)	0.099 (0.093, 0.112)	0.110 (0.100, 0.120)	0.104 (0.103, 0.111)	0.135 (0.122, 0.139)	0.107 (0.103, 0.110)	0.119 (0.118, 0.120)	0.137 (0.137, 0.137)
mean(CI)	0.069 (0.059, 0.079)	0.094 (0.076, 0.113)	0.093 (0.058, 0.127)	0.105 (0.067, 0.143)	0.112 (0.084, 0.140)	0.114 (0.071, 0.158)	0.128 (0.083, 0.172)	0.108 (0.020, 0.197)	0.121 (0.103, 0.140)	0.131 (NaN, NaN)
PD (g*cm^{-3})										
min, max	1.467, 1.497	1.463, 1.476	1.455, 1.470	1.455, 1.482	1.455, 1.584	1.459, 1.486	1.466, 1.480	1.476, 1.490	1.503, 1.662	1.510, 1.510
median(IQR)	1.477 (1.473, 1.484)	1.468 (1.463, 1.472)	1.461 (1.459, 1.465)	1.460 (1.458, 1.467)	1.464 (1.460, 1.488)	1.459 (1.459, 1.461)	1.467 (1.467, 1.474)	1.483 (1.479, 1.486)	1.589 (1.535, 1.642)	1.505 (1.505, 1.505)
mean(CI)	1.482 (1.462, 1.502)	1.469 (1.459, 1.479)	1.463 (1.452, 1.474)	1.467 (1.448, 1.486)	1.492 (1.393, 1.590)	1.469 (1.432, 1.506)	1.472 (1.455, 1.490)	1.483 (1.397, 1.569)	1.583 (0.569, 2.596)	1.510 (NaN, NaN)
Porosity (vol %)										
min, max	94.9, 95.9	93.0, 94.7	91.7, 94.8	90.6, 94.3	91.0, 93.7	91.1, 93.2	90.3, 92.6	92.2, 93.2	91.8, 92.8	91.4, 91.4
median(IQR)	95.6 (95.4, 95.8)	93.1 (92.7, 93.9)	94.2 (93.2, 94.8)	93.3 (92.3, 93.7)	92.7 (92.1, 93.1)	92.8 (92.4, 92.9)	90.8 (90.6, 91.7)	92.8 (92.6, 93.0)	92.5 (92.2, 92.8)	91.1 (91.1, 91.1)
mean(CI)	95.3 (94.6, 96.0)	93.6 (92.3, 94.9)	93.7 (91.4, 96.0)	92.8 (90.3, 95.4)	92.5 (90.7, 94.3)	92.3 (89.6, 94.9)	91.3 (88.4, 94.2)	92.7 (86.4, 99.0)	92.3 (86.2, 98.4)	91.4 (NaN, NaN)
pH										
min, max	4.3, 4.5	4.2, 4.5	4.3, 4.6	4.5, 4.9	4.6, 5.2	4.7, 5.2	4.8, 5.3	4.9,	5.0, 5.3	5.0, 5.0
median(IQR)	4.5 (4.4, 4.5)	4.3 (4.2, 4.4)	4.5 (4.4, 4.5)	4.7 (4.6, 4.8)	4.8 (4.7, 4.9)	4.7 (4.7, 4.9)	4.9 (4.8, 5.1)	5.1 (5.0, 5.2)	5.1 (5.1, 5.2)	5.0 (5.0, 5.0)
mean(CI)	4.4 (4.3, 4.6)	4.3 (4.1, 4.5)	4.5 (4.3, 4.7)	4.7 (4.4, 4.9)	4.8 (4.4, 5.3)	4.9 (4.2, 5.5)	5.0 (4.3, 5.6)	5.1 (2.3, 7.9)	5.1 (3.6, 6.7)	5.0 (NaN, NaN)
EC (mS*cm^{-1})										
min, max	48.3, 111.2	30.2, 85.8	24.0, 83.3	25.2, 70.8	24.6, 65.5	50.2, 59.4	43.8, 57.6	53.0, 63.4	55.4, 63.9	71.3, 71.3
median(IQR)	55.5 (46.6, 73.5)	77.2 (61.2, 84.6)	65.7 (55.4, 68.7)	61.1 (50.8, 64.1)	59.3 (48.7, 62.4)	56.5 (52.7, 56.6)	54.1 (49.0, 55.6)	55.1 (53.8, 56.5)	57.6 (56.0, 59.3)	71.7 (71.7, 71.7)
mean(CI)	68.6 (22.9, 114.4)	68.5 (27.1, 109.9)	60.7 (20.1, 101.3)	55.0 (22.4, 87.6)	52.3 (22.5, 82.1)	54.9 (43.4, 66.4)	52.4 (33.8, 71.0)	58.2 (-7.8, 124.1)	59.7 (5.7, 113.6)	71.3 (NaN, NaN)
von Post										
min, max	2, 5	4, 5	4, 7	4, 9	4, 9	4, 8	5, 8	4, 8	5, 9	5, 5
median(IQR)	5 (4, 5)	5 (4, 5)	6 (5, 6)	6 (5, 7)	6 (6, 8)	7 (6, 7)	8 (6, 8)	6 (5, 7)	8 (7, 8)	5 (5, 5)
mean(CI)	4 (2, 6)	5 (4, 6)	5 (4, 7)	6 (3, 9)	7 (3, 10)	6 (2, 11)	7 (2, 11)	6 (-22, 34)	7 (-19, 33)	5 (NaN, NaN)
OM (m %)										
min, max	95.29, 97.75	97.03, 98.12	97.55, 98.78	96.55, 98.74	88.07, 98.79	96.22, 98.47	96.68, 97.85	95.90, 97.02	81.62, 94.80	94.22, 94.22
median(IQR)	96.97 (96.39, 97.31)	97.72 (97.35, 98.09)	98.23 (97.96, 98.45)	98.32 (97.78, 98.49)	98.03 (96.05, 98.31)	98.43 (98.28, 98.47)	97.74 (97.21, 97.80)	96.49 (96.20, 96.77)	87.72 (83.29, 92.16)	94.65 (94.65, 94.65)
mean(CI)	96.55 (94.89, 98.21)	97.59 (96.74, 98.45)	98.08 (97.19, 98.97)	97.77 (96.21, 99.32)	95.72 (87.58, 103.86)	97.62 (94.59, 100.65)	97.32 (95.85, 98.79)	96.46 (89.35, 103.57)	88.21 (4.47, 171.95)	94.22 (NaN, NaN)
Ash (m %)										
min, max	2.25, 4.71	1.88, 2.97	1.22, 2.45	1.26, 3.45	1.21, 11.93	1.53, 3.78	2.15, 3.32	2.98, 4.10	5.20, 18.38	5.78, 5.78
median(IQR)	3.03 (2.69, 3.61)	2.28 (1.91, 2.65)	1.77 (1.55, 2.04)	1.68 (1.51, 2.22)	1.97 (1.69, 3.95)	1.57 (1.53, 1.72)	2.26 (2.20, 2.79)	3.51 (3.23, 3.80)	12.28 (7.84, 16.71)	5.35 (5.35, 5.35)
mean(CI)	3.45 (1.79, 5.11)	2.41 (1.55, 3.26)	1.92 (1.03, 2.81)	2.23 (0.68, 3.79)	4.28 (-3.86, 12.42)	2.38 (-0.65, 5.41)	2.68 (1.21, 4.15)	3.54 (-3.57, 10.65)	11.79 (-71.95, 95.53)	5.78 (NaN, NaN)
Carbon (m %)										
min, max	52.75, 53.17	54.23, 55.61	56.32, 57.04	57.10, 59.22	57.10, 58.98	57.48, 59.65	58.65, 59.65	58.65, 59.65	50.55, 59.65	57.04, 57.04
median(IQR)	52.87 (52.77, 53.01)	54.35 (54.31, 54.67)	57.00 (56.83, 57.01)	58.56 (57.89, 59.04)	57.70 (57.21, 58.36)	58.65 (58.06, 59.15)	59.19 (58.92, 59.42)	59.15 (58.90, 59.40)	55.10 (52.82, 57.38)	57.04 (57.04, 57.04)
mean(CI)	52.91 (52.61, 53.22)	54.63 (53.60, 55.67)	56.84 (56.29, 57.39)	58.36 (56.84, 59.89)	57.87 (56.48, 59.26)	58.59 (55.90, 61.29)	59.16 (57.92, 60.41)	59.15 (52.80, 65.50)	55.10 (-2.71, 112.91)	57.04 (NaN, NaN)
Nitrogen (m %)										
min, max	1.53, 2.72	2.31, 2.92	2.15, 2.80	1.95, 2.88	1.95, 2.57	1.68, 2.02	1.68, 1.95	1.68, 1.85	1.22, 1.85	1.97, 1.97
median(IQR)	1.73 (1.62, 2.04)	2.46 (2.38, 2.62)	2.25 (2.21, 2.40)	2.04 (2.01, 2.26)	2.04 (2.01, 2.18)	1.85 (1.77, 1.94)	1.85 (1.77, 1.90)	1.77 (1.72, 1.81)	1.54 (1.38, 1.69)	1.97 (1.97, 1.97)
mean(CI)	1.93 (1.07, 2.79)	2.54 (2.11, 2.97)	2.36 (1.89, 2.83)	2.23 (1.53, 2.92)	2.15 (1.70, 2.60)	1.85 (1.43, 2.27)	1.83 (1.49, 2.17)	1.77 (0.68, 2.85)	1.54 (-2.47, 5.54)	1.97 (NaN, NaN)
Hydrogen (m %)										
min, max	5.20, 5.81	5.51, 5.99	5.60, 6.20	5.52, 6.14	5.52, 5.97	5.29, 5.68	5.29, 5.86	5.29, 5.43	4.43, 5.43	5.18, 5.18
median(IQR)	5.26 (5.22, 5.41)	5.61 (5.54, 5.74)	5.78 (5.65, 5.97)	5.72 (5.54, 5.95)	5.72 (5.54, 5.91)	5.43 (5.36, 5.55)	5.43 (5.36, 5.64)	5.36 (5.33, 5.39)	4.93 (4.68, 5.18)	5.18 (5.18, 5.18)
mean(CI)	5.38 (4.92, 5.84)	5.68 (5.33, 6.02)	5.84 (5.41, 6.27)	5.77 (5.30, 6.25)	5.73 (5.37, 6.10)	5.47 (4.98, 5.96)	5.53 (4.79, 6.26)	5.36 (4.47, 6.25)	4.93 (-1.42, 11.28)	5.18 (NaN, NaN)
Sulfur (m %)										
min, max	0.19, 0.38	0.41, 0.60	0.46, 0.75	0.44, 0.89	0.44, 0.89	0.62, 1.14	0.70, 1.14	0.70, 1.14	0.89, 1.14	1.27, 1.27
median(IQR)	0.25 (0.20, 0.32)	0.45 (0.43, 0.50)	0.49 (0.47, 0.58)	0.52 (0.50, 0.62)	0.52 (0.50, 0.62)	0.70 (0.66, 0.92)	0.98 (0.84, 1.06)	0.92 (0.81, 1.03)	1.01 (0.95, 1.08)	1.27 (1.27, 1.27)
mean(CI)	0.27 (0.12, 0.41)	0.48 (0.35, 0.61)	0.55 (0.33, 0.77)	0.59 (0.28, 0.91)	0.59 (0.28, 0.91)	0.82 (0.12, 1.52)	0.94 (0.39, 1.49)	0.92 (-1.88, 3.72)	1.01 (-0.57, 2.60)	1.27 (NaN, NaN)
Oxygen (m %)										
min, max	34.09, 37.83	33.19, 35.47	30.31, 34.13	27.55, 33.63	22.96, 33.63	26.78, 30.92	28.70, 30.92	29.43, 30.92	24.45, 29.43	26.36, 26.36
median(IQR)	36.45 (35.37, 37.28)	34.16 (33.72, 34.69)	32.34 (31.59, 33.03)	30.96 (29.45, 32.29)	30.96 (28.30, 32.29)	29.43 (28.11, 30.18)	29.43 (29.06, 30.18)	30.18 (29.80, 30.55)	26.94 (25.70, 28.18)	26.36 (26.36, 26.36)
mean(CI)	36.20 (33.59, 38.81)	34.24 (32.71, 35.78)	32.28 (29.76, 34.80)	30.77 (26.65, 34.90)	29.63 (22.19, 37.07)	29.04 (23.83, 34.25)	29.68 (26.87, 32.49)	30.18 (20.71, 39.64)	26.94 (-4.70, 58.58)	26.36 (NaN, NaN)

Lowland blanket bogs – Industrial extraction

Depth Properties	0-10 cm (N = 12)	10-25 cm (N = 12)	25-50 cm (N = 12)	50-75 cm (N = 7)	75-100 cm (N = 6)	100-150 cm (N = 6)	150-200 cm (N = 4)	200-250 cm (N = 2)	250-300 cm (N = 1)
WC (m %)									
min, max	82.7, 89.1	83.8, 89.1	86.1, 89.5	86.8, 89.9	88.2, 90.8	88.1, 90.5	87.1, 91.1	86.4, 90.1	88.0, 88.0
median(IQR)	84.4 (83.7, 85.2)	86.6 (85.3, 87.9)	87.2 (86.5, 88.8)	87.7 (87.3, 89.2)	89.5 (88.5, 90.1)	88.4 (88.2, 89.6)	87.7 (87.2, 88.9)	88.3 (87.3, 89.2)	88.0 (88.0, 88.0)
mean(CI)	84.7 (83.6, 85.8)	86.6 (85.6, 87.6)	87.5 (86.7, 88.3)	88.2 (87.1, 89.4)	89.4 (88.3, 90.5)	88.9 (87.8, 90.0)	88.4 (85.5, 91.3)	88.3 (64.6, 111.9)	88.0 (NaN, NaN)
WC (vol %)									
min, max	56.5, 110.8	96.8, 129.0	80.6, 123.5	108.9, 125.3	118.4, 130.7	119.3, 130.2	115.1, 122.4	120.5, 124.2	114.4, 114.4
median(IQR)	89.0 (82.1, 101.7)	117.1 (113.5, 120.5)	114.6 (112.5, 117.8)	120.7 (118.4, 121.9)	122.8 (121.9, 128.6)	123.5 (122.3, 127.7)	119.9 (118.4, 120.8)	122.4 (121.5, 123.3)	114.4 (114.4, 114.4)
mean(CI)	88.5 (77.2, 99.7)	116.1 (110.5, 121.7)	113.0 (105.9, 120.2)	119.3 (114.5, 124.2)	124.5 (119.3, 129.7)	124.6 (120.2, 128.9)	119.3 (114.4, 124.2)	122.4 (99.0, 145.8)	114.4 (NaN, NaN)
BD (g*cm-3)									
min, max	0.103, 0.199	0.153, 0.200	0.125, 0.186	0.141, 0.179	0.132, 0.162	0.126, 0.173	0.120, 0.178	0.136, 0.190	0.156, 0.156
median(IQR)	0.173 (0.131, 0.184)	0.184 (0.160, 0.191)	0.159 (0.151, 0.175)	0.166 (0.147, 0.167)	0.149 (0.136, 0.156)	0.162 (0.147, 0.167)	0.165 (0.146, 0.176)	0.163 (0.150, 0.176)	0.156 (0.156, 0.156)
mean(CI)	0.160 (0.137, 0.183)	0.179 (0.168, 0.189)	0.161 (0.149, 0.172)	0.159 (0.146, 0.172)	0.147 (0.134, 0.160)	0.155 (0.137, 0.174)	0.157 (0.115, 0.199)	0.163 (-0.177, 0.503)	0.156 (NaN, NaN)
PD (g*cm-3)									
min, max	1.464, 1.578	1.455, 1.506	1.454, 1.515	1.463, 1.521	1.459, 1.556	1.459, 1.854	1.462, 1.501	1.531, 1.681	1.586, 1.586
median(IQR)	1.495 (1.483, 1.503)	1.473 (1.459, 1.483)	1.468 (1.463, 1.470)	1.472 (1.464, 1.501)	1.462 (1.460, 1.530)	1.463 (1.460, 1.540)	1.479 (1.475, 1.485)	1.606 (1.569, 1.644)	1.586 (1.586, 1.586)
mean(CI)	1.499 (1.479, 1.518)	1.476 (1.464, 1.487)	1.473 (1.460, 1.485)	1.484 (1.461, 1.506)	1.492 (1.441, 1.543)	1.544 (1.378, 1.709)	1.480 (1.455, 1.506)	1.606 (0.652, 2.560)	1.586 (NaN, NaN)
Porosity (vol %)									
min, max	86.5, 93.1	86.4, 89.6	87.4, 91.5	88.0, 90.7	88.9, 91.5	88.5, 91.4	88.0, 92.0	88.7, 91.1	90.2, 90.2
median(IQR)	88.5 (87.5, 91.6)	87.4 (87.0, 89.1)	89.2 (88.0, 89.7)	88.7 (88.6, 90.1)	90.1 (89.3, 90.9)	89.9 (88.8, 90.9)	88.8 (88.1, 90.1)	89.9 (89.3, 90.5)	90.2 (90.2, 90.2)
mean(CI)	89.3 (87.8, 90.9)	87.9 (87.1, 88.6)	89.1 (88.3, 89.9)	89.3 (88.3, 90.2)	90.1 (89.0, 91.2)	89.9 (88.6, 91.2)	89.4 (86.4, 92.3)	89.9 (74.7, 105.1)	90.2 (NaN, NaN)
pH									
min, max	3.9, 4.8	3.9, 5.0	4.3, 5.1	4.7, 5.1	4.7, 5.3	4.7, 5.5	4.8, 5.0	4.9, 4.9	5.2, 5.2
median(IQR)	4.5 (4.3, 4.7)	4.6 (4.5, 4.8)	4.8 (4.7, 5.0)	4.8 (4.7, 4.9)	4.8 (4.8, 5.0)	4.8 (4.8, 5.0)	4.9 (4.8, 4.9)	1; 4.9 (4.9, 4.9)	5.2 (5.2, 5.2)
mean(CI)	4.5 (4.3, 4.6)	4.6 (4.3, 4.8)	4.8 (4.6, 4.9)	4.8 (4.7, 5.0)	4.9 (4.7, 5.1)	5.0 (4.7, 5.2)	4.9 (4.7, 5.0)	4.9 (NA, NA)	5.2 (NaN, NaN)
EC (mS*cm^{-1})									
min, max	37.4, 121.3	39.7, 111.5	36.0, 86.1	41.5, 96.1	46.2, 87.1	46.0, 85.4	38.7, 55.7	72.7, 72.7	64.7, 64.7
median(IQR)	52.5 (49.5, 54.0)	51.0 (46.2, 58.7)	45.9 (41.3, 52.9)	52.2 (45.8, 56.7)	56.4 (53.9, 73.7)	50.7 (47.2, 57.9)	50.4 (47.4, 51.8)	1; 72.7 (72.7, 72.7)	64.7 (64.7, 64.7)
mean(CI)	56.8 (43.4, 70.2)	57.5 (44.5, 70.4)	50.8 (41.6, 60.1)	56.4 (39.3, 73.5)	63.1 (46.1, 80.1)	56.5 (40.8, 72.3)	48.8 (37.4, 60.2)	72.7 (NA, NA)	64.7 (NaN, NaN)
von Post									
min, max	4, 7	4, 7	5, 7	4, 7	4, 6	5, 7	5, 6	4, 4	5, 5
median(IQR)	5 (5, 6)	6 (5, 6)	11; 7 (5, 7)	5 (5, 6)	5 (5, 6)	5 (5, 6)	6 (6, 6)	1; 4 (4, 4)	5 (5, 5)
mean(CI)	5 (5, 6)	6 (5, 6)	6 (6, 7)	6 (5, 7)	5 (4, 6)	6 (5, 7)	6 (5, 7)	4 (NA, NA)	5 (NaN, NaN)
OM (m %)									
min, max	88.57, 97.99	94.57, 98.77	93.83, 98.86	93.33, 98.13	90.39, 98.45	65.76, 98.45	94.98, 98.19	80.07, 92.48	87.90, 87.90
median(IQR)	95.44 (94.76, 96.42)	97.28 (96.42, 98.39)	97.71 (97.49, 98.12)	97.35 (94.98, 98.01)	98.17 (92.55, 98.31)	98.08 (91.76, 98.37)	96.75 (96.28, 97.13)	86.27 (83.17, 89.38)	87.90 (87.90, 87.90)
mean(CI)	95.16 (93.59, 96.74)	97.06 (96.13, 98.00)	97.29 (96.26, 98.33)	96.40 (94.50, 98.29)	95.70 (91.51, 99.90)	91.42 (77.74, 105.09)	96.67 (94.58, 98.76)	86.27 (7.41, 165.14)	87.90 (NaN, NaN)
Ash (m %)									
min, max	2.01, 11.43	1.23, 5.43	1.14, 6.17	1.87, 6.67	1.55, 9.61	1.55, 34.24	1.81, 5.02	7.52, 19.93	12.10, 12.10
median(IQR)	4.56 (3.58, 5.24)	2.72 (1.61, 3.58)	2.29 (1.88, 2.51)	2.65 (1.99, 5.02)	1.83 (1.69, 7.45)	1.92 (1.63, 8.24)	3.25 (2.87, 3.72)	13.73 (10.62, 16.83)	12.10 (12.10, 12.10)
mean(CI)	4.84 (3.26, 6.41)	2.94 (2.00, 3.87)	2.71 (1.67, 3.74)	3.60 (1.71, 5.50)	4.30 (0.10, 8.49)	8.58 (-5.09, 22.26)	3.33 (1.24, 5.42)	13.73 (-65.14, 92.59)	12.10 (NaN, NaN)
Carbon (m %)									
min, max	57.89, 58.32	59.39, 61.67	60.47, 63.06	58.45, 62.79	58.45, 58.45	60.41, 60.41	60.41, 60.41	60.41, 60.41	52.73, 52.73
median(IQR)	58.11 (57.89, 58.32)	60.53 (59.39, 61.67)	61.77 (60.47, 63.06)	58.45 (58.45, 58.45)	58.45 (58.45, 58.45)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	52.73 (52.73, 52.73)
mean(CI)	58.11 (57.96, 58.25)	60.53 (59.77, 61.29)	61.77 (60.91, 62.62)	59.07 (57.55, 60.59)	58.45 (58.45, 58.45)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	52.73 (NaN, NaN)
Nitrogen (m %)									
min, max	1.34, 1.91	1.11, 1.83	1.15, 1.65	1.24, 1.52	1.52, 1.52	1.56, 1.56	1.56, 1.56	1.56, 1.56	1.72, 1.72
median(IQR)	1.62 (1.34, 1.91)	1.47 (1.11, 1.83)	1.40 (1.15, 1.65)	1.52 (1.52, 1.52)	1.52 (1.52, 1.52)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.72 (1.72, 1.72)
mean(CI)	1.62 (1.44, 1.81)	1.47 (1.23, 1.71)	1.40 (1.23, 1.57)	1.48 (1.38, 1.58)	1.52 (1.52, 1.52)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.72 (NaN, NaN)
Hydrogen (m %)									
min, max	4.95, 5.28	4.98, 5.11	5.36, 5.50	5.13, 5.50	5.13, 5.13	5.38, 5.38	5.38, 5.38	5.38, 5.38	4.80, 4.80
median(IQR)	5.12 (4.95, 5.28)	5.04 (4.98, 5.11)	5.43 (5.36, 5.50)	5.13 (5.13, 5.13)	5.13 (5.13, 5.13)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	4.80 (4.80, 4.80)
mean(CI)	5.12 (5.01, 5.22)	5.04 (5.00, 5.09)	5.43 (5.38, 5.48)	5.18 (5.05, 5.31)	5.13 (5.13, 5.13)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	4.80 (NaN, NaN)
Sulfur (m %)									
min, max	0.74, 0.77	0.80, 0.90	0.80, 0.86	0.82, 1.49	1.49, 1.49	1.48, 1.48	1.48, 1.48	1.48, 1.48	2.99, 2.99
median(IQR)	0.76 (0.74, 0.77)	0.85 (0.80, 0.90)	0.83 (0.80, 0.86)	1.49 (1.49, 1.49)	1.49 (1.49, 1.49)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	2.99 (2.99, 2.99)
mean(CI)	0.76 (0.75, 0.76)	0.85 (0.82, 0.88)	0.83 (0.81, 0.85)	1.39 (1.16, 1.63)	1.49 (1.49, 1.49)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	2.99 (NaN, NaN)
Oxygen (m %)									
min, max	29.09, 30.05	27.99, 30.10	26.82, 28.64	27.15, 28.87	28.87, 28.87	27.70, 27.70	27.70, 27.70	27.70, 27.70	24.14, 24.14
median(IQR)	29.57 (29.09, 30.05)	29.05 (27.99, 30.10)	27.73 (26.82, 28.64)	28.87 (28.87, 28.87)	28.87 (28.87, 28.87)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	24.14 (24.14, 24.14)
mean(CI)	29.57 (29.25, 29.89)	29.05 (28.34, 29.75)	27.73 (27.13, 28.33)	28.62 (28.02, 29.23)	28.87 (28.87, 28.87)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	24.14 (NaN, NaN)

Depth Properties	0-10 cm (N = 2, n = 12)	10-25 cm (N = 2, n = 12)	25-50 cm (N = 2, n = 12)	50-75 cm (N = 2, n = 7)	75-100 cm (N = 1, n = 6)	100-150 cm (N = 1, n = 6)	150-200 cm (N = 1, n = 4)	200-250 cm (N = 1, n = 2)	250-300 cm (N = 1, n = 1)
WC (m %)									
min, max	84.4, 85.0	85.2, 88.0	86.9, 88.2	86.8, 88.5	89.4, 89.4	88.9, 88.9	88.4, 88.4	88.3, 88.3	88.0, 88.0
median(IQR)	84.5 (84.5, 84.5)	86.6 (86.0, 87.3)	87.7 (87.1, 88.3)	87.6 (87.2, 88.0)	89.5 (89.5, 89.5)	88.4 (88.4, 88.4)	87.7 (87.7, 87.7)	88.3 (88.3, 88.3)	88.0 (88.0, 88.0)
mean(CI)	84.7 (81.2, 88.3)	86.6 (69.0, 104.2)	87.5 (79.3, 95.7)	87.6 (77.0, 98.2)	89.4 (NaN, NaN)	88.9 (NaN, NaN)	88.4 (NaN, NaN)	88.3 (NaN, NaN)	88.0 (NaN, NaN)
WC (vol %)									
min, max	80.8, 96.1	110.6, 121.6	105.7, 118.8	108.9, 121.1	124.5, 124.5	124.2, 124.2	119.3, 119.3	122.4, 122.4	114.4, 114.4
median(IQR)	93.7 (90.8, 96.5)	117.5 (115.4, 119.6)	115.7 (114.3, 117.1)	114.9 (111.9, 117.8)	122.8 (122.8, 122.8)	123.0 (123.0, 123.0)	119.9 (119.9, 119.9)	122.4 (122.4, 122.4)	114.4 (114.4, 114.4)
mean(CI)	88.5 (-8.7, 185.6)	116.1 (46.8, 185.4)	112.3 (29.4, 195.1)	115.0 (37.8, 192.2)	124.5 (NaN, NaN)	124.2 (NaN, NaN)	119.3 (NaN, NaN)	122.4 (NaN, NaN)	114.4 (NaN, NaN)
BD (g*cm-3)									
min, max	0.143, 0.176	0.166, 0.191	0.159, 0.160	0.158, 0.166	0.147, 0.147	0.155, 0.155	0.157, 0.157	0.163, 0.163	0.156, 0.156
median(IQR)	0.159 (0.150, 0.168)	0.175 (0.167, 0.184)	0.158 (0.156, 0.160)	0.162 (0.160, 0.164)	0.149 (0.149, 0.149)	0.162 (0.162, 0.162)	0.165 (0.165, 0.165)	0.163 (0.163, 0.163)	0.156 (0.156, 0.156)
mean(CI)	0.160 (-0.054, 0.373)	0.179 (0.018, 0.339)	0.159 (0.157, 0.162)	0.162 (0.112, 0.212)	0.147 (NaN, NaN)	0.155 (NaN, NaN)	0.157 (NaN, NaN)	0.163 (NaN, NaN)	0.156 (NaN, NaN)
PD (g*cm^{-3})									
min, max	1.495, 1.502	1.473, 1.478	1.468, 1.477	1.472, 1.486	1.492, 1.492	1.532, 1.532	1.480, 1.480	1.606, 1.606	1.586, 1.586
median(IQR)	1.489 (1.485, 1.494)	1.467 (1.463, 1.471)	1.465 (1.464, 1.467)	1.474 (1.473, 1.475)	1.462 (1.462, 1.462)	1.463 (1.463, 1.463)	1.479 (1.479, 1.479)	1.606 (1.606, 1.606)	1.586 (1.586, 1.586)
mean(CI)	1.499 (1.453, 1.544)	1.476 (1.442, 1.509)	1.472 (1.412, 1.533)	1.479 (1.394, 1.564)	1.492 (NaN, NaN)	1.532 (NaN, NaN)	1.480 (NaN, NaN)	1.606 (NaN, NaN)	1.586 (NaN, NaN)
Porosity (vol %)									
min, max	88.2, 90.5	87.1	89.1, 89.2	88.7, 89.4	90.1, 90.1	89.8, 89.8	89.4, 89.4	89.9, 89.9	90.2, 90.2
median(IQR)	89.3 (88.6, 90.0)	88.1 (87.6, 88.7)	89.2 (89.1, 89.3)	89.0 (88.9, 89.2)	90.1 (90.1, 90.1)	89.6 (89.6, 89.6)	88.8 (88.8, 88.8)	89.9 (89.9, 89.9)	90.2 (90.2, 90.2)
mean(CI)	89.3 (74.5, 104.2)	87.9 (77.3, 98.5)	89.2 (88.6, 89.8)	89.0 (85.1, 93.0)	90.1 (NaN, NaN)	89.8 (NaN, NaN)	89.4 (NaN, NaN)	89.9 (NaN, NaN)	90.2 (NaN, NaN)
pH									
min, max	4.3, 4.7	4.3, 4.8	4.6, 4.9	4.8, 5.1	4.9, 4.9	4.9, 4.9	4.9, 4.9	4.9, 4.9	5.2, 5.2
median(IQR)	4.5 (4.4, 4.6)	4.6 (4.6, 4.7)	4.8 (4.7, 4.9)	4.9 (4.9, 5.0)	4.8 (4.8, 4.8)	4.8 (4.8, 4.8)	4.9 (4.9, 4.9)	4.9 (4.9, 4.9)	5.2 (5.2, 5.2)
mean(CI)	4.5 (1.8, 7.2)	4.6 (1.8, 7.3)	4.8 (2.4, 7.1)	4.9 (3.2, 6.7)	4.9 (NaN, NaN)	4.9 (NaN, NaN)	4.9 (NaN, NaN)	4.9 (NaN, NaN)	5.2 (NaN, NaN)
EC (mS*cm^{-1})									
min, max	51.5, 62.1	49.8, 65.2	44.4, 58.9	45.2, 58.3	63.1, 63.1	55.4, 55.4	48.8, 48.8	72.7, 72.7	64.7, 64.7
median(IQR)	52.6 (52.3, 52.9)	50.7 (49.7, 51.6)	48.3 (45.3, 51.2)	49.8 (47.5, 52.1)	56.4 (56.4, 56.4)	49.5 (49.5, 49.5)	50.4 (50.4, 50.4)	72.7 (72.7, 72.7)	64.7 (64.7, 64.7)
mean(CI)	56.8 (-10.9, 124.6)	57.5 (-40.5, 155.4)	51.6 (-40.8, 144.1)	51.7 (-31.3, 134.7)	63.1 (NaN, NaN)	55.4 (NaN, NaN)	48.8 (NaN, NaN)	72.7 (NaN, NaN)	64.7 (NaN, NaN)
von Post									
min, max	5, 6	6, 6	6, 7	5, 7	5, 5	6, 6	6, 6	4, 4	5, 5
median(IQR)	6 (5, 6)	6 (6, 6)	6 (6, 6)	6 (6, 6)	5 (5, 5)	5 (5, 5)	6 (6, 6)	4 (4, 4)	5 (5, 5)
mean(CI)	5 (-1, 12)	6 (4, 8)	6 (-3, 16)	6 (-4, 17)	5 (NaN, NaN)	6 (NaN, NaN)	6 (NaN, NaN)	4 (NaN, NaN)	5 (NaN, NaN)
OM (m %)									
min, max	94.86, 95.46	96.84, 97.28	96.92, 97.71	96.24, 97.35	95.70, 95.70	92.39, 92.39	96.67, 96.67	86.27, 86.27	87.90, 87.90
median(IQR)	95.92 (95.54, 96.29)	97.77 (97.45, 98.09)	97.92 (97.79, 98.05)	97.19 (97.11, 97.27)	98.17 (98.17, 98.17)	98.13 (98.13, 98.13)	96.75 (96.75, 96.75)	86.27 (86.27, 86.27)	87.90 (87.90, 87.90)
mean(CI)	95.16 (91.36, 98.96)	97.06 (94.27, 99.86)	97.32 (92.29, 102.34)	96.79 (89.75, 103.84)	95.70 (NaN, NaN)	92.39 (NaN, NaN)	96.67 (NaN, NaN)	86.27 (NaN, NaN)	87.90 (NaN, NaN)
Ash (m %)									
min, max	4.54, 5.14	2.72, 3.16	2.29, 3.08	2.65, 3.76	4.30, 4.30	7.61, 7.61	3.33, 3.33	13.73, 13.73	12.10, 12.10
median(IQR)	4.08 (3.71, 4.46)	2.23 (1.91, 2.55)	2.08 (1.95, 2.21)	2.81 (2.73, 2.89)	1.83 (1.83, 1.83)	1.87 (1.87, 1.87)	3.25 (3.25, 3.25)	13.73 (13.73, 13.73)	12.10 (12.10, 12.10)
mean(CI)	4.84 (1.04, 8.64)	2.94 (0.14, 5.73)	2.68 (-2.34, 7.71)	3.21 (-3.84, 10.25)	4.30 (NaN, NaN)	7.61 (NaN, NaN)	3.33 (NaN, NaN)	13.73 (NaN, NaN)	12.10 (NaN, NaN)
Carbon (m %)									
min, max	57.89, 58.32	59.39, 61.67	60.47, 63.06	58.45, 62.79	58.45, 58.45	60.41, 60.41	60.41, 60.41	60.41, 60.41	52.73, 52.73
median(IQR)	58.11 (58.00, 58.21)	60.53 (59.96, 61.10)	61.77 (61.12, 62.41)	60.62 (59.54, 61.70)	58.45 (58.45, 58.45)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	60.41 (60.41, 60.41)	52.73 (52.73, 52.73)
mean(CI)	58.11 (55.37, 60.84)	60.53 (46.04, 75.02)	61.77 (45.31, 78.22)	60.62 (33.05, 88.19)	58.45 (NaN, NaN)	60.41 (NaN, NaN)	60.41 (NaN, NaN)	60.41 (NaN, NaN)	52.73 (NaN, NaN)
Nitrogen (m %)									
min, max	1.34, 1.91	1.11, 1.83	1.15, 1.65	1.24, 1.52	1.52, 1.52	1.56, 1.56	1.56, 1.56	1.56, 1.56	1.72, 1.72
median(IQR)	1.62 (1.48, 1.77)	1.47 (1.29, 1.65)	1.40 (1.27, 1.52)	1.38 (1.31, 1.45)	1.52 (1.52, 1.52)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.56 (1.56, 1.56)	1.72 (1.72, 1.72)
mean(CI)	1.62 (-2.00, 5.25)	1.47 (-3.10, 6.04)	1.40 (-1.78, 4.58)	1.38 (-0.40, 3.16)	1.52 (NaN, NaN)	1.56 (NaN, NaN)	1.56 (NaN, NaN)	1.56 (NaN, NaN)	1.72 (NaN, NaN)
Hydrogen (m %)									
min, max	4.95, 5.28	4.98, 5.11	5.36, 5.50	5.13, 5.50	5.13, 5.13	5.38, 5.38	5.38, 5.38	5.38, 5.38	4.80, 4.80
median(IQR)	5.12 (5.03, 5.20)	5.04 (5.01, 5.08)	5.43 (5.40, 5.46)	5.31 (5.22, 5.41)	5.13 (5.13, 5.13)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	5.38 (5.38, 5.38)	4.80 (4.80, 4.80)
mean(CI)	5.12 (3.02, 7.21)	5.05 (4.22, 5.87)	5.43 (4.54, 6.32)	5.31 (2.96, 7.67)	5.13 (NaN, NaN)	5.38 (NaN, NaN)	5.38 (NaN, NaN)	5.38 (NaN, NaN)	4.80 (NaN, NaN)
Sulfur (m %)									
min, max	0.74, 0.77	0.80, 0.90	0.80, 0.86	0.82, 1.49	1.49, 1.49	1.48, 1.48	1.48, 1.48	1.48, 1.48	2.99, 2.99
median(IQR)	0.76 (0.75, 0.76)	0.85 (0.83, 0.88)	0.83 (0.82, 0.84)	1.16 (0.99, 1.32)	1.49 (1.49, 1.49)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	1.48 (1.48, 1.48)	2.99 (2.99, 2.99)
mean(CI)	0.76 (0.56, 0.95)	0.85 (0.21, 1.49)	0.83 (0.45, 1.21)	1.16 (-3.10, 5.41)	1.49 (NaN, NaN)	1.48 (NaN, NaN)	1.48 (NaN, NaN)	1.48 (NaN, NaN)	2.99 (NaN, NaN)
Oxygen (m %)									
min, max	29.09, 30.05	27.99, 30.10	26.82, 28.64	27.15, 28.87	28.87, 28.87	27.70, 27.70	27.70, 27.70	27.70, 27.70	24.14, 24.14
median(IQR)	29.57 (29.33, 29.81)	29.05 (28.52, 29.57)	27.73 (27.28, 28.19)	28.01 (27.58, 28.44)	28.87 (28.87, 28.87)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	27.70 (27.70, 27.70)	24.14 (24.14, 24.14)
mean(CI)	29.57 (23.47, 35.67)	29.05 (15.64, 42.45)	27.73 (16.17, 39.29)	28.01 (17.08, 38.94)	28.87 (NaN, NaN)	27.70 (NaN, NaN)	27.70 (NaN, NaN)	27.70 (NaN, NaN)	24.14 (NaN, NaN)

Lowland blanket bogs – Domestic extraction

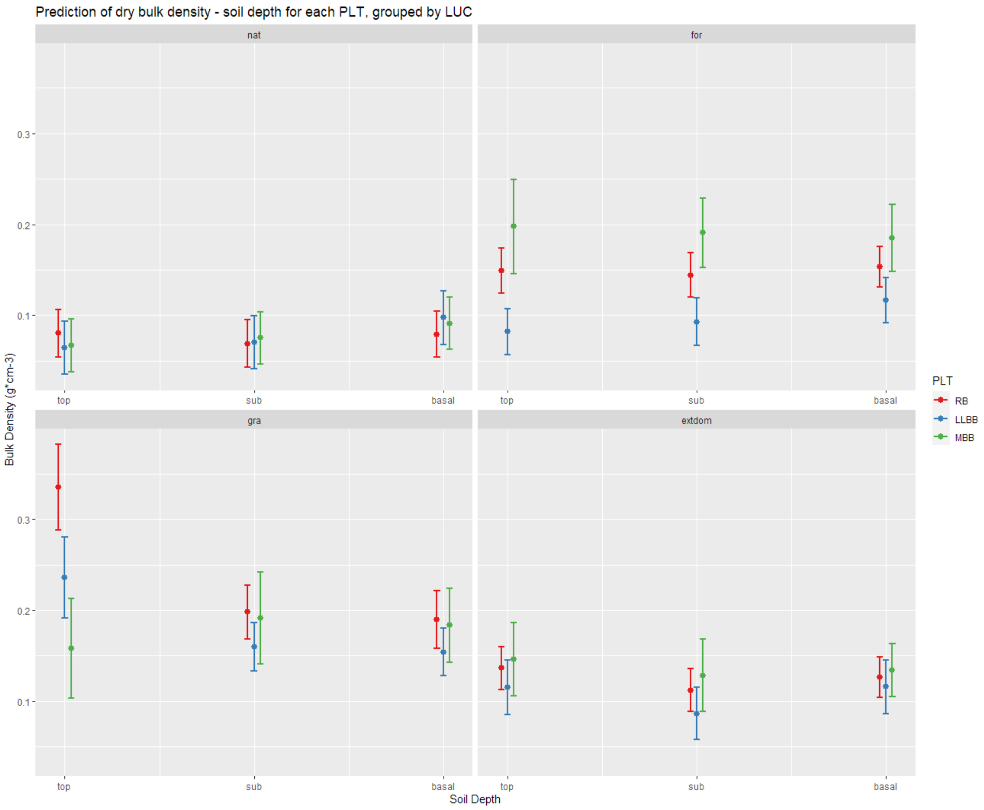
Depth Properties	0-10 cm (N = 17)	10-25 cm (N = 17)	25-50 cm (N = 17)	50-75 cm (N = 17)	75-100 cm (N = 17)	100-150 cm (N = 16)	150-200 cm (N = 13)	200-250 cm (N = 9)	250-300 cm (N = 5)	300-350 cm (N = 4)
WC (m %)										
min, max	80.8, 93.1	88.6, 93.1	90.1, 93.4	89.9, 93.3	89.5, 93.8	89.6, 93.6	88.8, 92.2	86.4, 91.8	87.5, 89.9	87.0, 89.8
median(IQR)	87.8 (83.7, 91.2)	90.9 (90.3, 91.8)	91.9 (91.4, 92.3)	92.1 (91.2, 92.6)	92.2 (91.3, 92.6)	91.3 (90.2, 91.8)	91.2 (90.1, 91.7)	89.2 (88.1, 90.9)	88.3 (87.5, 88.9)	88.2 (87.6, 88.9)
mean(CI)	87.5 (85.4, 89.6)	91.0 (90.3, 91.6)	91.8 (91.4, 92.2)	91.9 (91.4, 92.3)	92.0 (91.4, 92.6)	91.2 (90.6, 91.8)	90.9 (90.3, 91.5)	89.4 (88.0, 90.8)	88.4 (87.2, 89.7)	88.3 (86.4, 90.2)
WC (vol %)										
min, max	69.0, 107.7	72.0, 125.3	65.3, 121.5	75.3, 122.8	83.4, 125.0	63.0, 270.8	91.9, 125.6	85.2, 121.0	97.6, 121.8	108.8, 124.2
median(IQR)	92.6 (84.0, 98.7)	101.4 (93.8, 107.9)	97.9 (85.4, 108.8)	114.0 (95.6, 120.3)	114.2 (101.7, 122.2)	121.5 (106.2, 233.2)	119.6 (113.9, 121.1)	117.3 (112.3, 120.6)	115.0 (105.4, 116.4)	123.0 (119.3, 123.5)
mean(CI)	90.7 (84.9, 96.5)	100.6 (93.9, 107.4)	96.6 (87.7, 105.5)	106.4 (98.0, 114.9)	110.6 (103.5, 117.7)	152.2 (114.5, 189.9)	114.4 (107.8, 121.0)	112.8 (103.8, 121.8)	111.2 (99.3, 123.2)	119.8 (108.1, 131.4)
BD (g*cm^{-1})										
min, max	0.058, 0.199	0.058, 0.135	0.053, 0.116	0.058, 0.120	0.066, 0.121	0.073, 0.248	0.088, 0.153	0.085, 0.166	0.122, 0.165	0.124, 0.183
median(IQR)	0.122 (0.092, 0.161)	0.100 (0.091, 0.113)	0.089 (0.079, 0.101)	0.095 (0.088, 0.104)	0.097 (0.082, 0.111)	0.111 (0.106, 0.219)	0.110 (0.100, 0.131)	0.146 (0.113, 0.163)	0.150 (0.137, 0.154)	0.165 (0.150, 0.174)
mean(CI)	0.130 (0.107, 0.153)	0.101 (0.090, 0.112)	0.086 (0.077, 0.095)	0.094 (0.085, 0.102)	0.096 (0.088, 0.104)	0.144 (0.109, 0.178)	0.115 (0.103, 0.127)	0.135 (0.111, 0.158)	0.145 (0.125, 0.166)	0.159 (0.119, 0.200)
PD (gcm^{-1})										
min, max	1.462, 1.516	1.459, 1.474	1.453, 1.470	1.454, 1.464	1.453, 1.463	1.455, 1.466	1.457, 1.522	1.457, 1.471	1.465, 1.549	1.480, 1.660
median(IQR)	1.473 (1.468, 1.478)	1.467 (1.463, 1.469)	1.460 (1.457, 1.462)	1.457 (1.456, 1.459)	1.456 (1.455, 1.459)	1.459 (1.457, 1.461)	1.464 (1.461, 1.470)	1.466 (1.459, 1.468)	1.477 (1.469, 1.490)	1.574 (1.492, 1.654)
mean(CI)	1.475 (1.469, 1.482)	1.466 (1.464, 1.468)	1.460 (1.458, 1.462)	1.458 (1.457, 1.460)	1.457 (1.456, 1.459)	1.459 (1.458, 1.461)	1.470 (1.460, 1.481)	1.465 (1.461, 1.468)	1.490 (1.447, 1.533)	1.572 (1.417, 1.727)
Porosity (vol %)										
min, max	86.5, 96.1	90.8, 96.1	92.1, 96.4	91.8, 96.0	91.7, 95.5	82.9, 95.0	90.0, 94.1	88.7, 94.2	88.8, 91.8	87.6, 92.5
median(IQR)	91.7 (89.0, 93.8)	93.2 (92.3, 93.8)	93.9 (93.1, 94.6)	93.5 (92.9, 94.0)	93.4 (92.4, 94.4)	92.4 (85.0, 92.8)	92.5 (91.1, 93.2)	90.1 (88.9, 92.2)	90.3 (89.5, 90.7)	89.5 (88.9, 90.4)
mean(CI)	91.2 (89.6, 92.8)	93.1 (92.4, 93.9)	94.1 (93.5, 94.7)	93.6 (93.0, 94.1)	93.4 (92.8, 94.0)	90.1 (87.8, 92.5)	92.2 (91.4, 93.0)	90.8 (89.2, 92.4)	90.2 (88.8, 91.7)	89.8 (86.6, 93.0)
pH										
min, max	3.9, 4.6	4.1, 4.5	4.2, 4.5	4.2, 4.7	4.2, 4.7	4.3, 4.7	4.4, 4.8	4.7, 4.9	4.8, 5.0	4.9, 5.2
median(IQR)	4.3 (4.2, 4.4)	16; 4.3 (4.2, 4.4)	4.4 (4.3, 4.4)	4.4 (4.3, 4.6)	4.5 (4.4, 4.6)	4.5 (4.5, 4.6)	4.6 (4.5, 4.8)	4.8 (4.7, 4.8)	4.8 (4.8, 4.8)	4.9 (4.9, 5.0)
mean(CI)	4.3 (4.2, 4.4)	4.3 (4.3, 4.4)	4.4 (4.3, 4.4)	4.4 (4.4, 4.5)	4.5 (4.4, 4.6)	4.5 (4.5, 4.6)	4.6 (4.6, 4.7)	4.8 (4.7, 4.8)	4.8 (4.7, 5.0)	5.0 (4.7, 5.3)
EC (mS*cm^{-1})										
min, max	17.1, 165.1	32.6, 125.4	33.6, 106.1	39.2, 100.7	43.5, 86.2	39.1, 80.9	36.3, 91.2	38.5, 68.4	51.2, 61.0	45.2, 74.8
median(IQR)	44.3 (40.3, 88.2)	16; 46.7 (38.0, 96.4)	55.9 (51.2, 66.9)	57.7 (49.2, 80.9)	63.0 (51.9, 69.7)	60.0 (53.1, 69.8)	60.9 (53.5, 66.5)	59.0 (48.8, 63.1)	58.3 (56.7, 60.2)	47.8 (46.9, 54.7)
mean(CI)	66.7 (44.0, 89.3)	62.8 (45.4, 80.2)	64.3 (52.5, 76.2)	62.8 (53.2, 72.3)	63.0 (55.9, 70.1)	60.3 (53.9, 66.8)	61.3 (53.3, 69.3)	56.5 (48.8, 64.1)	57.5 (52.7, 62.3)	53.9 (31.6, 76.2)
von Post										
min, max	4, 7	3, 7	3, 7	4, 7	4, 7	4, 8	5, 9	7, 9	6, 8	7, 8
median(IQR)	5 (5, 6)	6 (5, 6)	16; 6 (5, 6)	6 (5, 6)	6 (5, 7)	7 (6, 7)	7 (6, 8)	8 (7, 8)	8 (7, 8)	8 (8, 8)
mean(CI)	6 (5, 6)	5 (5, 6)	6 (5, 6)	6 (5, 6)	6 (6, 6)	6 (6, 7)	7 (6, 8)	8 (7, 8)	7 (6, 9)	8 (7, 9)
OM (m %)										
min, max	93.74, 98.19	97.21, 98.43	97.50, 98.90	98.04, 98.82	98.13, 98.92	97.87, 98.75	93.21, 98.58	97.47, 98.59	90.99, 97.91	81.78, 96.72
median(IQR)	97.25 (96.86, 97.65)	97.80 (97.62, 98.09)	98.37 (98.22, 98.59)	98.59 (98.39, 98.66)	98.65 (98.47, 98.73)	98.43 (98.24, 98.58)	98.03 (97.55, 98.28)	97.81 (97.68, 98.39)	96.98 (95.90, 97.59)	88.94 (82.30, 95.74)
mean(CI)	97.08 (96.54, 97.62)	97.84 (97.66, 98.01)	98.37 (98.21, 98.53)	98.51 (98.39, 98.62)	98.58 (98.46, 98.69)	98.39 (98.25, 98.53)	97.49 (96.60, 98.38)	97.97 (97.65, 98.30)	95.87 (92.35, 99.40)	89.09 (76.25, 101.94)
Ash (m %)										
min, max	1.81, 6.26	1.57, 2.79	1.10, 2.50	1.18, 1.96	1.08, 1.87	1.25, 2.13	1.42, 6.79	1.41, 2.53	2.09, 9.01	3.28, 18.22
median(IQR)	2.75 (2.35, 3.14)	2.20 (1.91, 2.38)	1.63 (1.41, 1.78)	1.41 (1.34, 1.61)	1.35 (1.27, 1.53)	1.57 (1.42, 1.76)	1.97 (1.72, 2.45)	2.19 (1.61, 2.32)	3.02 (2.41, 4.10)	11.06 (4.26, 17.70)
mean(CI)	2.92 (2.38, 3.46)	2.16 (1.99, 2.34)	1.63 (1.47, 1.79)	1.49 (1.38, 1.61)	1.42 (1.31, 1.54)	1.61 (1.47, 1.75)	2.51 (1.62, 3.40)	2.03 (1.70, 2.35)	4.13 (0.60, 7.65)	10.91 (-1.94, 23.75)
Carbon (m %)										
min, max	52.38, 56.22	53.83, 56.23	55.87, 57.10	56.99, 58.12	56.99, 58.12	58.14, 59.49	58.14, 59.49	58.14, 59.49	58.14, 59.49	47.91, 61.10
median(IQR)	53.74 (52.38, 56.22)	54.45 (53.83, 56.23)	55.92 (55.87, 57.10)	57.07 (56.99, 58.12)	57.07 (56.99, 58.12)	58.19 (58.14, 59.49)	58.94 (58.14, 59.49)	59.49 (58.14, 59.49)	59.49 (58.14, 59.49)	54.50 (47.91, 61.10)
mean(CI)	54.14 (53.27, 55.00)	54.90 (54.36, 55.43)	56.32 (56.01, 56.62)	57.41 (57.13, 57.69)	57.41 (57.13, 57.69)	58.66 (58.31, 59.02)	58.89 (58.50, 59.28)	59.04 (58.52, 59.56)	58.95 (58.03, 59.87)	54.50 (42.39, 66.62)
Nitrogen (m %)										
min, max	1.80, 2.48	2.24, 2.61	2.04, 2.47	1.81, 2.37	1.81, 2.37	1.31, 2.39	1.31, 1.99	1.31, 1.82	1.31, 1.82	1.28, 2.14
median(IQR)	2.25 (1.80, 2.48)	2.42 (2.24, 2.61)	2.38 (2.04, 2.47)	2.03 (1.81, 2.37)	2.03 (1.81, 2.37)	1.82 (1.31, 2.39)	1.82 (1.31, 1.82)	1.31 (1.31, 1.82)	1.31 (1.31, 1.82)	1.71 (1.28, 2.14)
mean(CI)	2.17 (2.02, 2.33)	2.42 (2.34, 2.51)	2.29 (2.19, 2.39)	2.07 (1.95, 2.20)	2.07 (1.95, 2.20)	1.81 (1.56, 2.05)	1.61 (1.43, 1.79)	1.48 (1.28, 1.68)	1.51 (1.17, 1.86)	1.71 (0.92, 2.50)
Hydrogen (m %)										
min, max	5.33, 5.73	5.46, 5.91	5.44, 5.96	5.29, 5.96	5.29, 5.96	5.02, 5.97	5.02, 6.02	5.02, 5.62	5.02, 5.62	4.86, 5.21
median(IQR)	5.62 (5.33, 5.73)	5.66 (5.46, 5.91)	5.69 (5.44, 5.96)	5.63 (5.29, 5.96)	5.63 (5.29, 5.96)	5.62 (5.02, 5.97)	5.62 (5.02, 5.62)	5.02 (5.02, 5.62)	5.02 (5.02, 5.62)	5.04 (4.86, 5.21)
mean(CI)	5.56 (5.46, 5.65)	5.68 (5.58, 5.78)	5.70 (5.58, 5.81)	5.63 (5.48, 5.78)	5.63 (5.48, 5.78)	5.50 (5.28, 5.72)	5.40 (5.17, 5.64)	5.22 (4.99, 5.45)	5.26 (4.85, 5.67)	5.04 (4.71, 5.36)
Sulfur (m %)										
min, max	0.33, 0.62	0.41, 0.61	0.43, 0.91	0.44, 1.01	0.44, 1.01	0.60, 0.83	0.68, 0.83	0.76, 0.83	0.76, 0.83	0.83, 1.02
median(IQR)	0.50 (0.33, 0.62)	0.48 (0.41, 0.61)	0.54 (0.43, 0.91)	0.87 (0.44, 1.01)	0.87 (0.44, 1.01)	0.76 (0.60, 0.83)	0.76 (0.76, 0.83)	0.83 (0.76, 0.83)	0.83 (0.76, 0.83)	0.92 (0.83, 1.02)
mean(CI)	0.48 (0.42, 0.55)	0.50 (0.46, 0.55)	0.63 (0.52, 0.74)	0.77 (0.64, 0.90)	0.77 (0.64, 0.90)	0.74 (0.68, 0.79)	0.78 (0.75, 0.81)	0.81 (0.78, 0.83)	0.80 (0.75, 0.85)	0.92 (0.75, 1.10)
Oxygen (m %)										
min, max	33.37, 35.49	33.10, 35.29	32.70, 33.80	32.18, 32.96	32.18, 32.96	31.01, 31.18	27.07, 31.18	31.05, 31.18	31.05, 31.18	27.07, 28.70
median(IQR)	35.04 (33.37, 35.49)	34.56 (33.10, 35.29)	33.75 (32.70, 33.80)	32.76 (32.18, 32.96)	32.76 (32.18, 32.96)	31.05 (31.01, 31.18)	31.05 (31.05, 31.18)	31.05 (31.05, 31.18)	31.05 (31.05, 31.18)	27.88 (27.07, 28.70)
mean(CI)	34.61 (34.11, 35.10)	34.26 (33.78, 34.74)	33.39 (33.12, 33.67)	32.61 (32.44, 32.79)	32.61 (32.44, 32.79)	31.08 (31.04, 31.12)	30.49 (29.57, 31.41)	31.09 (31.04, 31.14)	31.10 (31.01, 31.19)	27.88 (26.39, 29.38)

Depth Properties	0-10 cm (N = 3, n = 17)	10-25 cm (N = 3, n = 17)	25-50 cm (N = 3, n = 17)	50-75 cm (N = 3, n = 17)	75-100 cm (N = 3, n = 17)	100-150 cm (N = 3, n = 16)	150-200 cm (N = 3, n = 13)	200-250 cm (N = 2, n = 9)	250-300 cm (N = 2, n = 5)	300-350 cm (N = 2, n = 4)
WC (m %)										
min, max	85.3, 91.4	90.2, 92.1	91.6, 92.0	91.6, 92.1	91.1, 92.5	90.1, 92.1	90.3, 91.4	88.9, 91.0	88.2, 88.6	88.4, 89.0
median(IQR)	85.6 (85.1, 88.5)	90.6 (90.6, 91.4)	91.9 (91.9, 91.9)	92.1 (91.7, 92.1)	92.2 (91.5, 92.3)	91.3 (90.6, 91.6)	90.6 (90.4, 91.0)	89.7 (89.1, 90.3)	88.3 (88.2, 88.3)	88.7 (88.6, 88.9)
mean(CI)	87.4 (78.8, 96.0)	90.9 (88.4, 93.4)	91.8 (91.2, 92.4)	91.9 (91.2, 92.6)	92.0 (90.1, 93.9)	91.2 (88.7, 93.7)	90.8 (89.4, 92.2)	89.9 (76.7, 103.1)	88.4 (85.8, 91.0)	88.7 (85.1, 92.3)
WC (vol %)										
min, max	86.5, 95.2	93.3, 106.4	83.9, 113.6	88.3, 120.9	95.4, 123.4	90.2, 250.6	103.9, 119.7	100.1, 119.6	101.5, 118.1	114.0, 124.1
median(IQR)	92.9 (90.6, 93.5)	104.5 (100.3, 109.2)	92.6 (88.6, 102.7)	114.0 (102.7, 117.3)	114.2 (104.6, 118.7)	121.5 (109.3, 183.8)	109.7 (106.8, 115.0)	116.4 (114.4, 118.5)	108.9 (105.2, 112.7)	119.1 (116.6, 121.6)
mean(CI)	90.5 (79.5, 101.4)	100.7 (84.0, 117.4)	96.3 (58.1, 134.6)	106.7 (65.1, 148.3)	110.7 (75.5, 145.9)	153.9 (-57.7, 365.4)	110.9 (90.9, 131.0)	109.9 (-13.8, 233.5)	109.8 (4.6, 215.0)	119.1 (55.3, 182.9)
BD (g*cm^{-3})										
min, max	0.084, 0.163	0.081, 0.112	0.073, 0.101	0.082, 0.104	0.093, 0.102	0.099, 0.235	0.103, 0.121	0.099, 0.149	0.136, 0.151	0.142, 0.162
median(IQR)	0.144 (0.114, 0.159)	0.111 (0.097, 0.112)	0.083 (0.076, 0.092)	0.097 (0.093, 0.100)	0.097 (0.094, 0.100)	0.107 (0.107, 0.175)	0.114 (0.107, 0.120)	0.128 (0.114, 0.143)	0.145 (0.140, 0.149)	0.152 (0.147, 0.157)
mean(CI)	0.131 (0.028, 0.233)	0.101 (0.057, 0.145)	0.086 (0.051, 0.121)	0.094 (0.067, 0.121)	0.096 (0.083, 0.109)	0.146 (-0.045, 0.337)	0.113 (0.090, 0.136)	0.124 (-0.194, 0.443)	0.144 (0.047, 0.241)	0.152 (0.023, 0.281)
PD (g*cm^{-3})										
min, max	1.471, 1.481	1.464, 1.468	1.458, 1.462	1.457, 1.460	1.455, 1.459	1.456, 1.461	1.462, 1.502	1.458, 1.468	1.471, 1.519	1.493, 1.655
median(IQR)	1.475 (1.473, 1.476)	1.467 (1.466, 1.468)	1.459 (1.458, 1.460)	1.456 (1.456, 1.458)	1.457 (1.456, 1.458)	1.459 (1.458, 1.460)	1.464 (1.461, 1.483)	1.463 (1.460, 1.465)	1.494 (1.482, 1.507)	1.574 (1.534, 1.615)
mean(CI)	1.475 (1.461, 1.489)	1.466 (1.461, 1.471)	1.460 (1.454, 1.466)	1.458 (1.453, 1.463)	1.457 (1.452, 1.462)	1.459 (1.453, 1.465)	1.476 (1.421, 1.531)	1.463 (1.396, 1.530)	1.495 (1.186, 1.804)	1.574 (0.545, 2.603)
Porosity (vol %)										
min, max	88.9, 94.3	92.4, 94.5	93.1, 95.0	92.9, 94.3	93.0, 93.6	83.9, 93.2	91.7, 93.0	89.8, 93.2	89.7, 91.1	89.1, 91.4
median(IQR)	90.2 (89.2, 92.2)	92.4 (92.4, 93.4)	94.3 (93.7, 94.8)	93.3 (93.1, 93.6)	93.4 (93.1, 93.5)	92.7 (88.0, 92.7)	92.4 (92.0, 92.8)	91.2 (90.3, 92.2)	90.3 (89.9, 90.7)	90.3 (89.7, 90.9)
mean(CI)	91.1 (84.1, 98.1)	93.1 (90.1, 96.1)	94.1 (91.7, 96.5)	93.5 (91.7, 95.4)	93.4 (92.6, 94.3)	90.0 (76.9, 103.1)	92.4 (90.8, 93.9)	91.5 (70.1, 112.9)	90.4 (81.8, 99.0)	90.3 (75.7, 104.9)
pH										
min, max	4.1, 4.4	4.3, 4.4	4.3, 4.4	4.4, 4.5	4.4, 4.5	4.4, 4.6	4.5, 4.7	4.7, 4.8	4.8, 4.9	4.9, 5.1
median(IQR)	4.3 (4.3, 4.4)	4.4 (4.3, 4.4)	4.4 (4.4, 4.4)	4.4 (4.4, 4.5)	4.5 (4.5, 4.5)	4.5 (4.5, 4.6)	4.6 (4.5, 4.7)	4.8 (4.7, 4.8)	4.9 (4.8, 4.9)	5.0 (4.9, 5.0)
mean(CI)	4.3 (3.9, 4.7)	4.3 (4.2, 4.5)	4.4 (4.3, 4.5)	4.5 (4.3, 4.6)	4.5 (4.3, 4.7)	4.5 (4.3, 4.7)	4.6 (4.3, 4.9)	4.8 (4.5, 5.1)	4.9 (3.8, 5.9)	5.0 (3.7, 6.3)
EC (mS*cm^{-1})										
min, max	30.6, 5.1	36.5, 108.1	47.9, 95.3	45.0, 87.3	49.7, 79.7	51.0, 72.8	52.7, 73.8	53.8, 65.3	56.5, 60.6	46.6, 71.0
median(IQR)	52.3 (40.7, 90.2)	47.7 (41.9, 78.1)	55.8 (51.1, 78.6)	60.4 (51.7, 73.1)	63.2 (55.6, 73.1)	57.8 (53.1, 66.0)	58.1 (56.4, 63.4)	60.7 (58.4, 63.0)	58.9 (58.0, 59.7)	58.8 (52.7, 64.9)
mean(CI)	70.0 (-53.8, 193.7)	64.6 (-30.3, 159.5)	66.1 (2.6, 129.5)	64.1 (10.9, 117.3)	63.9 (26.5, 101.3)	60.9 (33.4, 88.3)	61.5 (34.3, 88.8)	59.5 (-13.4, 132.5)	58.5 (32.2, 84.9)	58.8 (-95.8, 213.4)
von Post										
min, max	5, 6	5, 6	5, 6	5, 6	5, 6	5, 8	6, 8	7, 8	7, 8	7, 8
median(IQR)	6 (5, 6)	6 (5, 6)	6 (5, 6)	6 (5, 6)	6 (6, 6)	7 (6, 7)	8 (7, 8)	8 (7, 8)	8 (7, 8)	8 (7, 8)
mean(CI)	6 (4, 7)	5 (5, 6)	6 (4, 7)	6 (4, 8)	6 (5, 8)	7 (3, 10)	7 (5, 10)	8 (2, 13)	8 (1, 14)	8 (2, 13)
OM (m %)										
min, max	96.58, 97.45	97.68, 98.00	98.15, 98.55	98.33, 98.60	98.42, 98.78	98.29, 98.64	94.90, 98.21	97.68, 98.55	93.45, 97.47	82.21, 95.60
median(IQR)	97.11 (97.01, 97.28)	97.80 (97.72, 97.89)	98.39 (98.32, 98.49)	98.64 (98.51, 98.65)	98.60 (98.54, 98.66)	98.39 (98.37, 98.51)	98.00 (96.45, 98.24)	98.12 (97.90, 98.34)	95.52 (94.48, 96.56)	88.91 (85.56, 92.25)
mean(CI)	97.09 (95.96, 98.22)	97.83 (97.44, 98.23)	98.37 (97.87, 98.87)	98.51 (98.12, 98.90)	98.59 (98.14, 99.03)	98.41 (97.91, 98.91)	97.02 (92.46, 101.57)	98.11 (92.55, 103.67)	95.46 (69.91, 121.01)	88.91 (3.86, 173.95)
Ash (m %)										
min, max	2.55, 3.42	2.00, 2.32	1.45, 1.85	1.40, 1.67	1.22, 1.58	1.36, 1.71	1.79, 5.10	1.45, 2.32	2.53, 6.55	4.40, 17.79
median(IQR)	2.89 (2.72, 2.99)	2.20 (2.11, 2.28)	1.61 (1.51, 1.68)	1.36 (1.35, 1.49)	1.40 (1.34, 1.46)	1.61 (1.49, 1.63)	2.00 (1.76, 3.55)	1.88 (1.66, 2.10)	4.48 (3.44, 5.52)	11.09 (7.75, 14.44)
mean(CI)	2.91 (1.78, 4.04)	2.17 (1.77, 2.56)	1.63 (1.13, 2.13)	1.49 (1.10, 1.88)	1.41 (0.97, 1.86)	1.59 (1.09, 2.09)	2.98 (-1.57, 7.54)	1.89 (-3.67, 7.45)	4.54 (-21.01, 30.09)	11.09 (-73.95, 96.14)
Carbon (m %)										
min, max	52.38, 56.22	53.83, 56.23	55.87, 57.10	56.99, 58.12	56.99, 58.12	58.14, 59.49	58.14, 59.49	58.14, 59.49	58.14, 59.49	47.91, 61.10
median(IQR)	53.74 (53.06, 54.98)	54.45 (54.14, 55.34)	55.92 (55.89, 56.51)	57.07 (57.03, 57.59)	57.07 (57.03, 57.59)	58.19 (58.16, 58.84)	58.94 (58.54, 59.22)	58.81 (58.48, 59.15)	58.81 (58.48, 59.15)	54.50 (51.21, 57.80)
mean(CI)	54.11 (49.28, 58.95)	54.84 (51.74, 57.93)	56.30 (54.57, 58.03)	57.39 (55.83, 58.96)	57.39 (55.83, 58.96)	58.61 (56.71, 60.51)	58.86 (57.17, 60.54)	58.81 (50.24, 67.39)	58.81 (50.24, 67.39)	54.50 (-29.29, 138.30)
Nitrogen (m %)										
min, max	1.80, 2.48	2.24, 2.61	2.04, 2.47	1.81, 2.37	1.81, 2.37	1.31, 2.39	1.31, 1.99	1.31, 1.82	1.31, 1.82	1.28, 2.14
median(IQR)	2.25 (2.02, 2.37)	2.42 (2.33, 2.51)	2.38 (2.21, 2.42)	2.03 (1.92, 2.20)	2.03 (1.92, 2.20)	1.82 (1.56, 2.10)	1.82 (1.56, 1.90)	1.56 (1.44, 1.69)	1.56 (1.44, 1.69)	1.71 (1.50, 1.92)
mean(CI)	2.18 (1.32, 3.04)	2.42 (1.96, 2.88)	2.30 (1.73, 2.86)	2.07 (1.37, 2.77)	2.07 (1.37, 2.77)	1.84 (0.50, 3.18)	1.71 (0.83, 2.59)	1.56 (-1.68, 4.81)	1.56 (-1.68, 4.81)	1.71 (-3.75, 7.17)
Hydrogen (m %)										
min, max	5.33, 5.73	5.46, 5.91	5.44, 5.96	5.29, 5.96	5.29, 5.96	5.02, 5.97	5.02, 6.02	5.02, 5.62	5.02, 5.62	4.86, 5.21
median(IQR)	5.62 (5.47, 5.68)	5.66 (5.56, 5.79)	5.69 (5.57, 5.83)	5.63 (5.46, 5.79)	5.63 (5.46, 5.79)	5.62 (5.32, 5.79)	5.62 (5.32, 5.82)	5.32 (5.17, 5.47)	5.32 (5.17, 5.47)	5.04 (4.95, 5.12)
mean(CI)	5.56 (5.05, 6.07)	5.68 (5.12, 6.24)	5.70 (5.05, 6.34)	5.63 (4.79, 6.46)	5.63 (4.79, 6.46)	5.54 (4.34, 6.73)	5.55 (4.30, 6.80)	5.32 (1.51, 9.13)	5.32 (1.51, 9.13)	5.04 (2.81, 7.26)
Sulfur (m %)										
min, max	0.33, 0.62	0.41, 0.61	0.43, 0.91	0.44, 1.01	0.44, 1.01	0.60, 0.83	0.68, 0.83	0.76, 0.83	0.76, 0.83	0.83, 1.02
median(IQR)	0.50 (0.42, 0.56)	0.48 (0.44, 0.54)	0.54 (0.48, 0.73)	0.87 (0.66, 0.94)	0.87 (0.66, 0.94)	0.76 (0.68, 0.79)	0.76 (0.72, 0.79)	0.79 (0.78, 0.81)	0.79 (0.78, 0.81)	0.92 (0.88, 0.97)
mean(CI)	0.48 (0.12, 0.85)	0.50 (0.25, 0.75)	0.63 (0.00, 1.25)	0.77 (0.04, 1.51)	0.77 (0.04, 1.51)	0.73 (0.44, 1.02)	0.76 (0.57, 0.94)	0.79 (0.35, 1.24)	0.79 (0.35, 1.24)	0.92 (-0.28, 2.13)
Oxygen (m %)										
min, max	33.37, 35.49	33.10, 35.29	32.70, 33.80	32.18, 32.96	32.18, 32.96	31.01, 31.18	27.07, 31.18	31.05, 31.18	31.05, 31.18	27.07, 28.70
median(IQR)	35.04 (34.20, 35.27)	34.56 (33.83, 34.92)	33.75 (33.23, 33.77)	32.76 (32.47, 32.86)	32.76 (32.47, 32.86)	31.05 (31.03, 31.12)	31.05 (29.06, 31.12)	31.12 (31.08, 31.15)	31.12 (31.08, 31.15)	27.88 (27.48, 28.29)
mean(CI)	34.63 (31.86, 37.41)	34.32 (31.55, 37.09)	33.42 (31.87, 34.96)	32.63 (31.63, 33.64)	32.63 (31.63, 33.64)	31.08 (30.86, 31.30)	29.77 (23.96, 35.57)	31.12 (30.29, 31.94)	31.12 (30.29, 31.94)	27.88 (17.53, 38.24)

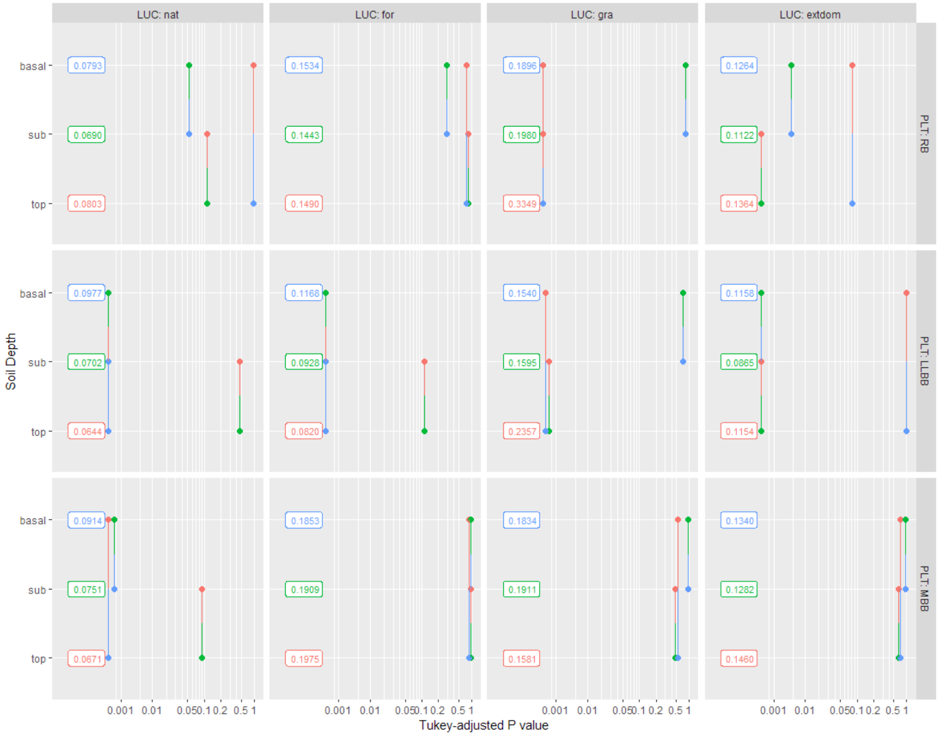
Appendix 5: Example of graphical statistical analysis of some peat properties (bulk density and TOC): model predictions and multiple comparisons.

(1) Bulk density: a) prediction model and multiple comparisons testing the effect of a) soil layer b) land use category and c) peatland type

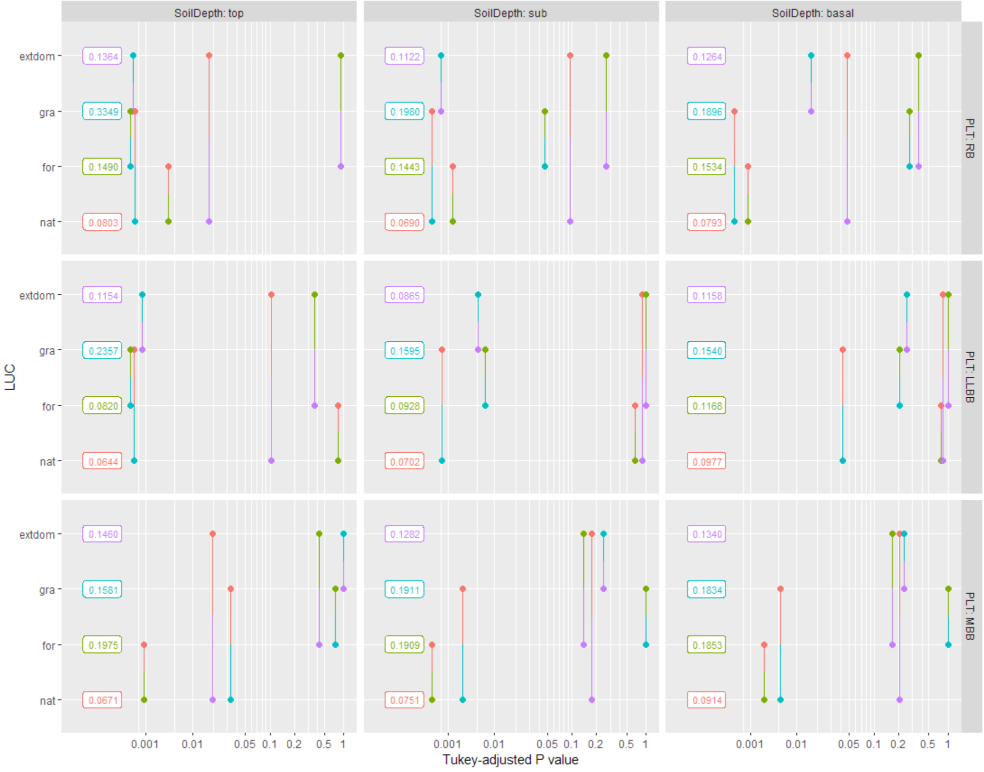
(a)



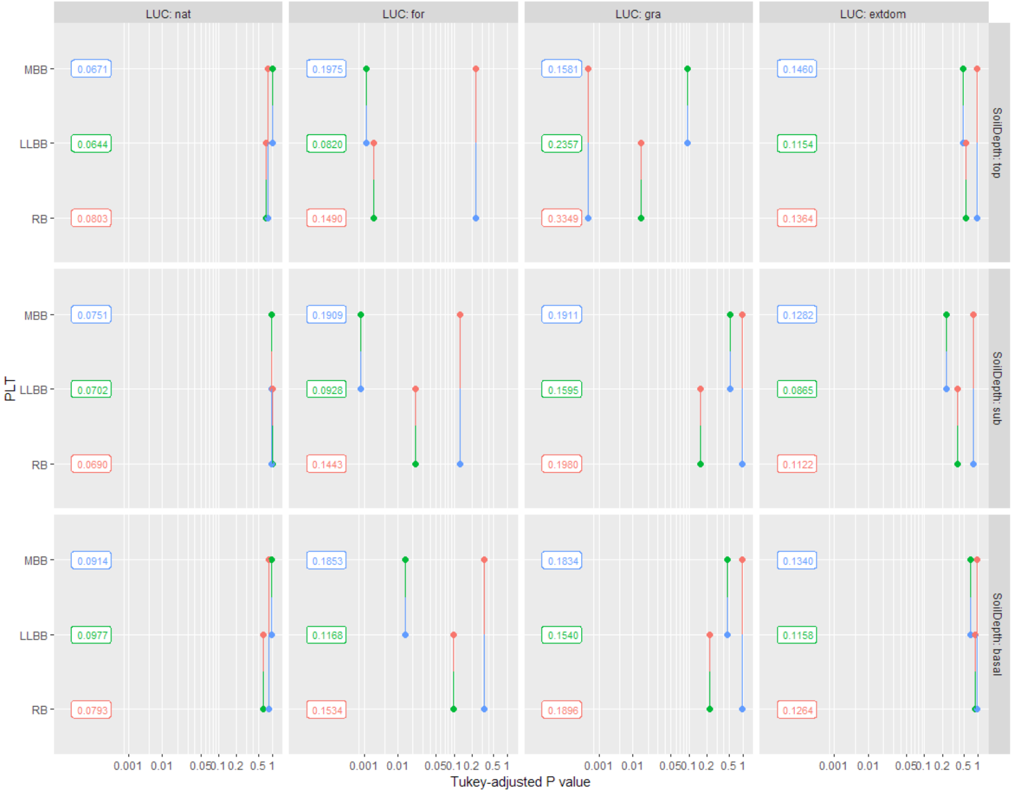
(b)



(c)

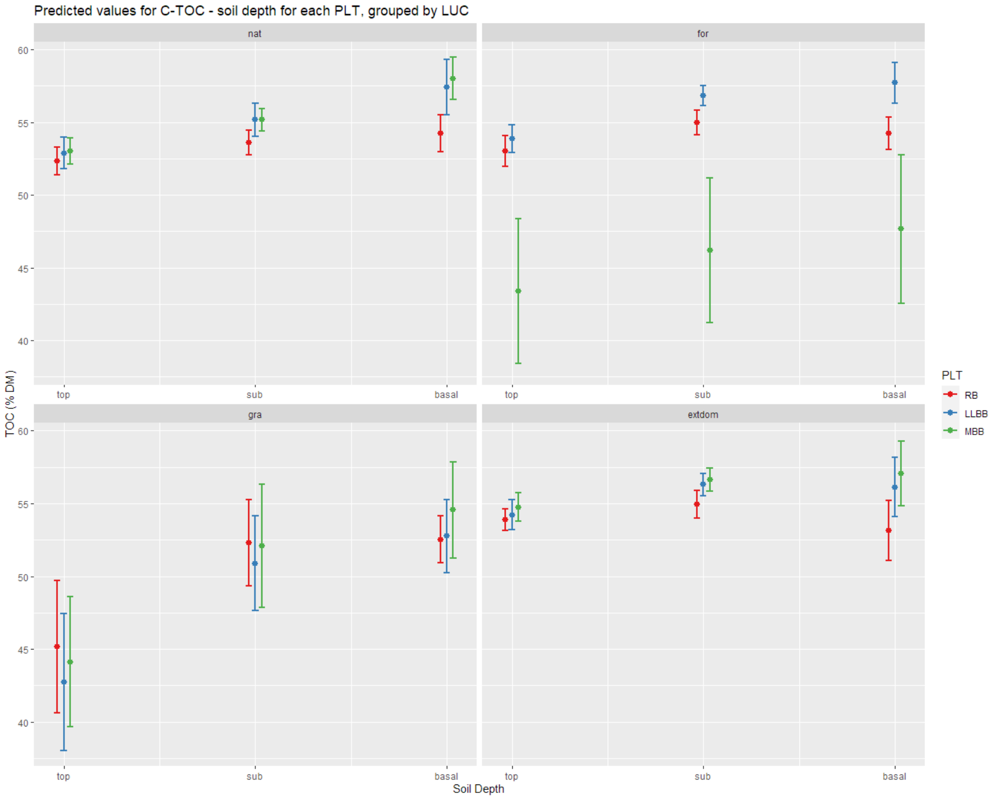

SoilDepth: top
SoilDepth: sub
SoilDepth: basal
PLT: RB
PLT: LLBB
PLT: MBB
LUC
extdom
gra
for
nat
0.1364
0.3349
0.1490
0.0803
0.1122
0.1980
0.1443
0.0690
0.1264
0.1896
0.1534
0.0793
0.1154
0.2357
0.0820
0.0644
0.0865
0.1595
0.0928
0.0702
0.1158
0.1540
0.1168
0.0977
0.1460
0.1581
0.1975
0.0671
0.1282
0.1911
0.1909
0.0751
0.1340
0.1834
0.1853
0.0914
0.001
0.01
0.05
0.1
0.2
0.5
1
Tukey-adjusted P value

(d)

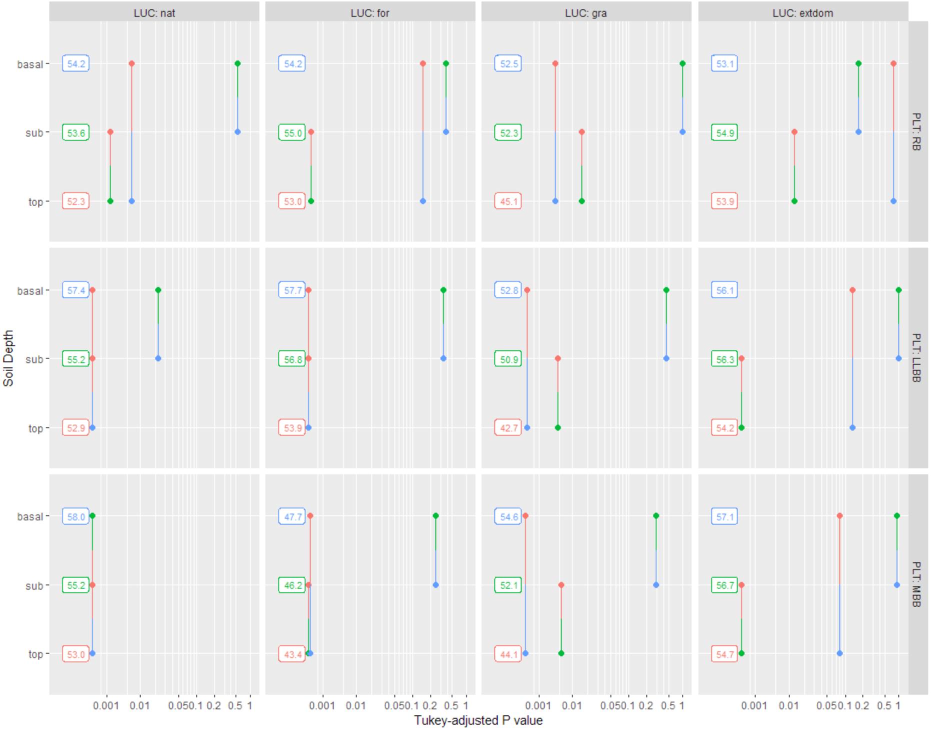

LUC: nat
LUC: for
LUC: gra
LUC: extdom
SoilDepth: top
SoilDepth: sub
SoilDepth: basal
PLT
MBB
LLBB
RB
0.0671
0.0644
0.0803
0.1975
0.0820
0.1490
0.1581
0.2357
0.3349
0.1460
0.1154
0.1364
0.0751
0.0702
0.0690
0.1909
0.0928
0.1443
0.1911
0.1595
0.1980
0.1282
0.0865
0.1122
0.0914
0.0977
0.0793
0.1853
0.1168
0.1534
0.1834
0.1540
0.1896
0.1340
0.1158
0.1264
0.001
0.01
0.05
0.1
0.2
0.5
1
Tukey-adjusted P value

(2) Total Organic Carbon: a) prediction model and multiple comparisons testing the effect of a) soil layer b) land use category and c) peatland type

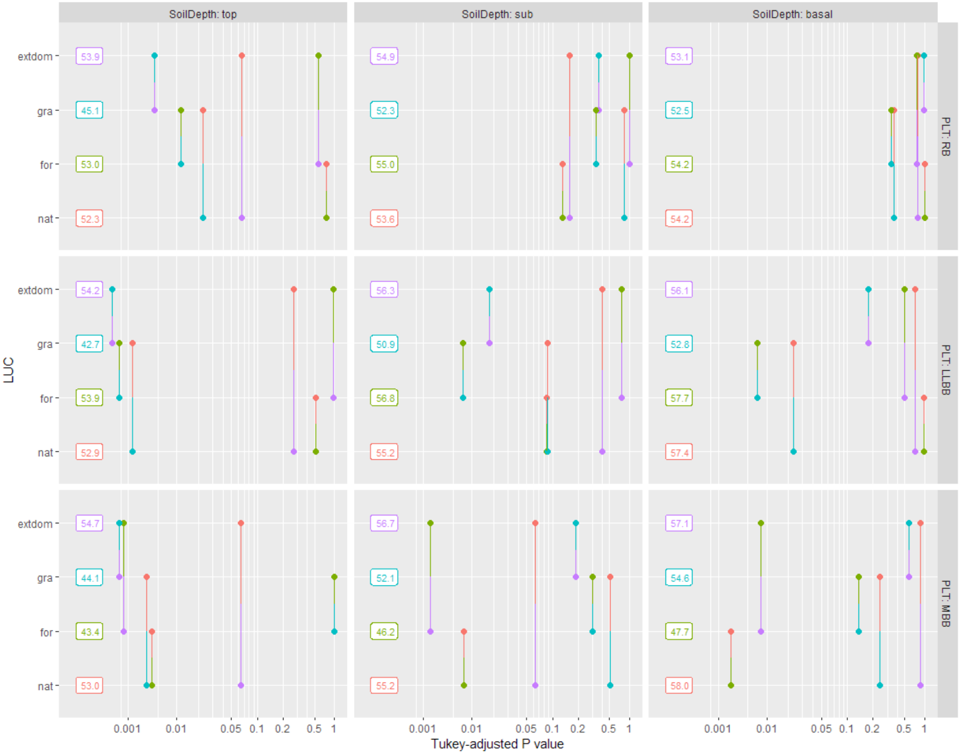
(a)



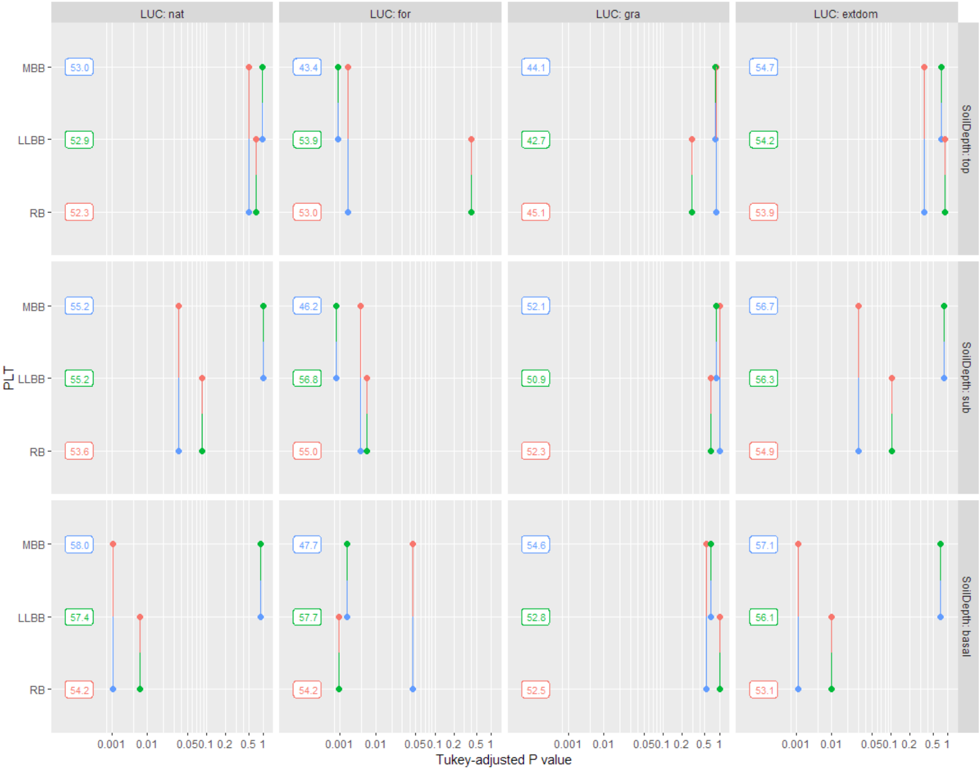
(b)



(c)


SoilDepth: top
SoilDepth: sub
SoilDepth: basal
PLT: RB
PLT: LLBB
PLT: MBB
LUC
extdom
gra
for
nat
53.9
45.1
53.0
52.3
54.9
52.3
55.0
53.6
53.1
52.5
54.2
54.2
54.2
42.7
53.9
52.9
56.3
50.9
56.8
55.2
56.1
52.8
57.7
57.4
54.7
44.1
43.4
53.0
56.7
52.1
46.2
55.2
57.1
54.6
47.7
58.0
0.001
0.01
0.05
0.1
0.2
0.5
1
Tukey-adjusted P value

(d)


LUC: nat
LUC: for
LUC: gra
LUC: extdom
SoilDepth: top
SoilDepth: sub
SoilDepth: basal
PLT
MBB
LLBB
RB
53.0
52.9
52.3
43.4
53.9
53.0
44.1
42.7
45.1
54.7
54.2
53.9
55.2
55.2
53.6
46.2
56.8
55.0
52.1
50.9
52.3
56.7
56.3
54.9
58.0
57.4
54.2
47.7
57.7
54.2
54.6
52.8
52.5
57.1
56.1
53.1
0.001
0.01
0.050.1
0.2
0.5
1
Tukey-adjusted P value

Appendix 6: Sub-peat substrate at surveyed sites

Bog Type	Site Name	Sub-peat Layer
Raised bog	Monivea	calcareous sediment
	Monganbog	blue clay sediment
	Cloonshanville	calcareous lake sediment-molluscs
	Scohaboy	calcareous lake sediment/blue clay/sand sediment
	Scohaboy	gyttja on sand on blue clay sediment
	Moyarwood	blue clay sediment
	Boora	calcareous-clay sediment
	Lanesborough	calcareous sediment
	Clara	calcareous sediment
	Castlerea	blue clay-sand sediment
	Clough	calcareous sediment
	Blackwater	gyttja on sand on blue clay sediment
	Curraghroe	blue clay-sand sediment
	Ballycollin	algae-calcareous sediment
Lowland blanket bog	Knockmoyle-Sheskin	rock
	Redhill	rock
	Ballyghisheen	rock
	Cloosh	rock
	Glencanane	rock
	Caher	rock
	Caanknoogheda	rock
	Gortnagan	rock
	Bellacorick	rock
Mountain blanket bog	Croaghonagh	rock
	TheCut	iron-rich red sandstone marl
	Glenlahan	iron-rich red sandstone marl
	Letterunshin	*Leached horizon over iron-enriched sub-soil over glacial till*
	Oxmountains	*Leached horizon over iron-enriched sub-soil over glacial till*
	Fiddandary	*Leached horizon over iron-enriched sub-soil over glacial till*