

Investigation of Moorland Burning and Carbon Dynamics for Climate Change Mitigation



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Introduction

Peatlands in the UK are managed mostly for economic purposes, with potentially serious consequences for their significant terrestrial carbon storage¹. Prescribed burning is one such major management practice that is practiced on approximately 18% of UK peatlands² which has been shown to affect the chemical, physical, and biological properties of peat.³ Yet, the impacts are highly debated and lack robust evidence. Therefore, further research is essential to better understand the impacts of prescribed burning on peat properties and its implications for the carbon storage potential of peatland ecosystems.



Fig 1. Peatland burning⁴

Aim: to investigate the impacts of prescribed burning on the chemical and physical properties of peat as well as microbial composition and functioning in the peatlands.

Study Site

A blanket moor, located in North Yorkshire, England, is the selected study site for this research. It spans an area of approximately 50 hectares and is characterized by its upland peatland ecosystem.

The present study compares areas that undergo regular controlled burns with adjacent unburnt and restored areas in this blanket moor.

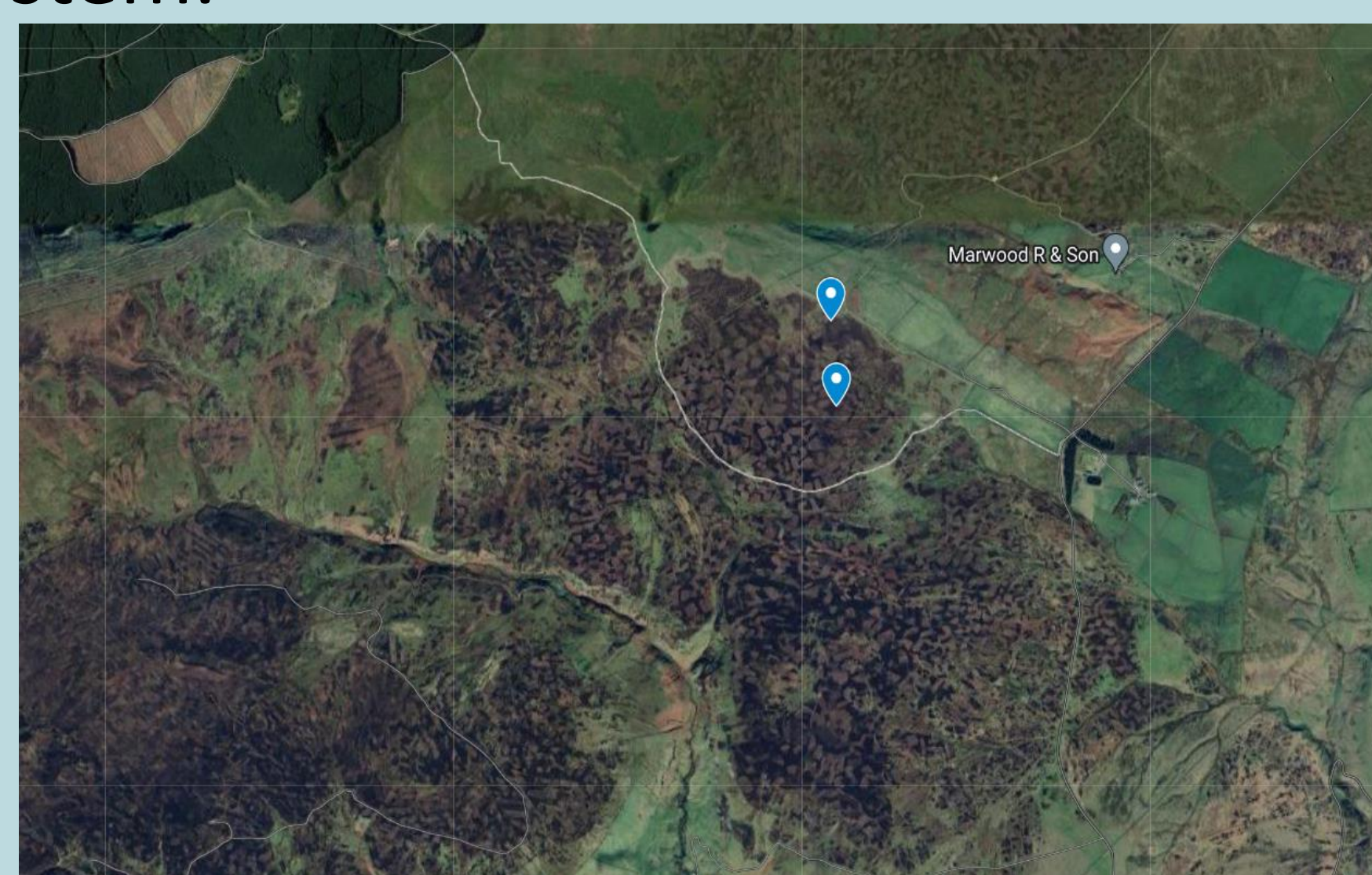


Fig 2. Map of the study area



Fig 3. An unburnt area of the study site



Fig 4. A recently burnt patch of the study site

Methods

Field campaigns and laboratory experiments will be conducted on peat samples from burnt, unburnt, and restored sites. Laboratory analysis will include:

Chemical Analysis

- TOC and TN
- Different element concentrations
- pH and Electrical Conductivity

Physical Analysis

- Soil Moisture (SM)
- Soil Bulk Density
- Loss on Ignition

Microbial Analysis

- Microbial community structure
- Microbial function
- Amoeba identification and quantification



Fig 3. Weighing samples for SM Analysis



Fig 4. Dried peat samples inside the oven



Fig 5. Samples inside the muffle furnace



Fig 6. Surface samples collected from contrasting sites: A. Restored 1 B. Past burnt C. Restored 2 D. Recently burnt

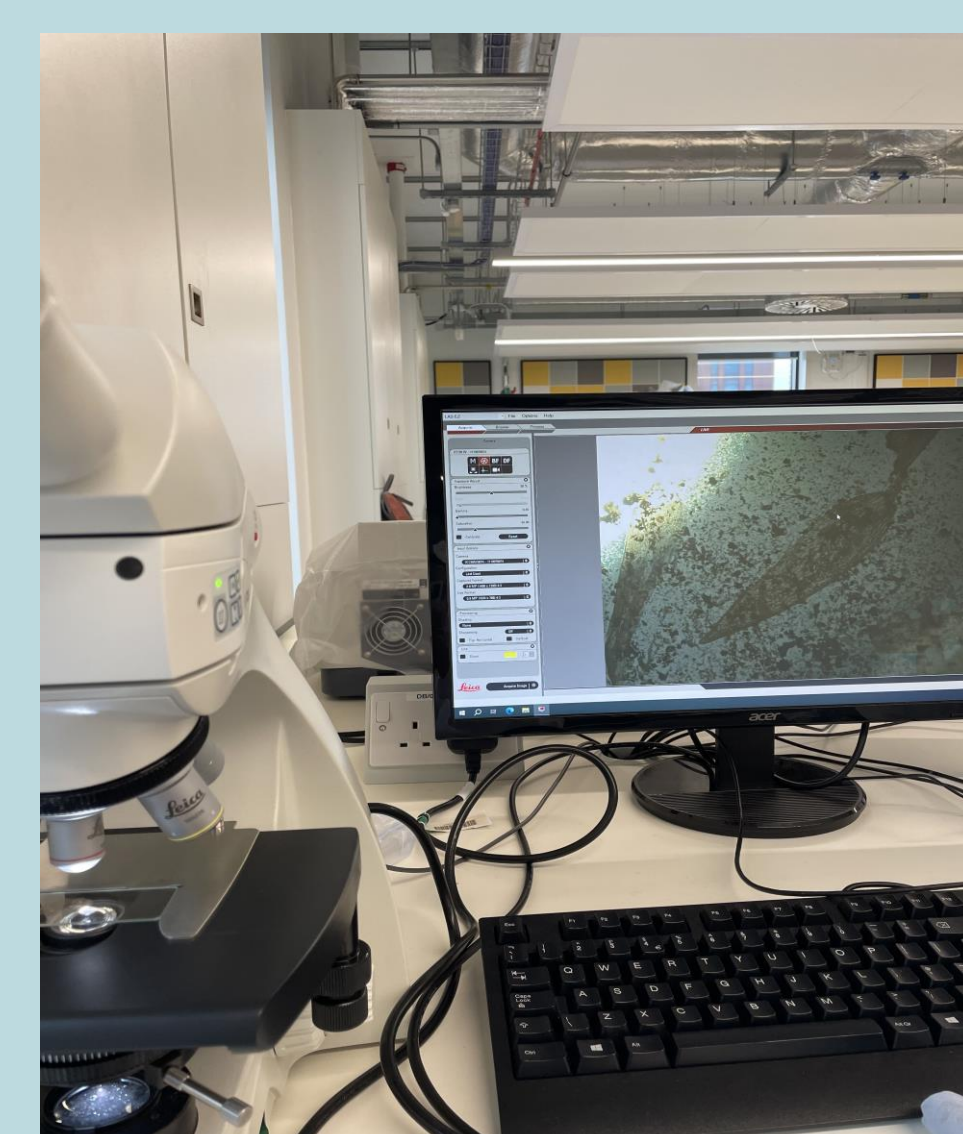


Fig 7. Stereo Microscopic analysis of Amoeba



Fig 8. *Nebela parvula*

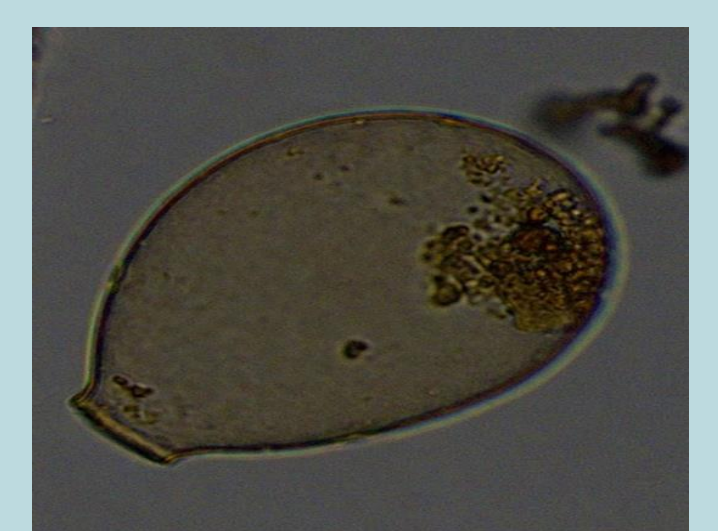


Fig 9. *Nebela tincta*

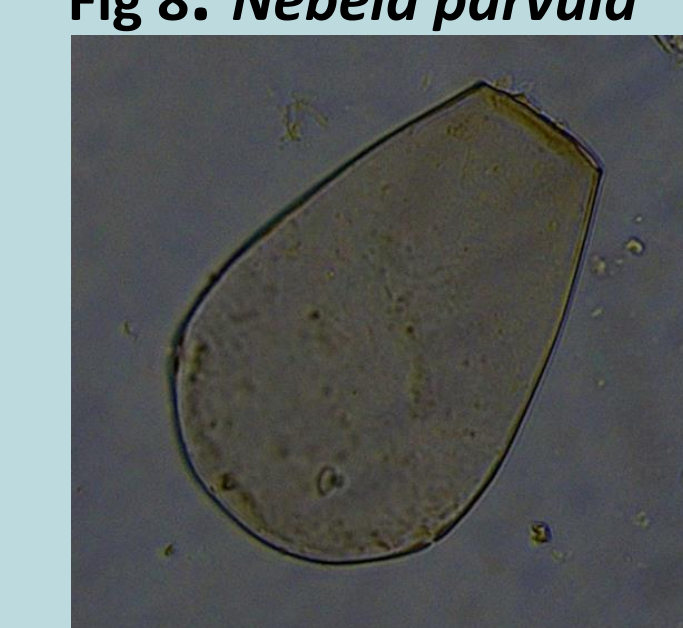


Fig 10. *Hyalosphenia papilio*



Fig 11. *Nebela flabellulum*

Project Contribution & Impact

The findings of this project will improve our understanding of how prescribed burning can impact the chemical, physical, and microbial properties of peat and will provide insights for policy development in conserving these invaluable peatland ecosystems.

Acknowledgement

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References

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