

Project title: Identifying bunding restoration opportunities in peatlands using remote sensing, and modelling their hydrological and hydraulic impacts

Ref: OP2435

Keywords: satellite; drones; hydrological modelling; ecological restoration.

One Planet Research Theme:

Climate & Climate Change | Earth System Processes | Anthropocene | Environmental Informatics

Lead Supervisor:

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Key Research Gaps and Questions:

- Can the use of remote sensing technology allow more efficient identification of opportunities for use of bunds in peatland restoration?
- How much water is stored by bunds and how does vegetation change in the surrounding areas?
- What impact do bunds have on the hydrology and hydraulics of peatland and how does this impact flood risk in the catchment?



Figure 1. Several bunds and their pools which were created as part of a pilot project at an estate in the North Pennines AONB.

Project Description:

The North Pennines Area of Outstanding Natural Beauty (AONB) Partnership's Peatland Programme was established in 2006, being nationally and internationally recognised since as one of the leading restoration programmes. Restoration has focused on blocking grips (artificial drains) and restoring eroding bare peat areas such as pans and gullies. However, there also remain vast areas of shallow gradient peatland which are vegetated but moisture deficient and lacking the peat-forming *Sphagnum* moss spp. which are critical to a healthy, functioning peatland. To restore these areas, there are now plans to expand use of a new technique called scallop/horseshoe bunding. These bunds are made from in-situ peat and create small water pools, thereby raising the water table and creating a water-rich environment for peatland fauna and flora. However, an efficient method is needed to identify further bunding opportunities at a landscape scale. Where are sphagnum mosses lacking, peatlands dry, and topography and peat depths suitable for bunding? Furthermore, to attract investment from the public or private sectors, it will be important to quantify the hydrological and hydraulic effects bunds have including water storage across a site and impacts on river heights and flood risk further down the catchment. This PhD project working closely with project partners at North Pennines AONB and other key stakeholders, will look to address these questions using a structured approach that will incorporate a mixture of multi-scale remote sensing, GIS, fieldwork, and modelling techniques. Training opportunities will be provided in field survey, drone operations, remote sensing and hydrological modelling.

Prerequisites: This project will suit an applicant with strong numerical skills and a willingness to master hydrological modelling and remote sensing and to undertake fieldwork. Knowledge of ecological and hydrological processes or geospatial sciences is advantageous. For more information, please contact Dr Rachel Gaulton (rachel.gaulton@ncl.ac.uk).

