

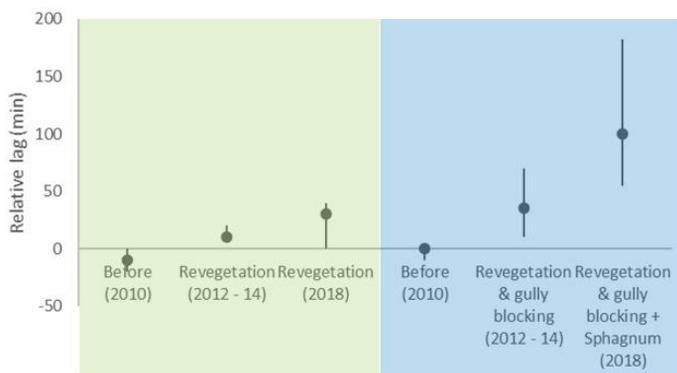


The challenges of measuring anything approaching normal conditions on the moors continue. Wildfire in February is unusual to say the least, so it was a relief when the temperatures dropped last week. Fortunately for us, none of our sites were affected and normal service has resumed in time for us to press on with fieldwork before bird-breeding season. There has been lots of activity in Protect and across the wider NERC NFM programme over the last couple of months. We have welcomed a new member of staff, had two papers published and have started to get some sensible results from our data, along with countless meetings, workshops and field days. Edited highlights below...

## Impacts of restoration on Kinder Scout

We've been monitoring field sites on Kinder Scout since 2010 in conjunction with our project partners, Moors for the Future Partnership. These sites were originally set up as part of the Defra funded [Making Space for Water](#) project, which investigated whether standard peatland restoration techniques can help alleviate flood risk downstream whilst also providing other ecosystem service benefits (\*spoiler alert\* they can). We set up three micro-catchments: one that was re-vegetated with a grass nurse crop; one that was re-vegetated and gully blocked; and an untouched bare peat control. In 2015, the site that was gully blocked was also planted with *Sphagnum* moss plugs as part of [MoorLIFE 2020](#).

Emma recently gave an update to MFFP on how stormflow behaviour at the sites has changed, and we thought we'd share our preliminary findings with you. We use many different metrics to help us understand what's going on, but the interventions have had the most striking impact on lag time - the time between peak rainfall and peak flow. The graph shows how lag times have changed after each phase of work. The green half represents the re-vegetated site, and the blue half represents the site that was blocked and planted with



*Sphagnum*. Data are presented as 'relative to control' to show the difference between the treatment sites and the sites that was left bare. Lag times have increased through time at both sites, but the greatest increase has been at the gully blocked site, where average lag times are an hour and a half longer than before restoration.

This shows that the interventions are slowing the flow of water and releasing it downstream more slowly. At present we aren't sure how much of this increase is due to gully blocks maturing and how much is from the *Sphagnum* planting, but we are setting up new experimental sites to help us figure it out.

## January Steering Group Meeting



We held a steering group meeting in Manchester in January. Most of our steering group meetings are done via teleconference to save our far-flung partners from travelling, but we aim to meet in person once a year. This was the first face-to-face meeting of the project, and it was great to put faces to names and have everyone together in one room. There were updates on field monitoring, a first look at some data, and an in-depth discussion to help us finalise which gully blocking designs we're going to trial. We also talked about the wider NERC-NFM programme ([Protect-NFM](#), [LANDWISE](#), and [Q-NFM](#)) and how we can tie the findings of the three projects together.



## NERC-NFM Programme modelling workshop



In February the modelling teams from the three NERC-NFM projects met in Lancaster to discuss their modelling strategies, present early results and share ideas. It was useful to hear from the teams about the different challenges that their catchments pose in terms of model representation. Some of the key themes from the day for the Protect team were: 1) the value of setting objective criteria for a model's success or failure before running the model (rather than just taking the best model no matter how good or bad); 2) the potential impact of evaporation even during storms; and 3) the different strategies available for channel / floodplain flow. This meeting was a valuable opportunity to talk both in person and in groups to modelling experts about our project.

## Two new papers showing benefits of peat restoration to NFM

Members of the Protect-NFM team have written two journal articles that have been published since the beginning of the year that highlight the NFM benefits of blanket peat restoration.

The first, [\*Restoration of blanket peat moorland delays stormflow from hillslopes and reduces peak discharge\*](#), discusses the findings of the stormflow element of the Making Space for Water project. It shows how re-vegetating bare peat using a grass nurse crop reduces peak flows by 27% and increases lag times by 106%, and that the addition of gully blocking doubles these impacts. The findings suggest that increased surface roughness is the key driver of change. This is the first time that a peer-reviewed paper details the NFM benefits of blanket peat restoration, and provides the starting point for the evidence base that we will continue to develop through Protect-NFM.

The second paper, [\*Trajectories of ecosystem change in restored blanket peatlands\*](#), frames the NFM benefits of blanket peatland restoration within the wider context of ecosystem services recovery. It shows how the changes in stormflow are accompanied by increased biodiversity, reduced sediment release, and water table recovery. The paper demonstrates how peatland management for NFM can sit within multi-benefit restoration initiatives.

Both papers are open access so are free to read online and download. Please feel free to share with your networks.

## Salim Goudarzi joins the team

We're extremely pleased to welcome Salim to the Protect-NFM team. He will be based at Newcastle University for the duration of the project, working with David Milledge as a Research Associate on hydrological numerical model development. We've given him the traditional Protect-NFM welcome of dragging him out in the rain during his first week on the job!

Salim has a BSc in Fluid Mechanics, MSc in Computational Fluid Dynamics (CFD) from Leeds, a PhD from Durham University in Petroleum Geophysics, and 7 years experience in numerical and analytical solution of "stiff" and "non-stiff" Partial Differential Equations (PDE) describing multi-component multi-phase flow, solute transport, and heat transfer in porous media.

