Research Experience Placement (REP) Scheme 2026

Supervisor Project Proforma

Project title:	Do Regenerative Farming Practices Improve Soil Hydraulic Properties? A Field and Laboratory Investigation Across SpongeScapes UK Case Study Sites
Host Institution:	UK Centre for Ecology & Hydrology (UKCEH), Wallingford
Project supervisor (name, department):	Dr Neeraj Sah, Water & Climate Science, UKCEH, Wallingford
Project enquiries (supervisor email):	neesah@ceh.ac.uk
Co-Supervisor(s) (name, department):	Dr Alejandro Dussaillant, Water & Climate Science, UKCEH, Wallingford Dr James Blake, Water & Climate Science, UKCEH, Wallingford
Proposed start date and weekly hours: (6 weeks duration)	Start date: 15 June 2026 End date: 24 July 2026 Duration: 6 weeks Hours per week: 37
Short project summary (max 75 words):	Working within the SpongeScapes project, the intern will investigate whether regenerative land management improves soil hydraulic properties compared to conventional farming — and what that means for flood and drought resilience. Using new field measurements alongside an existing multi-year dataset from paired agricultural sites in Oxfordshire that started in LANDWISE and Evenlode NFM projects in 2019, the intern will carry out soil sampling, infiltration and percolation tests, laboratory analysis, and data analysis and visualisation.
Project description (max 700 words):	**Background** Regenerative agriculture — encompassing practices such as minimal tillage, cover cropping, and managed grazing — is widely promoted as a way to improve soil health. Better soil structure means higher infiltration rates and greater water - holding capacity, which can reduce surface runoff and increase resilience to both flood and drought. Despite growing interest, quantitative evidence comparing soil hydraulic properties between regenerative and conventional systems at the field scale remains limited. This internship is embedded within SpongeScapes (EU Horizon and UKRI-funded; 2023–2027), research project investigating how natural landscapes can be restored to absorb, store, and slowly release water — reducing flood peaks, alleviating drought, and improving water quality. These "sponge measures" include woodland planting, regenerative agriculture, and Natural Flood Management (NFM) features such as leaky dams, field corner bunds and storage ponds. UKCEH is leading investigations at four UK case study sites, including paired semi-conventional and regenerative agricultural sites, a regenerative grazing site in Oxfordshire, and the Littlestock Brook NFM site. Seasonal soil surveys have been underway since 2023 to pair with those done 5 years before within LANDWISE NFM, and the intern will contribute to this ongoing programme.

Research Question

How do soil hydraulic properties differ between regenerative and conventional agricultural land management, and what does this mean for flood and drought resilience?

Tasks

1. Field data collection:
    - Soil sampling for porosity analysis across paired regenerative and conventional and other sites
    - Infiltration testing using ring infiltrometers and mini-disk infiltrometers
    - Percolation testing using the Guelph permeameter
    - Trialling the SATURO dual-head infiltrometer, worm count and soil compaction tests, and developing SOPs for both instruments
2. Laboratory analysis:
    - Porosity determination from collected soil samples
    - Learning to independently conduct soil water retention curve (SWRC) analysis on already collected samples, and comparing results with previously analysed samples from contrasting land use and management types
3. Data analysis:
    - Integrate new measurements with existing 2–4-year dataset from the same sites
    - Compare hydraulic properties across land management types and produce clear visualisations of findings
    - Generate useful parameterisation data for future modelling

Expected Outcomes

- New dataset of soil hydraulic properties across regenerative and conventional land management types
- Standard operating procedures (SOPs) for the SATURO infiltrometer and soil compaction testing
- Short report summarising findings and implications for NbS for flood and drought resilience, NFM, and numerical model parameterisation
- Presentation of results to the UKCEH team

Training and Wider Experience

The intern will be based at UKCEH Wallingford and will receive hands-on training in field soil measurement techniques, laboratory analysis, and environmental data management. They will interact with the COSMOS-UK soil moisture network team and the Floods and Droughts Research Infrastructure (FDRI) project team, gaining exposure to different field monitoring approaches, instruments and their wider research. They will be encouraged to take part in any workshops or webinars available during the placement and will attend regular team meetings at UKCEH.

Project timeline:

The timeline below is indicative. Week-by-week activities will be adjusted to account for weather, site access, and other logistical factors.

- Week 1 (15–19 Jun): Induction and safety training; background reading on regenerative agriculture, soil hydraulic properties, and their role in flood and drought resilience; introduction to existing dataset and sites
- Week 2 (22–26 Jun): Training in field protocols; first field visits — soil sampling, ring and mini-disk infiltrometers, Guelph permeameter; begin SATURO and soil compaction test trialling

	• Week 3 (29 Jun–3 Jul): Further field data collection across all paired sites; develop SOPs for SATURO and soil compaction test; begin laboratory processing of soil samples • Week 4 (6–10 Jul): Undertake laboratory analysis (porosity determination, water retention curves); integrate new data with existing dataset • Week 5 (13–17 Jul): Statistical analysis and data visualisation; • Week 6 (20–24 Jul): Write up report; prepare and deliver presentation to UKCEH team; submit student reporting form
Candidate requirements:	**Essential:** • Currently studying for an undergraduate degree in Physical Geography, Environmental Science, Hydrology, Soil Science, or a closely related discipline • Interest in field-based environmental research and laboratory work • Basic data analysis and visualisation skills (e.g. Excel, Python, or R) • Willingness to work outdoors in variable summer weather conditions
Background reading and references:	• Dussaillant, A., Sah, N., Blake, J., Rameshwaran, P. and Old, G. (2025) Sponge function: indicators and metrics to assess water retention in Nature-Based Solutions with application to UK fluvial and agricultural sites, EGU General Assembly, Vienna, Austria, 27 Apr - 2 May 2025, EGU25-17085, https://doi.org/10.5194/egusphere-egu25-17085 • Robotham, J., Trill, E., Blake, J., Rameshwaran, P., Scarlett, P., Old, G., and Clark, J. (2025) Soil hydraulic and hydrological data from seven field sites in the Thames catchment, UK, 2021, Earth Syst. Sci. Data, 17, 4277–4291, https://doi.org/10.5194/essd-17-4277-2025 • Ponnambalam R., Blake, J., Trill, E., Robotham, J., Bishop, J., Old, G., O'Brien, A. and Scarlett, P. (2024) Nature-based solutions (Nbs) for flood mitigation: Recent UK case studies, 6th International Conference on Science and Technology Applications in Climate Change (STACLIM 2024), Terengganu, Malaysia, 3-5 Sep 2024, E3S Web of Conferences (Environment, Energy and Earth Sciences), 599, https://doi.org/10.1051/e3sconf/202459902004 • Robinson, D.A. et al. (2022) Global meta-analysis of soil hydraulic properties on the same soils with differing land use. Science of the Total Environment, 158506. https://doi.org/10.1016/j.scitotenv.2022.158506 • Blanchy, G. et al. (2023) Soil and crop management practices and the water regulation functions of soils: a qualitative synthesis of meta-analyses relevant to European agriculture. SOIL, 9, 1–20. https://doi.org/10.5194/soil-9-1-2023 • Blanchy, G. et al. (2023) Impacts of soil management and climate on saturated and near-saturated hydraulic conductivity: analyses of the Open Tension-disk Infiltrometer Meta-database (OTIM). HESS, 27, 2703–2724. https://doi.org/10.5194/hess-27-2703-2023 • Dadson, S.J. et al. (2017) A restatement of the natural science evidence concerning catchment-based natural flood management in the UK. Proceedings of the Royal Society A, 473. https://royalsocietypublishing.org/rspa/article/473/2199/20160706/57383/A-restatement-of-the-natural-science-evidence • SpongeScapes Project (2023–2027) EU Horizon Europe Grant No. 101081634. https://www.spongescapes.eu/

To be completed by institutional CENTA PoC

I confirm that:

- The host institution takes responsibility for selecting a suitable undergraduate student and ensuring and confirming their eligibility under the NERC REP student eligibility criteria.

- This REP project falls within the NERC remit, is of suitable quality and meets the REP research project criteria.
- Appropriate supervisory arrangements are in place.
- The application processes used will be inclusive and accessible.
- Reasonable adjustments will be made for students that need them whilst undertaking placements.
- The placement will be carried out in accordance with all applicable ethical, legal and regulatory requirements including relevant provisions of the GDPR, Data Protection Act 2018, Equality Act 2010 and Modern Slavery Act 2015.
- The host organisation takes responsibility for identification, protection and exploitation of any intellectual property rights arising from the work.
- All facilities, agreements about access and collaborations necessary for the work will be obtained before the work commences.
- All costs awarded by NERC for the REPs will be used and accounted for appropriately.
- A report of the project by the student will be submitted no later than one week after the end date of the placement or Friday 25th September 2026, whichever falls first.
- A PhD interview (where possible) will be offered to all students who have completed a REP within the CENTA Doctoral Landscape Award.

Signed: _____

Date: _____

Position: _____