

Climate Change and the Uplands: Integrating Current Scientific Knowledge to Inform Policy

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1. Background

The UK uplands cover around 40% of the land, contain the most of the national soil carbon stocks, supply around 70% of the drinking water, are used to supply food and timber, support tourism and many recreational activities¹. They are an important national asset that may be put under additional pressure from a changing climate. Recent observations of a decline in UK soil carbon stocks² and increased carbon in UK freshwaters³ have highlighted the need for improved understanding of upland ecosystem functioning and 'service' provision (e.g. carbon storage, water quality, biodiversity etc.) to inform effective management now and in future. This project intends to bring together existing knowledge and data through a partnership network to identify what is known and what needs to be understood to deliver sustainable management of upland resources.

2. Key questions for policy makers

Key questions to be addressed by this project were identified by scientist, policy makers and other stakeholders at an EA-QUEST workshop⁴ held in Nov 2007:

- Does the 'condition' and 'pressures' on upland soils vary across the UK?
- What are the risks to upland soils and their services in the future?
In particular, will peat still be able to form under a changing climate?
- How might uplands ecosystems services be expected to change?

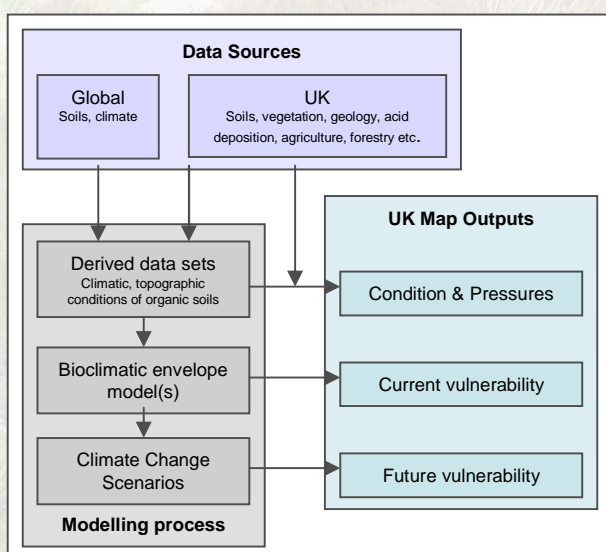


Figure 1. Workflow for project: data collation, modelling and map outputs

References

- ¹Orr HG, Wilby RL, McKenzie-Hedger M, Brown I (2008) *Climate Research*, 37: 77-98.
²Bellamy PH, Loveland PJ, Bradley RI, Lark RM, Kirk GJD (2005) *Nature*, 437: 245-248.
³Evans CD, Monteith DT, Cooper DM (2005) *Environmental Pollution*, 137: 55-71.
⁴Climate change and uplands: Science to inform adaptation, EA-QUEST Workshop, 8th-9th November 2007, Bristol, UK http://quest.bris.ac.uk/workshops/upland/EA-QUEST_Uplands_wkshp_rept.pdf

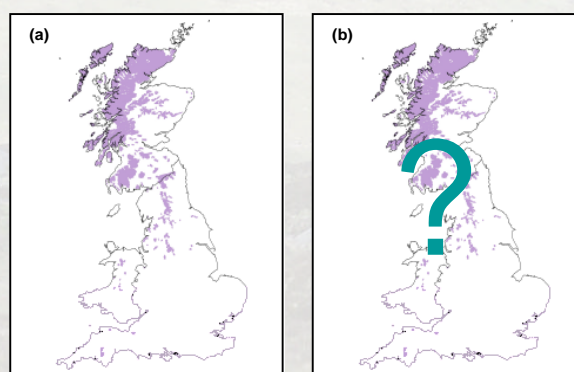


Figure 2. Ombrotrophic peat distribution (a) 1985 (current) (b) 2080 (future)
 Data from European Soils Database (Vector v2.0), eusoils.jrc.it/ESDB_Archive, based on FAO classification for Dystric Histosols (Od) where pH H₂O (1.5) is less than 5.5 in top 20-50 cm.

3. Research approach

Current knowledge and existing data will be integrated to produce national scale maps (Figure 1) to aid policy makers/managers prioritise action on:

- Current 'condition/use' and 'pressures' on upland soils
Develop 'best evidence' from available data on soils, geology, vegetation, land use, climate, atmospheric deposition/critical loads, agriculture, forestry, tourism etc. to identify assess likely condition and areas under most/least pressure.
- Vulnerability of peat formation to climate change
Develop bioclimatic envelope model(s) for peat distribution from
 - Global data (top-down approach)
 - UK data (bottom-up approach)
 to assess future peat distribution under climate change scenarios provided by UKCIP08 (Figure 2). Output will be compared to other point based peat accumulation models.

More information

Project web site: quest.bris.ac.uk/research/wkg-gps/soil.html
 Current and future vulnerability for organic soils: Joanna Clark (j.m.clark@bangor.ac.uk)
 Ecosystem services: Sarah Cornell (sarah.cornell@bristol.ac.uk)

This is a partnership project (collaborators listed below and on Knowledge map quest.bris.ac.uk/research/wkg-gps/soil/knowledge_map.pdf). We're keen to involve all people with an interest in the Uplands. If you're interested in getting involved please contact Joanna Clark.

Acknowledgements from workshop⁴

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