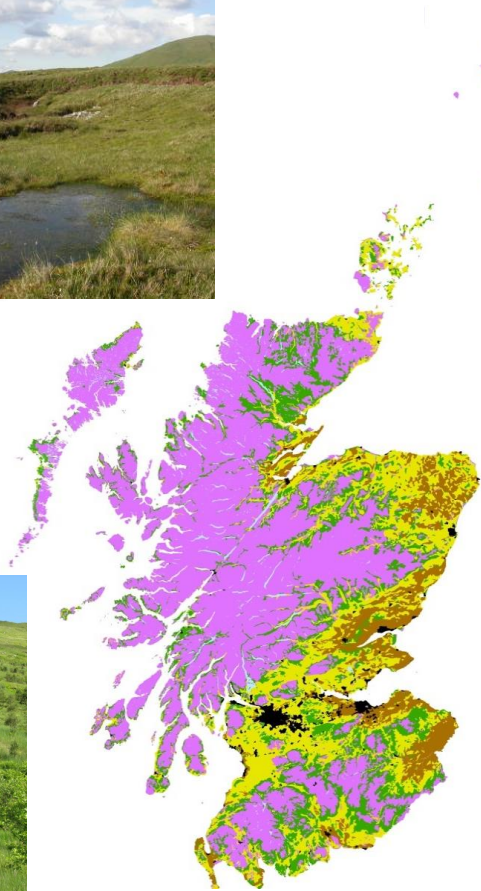


# Ecosystems and Land Use Stakeholder Engagement Group (ELSEG), 9<sup>th</sup> March 2022: Climate Change



# Adaptation of an ecosystem foundation species

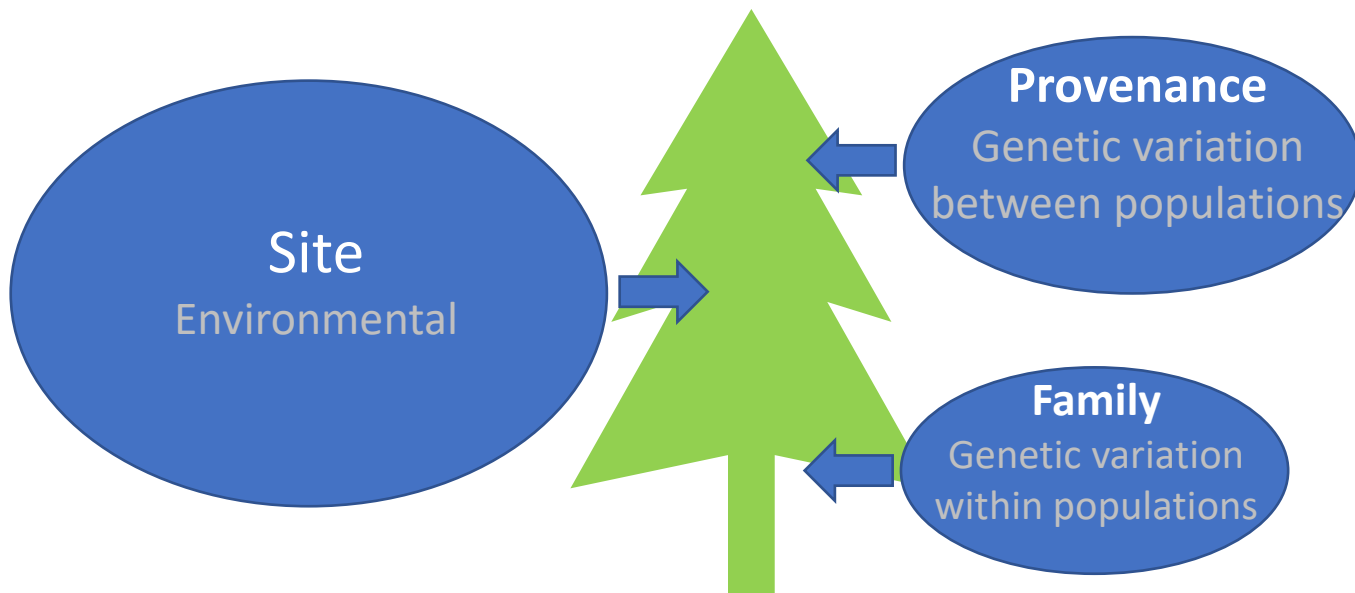
Glenn Iason, Joan Beaton, Jenni Stockan, Alison Hester

Project partners: UKCEH Stephen Cavers, Annika Perry; Forest Research Joan Cottrell



# Western provenances more resilient under current climate but eastern provenances may do better in the future

Early growth strongly influenced by environment (e.g. nursery, outdoors), legacy effect still evident >14 years.



Trait/Provenance	West	East
Growth	↑	↓
Supporting biodiversity	↑	↓
Resistance to insect pests	↑	↓
Resistance to fungal pathogens	↑	↓
Drought resistance	↓	↑
Frost tolerance	▭	▭

...but eastern provenances show greater plasticity.

# Assessing ecosystem services in the uplands

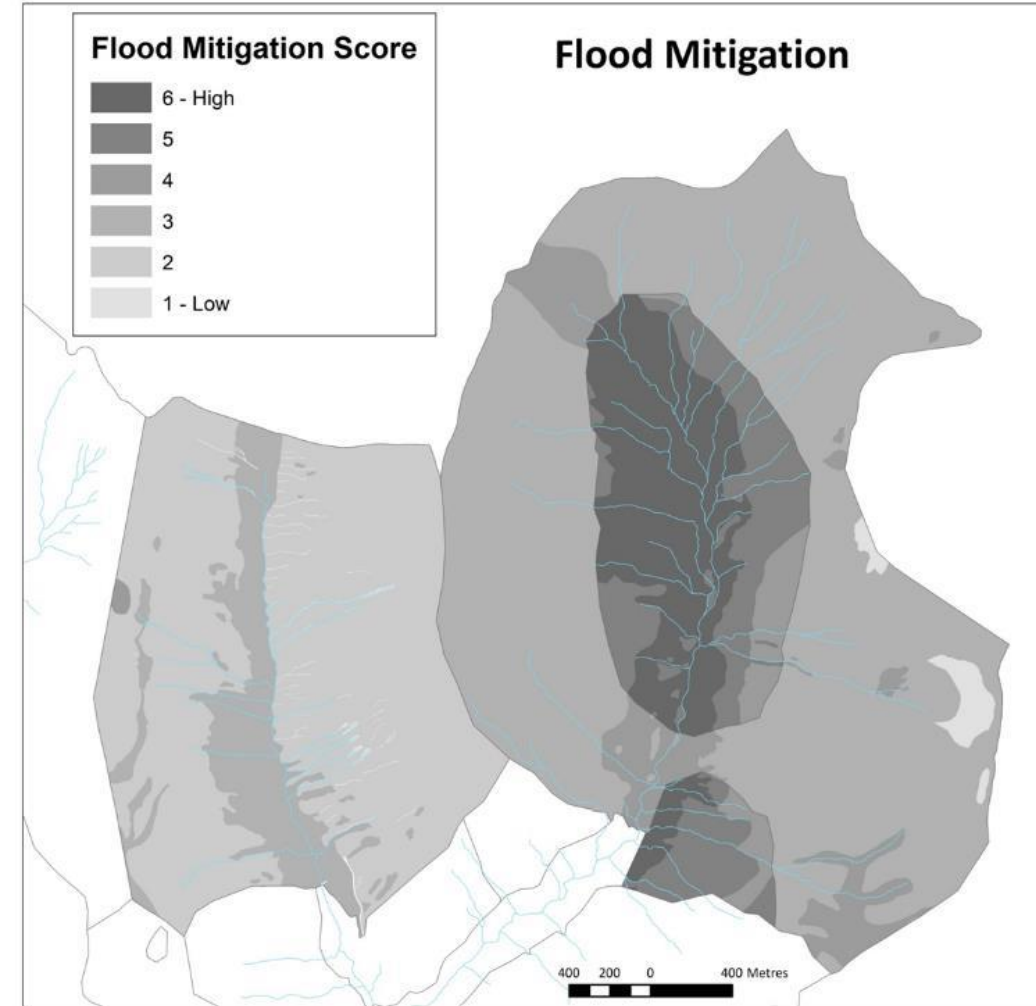
Davy McCracken, John Holland & Alistair McVittie

The way our uplands are managed can play a key role in dictating how valuable it is for providing a wide range of ecosystem services – such as flood mitigation, carbon sequestration, biodiversity, cultural heritage, and recreation.

**Research at SRUC Kirkton & Auchtertyre farms has been assessing public good provision from two adjacent large highland glens, one that was planted with montane woodland over twenty years ago and the other which is grazed by sheep and cattle**



# Provisioning, Supporting, Regulating & Cultural Services



# Assessing ecosystem services in the uplands: pathogen transmission

Beth Wells & Lee Innes

*Cryptosporidium* is a parasite can cause serious gastro-intestinal disease in young animals. Several species are zoonotic and can also be a danger to human health. The oocyst, or egg stage, can survive in damp and humid environments for years and is therefore a major concern to water providers if it enters water destined for human consumption.

**A joint Moredun, SRUC, Stirling University and Scottish Water project compared the prevalence of the parasite in two parallel glens, which exhibit similar topography and weather patterns, but different land management strategies**



The ungrazed Kirkton catchment supported a large population of field voles (*Microtus agrestis*). These animals use latrines and of the 59 latrine samples analysed, all of them tested positive for *Cryptosporidium*.



**The high prevalence in voles suggests that they may be causing a high environmental load of *Cryptosporidium* oocysts. However, when the DNA was sequenced, the species was found to be a water isolate, which is non-pathogenic to both livestock and humans.**

# Peatland restoration

Rebekka Artz, Alessandro Gimona



Restoring Scotland's degraded peatlands has the potential to help sequester carbon , create fully functioning wetlands and help address both the Climate Emergency and Biodiversity Crisis. But tracking how successful such rewetting has been can be laborious and time-consuming and may take years to achieve.

**We combined Earth Observation data of soil moisture at 1 km scale with Rainfall data to develop a soil moisture index at 20 m scale and assessed the potential to track changes in soil moisture throughout the year.**

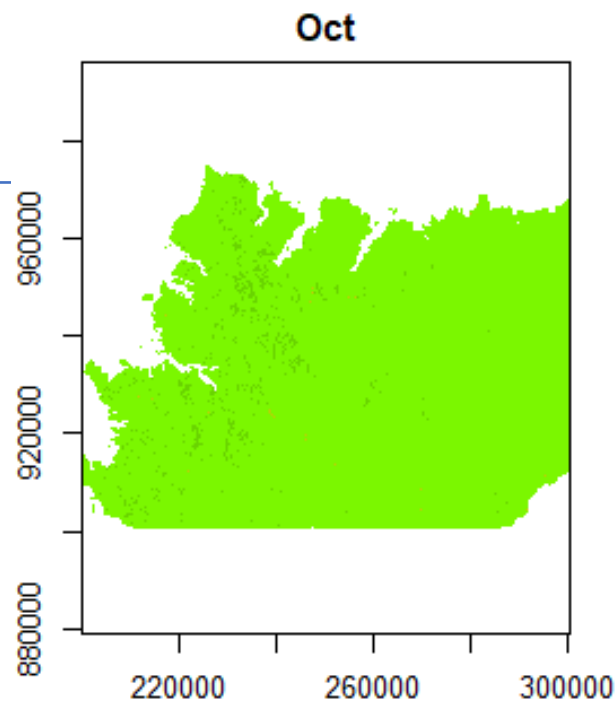
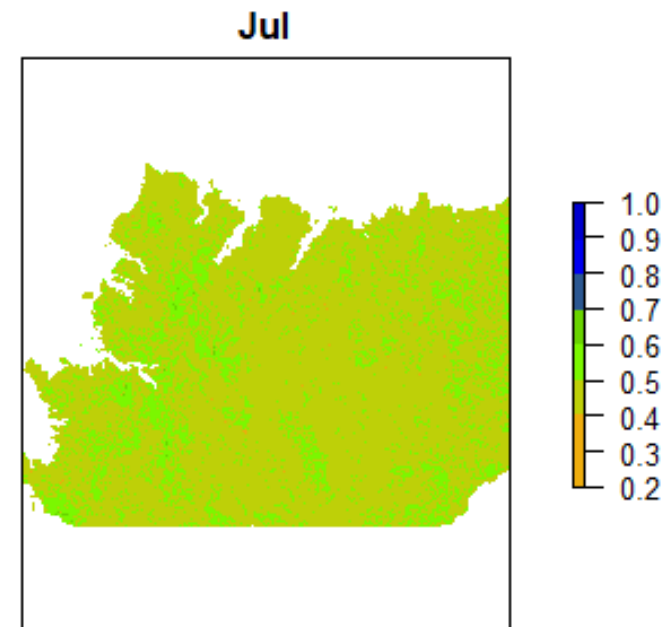
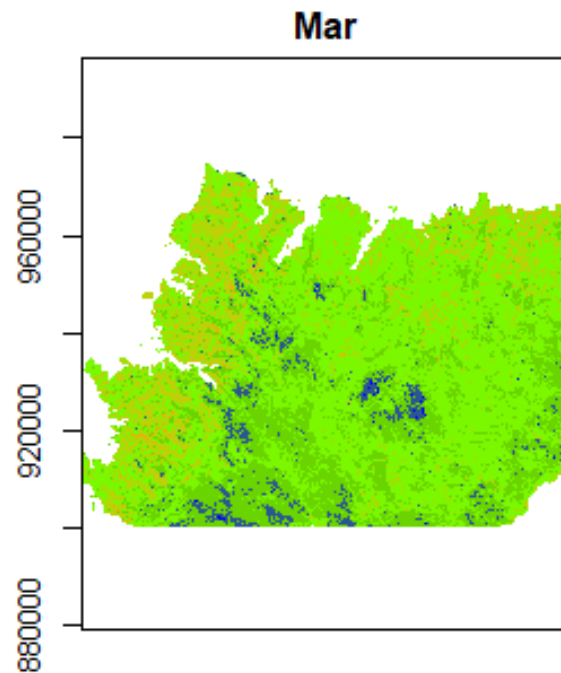


# Soil Moisture Index (20 m resolution)

1 Km resolution Soil  
Moisture Index  
(from ESA)

NIMROD  
(RADAR) rainfall data

20 m resolution  
satellite covariates



# Predicting ticks and Lyme disease risk under climate change and mitigation scenarios

Lucy Gilbert

Ticks carry a wide range of pathogens, including the bacteria that cause Lyme disease – the most prevalent vector-borne disease in the northern hemisphere.

We developed agent-based models to address the question:

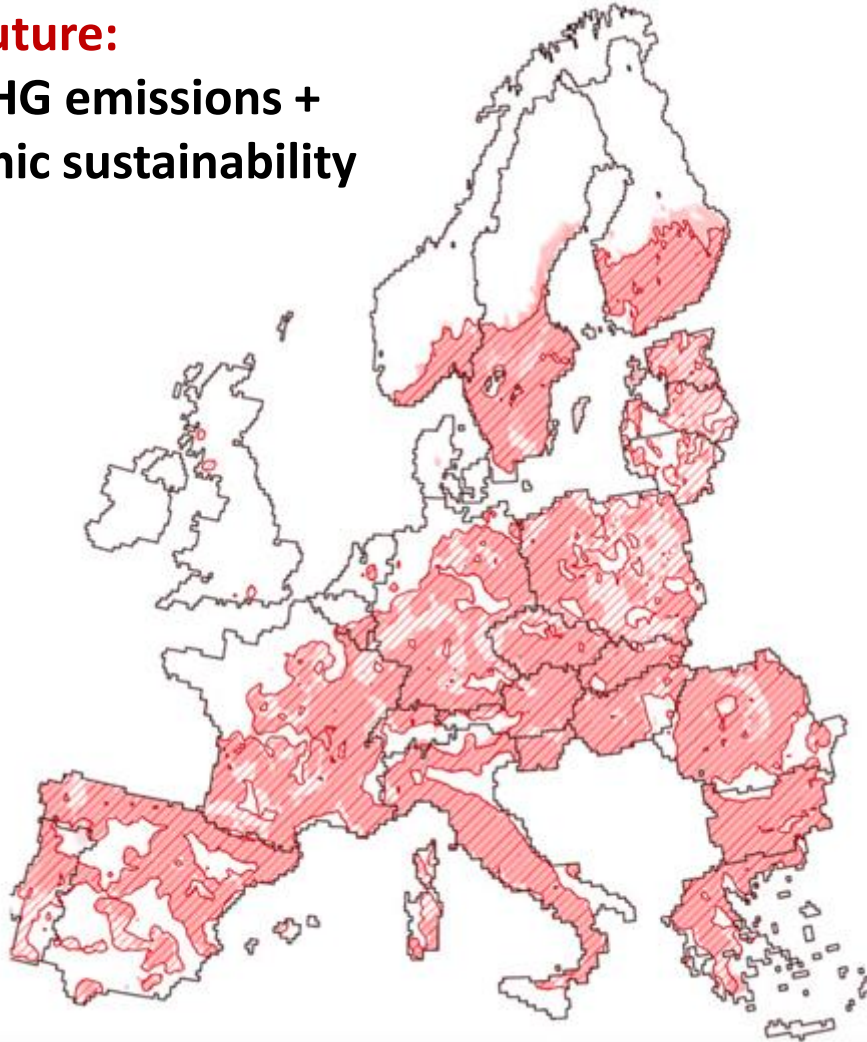
**How will climate change, mitigation strategies and future socio-economic scenarios impact ticks and Lyme disease risk?**



# Lyme disease risk is projected to increase with higher GHG emissions and socio-economic disparity

## Least risky future:

Minimum GHG emissions +  
socioeconomic sustainability



## Most risky future:

Intermediate GHG emissions +  
socioeconomic disparity

