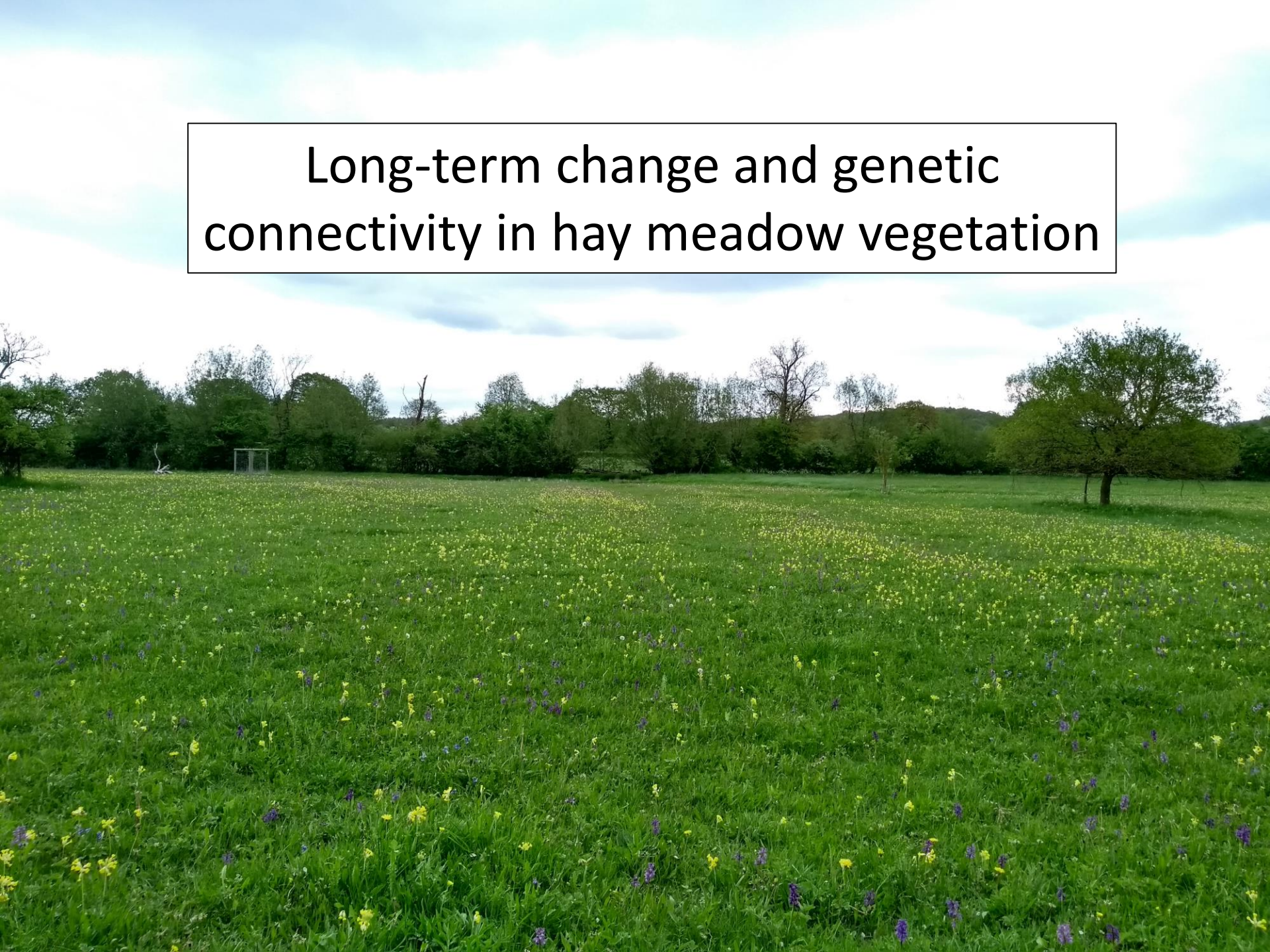
# Long-term change and genetic connectivity in hay meadow vegetation

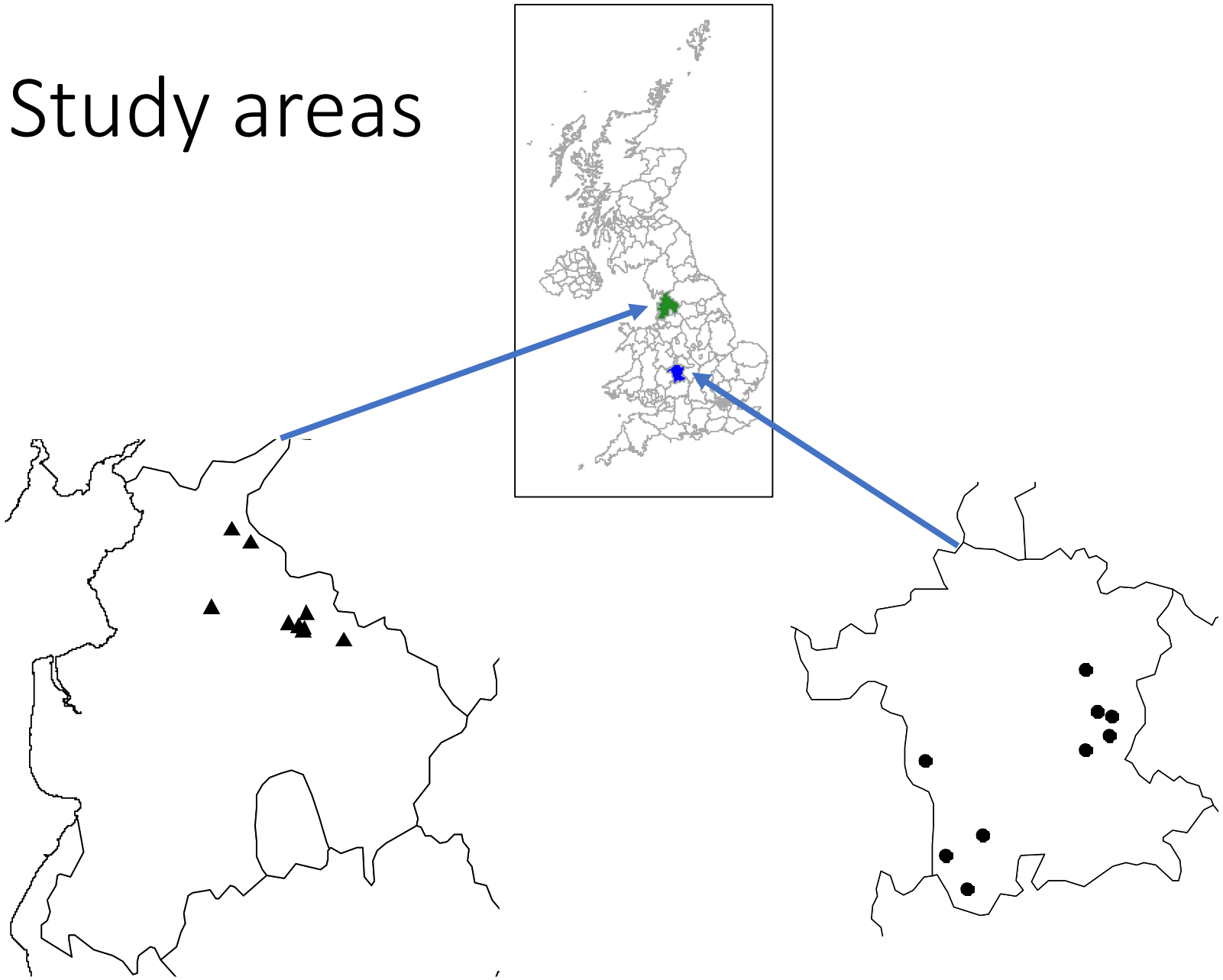



Why meadows?

# Research questions

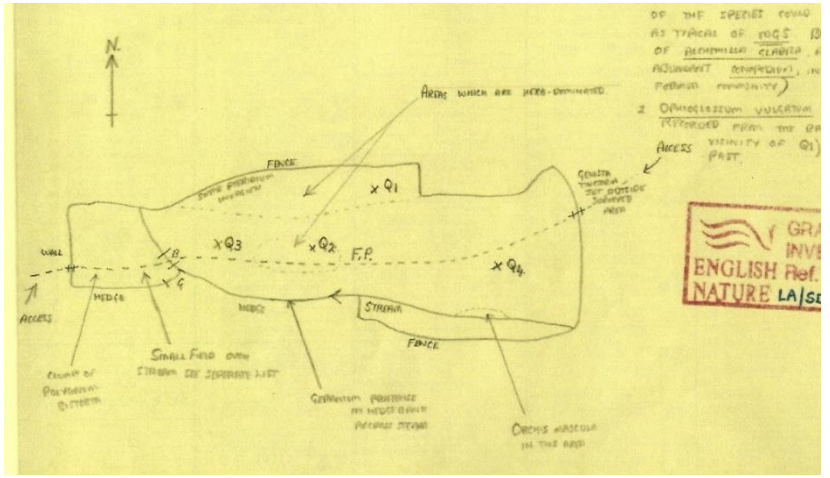
- How has vegetation changed over 25 years?
- How has genetic diversity and connectivity been affected by habitat fragmentation?

# Study areas

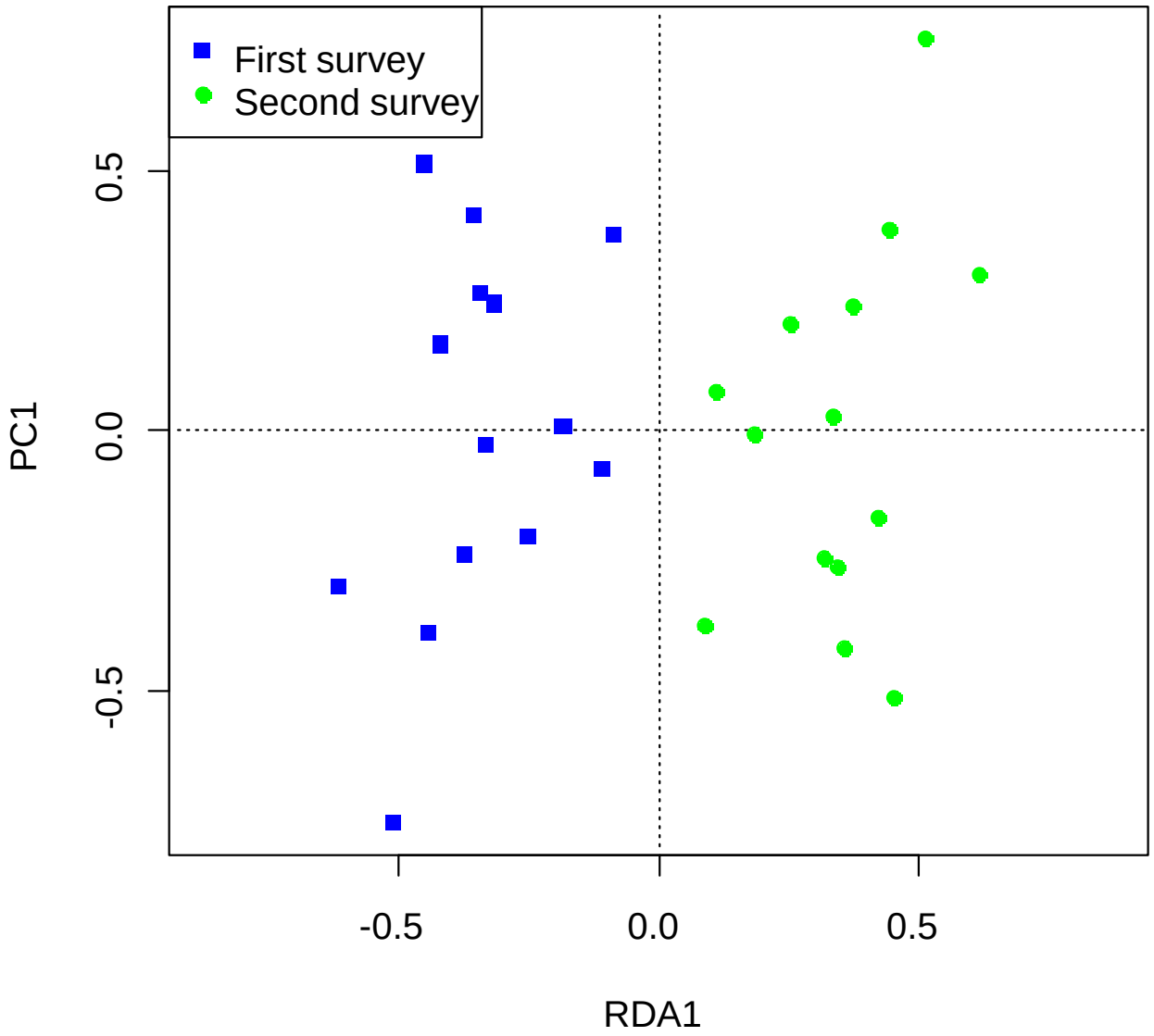


# Long-term change in vegetation

- Repeat surveys of 14 meadows
- 1m x 1m quadrats and site species lists
- Data analysis




# Significant change in overall community composition



Group of positive indicator species –similar result for each survey

But when individual species analysed…fewer meadow specialists

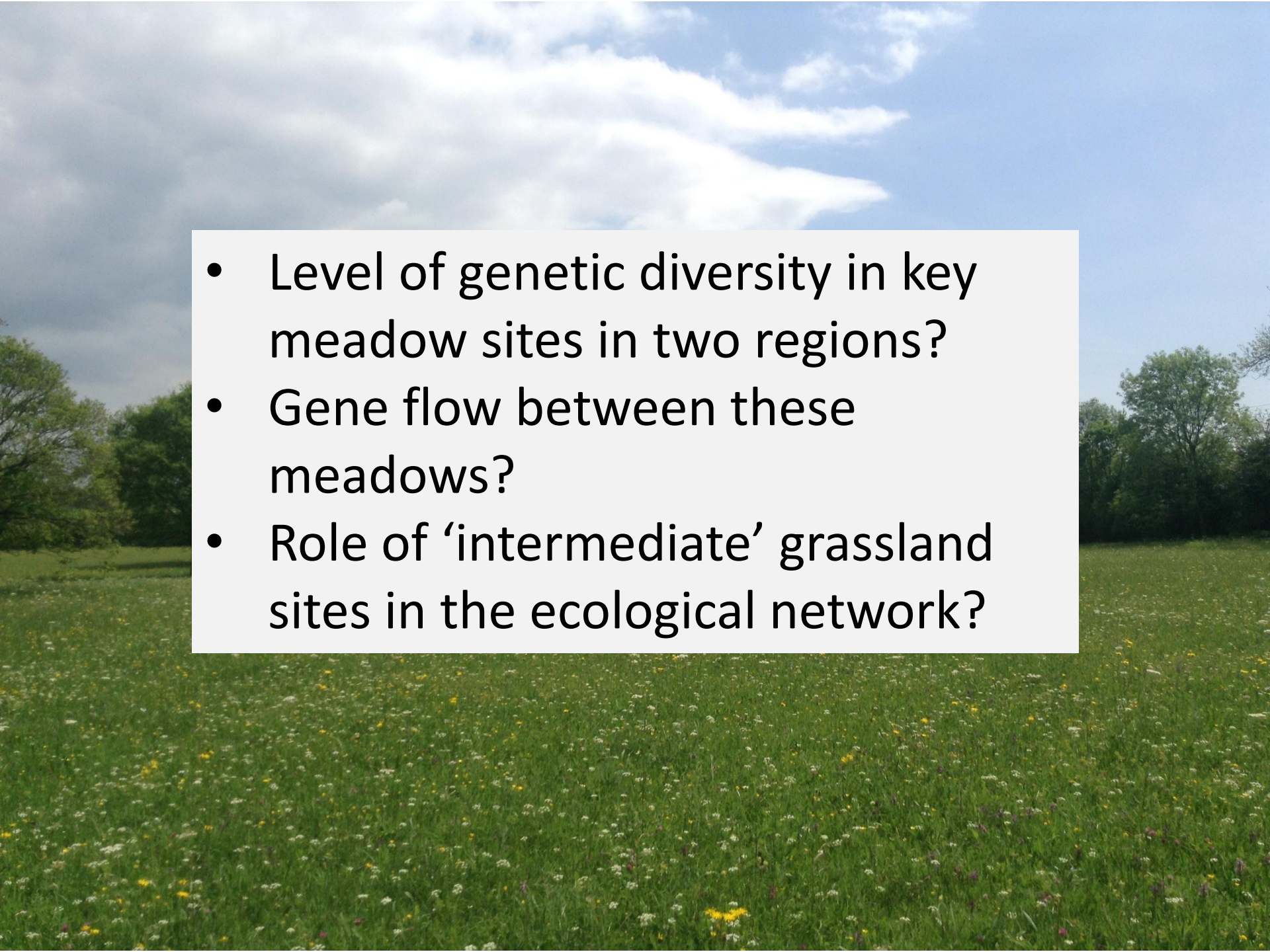
- Increases in grassland generalists
- Vegetation more homogenous
- More annuals

# Drivers for change

1. Standard approach to management
2. Climatic conditions - increased soil moisture; *Alchemilla glabra* has a northern distribution
3. Soil fertility affected by aerial nitrogen deposition?
4. Habitat loss (fragmentation)

# Genetic diversity and connectivity

- Loss of genetic diversity, potential for reduced resilience to environmental change
- Large populations more likely to have higher levels diversity
- Connected populations also more likely to be genetically diverse



- Level of genetic diversity in key meadow sites in two regions?
- Gene flow between these meadows?
- Role of ‘intermediate’ grassland sites in the ecological network?

## Intermediate sites

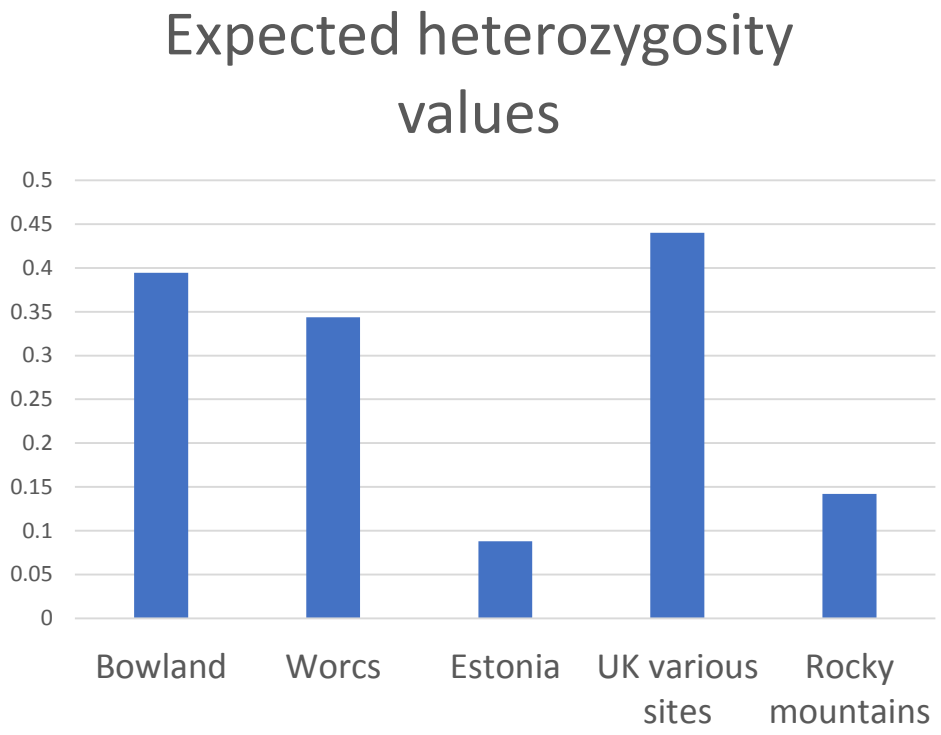
- Roadside verges
- Field edges
- Churchyard

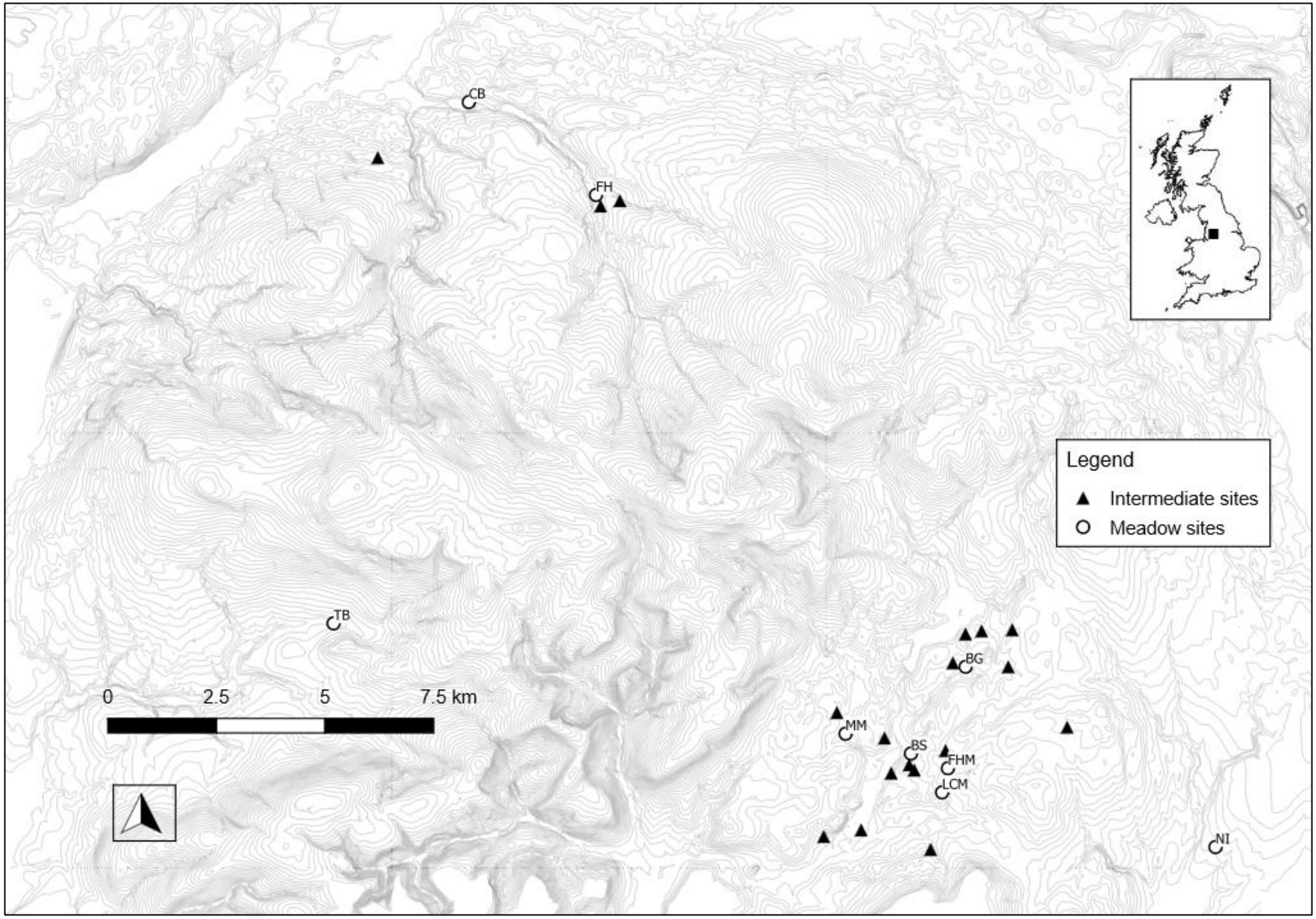
# Study species

- *Rhinanthus minor*, Yellow rattle
- Annual
- Insect pollinated
- Representative species

# Results: genetic diversity

- Moderate genetic diversity
- Expected heterozygosity higher than in some other studies

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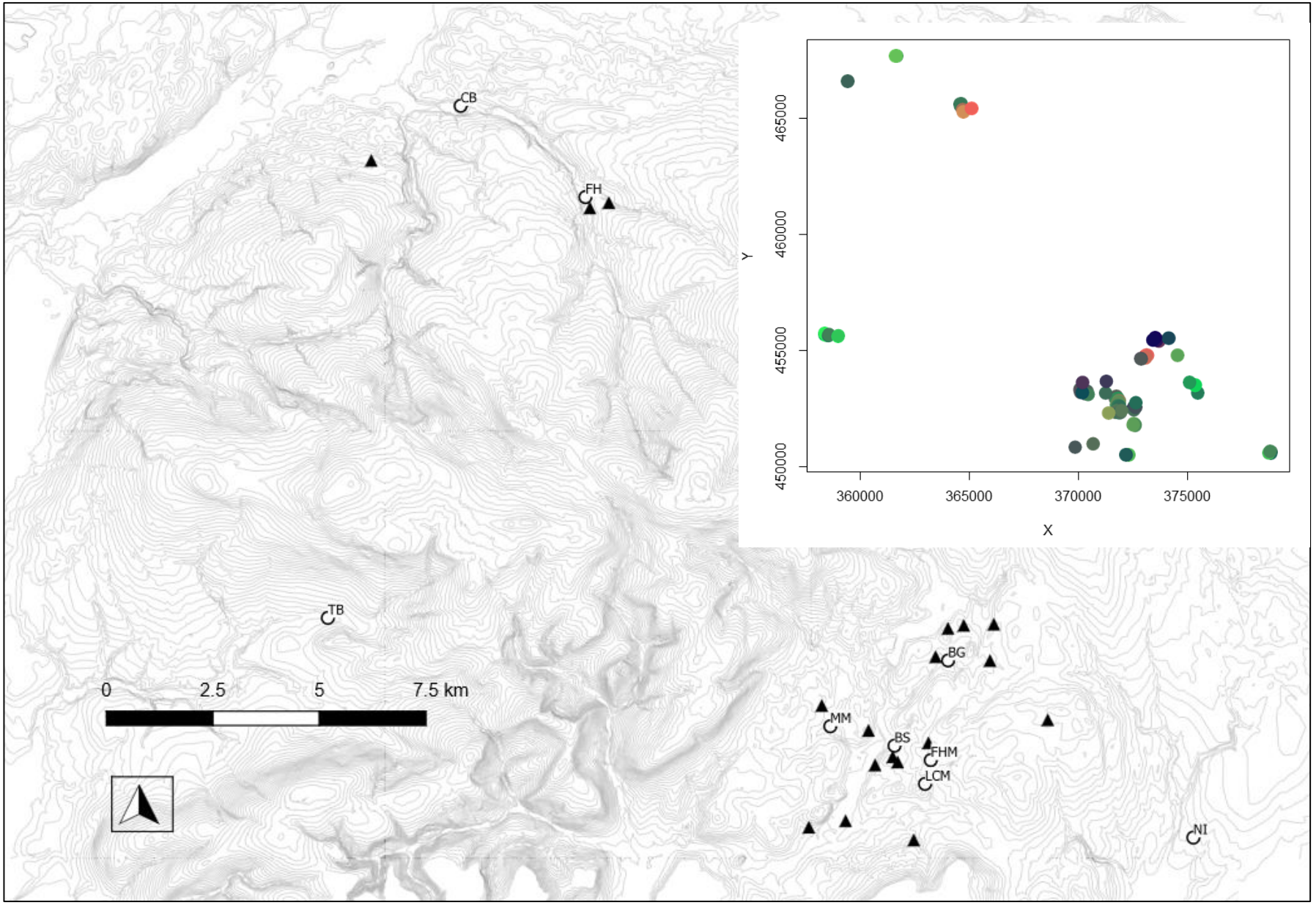
Legend
Intermediate sites
Meadow sites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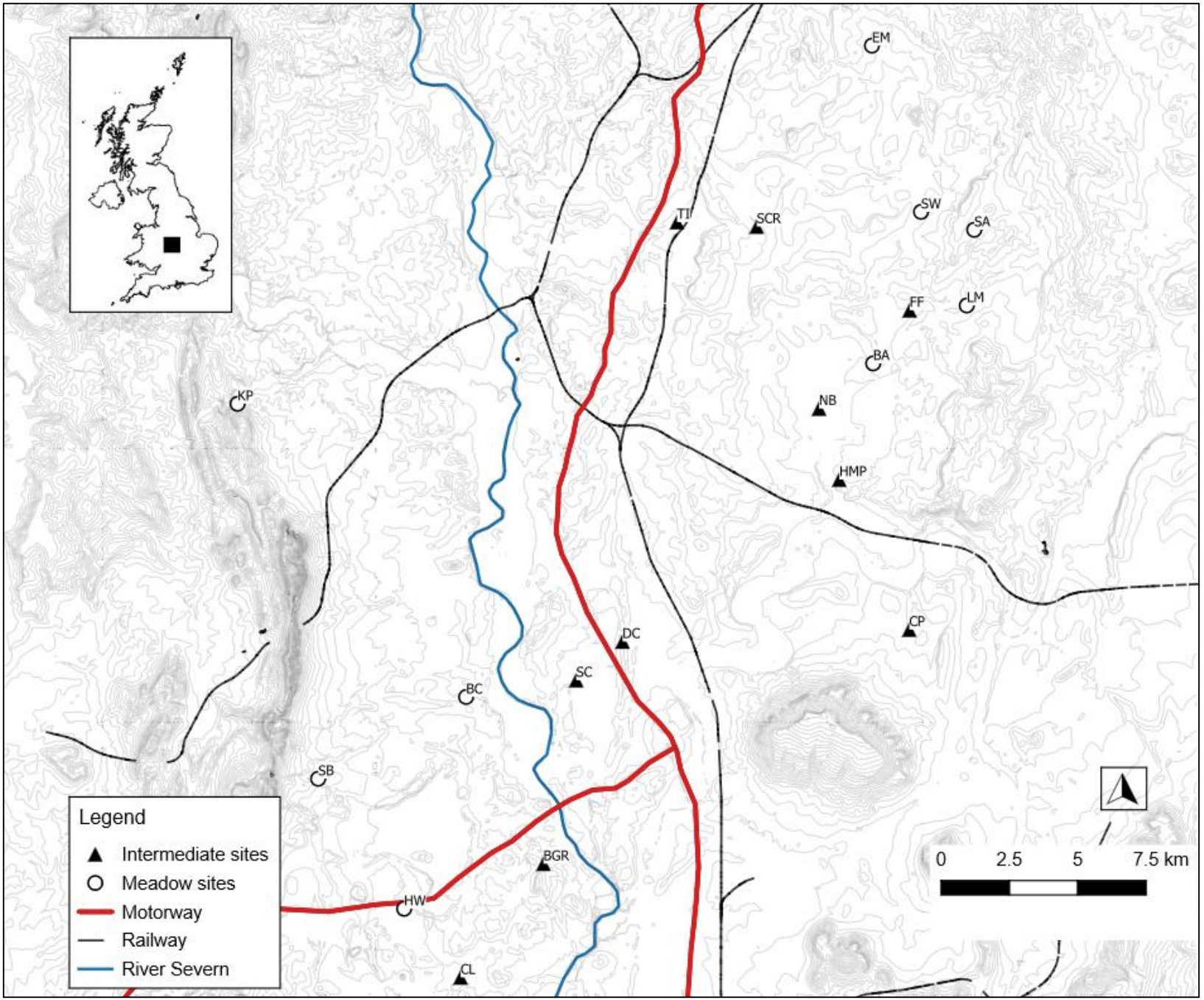
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Intermediate sites
Meadow sites
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Railway
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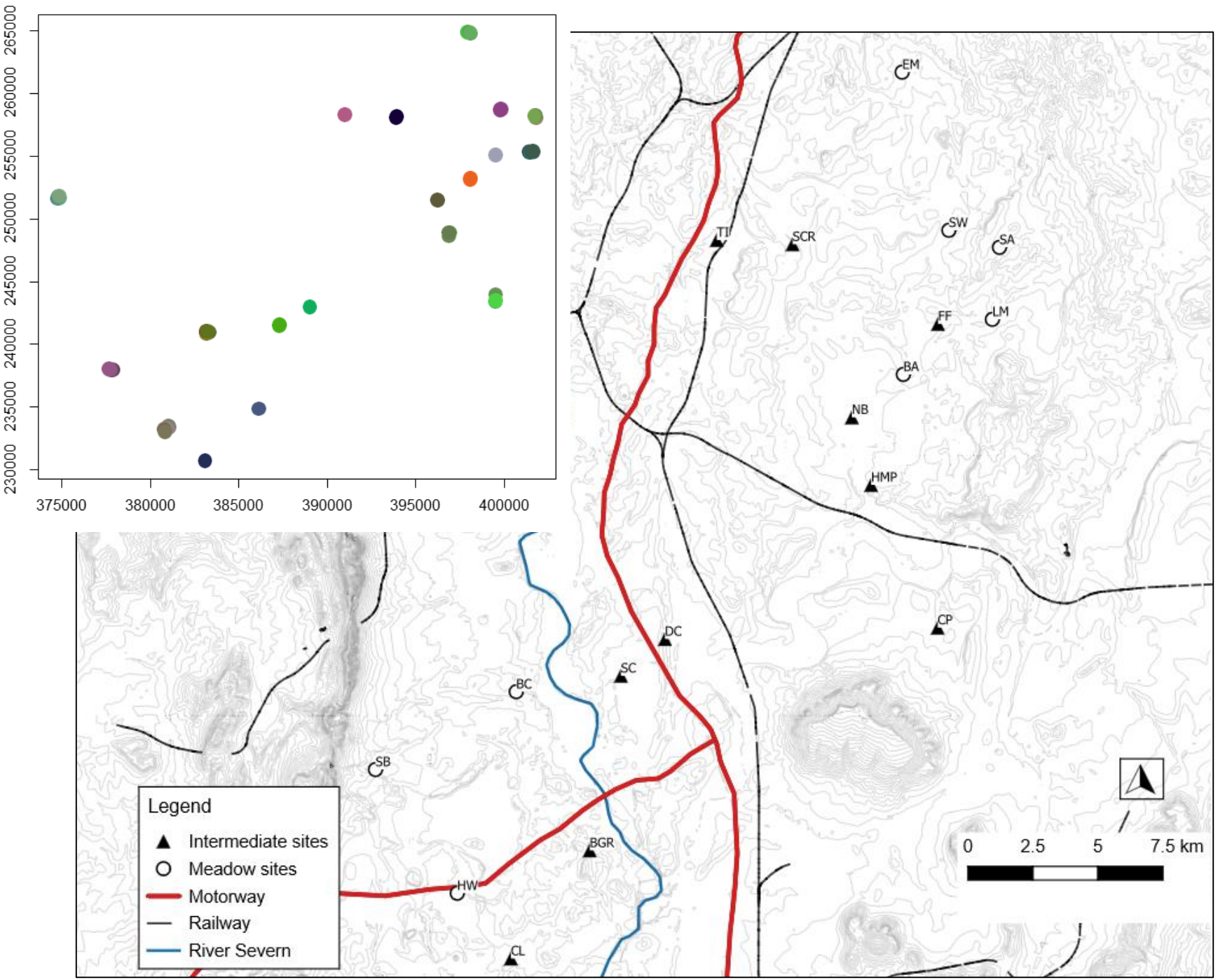
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Intermediate sites
Meadow sites
Motorway
Railway
River Severn
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# Main findings

- Moderate diversity – maintained by conservation management
- Gene flow – restricted by land use more than topography
- Intermediate sites can be important in an ecological network

# Implications for conservation


- Meadow management necessary
- Targeted management agreements
- Formalise management of intermediate sites
- Areas with intensive land-use a priority

# Thanks to:






Farmers and landowners, field and lab assistants