

The Ecological Network Tool

Using Spatial Modelling to Identify Priorities for Wetland and Woodland Creation Across North-West England

Natural Course EU LIFE+ Project

Natural Course is building capacity to protect and improve our North West water environment now and for the future

- 10 year EU LIFE funded programme
- Several partners working together to solve challenges in the North West RBD.
- Develop projects to better understand and overcome barriers preventing the achievement of 'good ecological status' under the EU Water Framework Directive.
- Aims to improve water environment through:
 - Increasing capacity, collaboration and engagement with partners
 - Sharing knowledge and increasing use of third party data
 - Improving affordability
 - Addressing root cause of issues
 - Upscale successes



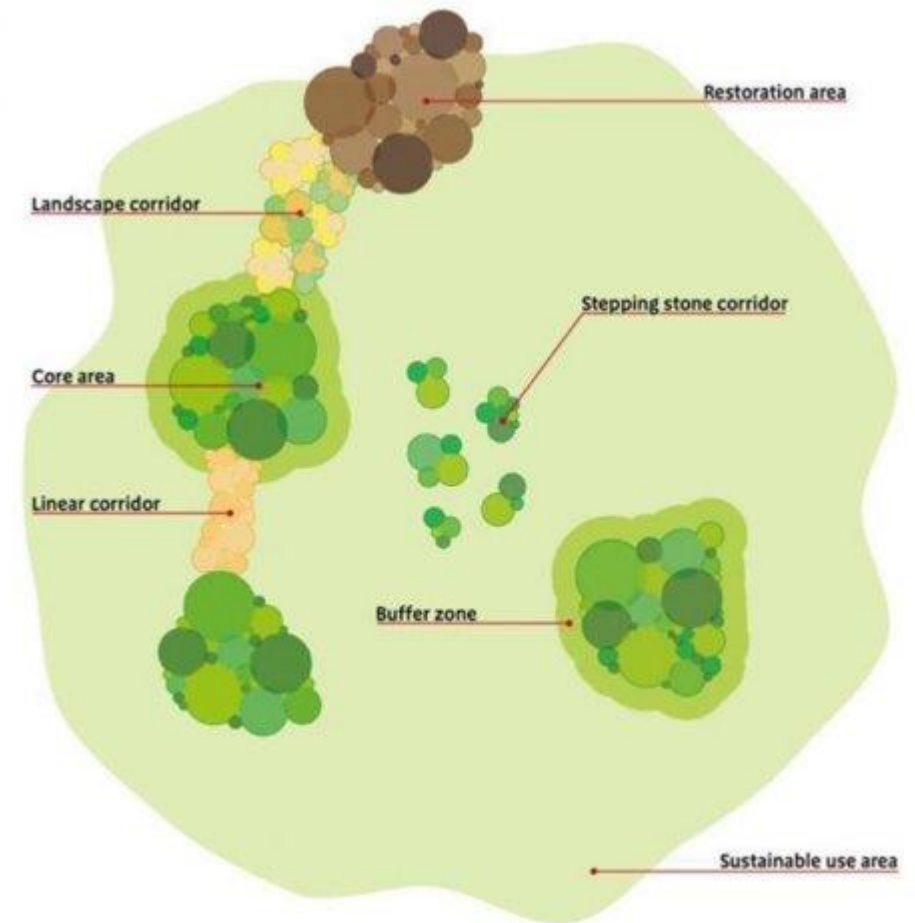
Project Rationale

Why this Tool?

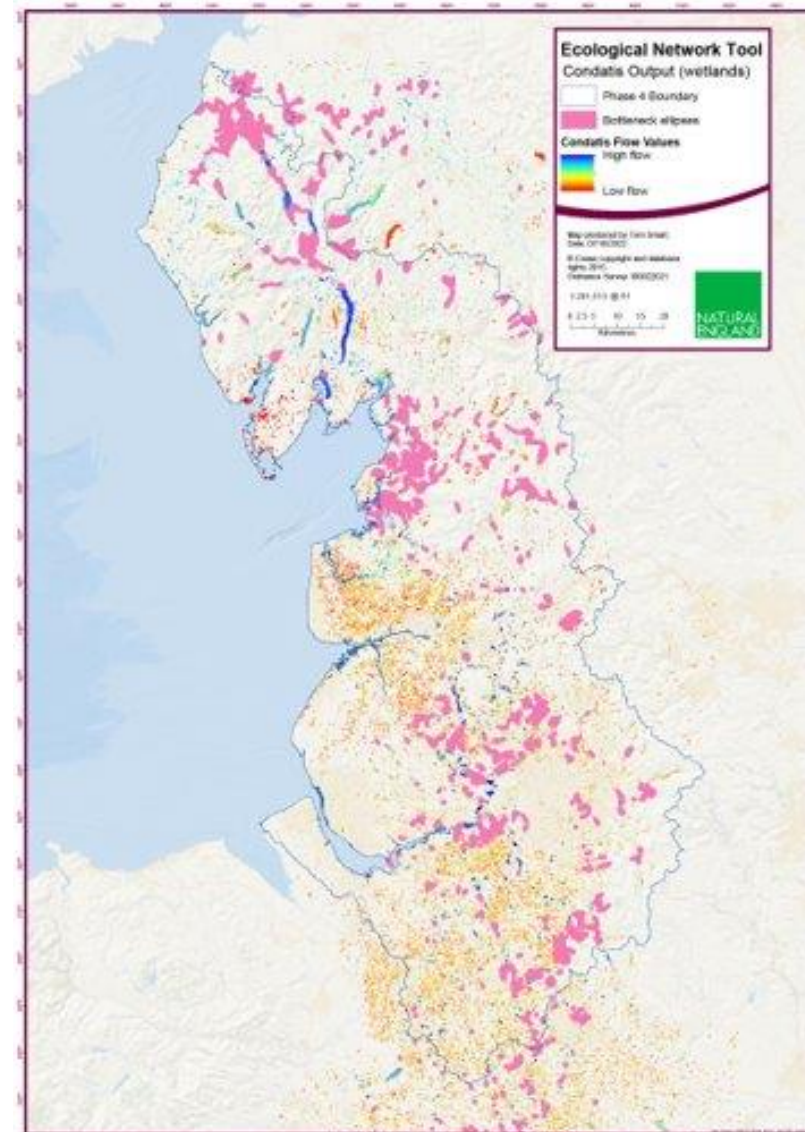
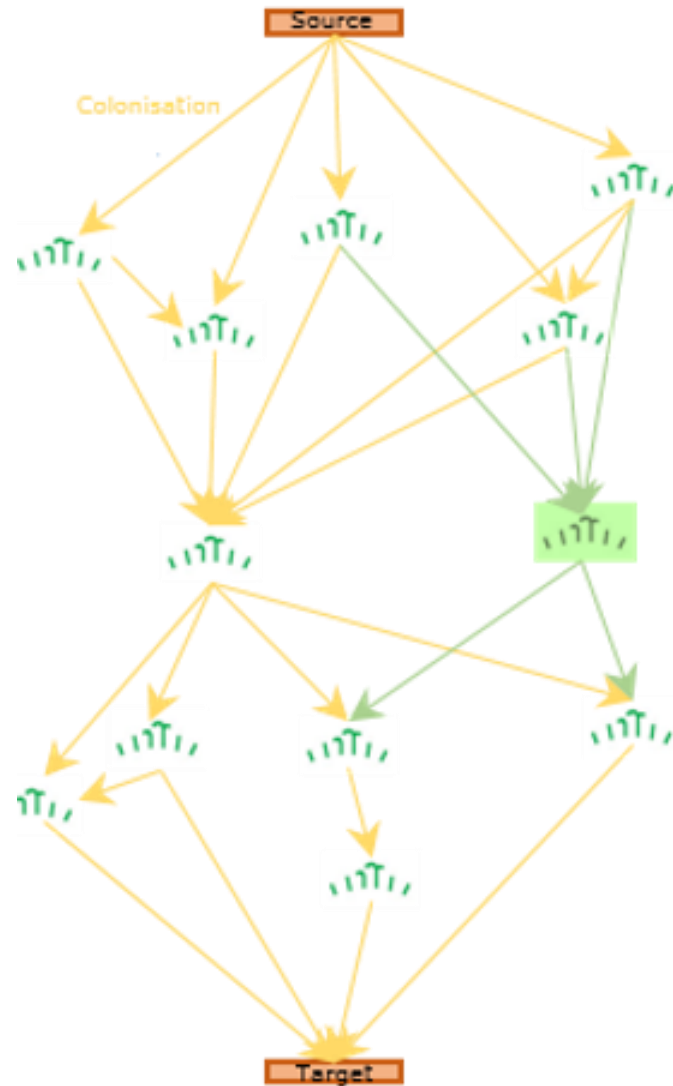
- 25 Year Environment Plan: Nature Recovery Network
- Bigger, Better, More, Connected

Need to understand:

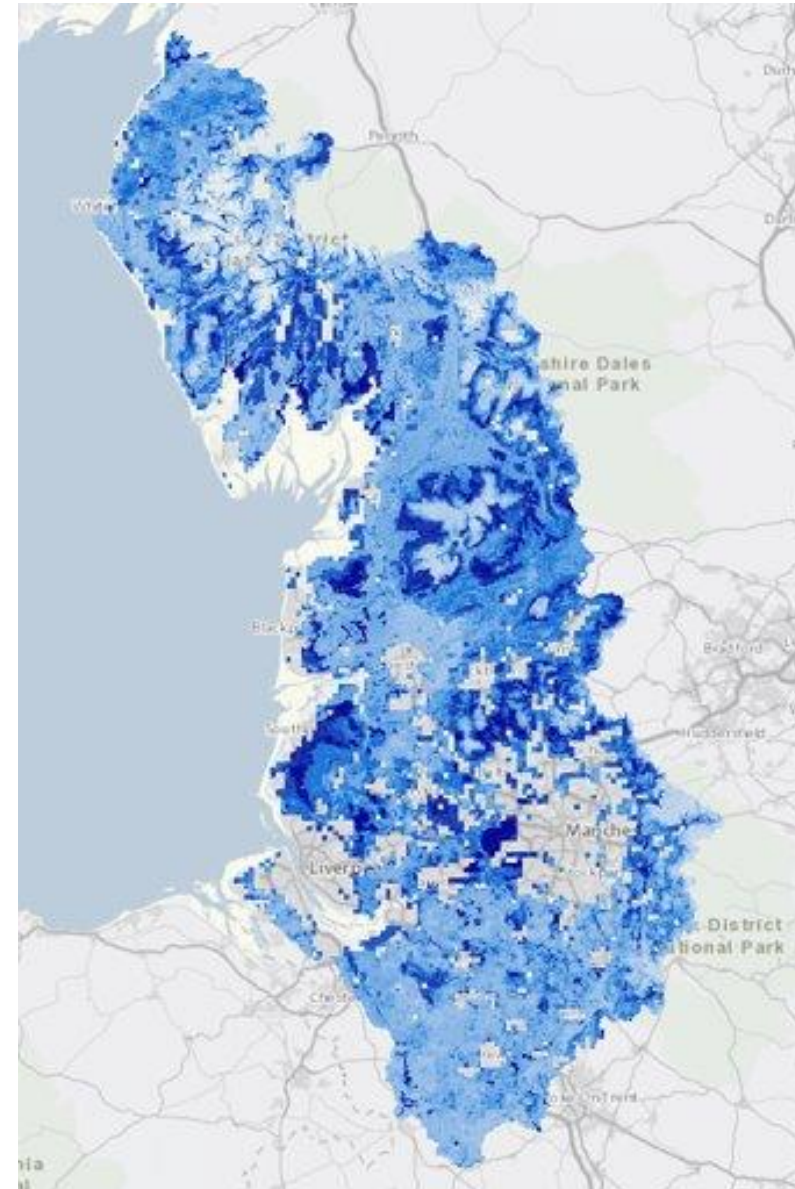
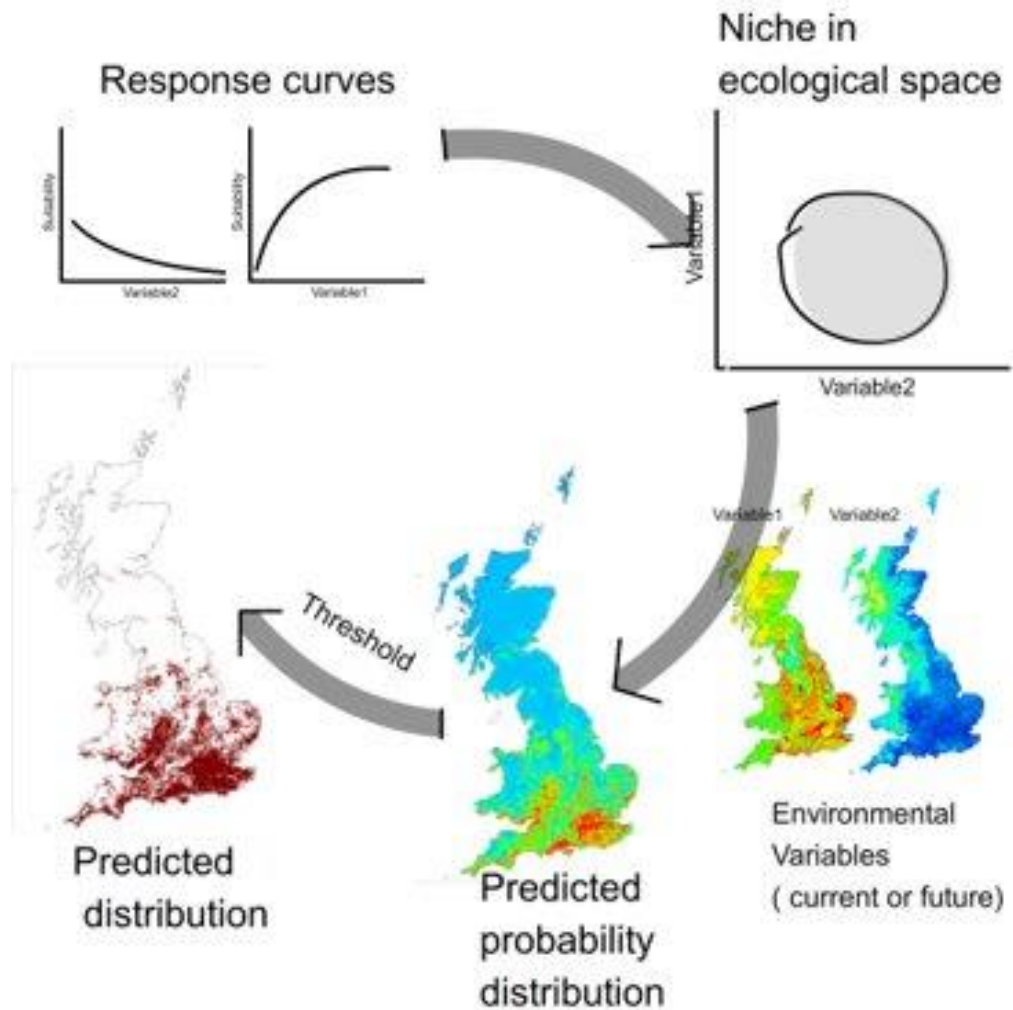
- Where **are** our existing habitat networks?
- Where **should** the networks be?
‘where do species want to go?’
- Where **could** the networks be?
‘where are conditions suitable?’

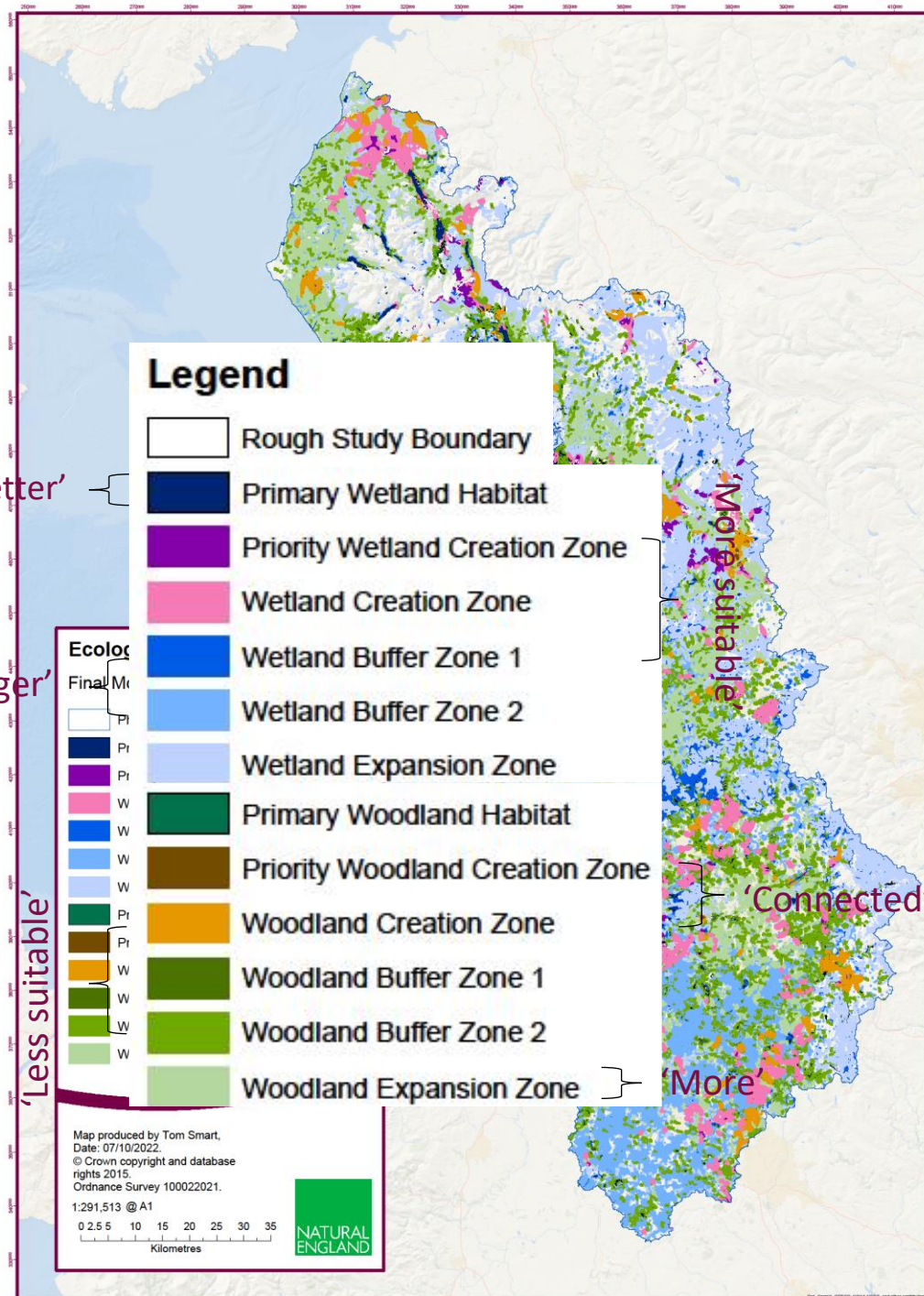
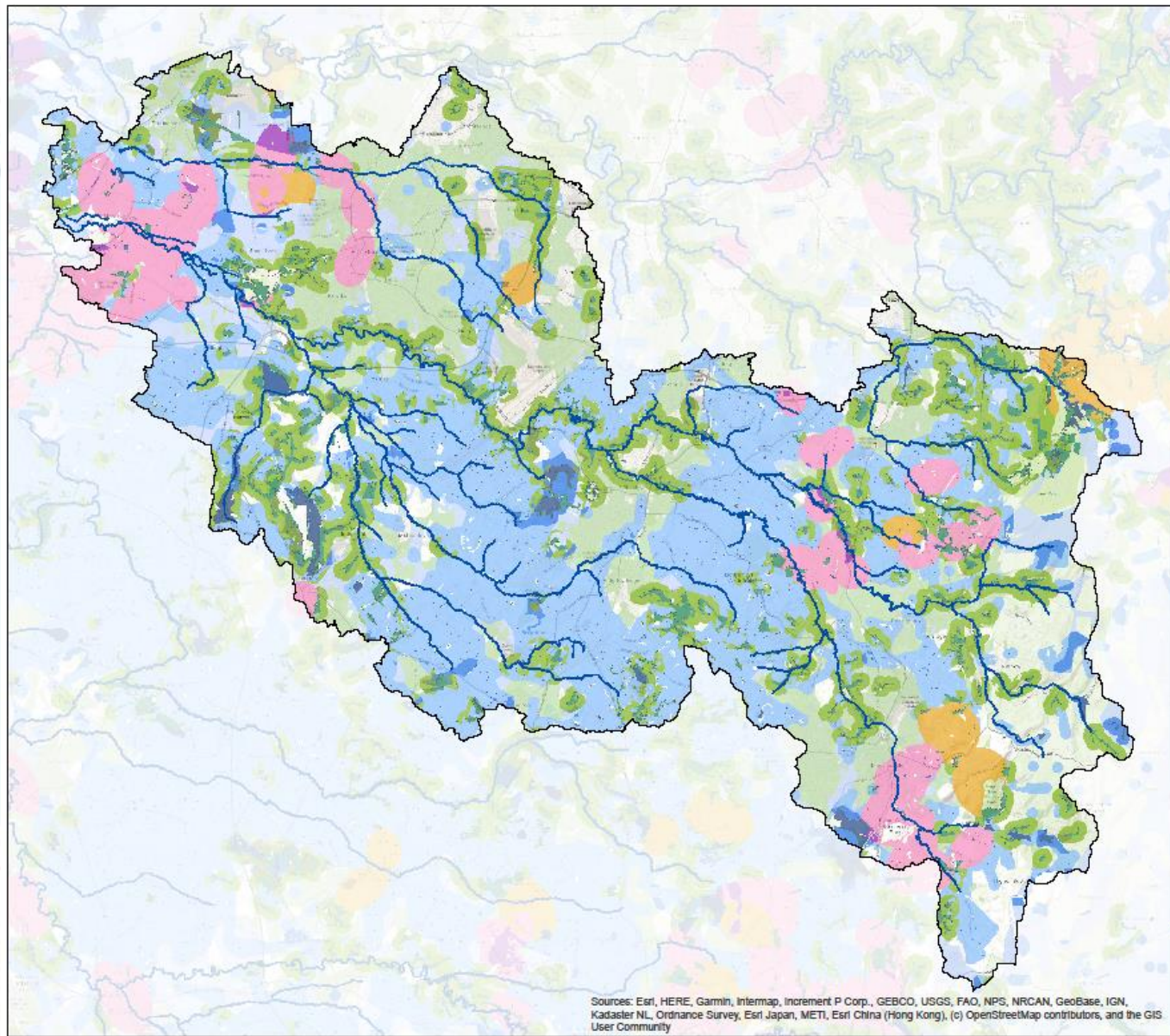


Methodology: where do species want to go?



Methodology: where are conditions suitable?





DISCLAIMER: What the Tool is, and isn't!

The ENT is a ***prioritisation*** guide, not an instruction manual.

Three possible uses:

- Identify *where to start looking* for potential project sites.
- Select *which site* to deliver an intervention between several options.
- Select *which intervention* to deliver between options at one site.

The Tool should be used alongside local data/knowledge/ground truthing.
These are not mutually exclusive.

Example: Where to start looking

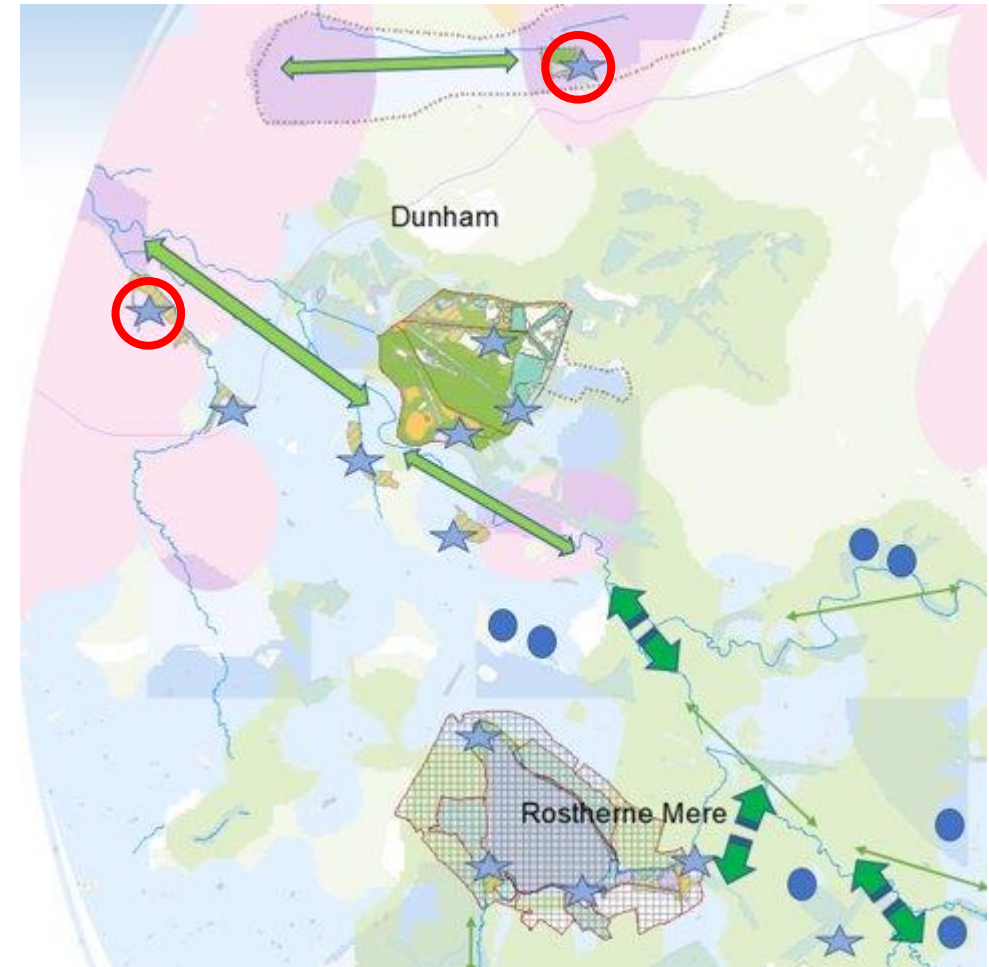


Example: Which site, which intervention?

Lost Wetlands: **€470k**
Complementary funded project.

Used ENT as evidence to win funding.

Combined with local knowledge and site visits: where to add GCN ponds, bog/fen restoration opportunities.

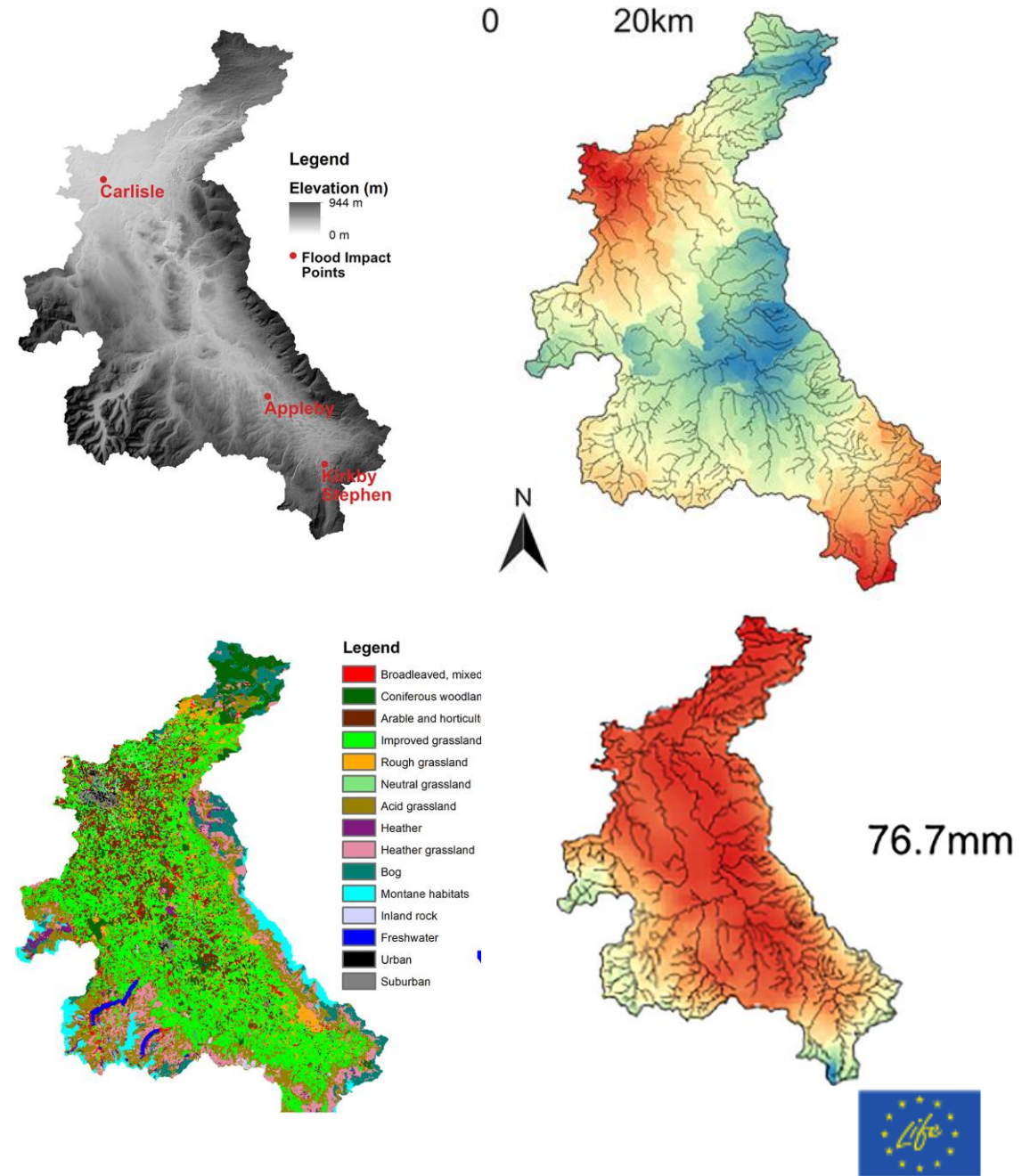


Legend

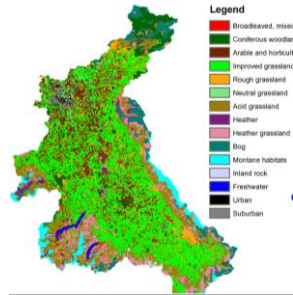
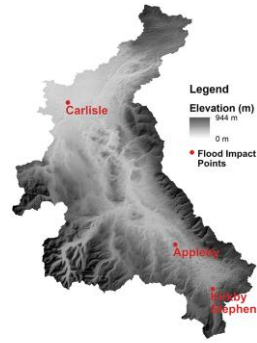
	Rough Study Boundary		EA Main Rivers
	Primary Wetland Habitat		Primary Woodland Habitat
	Priority Wetland Creation Zone		Priority Woodland Creation Zone
	Wetland Creation Zone		Woodland Creation Zone
	Wetland Buffer Zone 1		Woodland Buffer Zone 1
	Wetland Buffer Zone 2		Woodland Buffer Zone 2
	Wetland Expansion Zone		Woodland Expansion Zone

Going Further: Upland NBS

- Durham University open source tool
- Incorporates topography, land cover, landscape connectivity
- Catchment scale
- Based on key rainfall events from last 30-40 years, with key points of impact being major conurbations in each catchment.



Basic SCIMAP Workflow



Topography

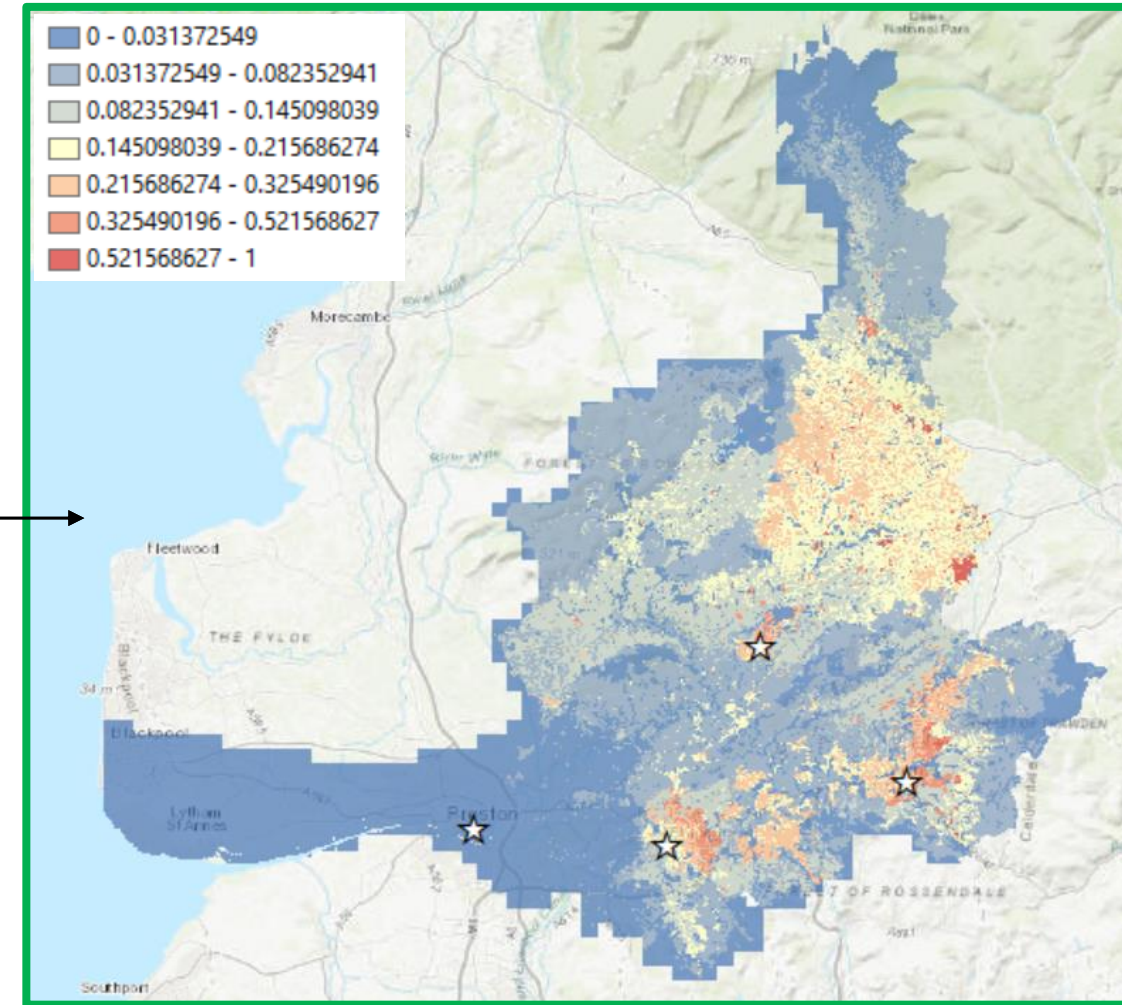
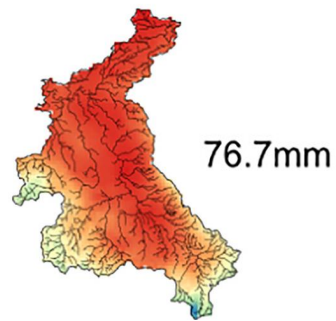
Land Cover

Points of Impact

Connectivity

Overland flow times

High rainfall events



Input data

Data Processing

Prioritisation

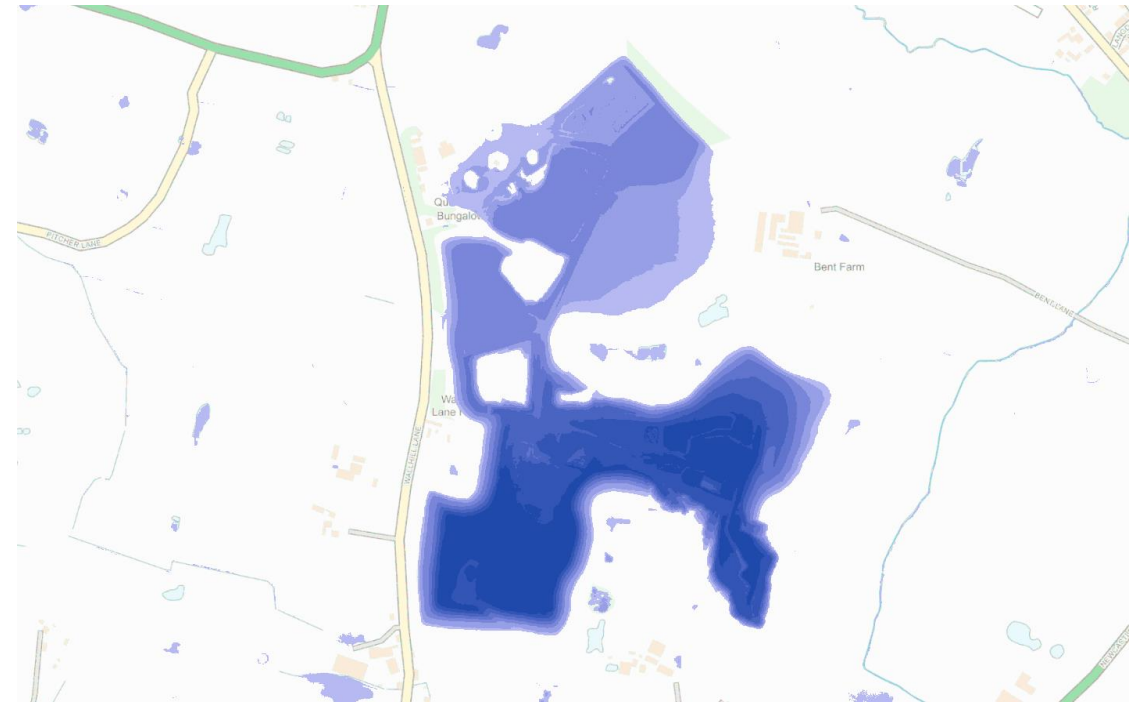
Case Study 1: Wetlandscapes

Based on the approach developed by Northumberland County Council for the Northumberland LNRS Pilot.

LiDAR 1m resolution to show topography and identify natural depressions.

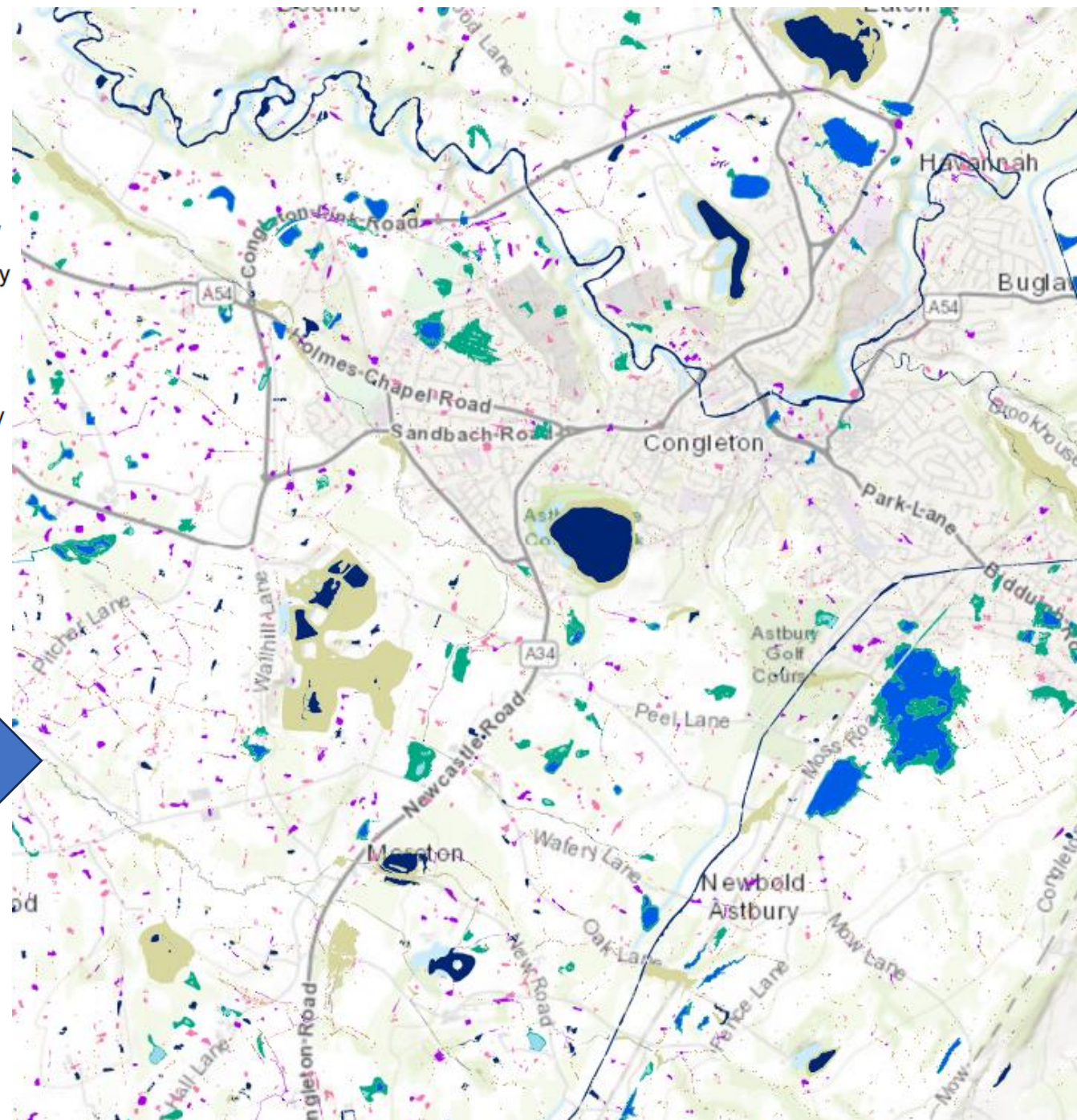
Highlights areas where water is likely to naturally accumulate.

Categorised based on depth and size to highlight opportunities for different types of wetland restoration



Legend

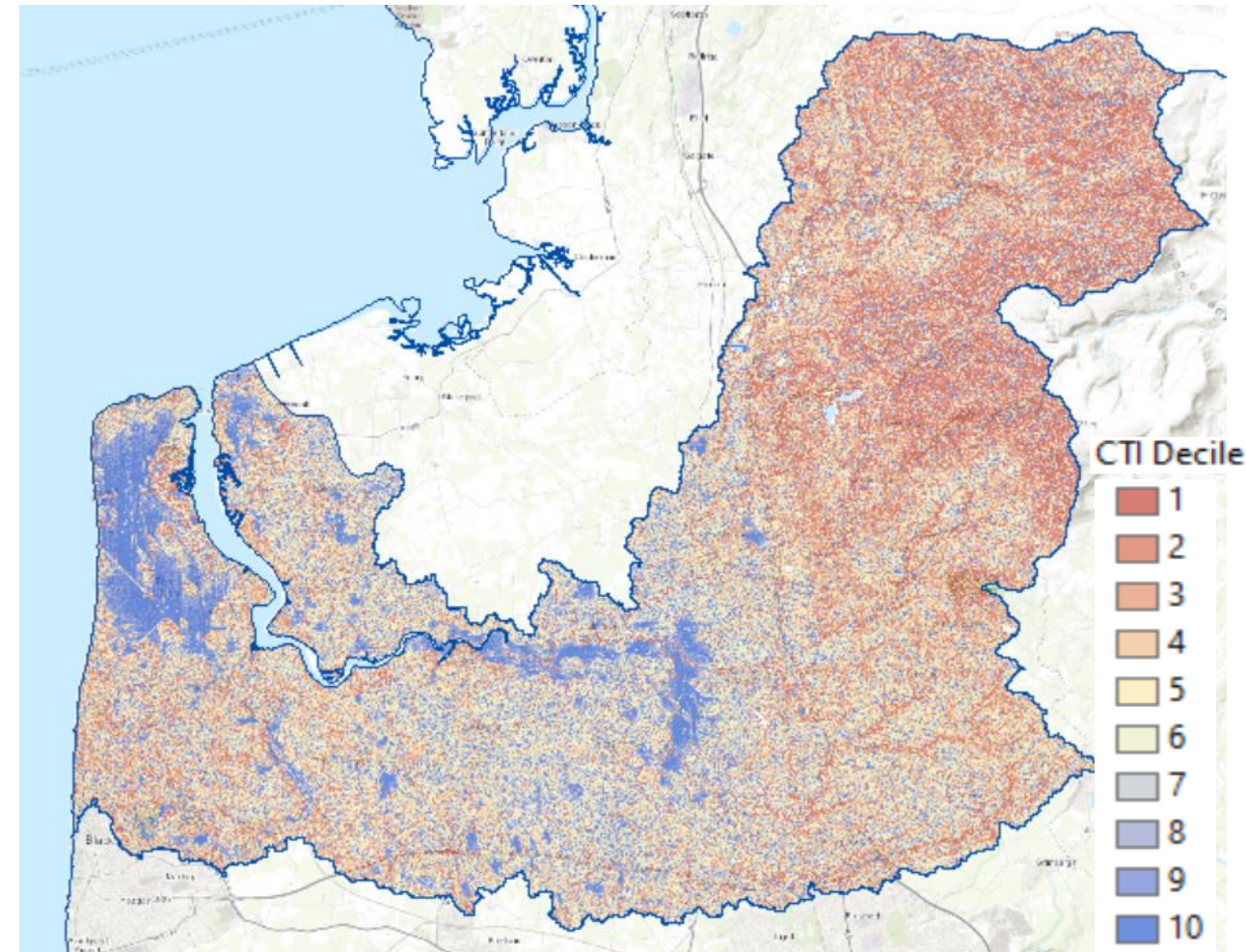
- Ditch
- Scrape
- Ephemeral_pond
- Existing Waterbody
- Fringing_Waterbody
- Wader_habitat
- GCN_pond
- Shallow_Waterbody
- Large_Waterbody



High : 335.282
Low : 48.457

Case Study 2: Compound Topographic Wetness Index

- Approach developed by MMU academics and NE specialists.
- LiDAR 1m resolution to calculate 'flow accumulation'
- Weighted by soil and land cover permeability.
- Highlights areas where land likely to hold water (e.g. wetland restoration opportunity)



High-resolution wetness index mapping: A useful tool for regional scale wetland management

Thomas P. Higginbottom^{a,*}, C.D. Field^a, A.E. Rosenburgh^b, A. Wright^c, E. Symeonakis^a, S.J.M. Caporn^c

^a School of Science and the Environment, Manchester Metropolitan University, Manchester M1 5GD, United Kingdom

^b Department of Biosciences, Durham University, Durham DH1 3LE, United Kingdom

^c Natural England, Arndale Centre, Market Street, Manchester M4 3AQ, United Kingdom

Case Study 3: Water Vole connectivity

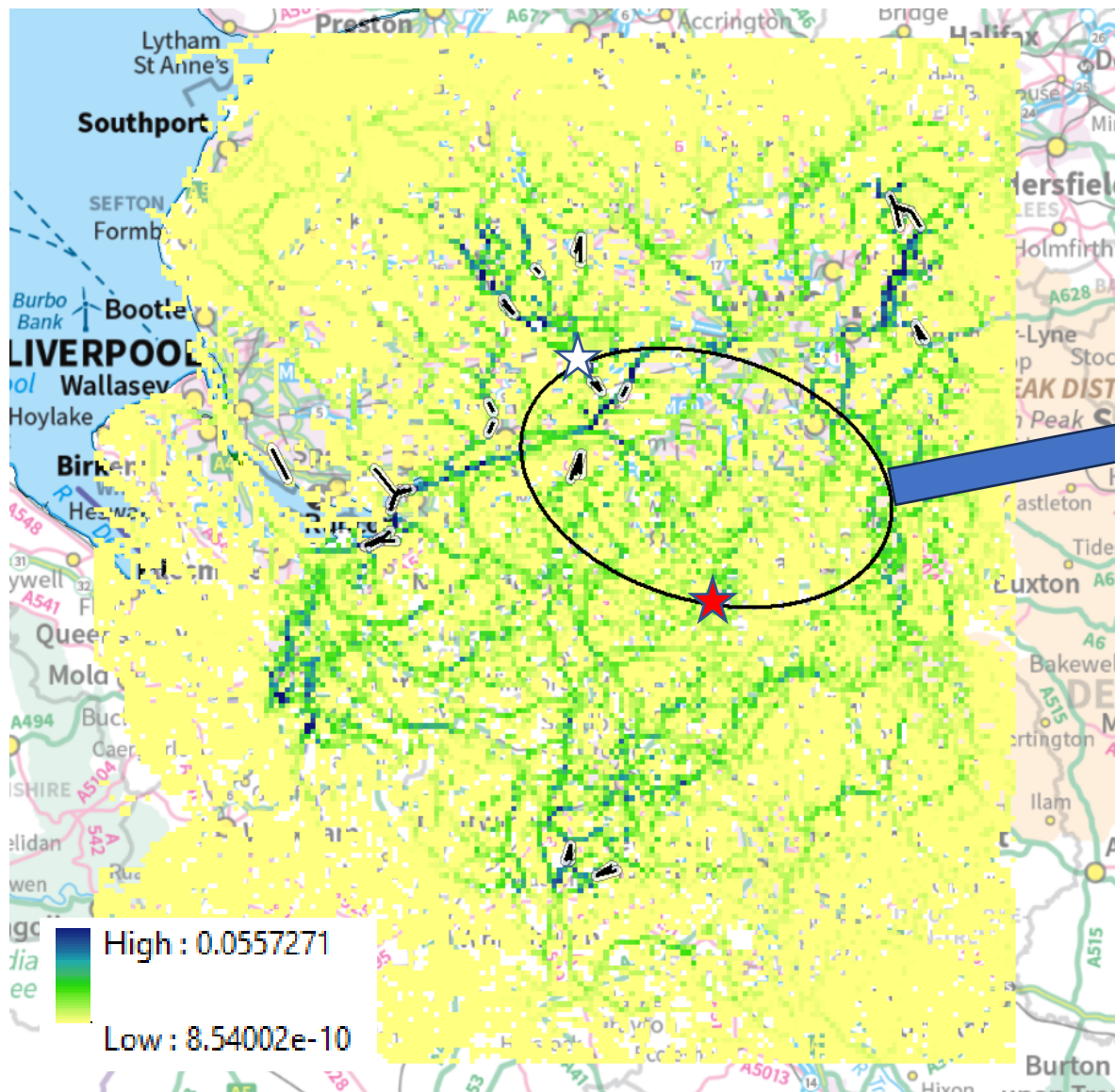
Use Condatis to assess habitat connectivity for a specific wetland species.

- Finer detail in habitat layer
- Finer taxonomic scope
- Finer spatial grain

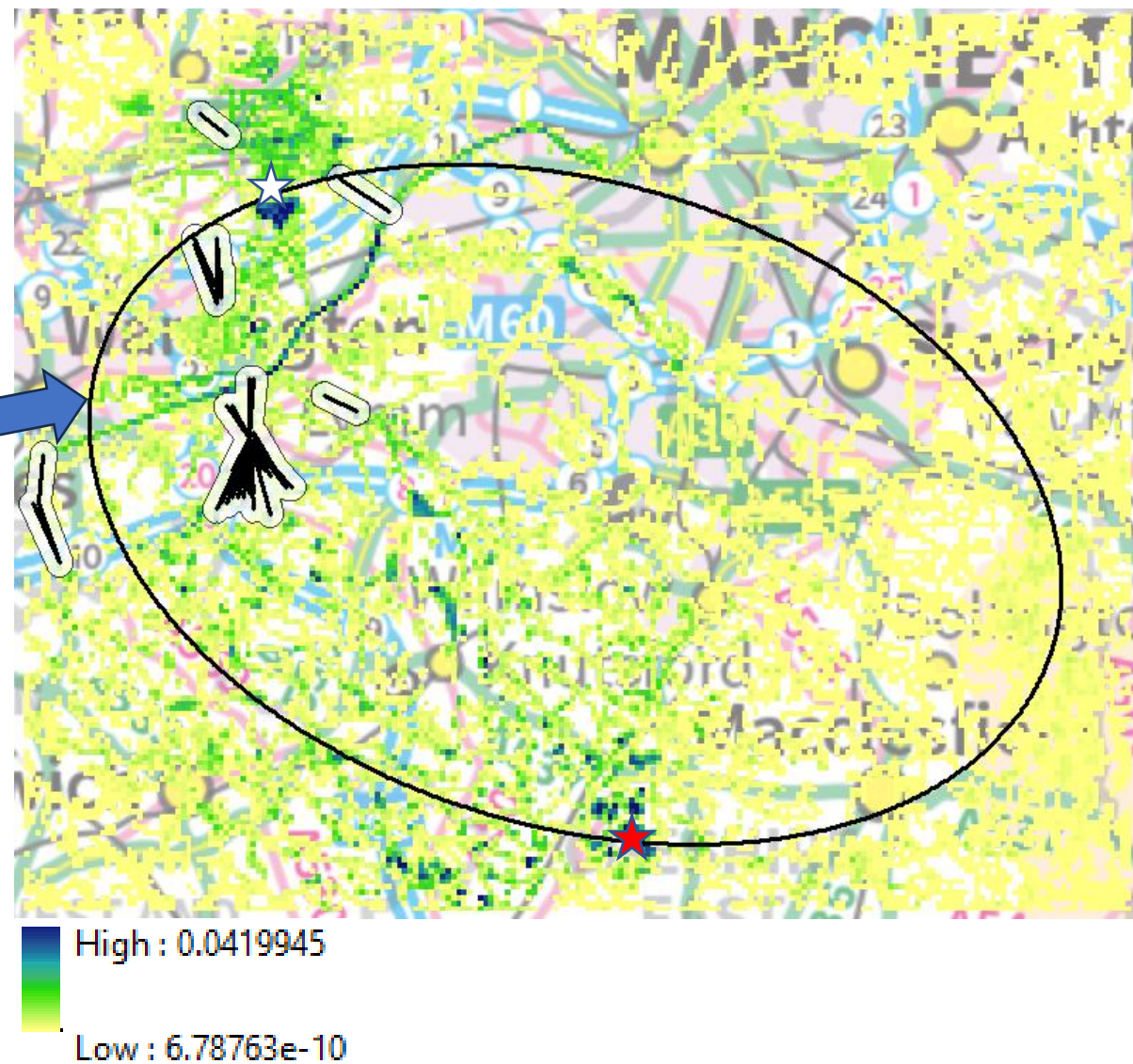
Using broad scale modelling to inform source/targets for finer scale modelling.



Water Vole dispersal across Cheshire and Greater Manchester



Water Vole dispersal through Lost Wetlands



In Summary:

Lowland Ecological Network Tool maps priorities for lowland wetland and woodland creation to maximise connectivity and network resilience.

Used in combination with additional datasets it shows where investment can provide the highest benefits.

Inclusion of upland habitats with a focus on upland bogs to 'slow the flow' and reduce flood risk for communities downstream.

Case studies showcasing different tools in different geographies, informing more specific interventions at local scale.