



**NATURAL**  
OUR WATER. OUR FUTURE  
**COURSE**

# Natural Course Ecological Network Tool

## Tom Smart - Natural England



# Our Aims and Objectives

As part of Natural Course, NE developed an Integrated Ecological Network Tool to:

Understand and map ecological networks in NW England

Identify priority areas for restoration: *bigger, better, more connected*

Highlight areas where nature-based solutions for biodiversity align with Natural Course objectives



PA Media



Getty Images

# Rationale for the Tool

Species are likely to ‘range-shift’ in response to climate change.

Need to understand:

- Where **are** the existing habitat networks to facilitate this?  
Make **better** networks – protect and restore
- Where **should** the networks be (*‘where do species want to go?’*)  
Make **more connected** networks – add stepping stones
- Where **could** the networks be (*‘where are conditions suitable?’*)  
Make **bigger** networks – enlarge and enhance



Neil Hulme/Butterfly Conservation

# Modelling Approach

**Multiple modelling approaches to answer several questions**

Condatis (Hodgson et al, 2012) and Circuitscape (McRae et al, 2014)

- Where species ‘want’ to go, where the network ‘should’ be

Biomod2 (R package; Thuiller et al, 2014):

- Suitability for wetland habitats, where the network ‘could’ be

For more info on modelling software: <http://wordpress.condatis.org.uk/about-the-software/more-information>

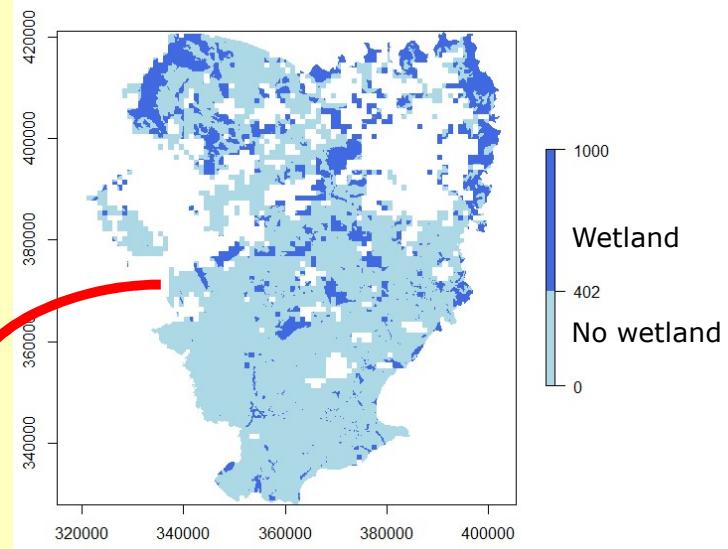
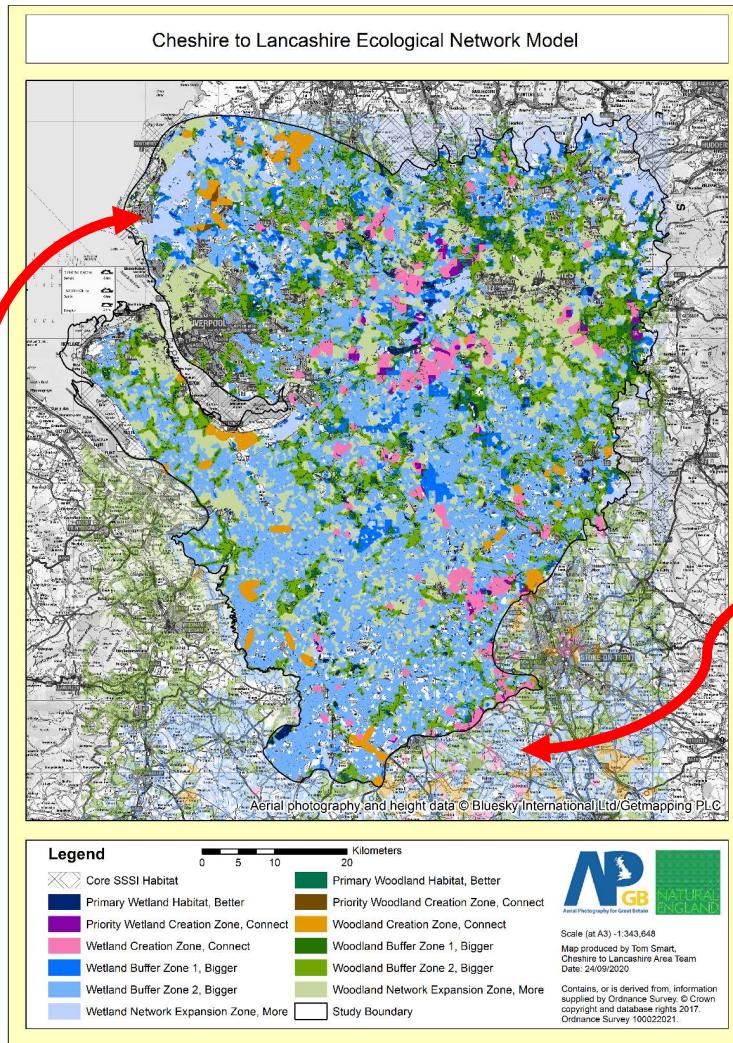
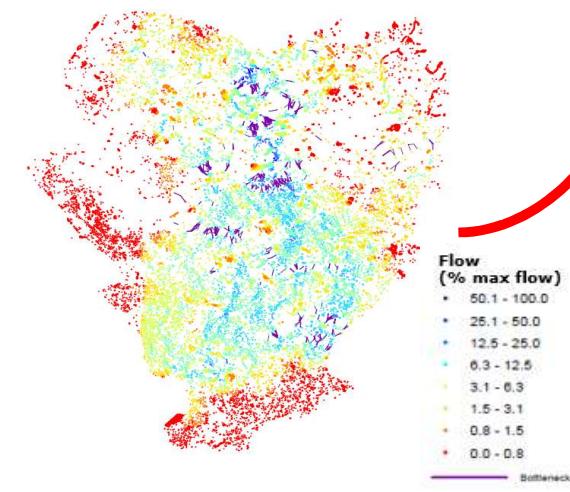
<https://cran.r-project.org/web/packages/biomod2/biomod2.pdf>

<https://circuitscape.org/docs/>



condatis





# Guiding nature-based solutions

**Stackable benefits for biodiversity, WFD and flood mitigation**

Biodiversity Net Gain and planning

Informing ELMS and agri-environment

Green and blue infrastructure

Actions guided by model: semi-natural habitat creation? restoration and enhancement? artificial measures e.g. SuDS schemes?



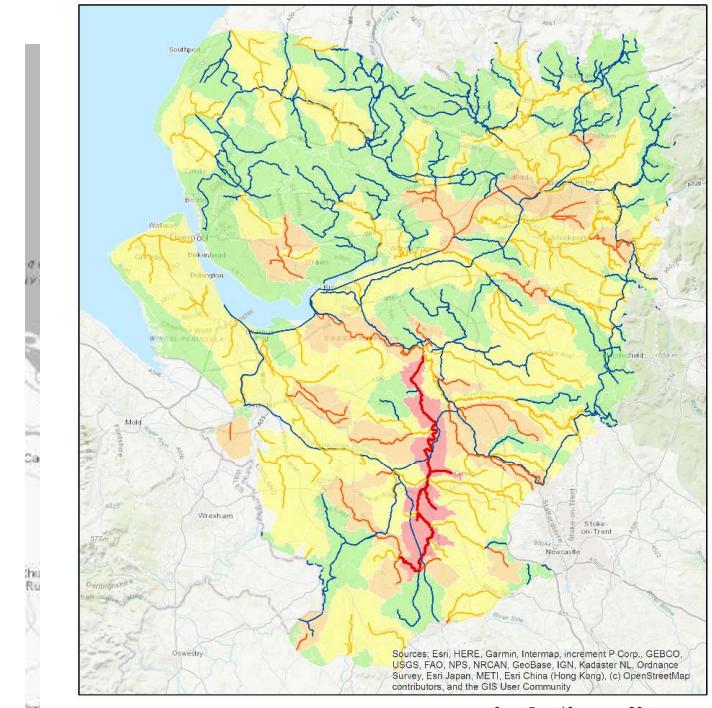
# Aligning Natural Course Priorities

## Selected nine WFD determinants

Macroalgae, Macrophytes and Phytoplankton, ANC, Ammonia, Dissolved N, pH, P, Temperature.

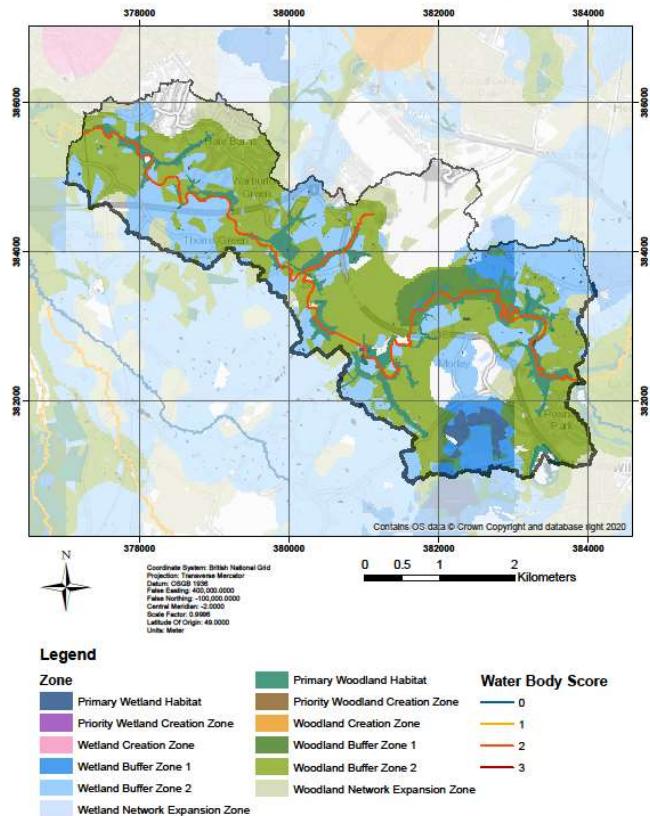
## Sub-catchment scale

Where are there multiple targets?  
How does this align with biodiversity-based Ecological Network?

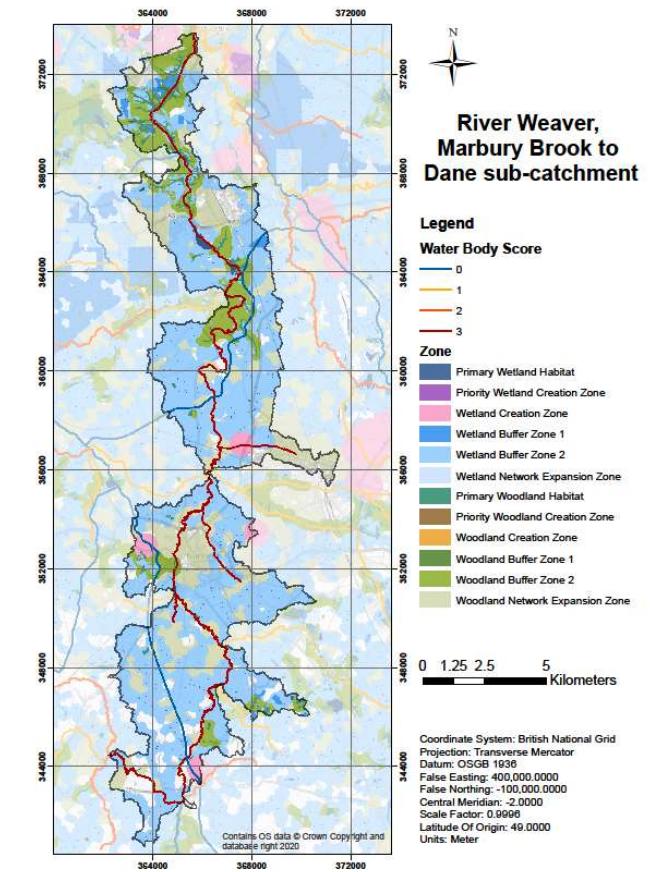
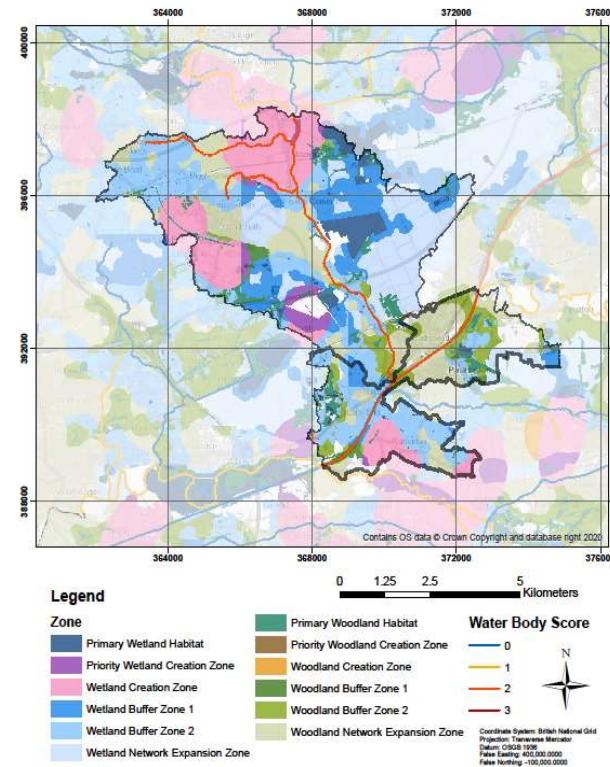


# Examples

Bollin (River Dean to Ashley Mill)



Glaze, Mersey and Manchester Ship Canal



# Model Limitations

## ***How NOT to use the model!***

Model defines zones to consider, not prescriptive.

Only as reliable as input data – **MUST** ground truth!

Distinct ‘Zones’ are unlike real world ecology, which will work along gradients rather than sharp boundaries

Model can **inform** decision-making, but **can’t** make decisions.



# Strategic Next Steps

Ecological Network being used as an evidence base in GM LNRS, and to attract investment e.g. Seed funding

Natural Course Phase 4 (TBC!):

- Expand spatial coverage to full Natural Course area
- Incorporate uplands
- Finer scale modelling to inform specific interventions

Continuing engagement with key partners to embed model



# Thank you!

Tom Smart

[thomas.smart@naturalengland.org.uk](mailto:thomas.smart@naturalengland.org.uk)

