Condatis Project within the YDNP

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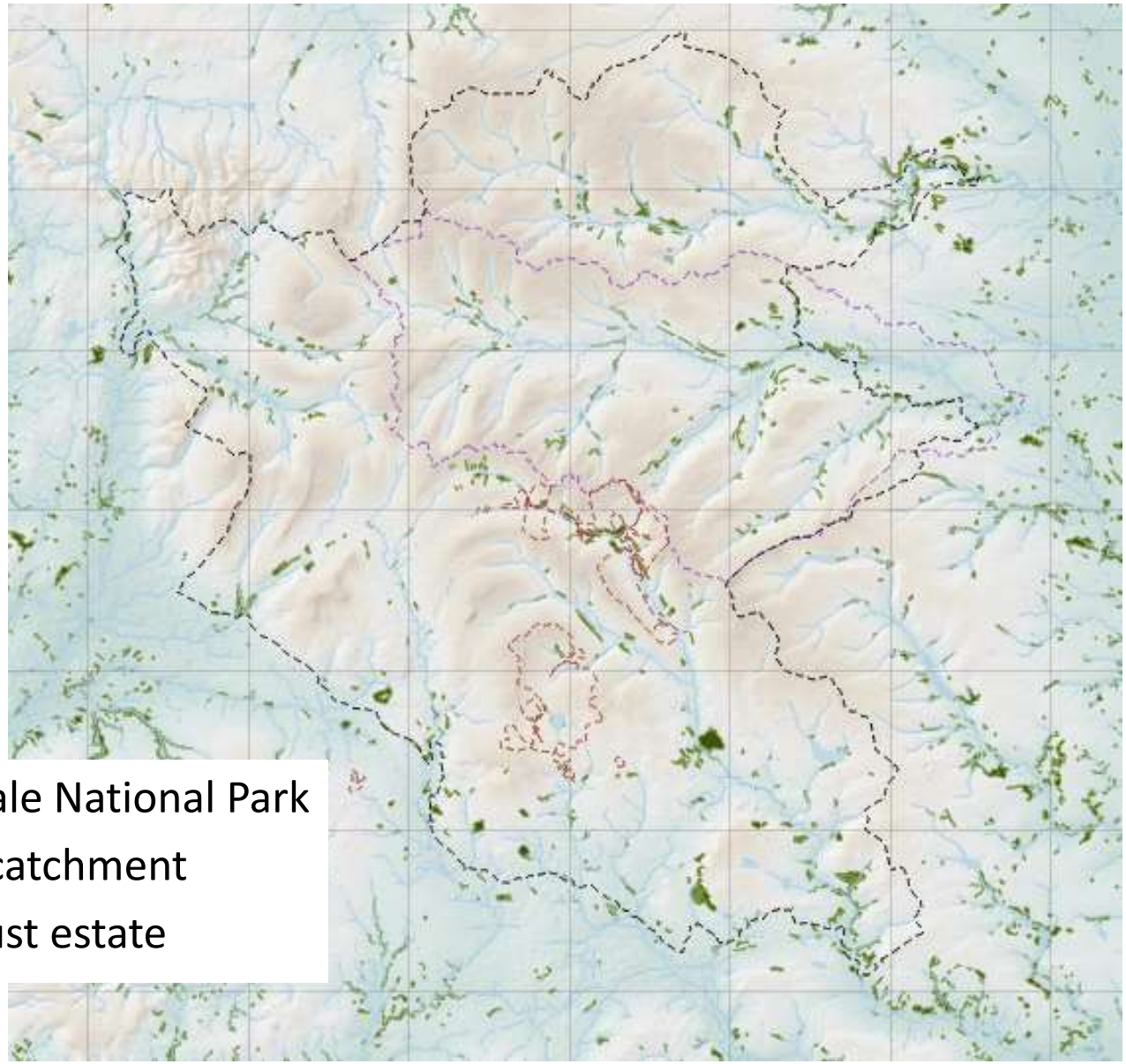
Project questions

- How does scale selection influence identification of bottlenecks, priority habitats and areas for new habitat in modelling species flow at property, catchment, national park and regional scales?

- How do different strategies for selection of habitat restoration areas affect potential speed of species colonisation through fragmented habitats as modelled by Condatis?

- What are the spatial differences between the location of actual or potential restoration projects when compared to recommended areas identified by Condatis through backwards optimisation?

Study areas at three scales

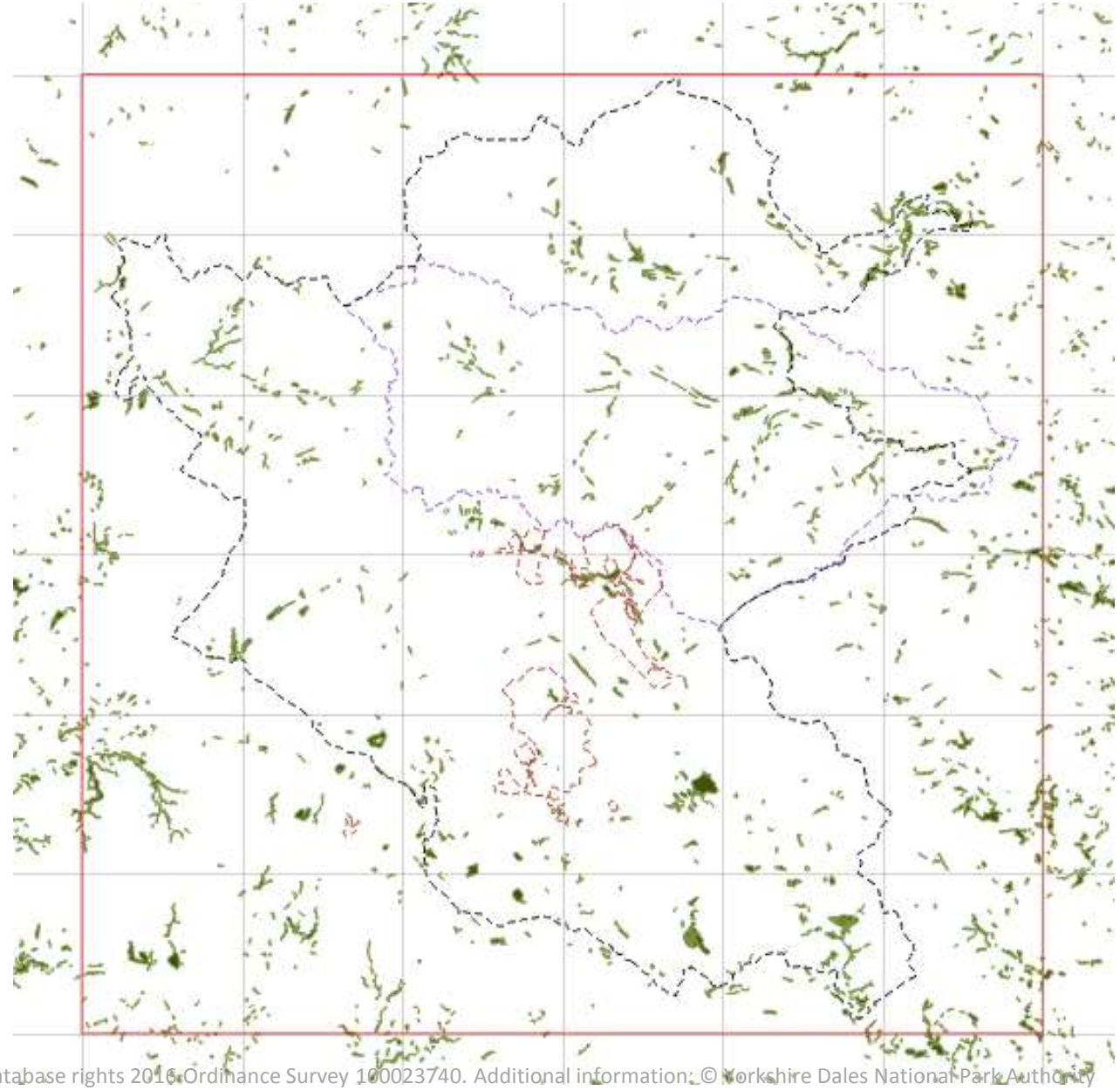


Yorkshire Dale National Park

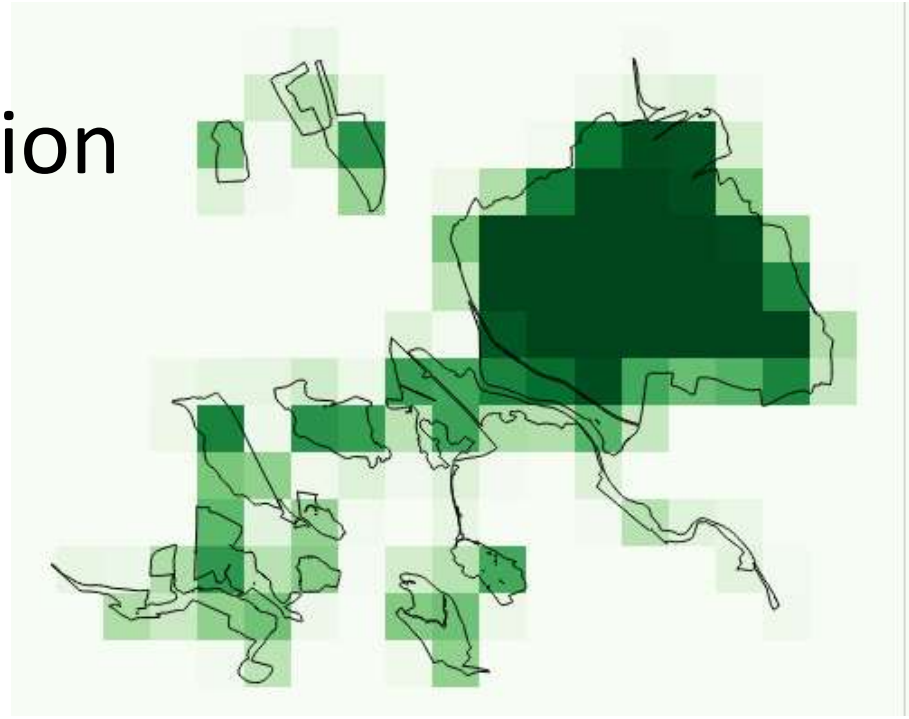
Upper Use catchment

National Trust estate

Native woodland Habitat data

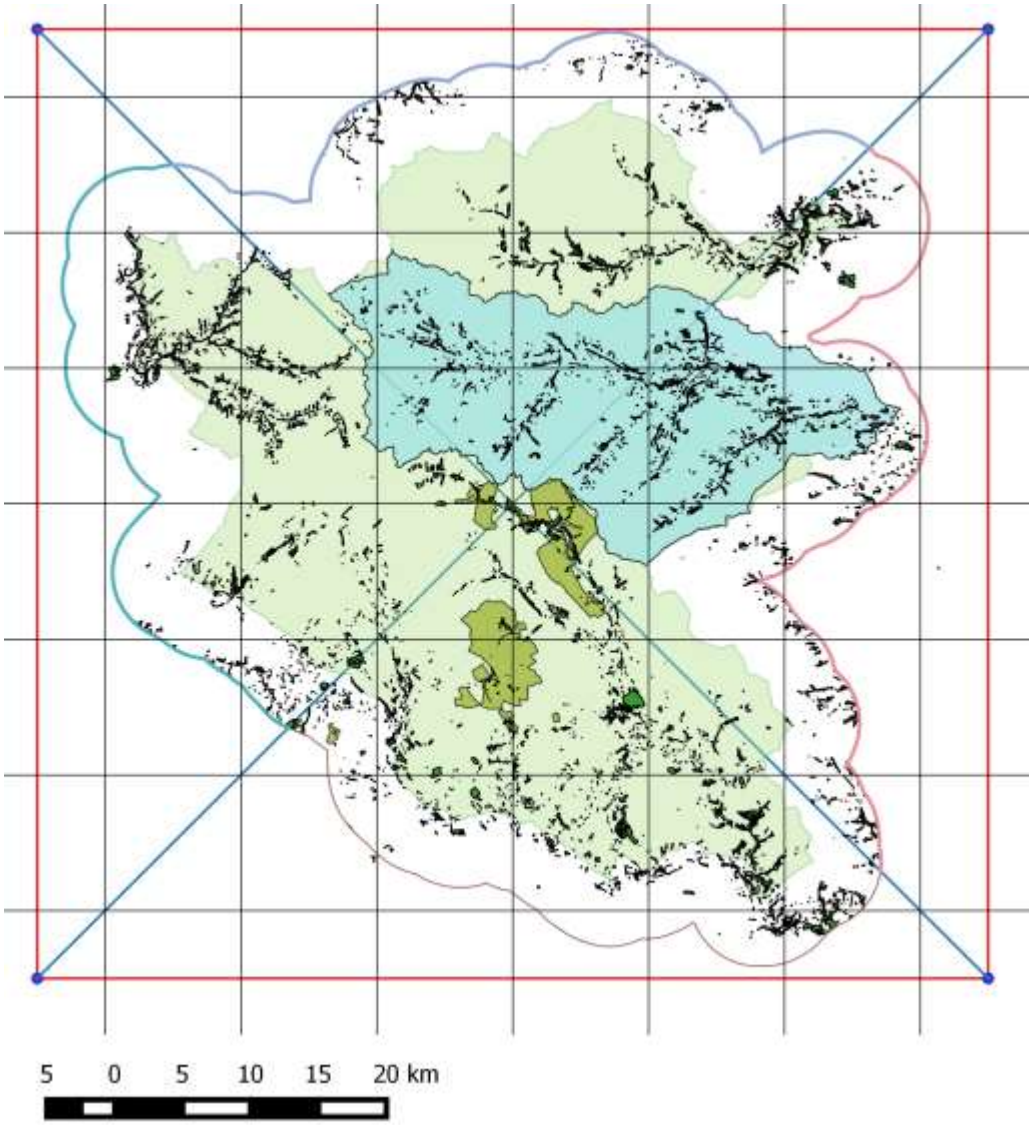


Habitat data preparation



- Native woodland as Shapefile vector
- Removed polygons < 1.5Ha (not functional wood)
- Rasterised to 10m cells (wood present / absent)
- Aggregated to 200m cell raster
- Calculated cells values as % area of woodland

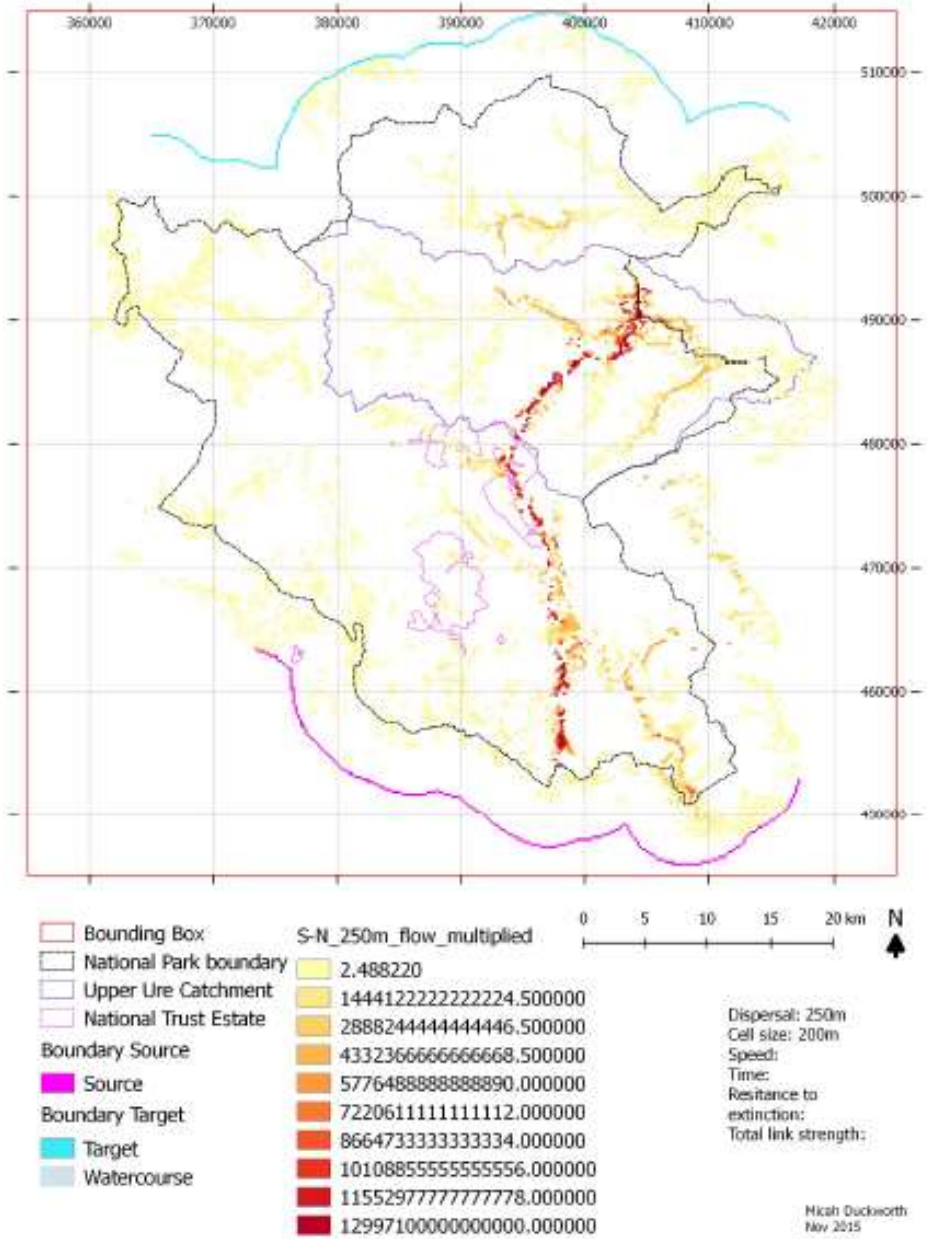
Initial exploration



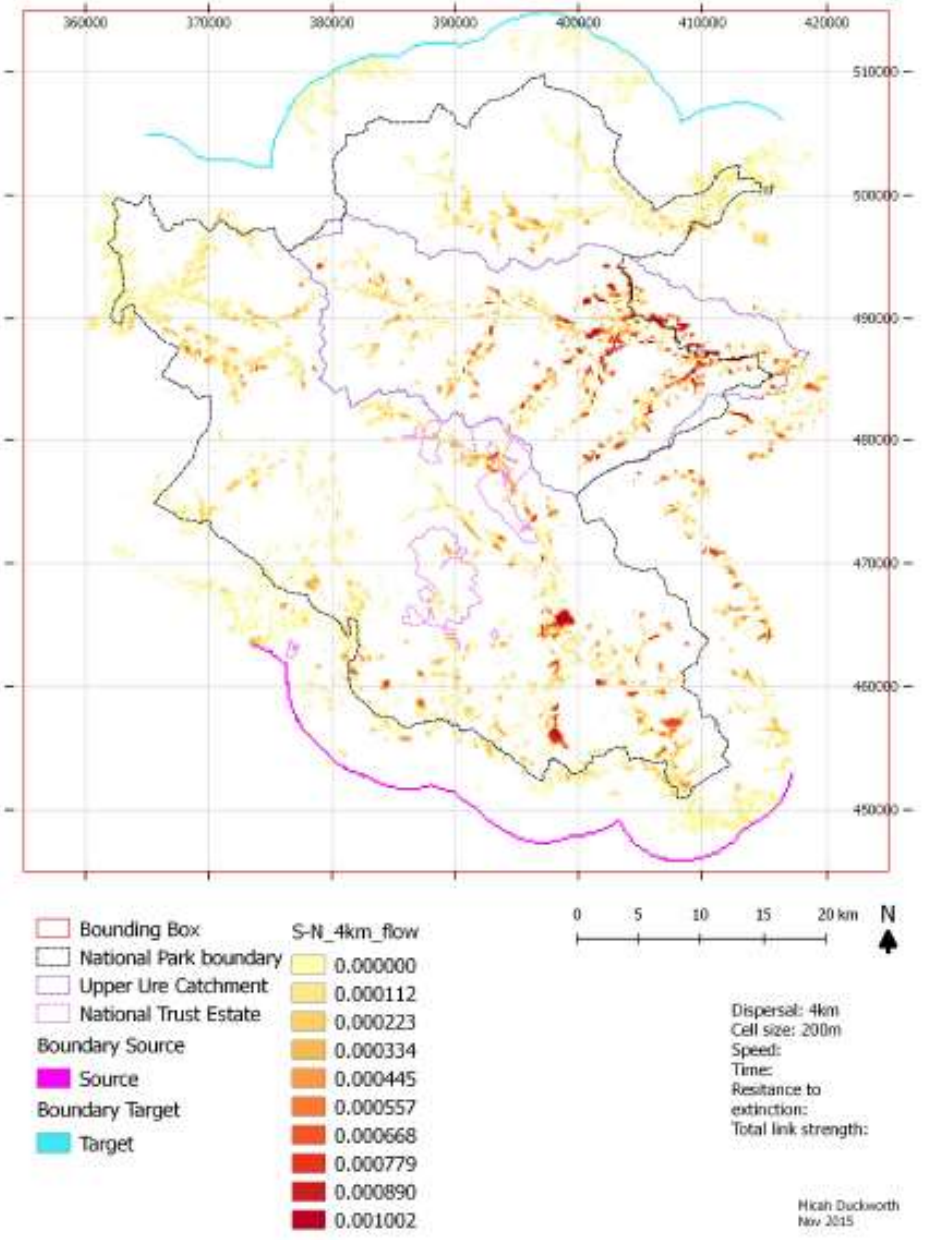
Source and target areas derived from 5km buffer of park boundary.

Buffered boundary cut by diagonals from the bounding box to create four N, S, E, W sections.

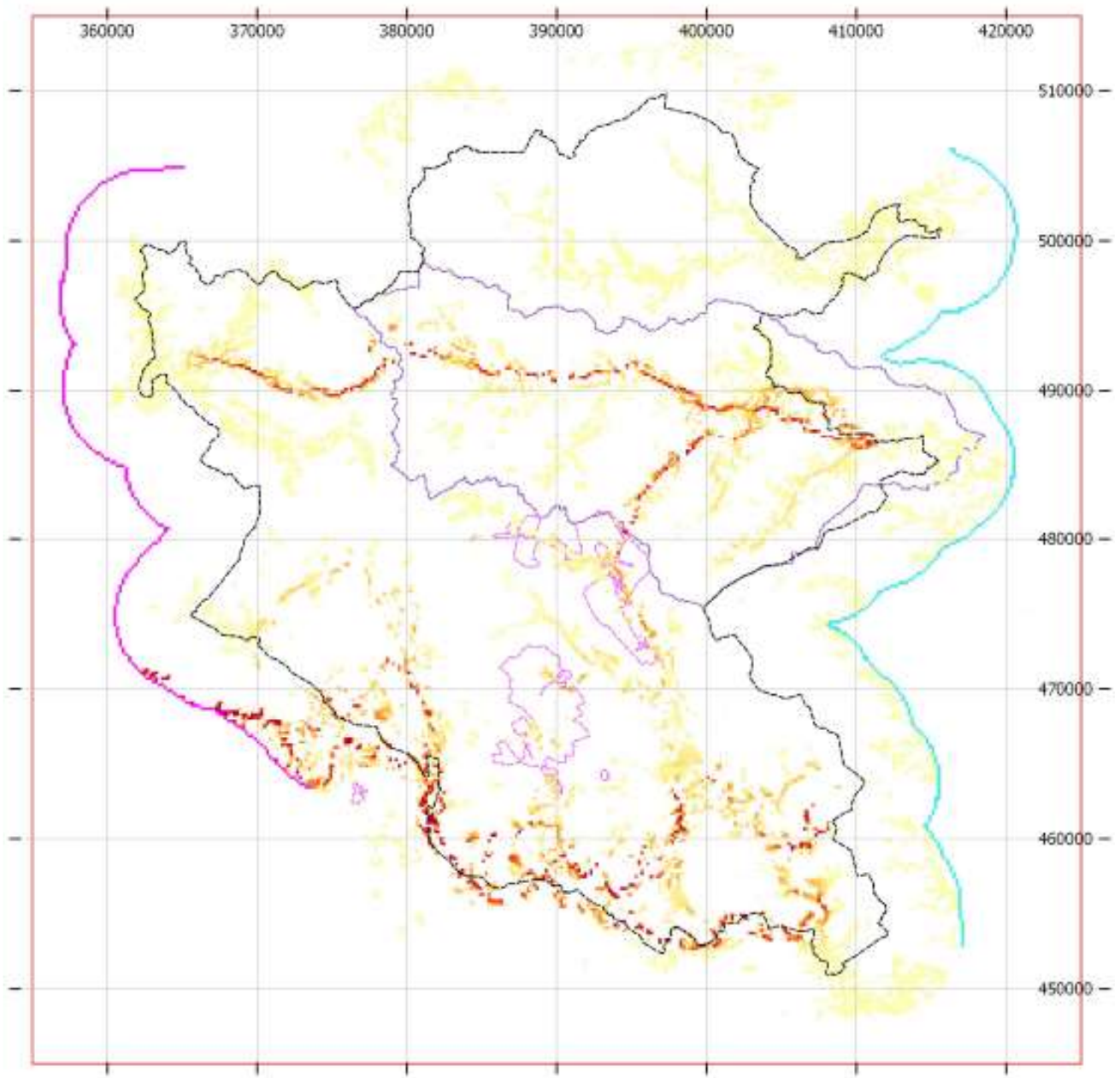
Condatis model of South to North flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 250m



Condatis model of South to North flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 4km



Condatis model of West to East flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 250m



Condatis model of West to East flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 250m

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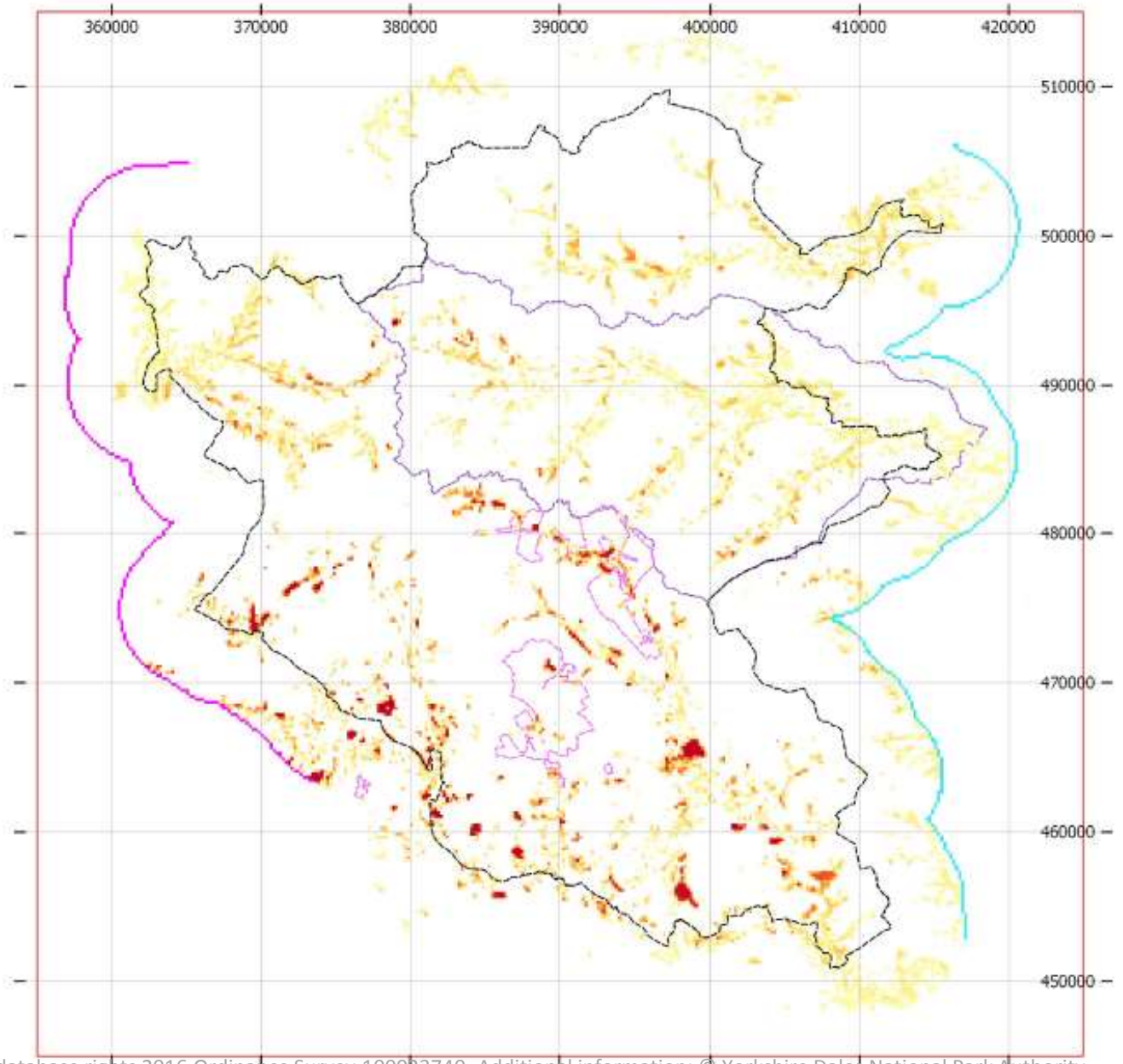
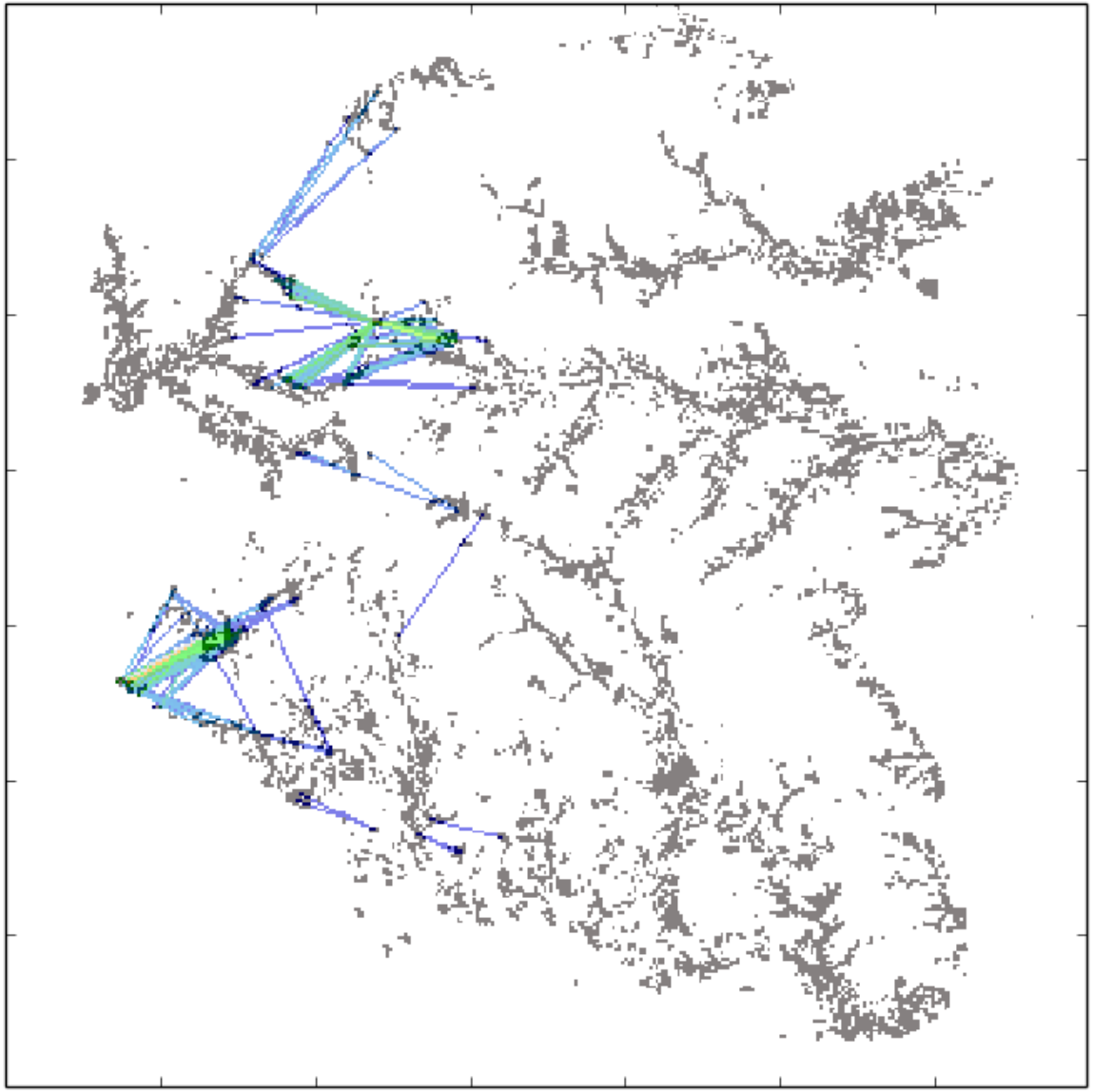
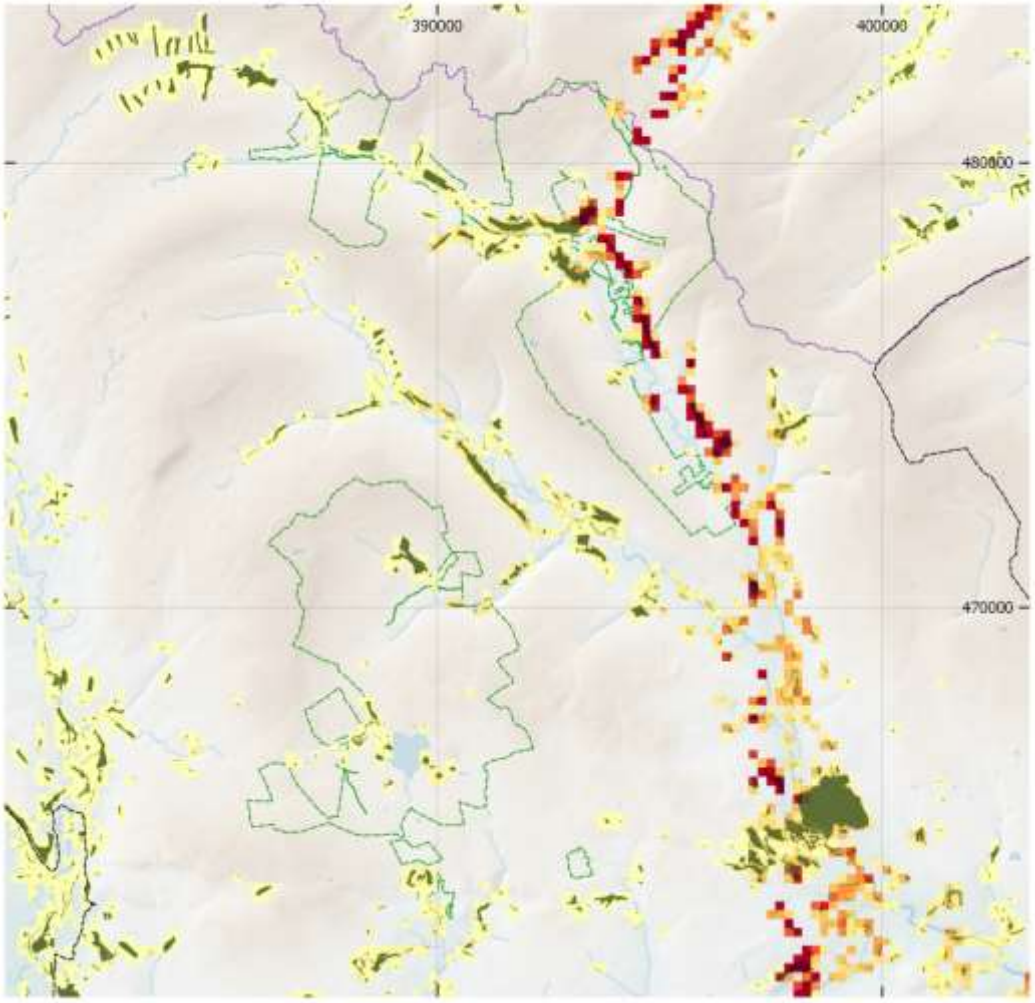


Bottlenecks W- E 4km mean dispersal



Initial results

Condatis model of South to North flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 250m



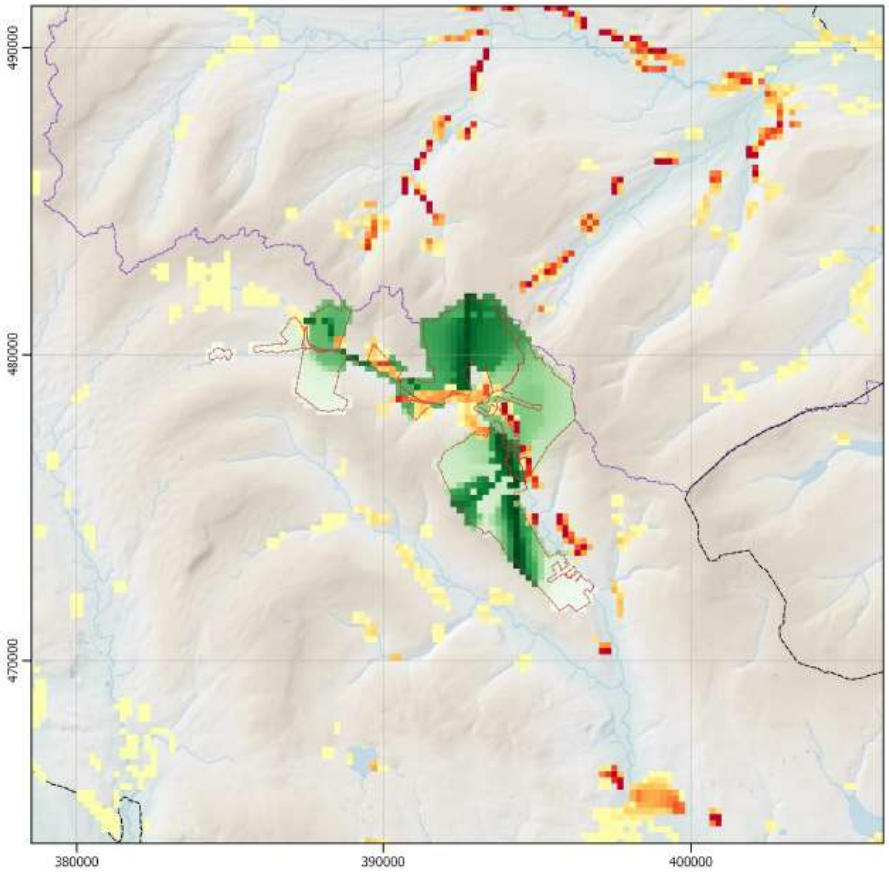
Flow maps for low mean dispersal show flow intensity concentrated in identifiable corridors.

BUT speed and time outputs suggest chance of target colonisation close to zero!

Backwards optimisation

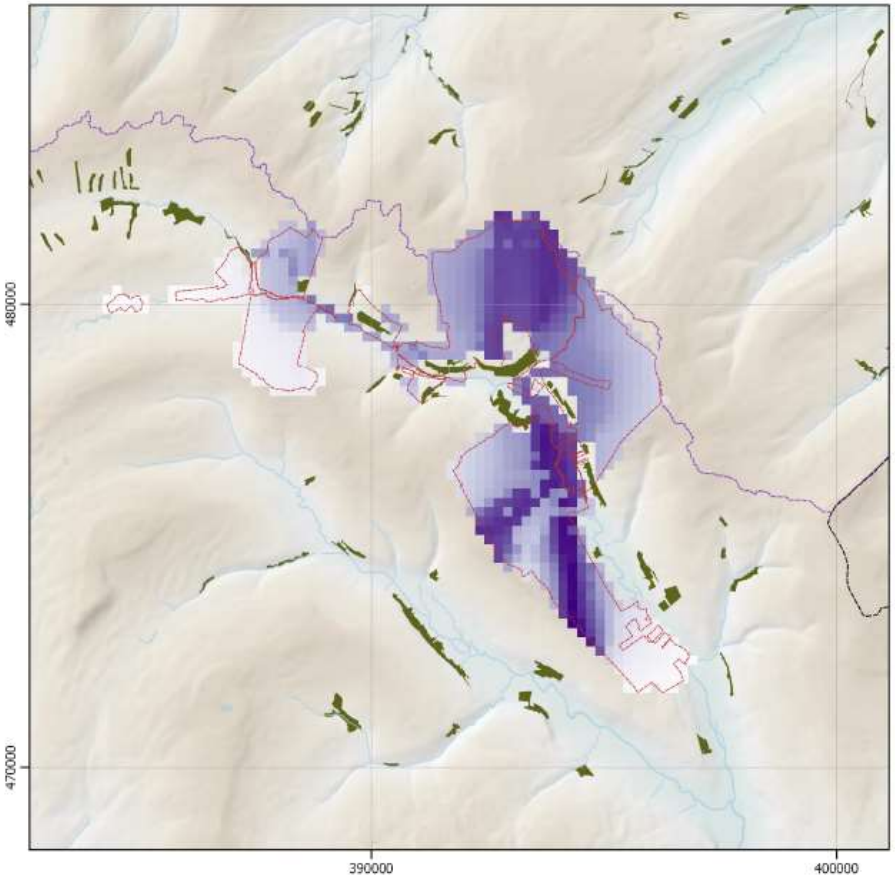
South – North 250m disp.

Flow (red) and rank (green)

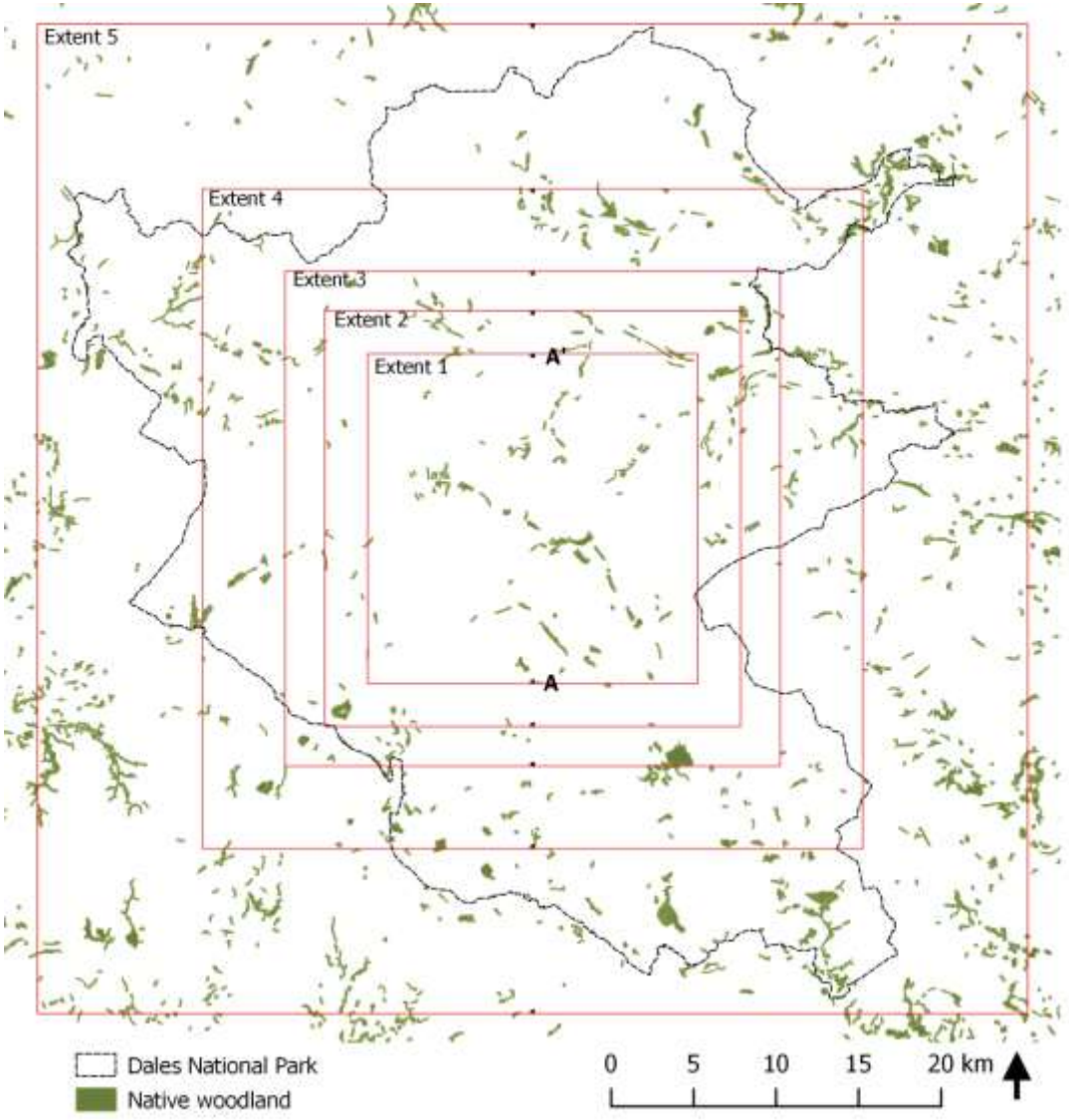


S-N and W-E 250m disp.

Ranks combined



Scale tests – extent of habitat incuded

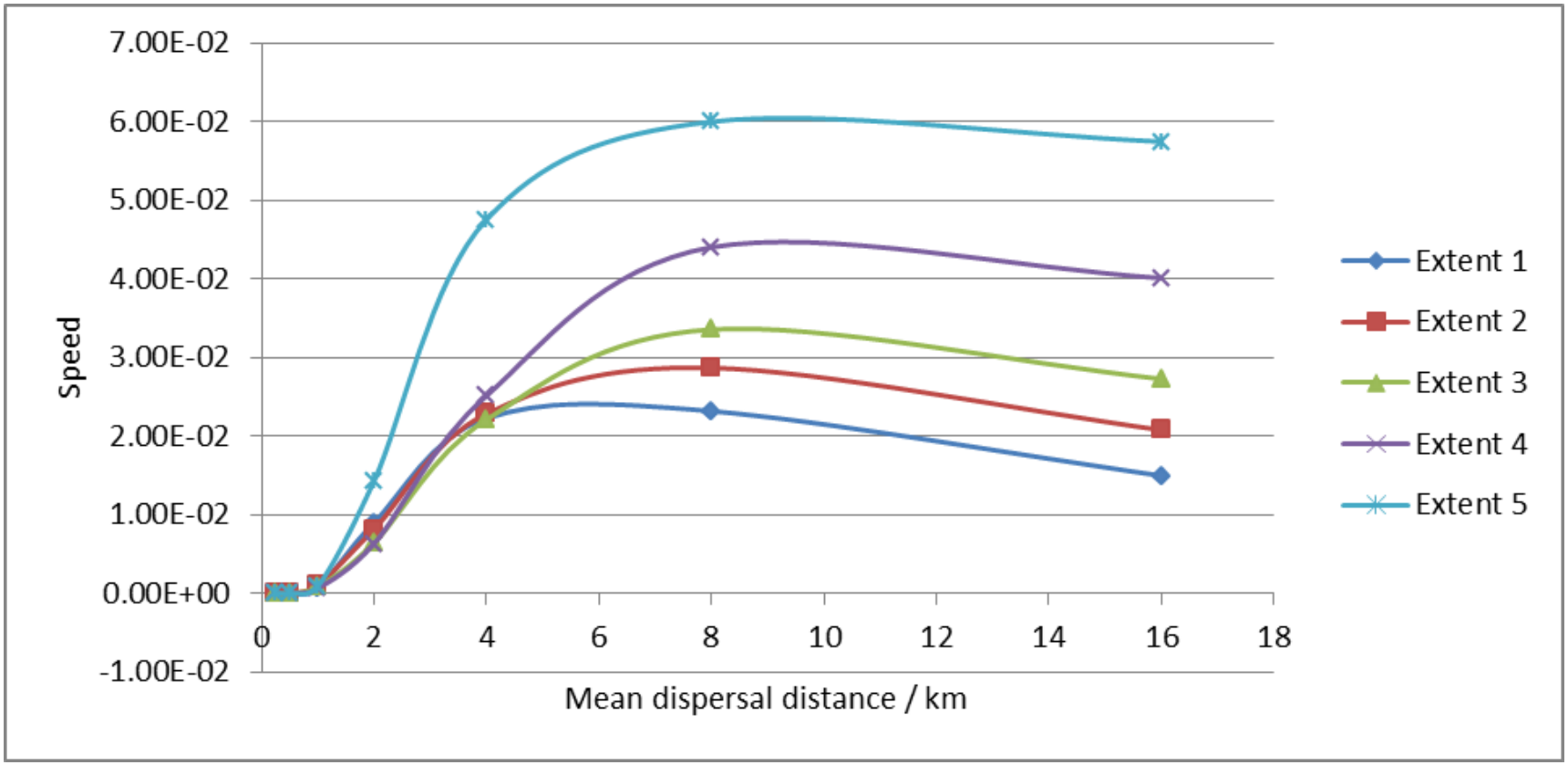


Flow tests between AA' using habitat at 5 different extents. Speed outputs compared, also relative distribution of flow intensity within the area of interest Extent 1

Generic focal species tests

Speed output between AA' at each habitat extent for a range of mean dispersal distances:

250m, 500m, 1km, 2km, 4km, 8km 16km



Generic focal species tests

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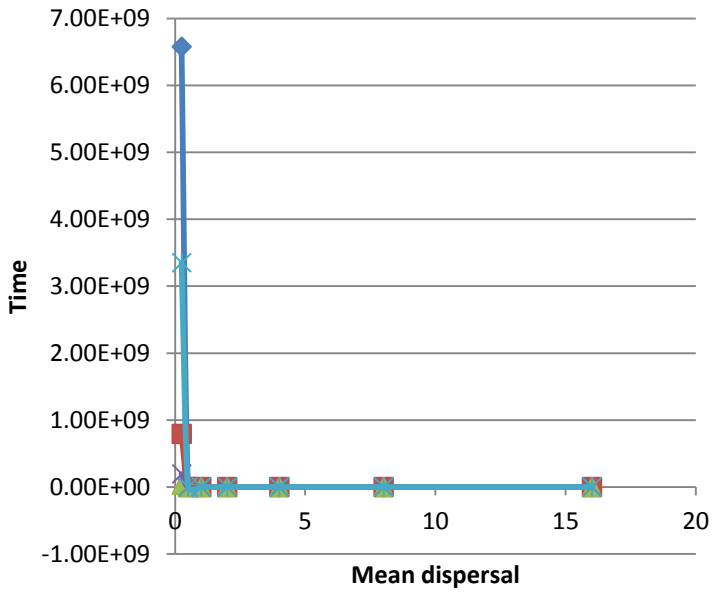

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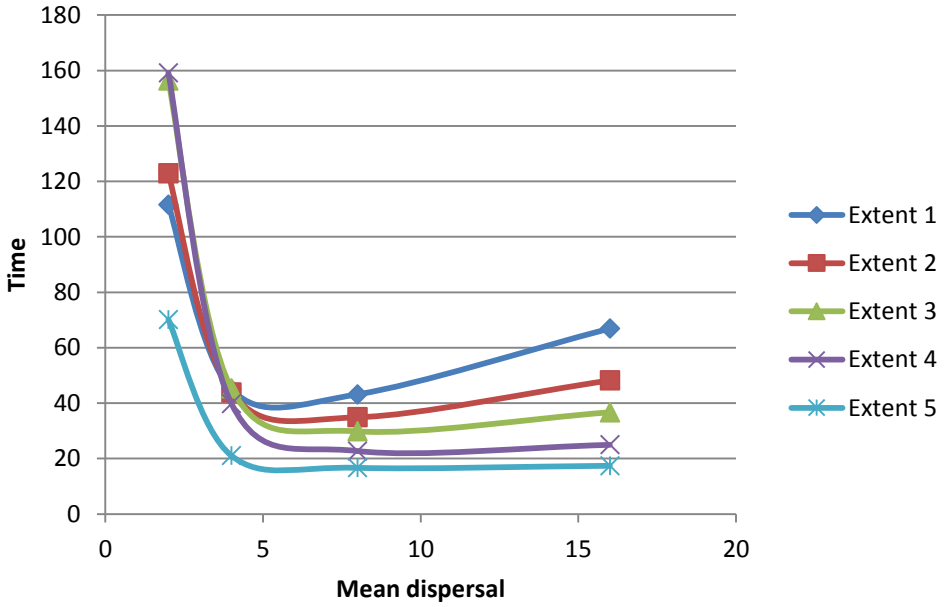
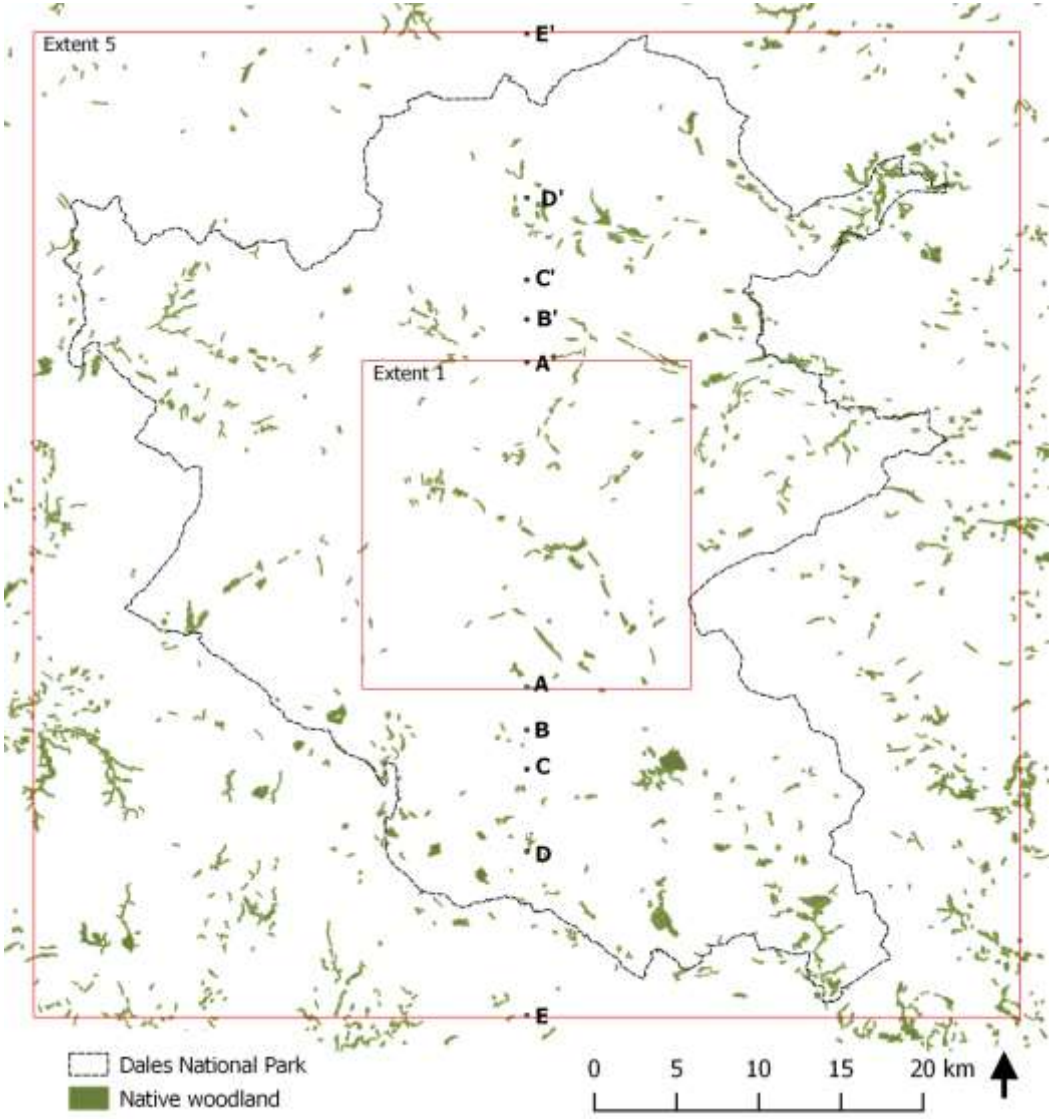


2km, 4km, 8km 16km

Scale tests – point source / target separation

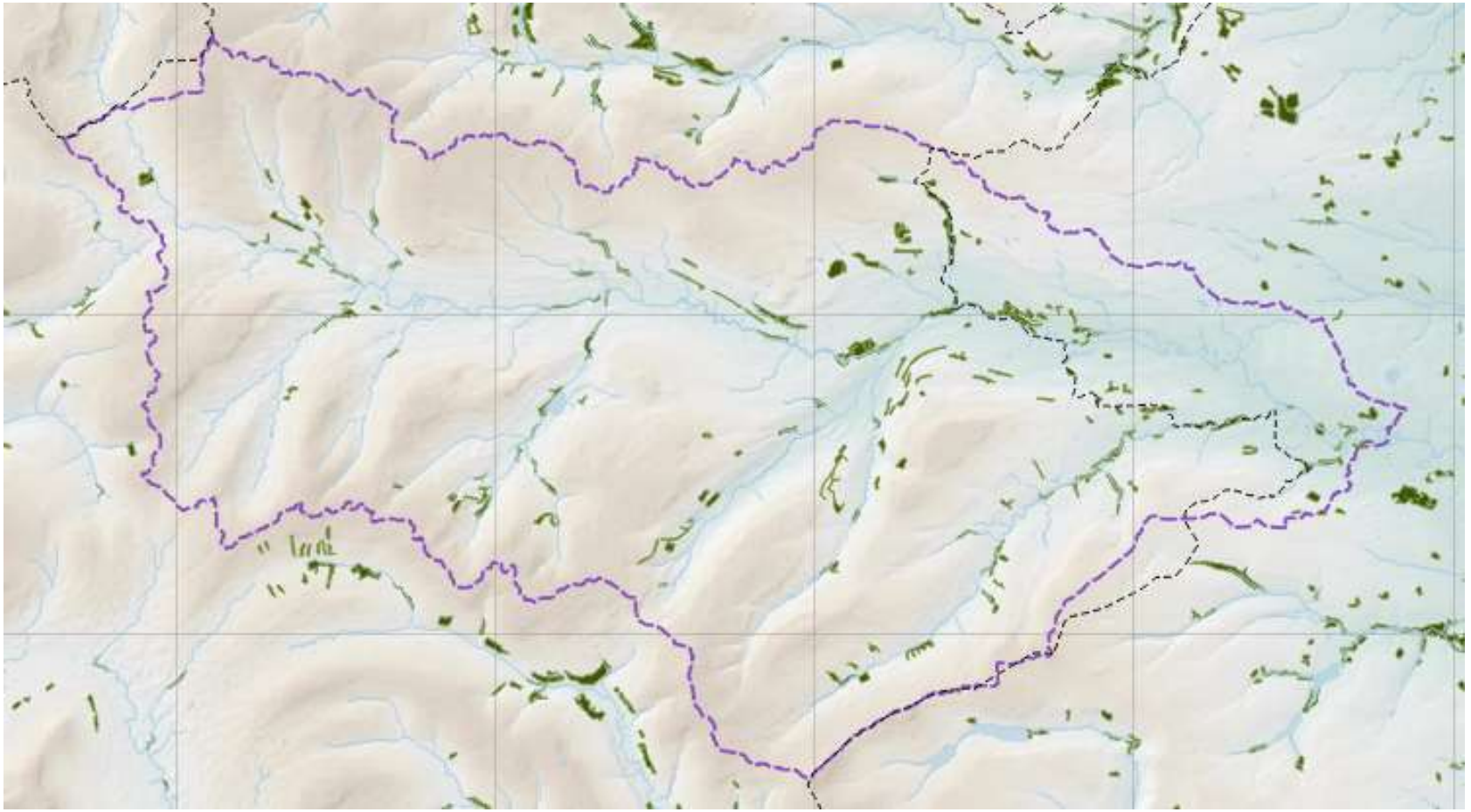


Flow tests using habitat at Extent 5 for source and target points at different degrees of separation (AA' BB' CC' DD' EE').

Relative distribution of flow intensity within Extent 1 compared for each test.

Focal species study

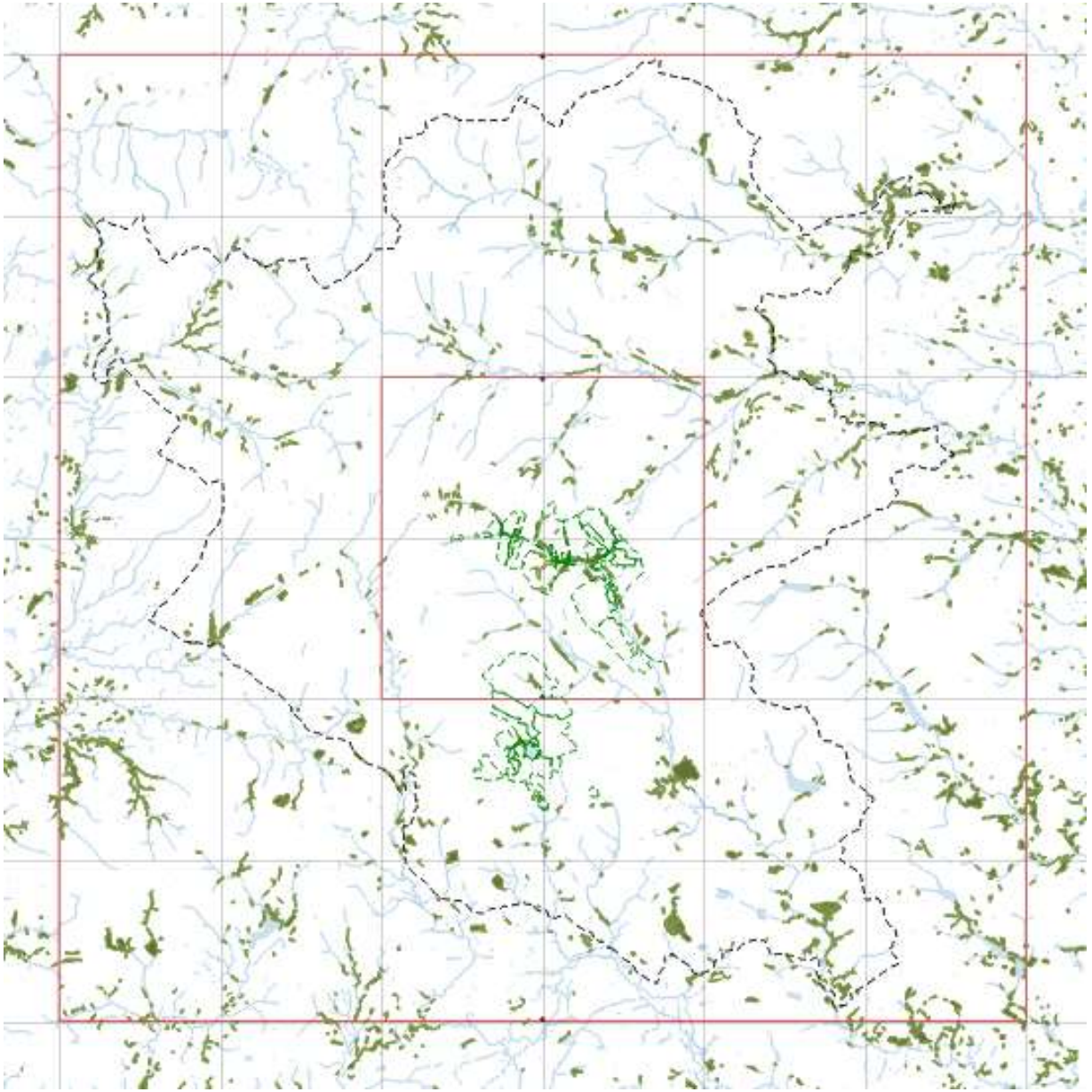
Dormouse reintroduction project in Upper Ure catchment



Evaluation of habitat restoration strategies

New woodland planting in Upper Wharfedale circa 72 Ha

Extents used for new woodland flow tests



Effects of new woodland planting on flow model outputs

				Baseline habitat		New woodland planting		% difference	
	Source / Target	Habitat area	Mean Dispersal	Speed	Time	Speed	Time	Speed	Time
a)	AA’	Extent 5	2km	0.0142565	70.1433	0.0165246	60.5159	115.91	86.27
b)	EE’	Extent 5	2km	0.00107596	929.404	0.00108031	925.664	100.40	99.60
c)	S border / N border	Extent 1	2km	0.0266915	37.4652	0.046576	21.4703	**174.50**	**57.31**
d)	S border / N border	Extent 5	2km	0.0206198	48.4971	0.0219801	45.4957	106.60	93.81
e)	AA’	Extent 1	2km	0.00896151	111.588	0.0113638	87.9985	126.81	78.86