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

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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
Condatis model of West to East flow using quarter segments of 5km buffer from NP boundary as source and target areas. Species dispersal parameter: 4km
Bottlenecks W- E  4km mean dispersal
Initial results

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 included

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

Time outputs between AA' at each habitat extent for a range of mean dispersal distances:

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

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

<table>
<thead>
<tr>
<th>Source / Target</th>
<th>Habitat area</th>
<th>Mean Dispersal</th>
<th>Baseline habitat</th>
<th>New woodland planting</th>
<th>% difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Speed</td>
<td>Time</td>
<td>Speed</td>
</tr>
<tr>
<td>a) AA'</td>
<td>Extent 5</td>
<td>2km</td>
<td>0.0142565</td>
<td>70.1433</td>
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<td>b) EE'</td>
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<td>0.00107596</td>
<td>929.404</td>
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<td>c) S border / N border</td>
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<td>37.4652</td>
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<td>d) S border / N border</td>
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<td>48.4971</td>
<td>0.0219801</td>
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<tr>
<td>e) AA'</td>
<td>Extent 1</td>
<td>2km</td>
<td>0.00896151</td>
<td>111.588</td>
<td>0.0113638</td>
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