Addressing habitat fragmentation and connectivity in EIA

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Habitat fragmentation and connectivity in UK & International EIAs

8 UK EIAs
- 3 road schemes
- 1 pipeline
- 1 transmission line
- 1 wind power
- 2 mixed use developments

6 International EIAs
- 3 hydro power
- 1 wind power
- 1 gas pipeline
- 1 transmission line
Heathrow Expansion Project (HEP)

- Nationally significant infrastructure
- New north-west runway
- Airport supporting facilities
- Associated infrastructure (grey, green, blue)

Completed work:
- EIA Scoping Report
- Comprehensive baseline studies
- PEIR
- Started the Environmental Statement

Project is currently on hold

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
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<tbody>
<tr>
<td>2026</td>
<td>2030</td>
<td>2035</td>
<td>2050</td>
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HEP – why was habitat connectivity analysis needed?

Planning Inspectorate comment:
‘...ensure that ecological connectivity is adequately considered and assessed, including effects on the existing connectivity (including hydrological links) and connectivity to and from any proposed offsetting/compensatory habitat to be provided.’

<table>
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<th>Habitat Fragmentation Impact Assessment</th>
<th>Green Infrastructure Design</th>
<th>Biodiversity Net Gain Calculations</th>
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HEP - Collection of data for habitat connectivity analysis

Field Data
- Habitat survey (incl. condition assessment)
- Protected species surveys

Remote Sensing
- LIDAR
- Satellite imagery

Existing GIS Data
- NE Priority Habitat Inventory
- EA River Inventory
- OS Master Map
- Bluesky tree data

Desk Study
- Literature review
- Biological records
Circuitscape

- Software for **functional connectivity** analysis, used to predict patterns of movement, gene flow, and genetic differentiation among species populations in landscapes
- Based on ‘circuit theory’ and frequently used in conservation/academic research
- Uses **nodes** and **habitat resistance** values to map the “ease of movement” of species through the landscape

McRae & Shah, 2009
HEP - habitat connectivity analysis

- Study area was much larger than the project area of influence
- Landscape scale approach

Species analysed:
- 4 bat species
- 2 reptile species
- Badger
- Otter
- Kingfisher
- Coarse fish assemblage

Connectivity analysis study area: 8523 ha
Habitat connectivity baseline:
Grass snake (*Natrix helvetica*)

**Data used in the model:**
- Habitat survey
- Reptile refugia surveys
- Research on habitat preference
- Expert opinion
Habitat connectivity analysis for grass snake

Baseline

Project without mitigation

Project with mitigation
Future research on ecological connectivity in EIA

- Comparison of remote sensing techniques to inform connectivity analyses at different scales
- Monitoring actual vs. predicted connectivity
- Functional connectivity vs. structural connectivity
- Ecological connectivity vs. connectivity for people

Special Issue:
Advancing the Consideration of Ecological Connectivity in Environmental Impact Assessment

Manuscript deadline: 26 June 2021
Let’s continue the conversation!
Post questions and comments via chat in the IAIA21 platform.

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