Urban Woodland Butterfly Habitat Suitability
What effect does habitat quality, size and vegetation structure have on distribution of urban woodland butterflies?

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Milton Keynes (MK) has a unique network of well-vegetated roads 1, and has five major patches of ancient woodlands, plus a mixture of amenity woodlands. As urbanization expands rapidly, studying impacts of fragmentation is important, and may also have implications for butterflies living within a hostile matrix elsewhere 4. This method can help us understand how species adapted to living in patches persist with increasingly hostile surroundings, but also bring rich and diverse nature closer to people 5.

The importance of urban butterfly conservation

What are the causes of butterfly decline?
1. Climate change
2. Habitat loss
3. Mismanagement

The Pearl-bordered Fritillary, once very common in the UK, is now one of our most endangered butterflies, and extinct in MK.

Prospects can be improved with suitable land management techniques where it still occurs.

The UK has 59 species of butterflies, 24 live in Milton Keynes 15 species were recorded in this study.

Top 3 most common butterflies in MK woods

<table>
<thead>
<tr>
<th>Butterfly Species</th>
<th>Common Name</th>
<th>MK Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speckled Wood</td>
<td>Pararge aegeria</td>
<td>10</td>
</tr>
<tr>
<td>Ringlet</td>
<td>Aphantopus hyperantius</td>
<td>8</td>
</tr>
<tr>
<td>Large White</td>
<td>Ixias brassica</td>
<td>7</td>
</tr>
</tbody>
</table>

Generalists dominate most sites

Two major generalist species, Speckled Wood and Ringlet, are the most abundant species at almost every site (Table 1). Notably, Kingsmead Spinney has a good number of several species seeing a national decline, despite its size. The importance of urban butterfly conservation

Not all ancient woodlands are equal

Between-patch variances matter. Ancient woodlands encompass the majority of butterfly species but two outliers Kingsmead Spinney and Linford Wood (both ancient) are of contrasting condition, at 40 ha and 2 ha respectively. There is no correlation between area and Simpson diversity index (p=0.14), Species Richness (p=0.10) or species per transect (p=0.12).

Ancient woodland has more complex structure than other sites

There were significant differences between woodland types in several habitat variables (Table 2) with ancient woodland sites tending to have more complex structure.

Butterflies are Biodiversity Indicators

Conserving habitats for the benefit of butterflies often increases biodiversity of plants, invertebrates and other animals 1. They are important pollinators, and therefore make up a vital element of ecosystem function. Finally, they are relatively well recorded with long time-series in the UK 1 so are good tools for examining response to change over time locally and nationally.

Ancient woodland is the most diverse, but it’s not all about size

Using pollard walks for 9 weeks from June 2022, ten sites were surveyed; 5 ancient woodland, 2 amenity and 3 roadside woody vegetation. Ancient woodland has the highest Total (Figure 1, a), Richness (b) and Simpson's Index (c) of butterflies per 100m, irrespective of size.

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Conclusion

- Ancient woodlands supported the largest and most diverse butterfly communities, even in relatively small sites.
- Habitat differences may explain differences between butterfly communities but the picture is complex.
- Future work will increase the number of amenity and roadside transects and use remote-sensing for habitat structure assessments.