Milton Keynes (MK) has a unique network of well-vegetated roads, 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. 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.

### Generalists dominate most sites

Two major generalist species, Speckled Wood and Ringlet, are the most abundant species at almost every site (Table 1). However, Kingsmead Spinney has a high number of several species seeing a national decline, despite its size.

### Top 3 most common butterflies in MK woods

- **Speckled Wood**
- **Ringlet**
- **Large White**

### 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 sizes, at 40 ha and 2 ha respectively. There is no correlation between butterfly species but two outliers Kingsmead Spinney and Linford Wood (both ancient).

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

Using pollard walls 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 butterfly species per 100m, irrespective of size. Quantitative techniques where it still occurs.

### Butterflies are Biodiversity Indicators

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

### Conclusion

- **Ancient woodland 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.**

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**Table 1. National trends**

<table>
<thead>
<tr>
<th>Butterfly species</th>
<th>Amenity</th>
<th>Roadside</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species richness</td>
<td>0.75</td>
<td>0.55</td>
</tr>
<tr>
<td>Simpson's index</td>
<td>0.90</td>
<td>0.35</td>
</tr>
</tbody>
</table>

**Table 3.** Natural trends \( \gamma \) relates abundance per woodland site, arranged by type and ordered by area within type. Colour grading shows more to least abundance species per woodland site.

**Figure 2** (a) Canonical Correspondence Analysis (CCA) for all woodlands, and (b) a CCA ordination spider only for ancient sites.