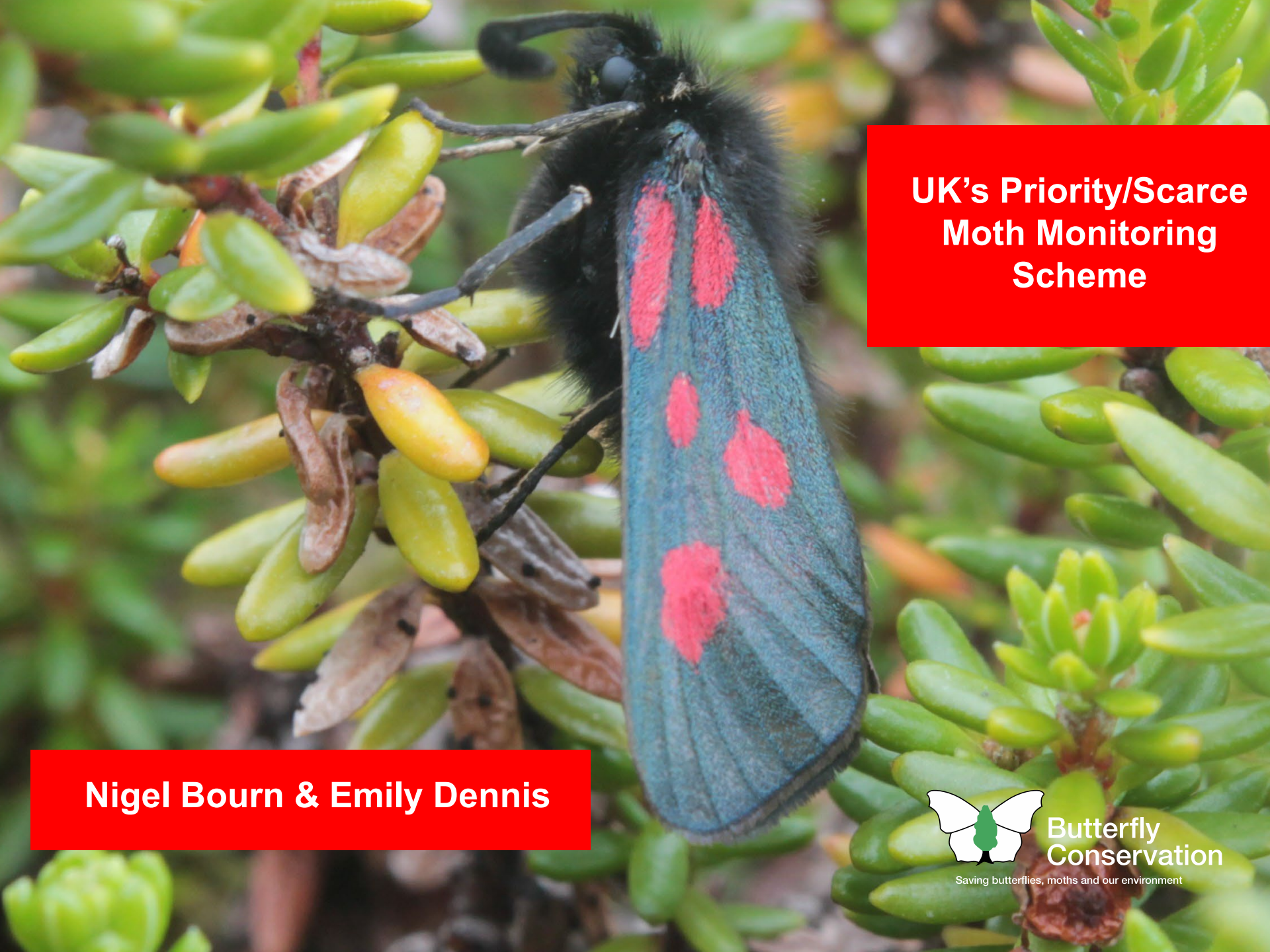

UK's Priority/Scarce Moth Monitoring Scheme

Nigel Bourn & Emily Dennis

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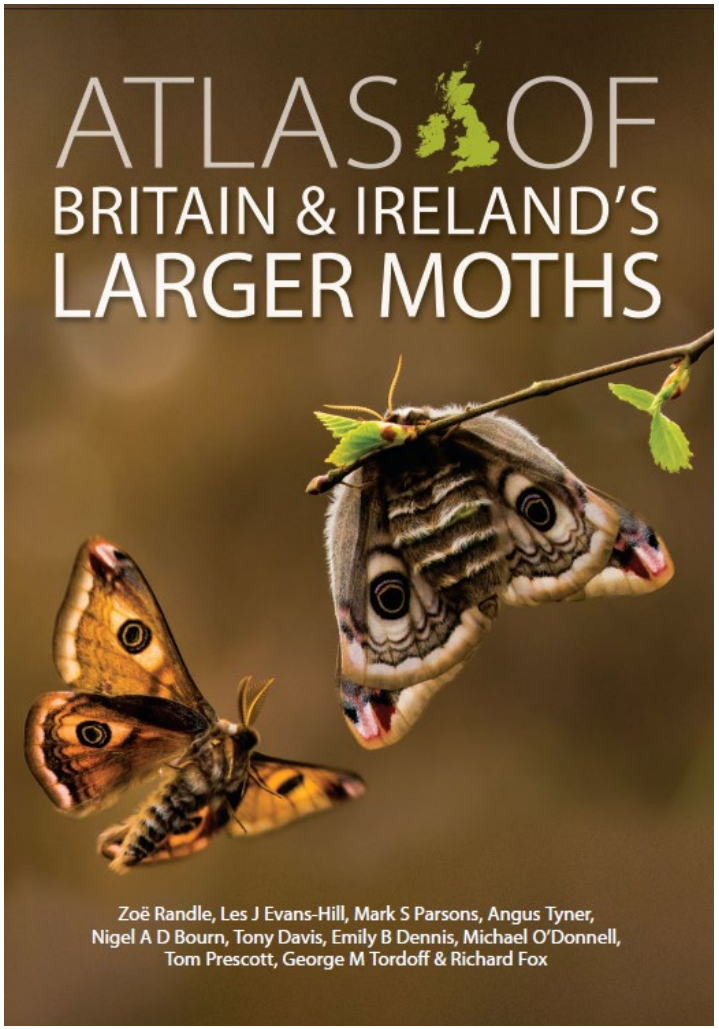
Atlas of Britain and Ireland's Larger Moths



MOTHS COUNT National Moth Recording Scheme

MOTHS IRELAND

- 893 macro-moth species
- 867 species with accounts
- 26 appendix species

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Long-term distribution trends 1970-2016

We used a standardised long term trend from 1970

For this 47 year period 1970-2016

390 species had sufficient data

163 (**42%**) species **declined** in distribution

227 (**58%**) species **increased** in distribution

94%

White Colon

667%

Red-green Carpet

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Distribution trends across species

For these 390 species

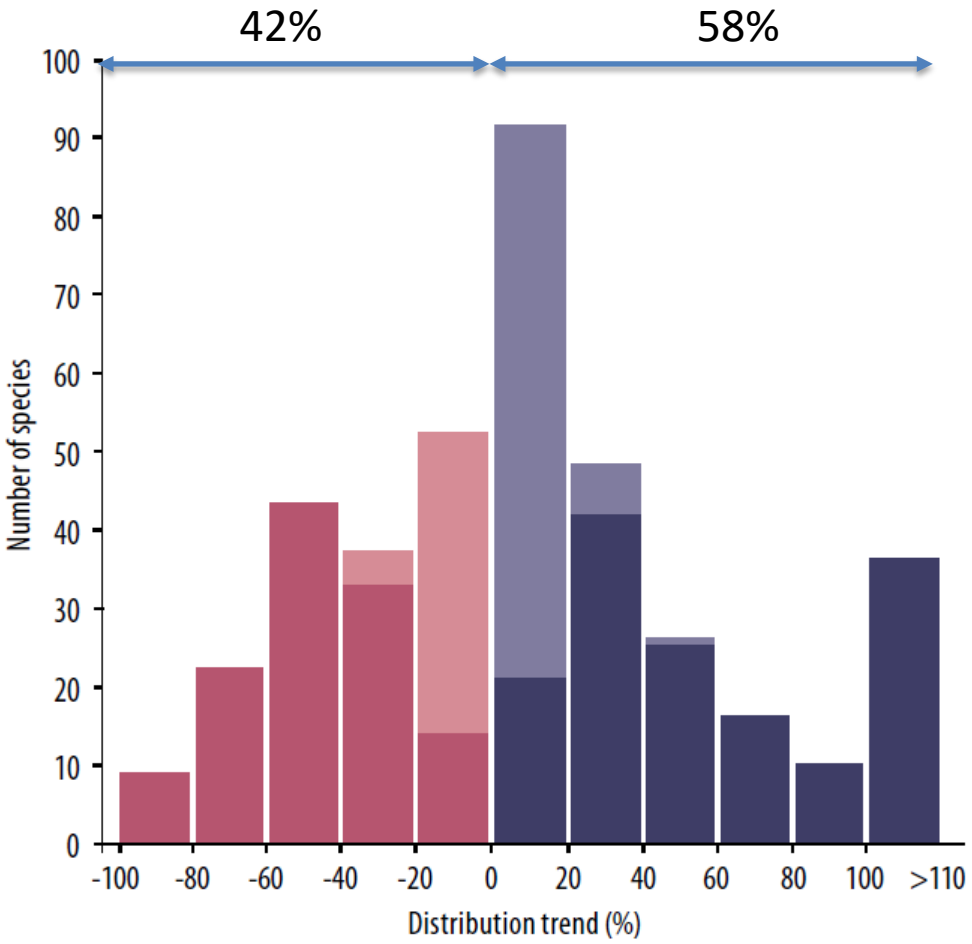
121 (31%) species significant declines

46 of these declined by at least 50%

148 (38%) species significant increases

36 of these more than doubled

121 (31%) non-significant changes



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Rothamsted abundance trends

Robust long term abundance trends for GB

427 macro-moth species

Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

ROTHAMSTED RESEARCH

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Long-term abundance trends 1970-2016

47 year period 1970-2016

397 species

248 (**62%**) species declined in abundance

149 (**38%**) species increased in abundance

100%

Stout Dart

84,589%

Buff Footman

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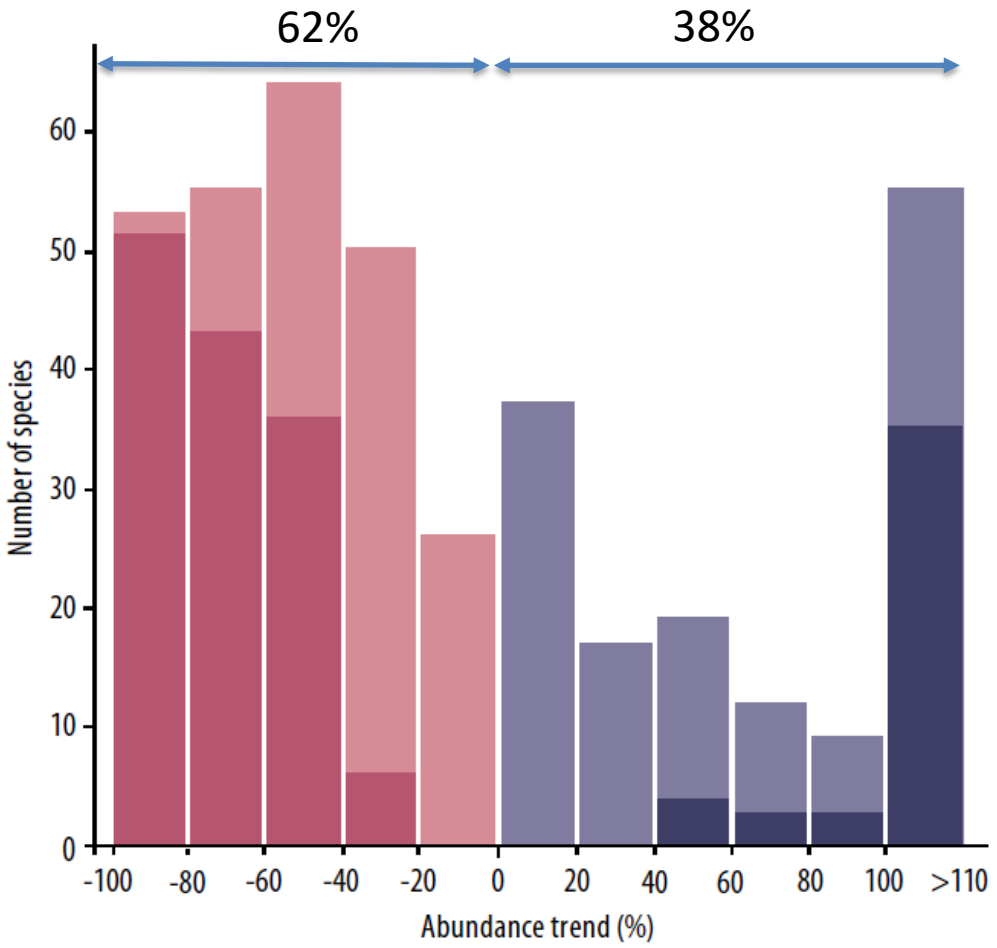
Abundance trends across species

136 (**34%**) species significant declines

108 of these declined by at least 50%

45 (**11%**) species significant increases

35 species more than doubled



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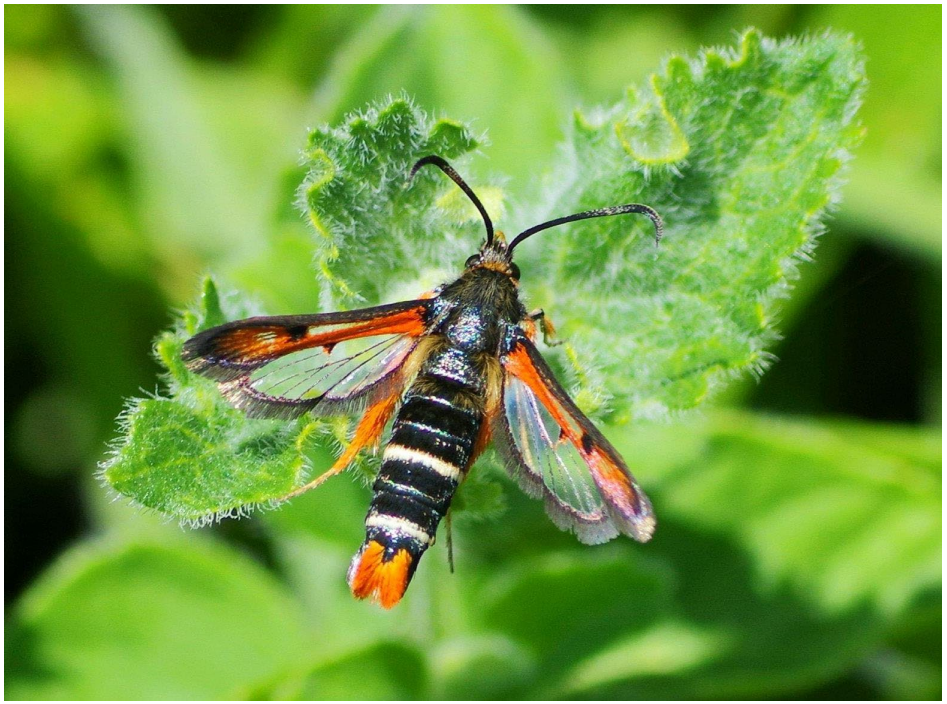
Clear monitoring gaps

Abundance trends only available for the 397 most widespread species

Distribution trends also possible for 390 but again only for the widespread species

What about restricted species and those of conservation priority?

BC's moth ecologists developed systematic monitoring tailored to each species to assess the success or otherwise of our conservation work



Pyropteron chrysidiformis

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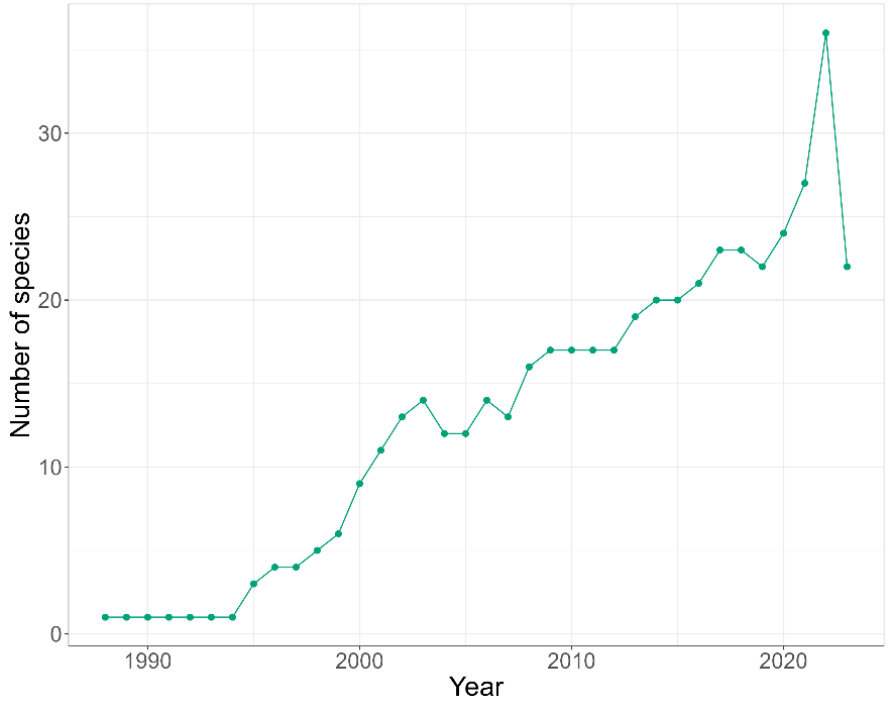
Assessing the data and growing the coverage

- Can we use this data to calculate trends for less common species and develop an Indicator?
- In 2023 systematic counts were available for 39 species using a range of methods
- Monitoring for a number of species has been introduced in recent years, and thus these species have the potential to contribute to analyses in future once a reasonable (i.e. at least 5 years) of data have been collected.



Number of scarce moth species monitored each year.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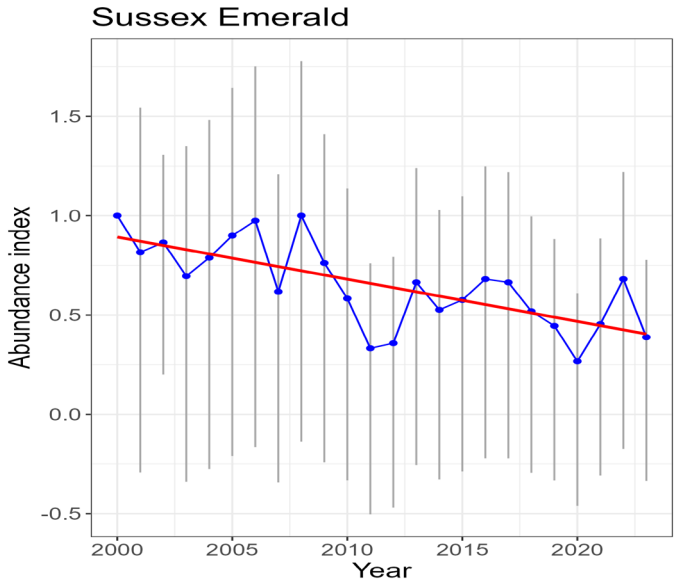
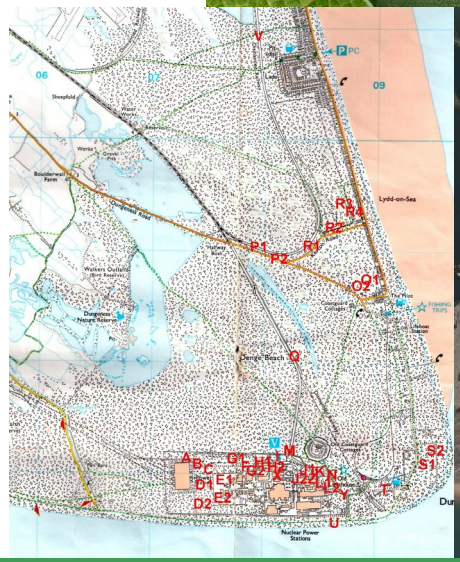
1 *Thalera fimbrialis (*Sussex Emerald Moth)

- Restricted to one shingle site in the south-east of England, **larval monitoring** has been carried out since 2000 using a standardised **30 minute timed count**.
- Principally feeds on *Daucus carota (w*ild carrot)





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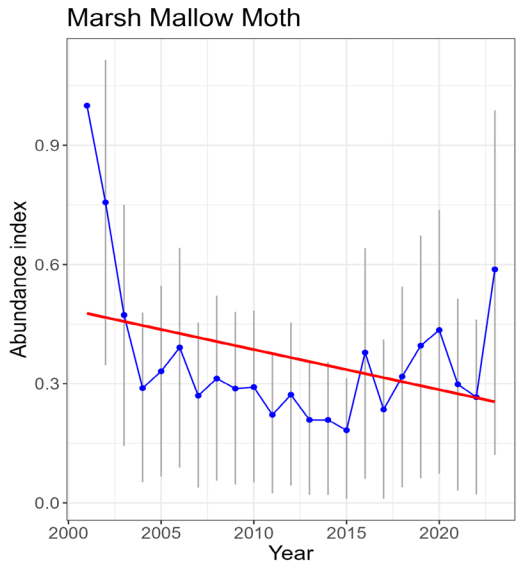
2 *Hydraecia osseola* (Marsh Mallow Moth)

Eight populations in SE England and reliant on large, extensive stands of the larval foodplant, Marsh Mallow *Althaea officinalis.*

Three sites are monitored by **nocturnal transects** and five by **timed torchlight foodplant searches**, each totalling 60 minutes.



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Examples of new species

*Ancylis tineana (*Rannoch Roller)

- A scarce species in the UK found in the Scottish Highlands, monitoring started in 2020.
- On damp habitats and dry moorland with regenerating birch where it may use trees up to 1.2 m tall
- **Larval spinning's are counted** and divided by the area searched (hectares) to generate a spinning density.
- This allows comparison between sites and a standard approach to measure change over time.

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Zygaena exulans (Mountain Burnet)

- *Zygaena exulans is* a montane species occurring at an altitude of 600-1050m restricted to three 10 km squares in the UK, in the Highlands of Scotland.
- The species occupies dry crowberry (*Empetrum nigrum*) rich heathland.
- A weekly **single species transect**, is walked on the main site by volunteers, allowing the peak of the population to be determined.
- At other sites **a timed count** method is used which allows the population to be calculated using one visit.
- Data is converted to the encounter rate, (number seen per hour), to allow comparison between sites and years.

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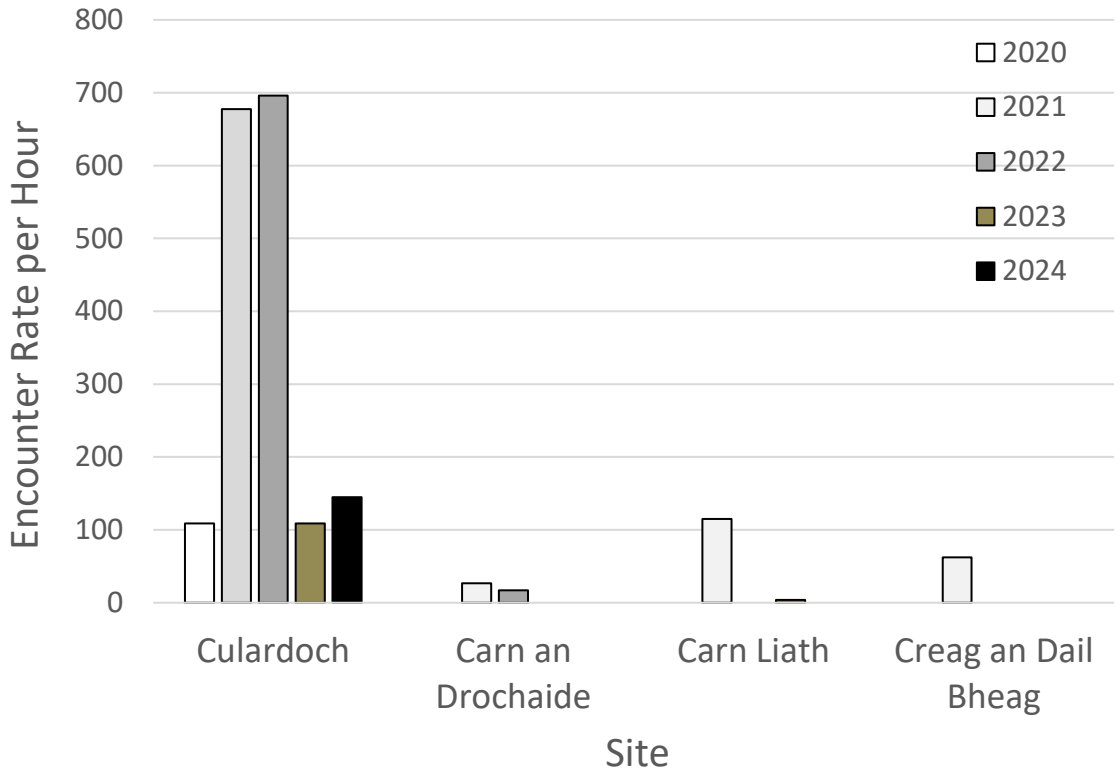
Results for first five years

Morrone transect

Year	Peak Count	Date of Peak
2020	104	25th June
2021	69	1st July
2022	286	9th July
2023	142	22nd June
2024	11	9th July

Timed counts at other sites



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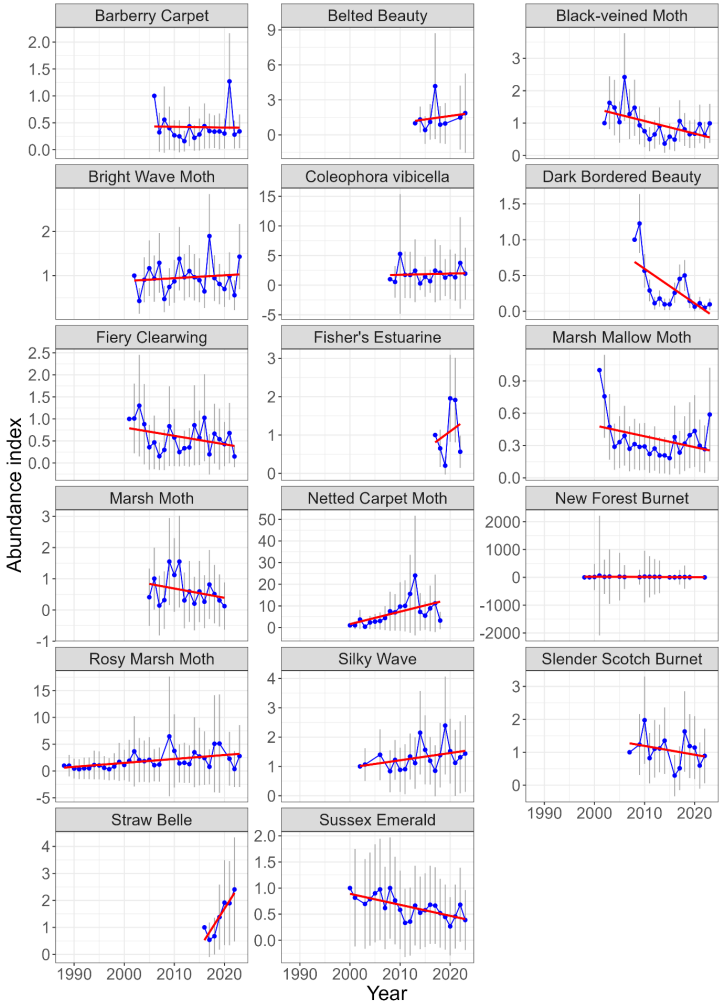
Analytical method and species indices

- For each species an overall **index of abundance** was estimated using TRIM.
- A summary for each species was then produced (e.g. plotting the number of sites per year, and site-level data) and **outputs assessed** to highlight issues and improved to produce **more robust outputs.**
- For example, in some cases data from earlier years, resulting from limited sites, were excluded.
- Following the above process, **species indices and trends were estimated from the filtered dataset**.



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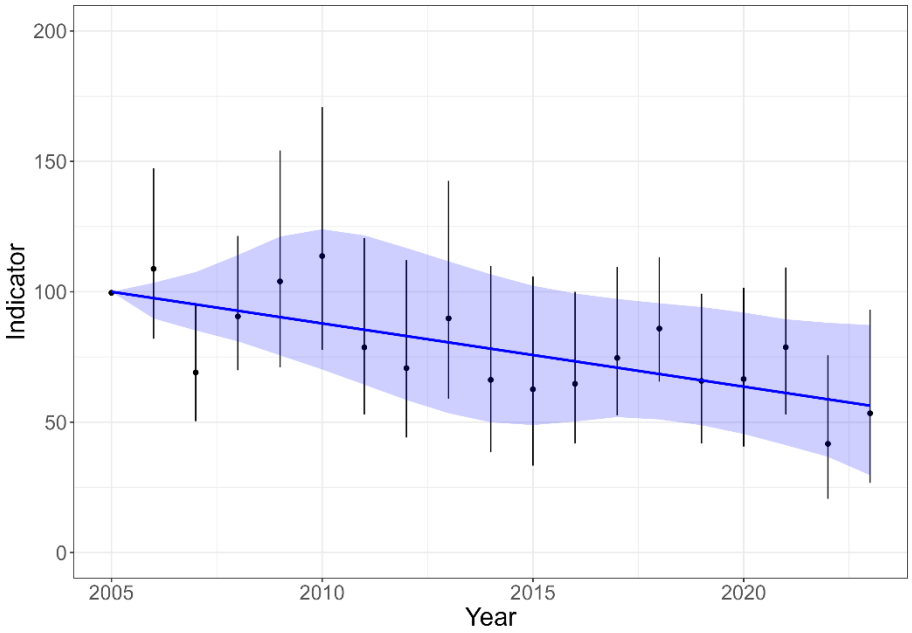
Species Indicator produced

- 16 species were combined to produce a multi-species indicator from 2005 onwards (the year beyond which at least half of the species have data in all years).
- The indicator was calculated based on a geometric mean using the BRCindicators package and 95% confidence intervals were calculated based on bootstrapping (resampling) the species
- The trend was based on a linear regression through the smoothed indicator.
- The trend for the indicator for 2005-2023 is estimated as -44% (95% CI: -67%, -13%). The ten-year trend (2014-2023) is -28% (95% CI: --50%, +4%).



Scarce moth indicator based on 16 species. Solid blue line is the smoothed indicator with 95% CI shown as the shaded area. Black dots indicate the unsmoothed indicator.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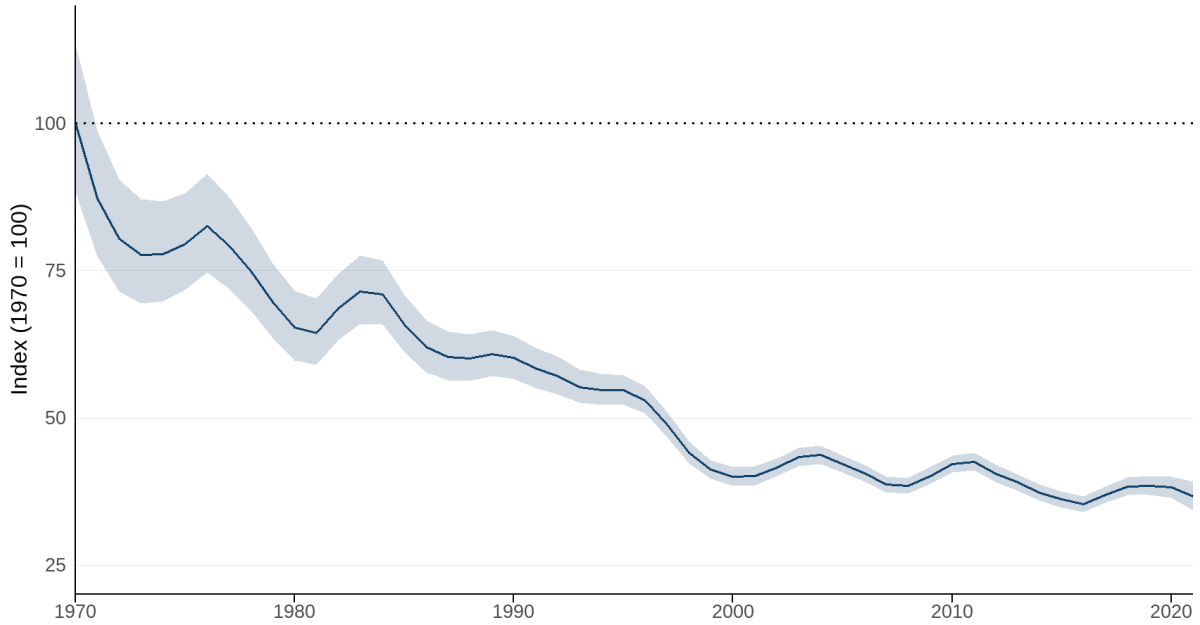
A UK Government Indicator

Adopted by the government and now also incorporated into the UK Biodiversity Indicator - Status of priority species :relative abundance



Trend in the relative abundance of priority species in the UK, 1970 to 2021
n=228 species (birds (103), mammals (13), butterflies (24) and moths (88))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Summary

- Its possible to monitor rare and restricted species using a range of methods from traditional transects to nocturnal searches for eggs, larvae or adults
- Important to record effort to assess numbers from year to year
- We started small with a few species and have expanded as experience and volunteer interest grows
- From small beginnings initiatives can grow – data now used as part of a Government Environmental Indicator.

Acknowledgements

Butterfly Conservation (UK)'s species ecology team, particularly Patrick Cook, Rachel Jones, George Tordoff, Tony Davies and Rebecca Levey.

The recorders and volunteers who contribute to the data collection particularly Sean Clancy.

Any questions?

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