## UKBMS 2023 publication Official Statistic briefing

## Key facts about the release

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| **1. Official Statistic name** | Point of first release for statistics on abundance of UK butterflies (2023 publication; includes data up to 2022) |
| **2. Publication timing** | This Official Statistic was published at 9:30am on 24th March 2023.  |
| **3. How to access** | The Official Statistics are available at <https://ukbms.org/official-statistics>  |
| **4. Short description** | * The statistics comprise trends of UK butterfly species based on results of the UK Butterfly Monitoring Scheme (UKBMS).
* The UKBMS is a long-term monitoring scheme (running since 1976) involving repeat sampling at thousands of locations across the UK. The key method involves regularly counting butterflies along defined transects on days with specified weather criteria.
* The statistics incorporate data from three components of the UKBMS: traditional self-selected transects; stratified random Wider Countryside Butterfly Survey (WCBS) squares; and targeted species surveys.
* The UK Butterfly Monitoring Scheme is organised and funded by Butterfly Conservation (BC), the UK Centre for Ecology and Hydrology (UKCEH), British Trust for Ornithology (BTO), and the Joint Nature Conservation Committee (JNCC). The UKBMS is indebted to all volunteers who contribute data to the scheme.
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| **5. Scope of statistics** | * Population trends are presented at UK level for 58 of the 59 regularly occurring species.
* Trends are presented at country level where sufficient data are available.
* Figures are presented for annual change (2021-2022), the last 10 years, and long-term trends (since monitoring began from 1976).
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| **6. Who was involved and key contact point** | * The statistic was produced by the UKBMS partnership, with UKCEH having primary responsibility for producing the statistics.
* Quality Assurance was carried out by the UKCEH, BC, BTO and JNCC.
* This is published as a JNCC Official Statistic and the key contact for any queries is kirsi.peck@jncc.gov.uk
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| **7. Associated comms activity** | * A press release will be released on 28th March, embargoed till 00:00 30th March, after the Butterfly Recorders’ Meeting. Please wait until this date before proactively promoting these official statistics.
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| **8. Relation to any other National/Official Statistics** | * This statistic forms part of a suite of statistics coming out of partnership monitoring schemes in JNCC’s terrestrial evidence programme. See <https://jncc.gov.uk/about-jncc/corporate-information/jncc-official-statistics-list-and-release-dates/>
* The statistic feeds into the National Statistics Compendium – [UK Biodiversity Indicators](https://jncc.gov.uk/ukbi) and country level indicators e.g. for [Scotland](https://www.nature.scot/doc/scotlands-indicators-terrestrial-insect-abundance-butterflies) and for [England](https://www.gov.uk/government/statistics/england-biodiversity-indicators) and will feed into the [Outcome Indicator Framework](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/992970/Outcome_Indicator_Framework_for_the_25_Year_Environment_Plan_2021_Update.pdf) for the 25y Environment plan in England.
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| **9. Further information** | * The summary below gives a brief overview of the Official Statistic results and related information.
* Technical details of the method and quality assurance process are set out in a separate document on the UKBMS website [here](https://ukbms.org/official-statistics).
* A separate discussion paper on drivers of change has been produced and is available on UKBMS website [here](https://ukbms.org/official-statistics).
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## Take home messages

1. Results summary
* Trends for UK butterfly species vary, with about a third of the species assessed in the UK showing a significant long-term decline in abundance (33%), compared to 29% showing a significant long-term increase. However, over the last decade the majority of species have been stable, with 4 species (7%) showing a statistically significant increase and no species showing a significant decline. Whilst it is encouraging that declines have stabilised compared to several decades ago, we note that abundance indices remain at a lower level for many species; in particular some habitat specialist species have not recovered to the higher numbers that were typically found in the early 1970s[[1]](#footnote-1).
* Overall, 2022 was an average year for butterflies, ranking 27th in the 47-year series. None of the 58 species assessed had their best year or worst year on record at UK level.
* However, Purple Emperor and Large Blue both had their 2nd best year on record, and Chequered Skipper and Dark Green Fritillary had their third best year on record. The biggest ‘losers’ of 2022 were Small Pearl-bordered Fritillary (2nd worst year or record) and Small Copper (3rd worst year on record). A further large annual decline for Small Tortoiseshell resulted in the 4th worst year on record for this species, continuing the significant long-term decline of this common and widespread species (down by 80% since 1976).
* There were some regional differences in how butterflies fared in 2022. Long-term declines still outnumber long-term increases on English sites, but over the last ten years most species are showing stable numbers with only two species showing significant short-term declines. In Wales and in Northern Ireland, out of the species with sufficient data to be assessed, there are both long- and short-term declines in several species, but it is encouraging that eight species are showing a long-term increase in Wales. The most positive outlook comes from Scotland, where many more species are increasing than decreasing. The fact that some species are expanding their range in Scotland is likely to be contributing to these more positive trends.
* Speckled Wood had its best year on record in Scotland, while Small Pearl-bordered Fritillary in England and Scotch Argus in Scotland recorded their worst year on record. Contrary to the trend elsewhere in the UK, it was a very good year for Small Tortoiseshell in Northern Ireland, registering its 2nd best year on record.
* Following the lower levels of data collected in 2020 due to covid restrictions, and the subsequent recovery in 2021, record numbers of sites were surveyed in 2022, and sufficient data was received to produce trends for all of the 58 species for which trends are usually produced.
1. **Drivers of change**
* Key drivers responsible for long-term declines in abundance include changes in the extent, condition and fragmentation of habitats caused by the intensification of farming, changes in forestry practices, urban development, pollution and climate change. Note that some drivers, e.g. climate change are likely to have mixed, species dependent impacts. An increasing number of sites are consistently recording substantial second broods of Dingy Skipper in southern England, which may be due to effects of climate change.
* Weather conditions can create noticeable fluctuations in butterfly populations from one year to the next as they impact butterfly development and activity directly, as well as indirectly (e.g. via impacts on habitat). Generally, butterflies tend to fare better with warm sunny weather during their flight period. [Met Office data](https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index) shows that 2022 was the warmest on record for the UK although the weather fluctuated considerably each month with cooler and unsettled periods alternating with warmer, more settled spells. The rainfall was mostly below average with drought conditions in second half of the summer, especially in eastern parts of England. The drought appears to have had a major negative impact on some species in the latter part of the monitoring season.
* Targeted conservation management to protect and improve habitat can have positive impacts on species abundance. For example, the Heath Fritillary is a threatened habitat specialist species that has benefited from habitat management. Whilst its long-term trend is of significant decline, Heath Fritillary has increased on monitored sites in recent years.

### Relevance of scheme results

* Butterfly populations are used as indicators for environmental change due to rapid and sensitive responses to subtle habitat and climatic changes, and reflection of the responses of other wildlife.
* UKBMS data are widely used in scientific research, for local site management, and have broad policy relevance. Data feed into [European indicators](https://ec.europa.eu/eurostat/cache/metadata/EN/sdg_15_61_esmsip2.htm), [UK biodiversity indicators](https://jncc.gov.uk/our-work/uk-biodiversity-indicators-2019/) and national indicators as part of measuring progress towards national and international (eg CBD) targets.

### Value of citizen science approach

* Around 3,000 skilled volunteers are involved, at an estimated annual value of over £2million[[2]](#footnote-2).
* This ‘citizen science’ approach enables wide-scale simultaneous sampling coverage, and gives health benefits to the volunteers engaging in an active out-of-doors conservation/monitoring project.
1. **Confidence in results**
* The UKBMS uses peer reviewed methodologies to ensure results are scientifically robust. The WCBS sampling framework has been designed to ensure representative land cover sampling.
* Records submitted undergo quality assurance to check for unexpected data entries, and the statistical analytical approach is designed to account for gaps in the recording.
* The statistical significance of 10-year and long-term trends has been assessed and is clearly presented.
* Sample size is high; a total of a total of 2,089 self-selected transects and 843 WCBS squares submitted data in 2022, as well as 262 sites where additional targeted surveys took place.

**Results Overview**

**Table 1: UK trends for butterfly populations**

The annual, 10-year and long-term changes are shown. Whilst annual change is interesting, it should be noted that there are naturally year to year fluctuations in butterfly populations, and the 10-year and long term trends are of more relevance from a conservation perspective.

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|  | **Species showing decreases in UK population**  | **Species showing increases in UK population** | **Commentary** |
| ***Annual change***  | 27 out of 58 species for which annual changes were calculated | 29 out of 58 species for which annual changes were calculated | This is a simple comparison of annual change. Statistical significance is not assessed.  |
| ***10-year trend*** | **No species show a statistically significant decrease**(25 additional species show an apparent decrease that are not statistically significant due to high variability relative to level of change, or low sample size) | **4 species show a statistically significant increase (7% of species assessed)**(27 additional species show an apparent increase that are not statistically significant due to high variability relative to level of change, or low sample size) | Note that 10 years is quite a short time to assess trends in butterflies and the trend is sensitive to start and end year values.  |
| ***Long-term trend*** | **19 species show a statistically significant decrease (33% of species assessed)**(10 additional species show an apparent decrease that are not statistically significant, due to high variability relative to level of change, or low sample size) | **17 species show a statistically significant increase (29% of species assessed)**(12 additional species show an apparent increase that are not statistically significant due to high variability relative to level of change, or low sample size) |  |
| ***Species that fared particularly well in 2022*** *annual change of 35% or greater* | Clouded Yellow 265%Lulworth Skipper 99%Holly Blue 87%Cryptic Wood White 86%Large Blue 70%Purple Emperor 55%Green Hairstreak 52%White Admiral 46%Marsh Fritillary 45%Comma 38%Ringlet 38% | No species had their best year on record |
| ***Species that fared particularly badly in 2022****annual change of 35% or greater* | Glanville Fritillary -55%Northern Brown Argus -48%Red Admiral -46%Scotch Argus -36% | No species had their worst year on record |

**Table 2: Country level breakdown of trends**

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|  | **England** | **Wales** | **Scotland** | **Northern Ireland** |
| **Number of species** assessed  | 55 | 33 | 26 | 14 |
| **Significantly increasing species** over 10 years and long term. Presented as % (numbers in parentheses) of those species assessed  | 1. Over 10 years:

7% (4 species)1. Over series

29% (16 species) | 1. Over 10 years:

0% (0 species)1. Over series

24% (8 species) | 1. Over 10 years:

15% (4 species)1. Over series

38% (10 species) | 1. Over 10 years:

0% (0 species)1. Over series

0% (0 species) |
| **Significantly decreasing species** over 10 years and long term. Presented as % (numbers in parentheses) of those species assessed  | 1. Over 10 years:

4% (2 species)1. Over series:

38% (21 species) | 1. Over 10 years:

15% (5 species)1. Over series:

27% (9 species) | 1. Over 10 years:

8% (2 species)1. Over series:

12% (3 species) | 1. Over 10 years:

14% (2 species)1. Over series:

21% (3 species) |
| **Species that fared particularly well in 2022 in each country**annual change of 35% or greater | Clouded Yellow 265%Lulworth Skipper 99%Holly Blue 82%Marsh Fritillary 82%Green Hairstreak 73%Large Blue 70%Purple Emperor 55%White Admiral 46%Comma 42%Ringlet 41%Wall 38% | Green Hairstreak 146%Brown Hairstreak 70%Painted Lady 61%Brimstone 45%Grayling 39% | Painted Lady 124%Red Admiral 118%Speckled Wood 87%Large Heath 62%Peacock 52%Small White 41% | Cryptic Wood White 86%Orange-tip 67% |
| **Species that fared particularly badly in 2022 in each country**annual change of 35% or greater | Glanville Fritillary -68%Red Admiral -49%Brown Hairstreak -48%Northern Brown Argus -48% | Brown Argus -49%Small Heath -41%Purple Hairstreak -39%Silver-washed Fritillary -36% | Wall -65%Small Pearl-bordered Fritillary -57%Scotch Argus -53%Common Blue -50%Pearl-bordered Fritillary -48%Northern Brown Argus -46%Small Heath -40%Small Copper -38% | Small Copper -70%Large White -56%Common Blue -42% |
| Species with their best year on record | None | None | Speckled Wood | None |
| Species with their worst year on record | Small Pearl-bordered Fritillary | None | Scotch Argus | None |

1. The UKBMS started in 1976, recording one year of high population numbers for habitat specialist species before populations crashed following drought. However, Butterflies for the New Millennium recording data confirms that higher numbers were typically around in the earlier 1970s and previously (i.e. the UKBMS did not happen to record an unusually good year in 1976). (<https://butterfly-conservation.org/sites/default/files/soukb-2015.pdf>) [↑](#footnote-ref-1)
2. Using day rate of £150 a day for ‘skilled labour’ as requires specialist identification skills. [↑](#footnote-ref-2)