## UKBMS 2021 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 (2022 publication; includes data up to 2021) |
| **2. Publication timing** | This Official Statistic was published at 9:30am on 25th March 2022.  |
| **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 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 56 of the 59 regularly occurring species.
* Trends are presented at country level where sufficient data are available.
* Figures are presented for annual change (2020-2021), 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 anna.robinson@jncc.goc.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 butterfly species assessed in the UK showing a significant long-term decline in abundance (34%), compared to 29% showing a significant long-term increase. However, over the last decade the majority of species are stable, with 7 species (13%) showing a statistically significant increase and no species showing a significant decline. Whilst 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 2021 was a slightly below average year for butterflies, ranking 28th in the 46 year series. None of the 56 species assessed had their best year or worst year on record at UK level. However, Dark Green Fritillary and Glanville Fritillary both had their 2nd best year on record, and three species had their third best year on record: Chalk Hill Blue, and Brown Hairstreak and Black Hairstreak. Overall it was a poor year for several common and widespread species in the UK (e.g. Meadow Brown, Ringlet, Gatekeeper, Green-veined White, Large White, Small White), influenced by declines in England and Wales.
* There were some regional differences in how butterflies fared in 2021. England showed approximately twice as many species with an annual decline compared to increase, whereas for Scotland, Wales and NI, out of the species with sufficient data to be assessed, the number of species increasing versus decreasing on the previous year was more evenly matched. Some species are expanding their range in Scotland, for example, Wall, Specked Wood, and Ringlet, contributing to more positive Scotland trends for these species.
* Following the lower levels of data collected in 2020 due to covid restrictions, the number of samples bounced back in 2021, particularly for traditional self-selected transects, where the number of sites recorded reached its greatest total to date. However, there was a decrease in data received from some non-transect single species surveys, resulting in two species with insufficient data in 2021 to produce accurate indices of abundance at the UK and respective country level: Large Blue and Chequered Skipper. This was also the case for High Brown Fritillary in Wales.
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.
* 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 shows the [weather in 2021](https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index) was very slightly warmer than average with close to average levels of rainfall. There were some regional weather differences, for example slightly more sunshine in Northern areas of the UK in the summer, and it being particularly wet in Wales, south-west England and eastern Scotland in May. These regional differences likely contributed to differences in annual changes in butterfly populations in the different parts of the UK.
* 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 is now showing a significant increase on monitored sites over the last ten 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

* 2,500+ skilled volunteers are involved, at an estimated annual value of approximately £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 1917 self-selected transects and 790 WCBS squares submitted data in 2021, as well as 211 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***  | 36 out of 56 species for which annual changes were calculated | 19 out of 56 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**(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)  | **7 species show a statistically significant increase (13% of species assessed)**(38 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 (34% 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) | **16 species show a statistically significant increase (29% of species assessed)**(11 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 2021*** *annual change of 35% or greater* | Painted Lady 378%Glanville Fritillary 104%Brown Hairstreak 91%Adonis Blue 62%Black Hairstreak 62%Chalk Hill Blue 48%Purple Emperor 45% | No species had their best year on record. |
| ***Species that fared particularly badly in 2021****annual change of 35% or greater* | Clouded Yellow -64%Holly Blue -50%Cryptic Wood White -47%Purple Hairstreak -43%Silver-spotted Skipper -40%Green Hairstreak -39% | 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  | 54 | 31 | 24 | 14 |
| **Significantly increasing species** over 10 years and long term. Presented as % (numbers in parentheses) of those species assessed  | 1. Over 10 years:

15% (8 species)1. Over series

22% (12 species) | 1. Over 10 years:

6% (2 species)1. Over series

26% (8 species) | 1. Over 10 years:

33% (8 species)1. Over series

50% (12 species) | 1. Over 10 years:

7% (1 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:

2% (1 species)1. Over series:

37% (20 species) | 1. Over 10 years:

3% (1 species)1. Over series:

23% (7 species) | 1. Over 10 years:

8% (2 species)1. Over series:

13% (3 species) | 1. Over 10 years:

0% (0 species)1. Over series:

14% (2 species) |
| **Species that fared particularly well in 2021 in each country**annual change of 35% or greater | Painted Lady 408%Brown Hairstreak 108%Glanville Fritillary 62%Black Hairstreak 62%Adonis Blue 62%Chalk Hill Blue 48%Purple Emperor 45%Scotch Argus 40%Red Admiral 38% | Grayling 142%Brown Argus 118%Wall 117%Small Pearl-bordered Fritillary 91%Small Heath 82%Marsh Fritillary 76%Common Blue 62%Painted Lady 46% | Wall 182%Marsh Fritillary 132%Grayling 91%Painted Lady 84%Large White 74%Small Pearl-bordered Fritillary 62% | Large White 144%Small White 138%Green-veined White 60% |
| **Species that fared particularly badly in 2021 in each country**annual change of 35% or greater | Clouded Yellow -65%Holly Blue -50%Green Hairstreak -48%Purple Hairstreak -43%Silver-spotted Skipper -40% | Brimstone -66%Dingy Skipper -64%Peacock -57%Purple Hairstreak -55%Small Tortoiseshell -52%Green Hairstreak -45%Holly Blue -44%Red Admiral -42%Small White -39% | Red Admiral -71%Peacock -48%Small Tortoiseshell -46% | Small Tortoiseshell -57%Cryptic Wood White -47%Orange-tip -47% |
| Species with their best year on record | * Dark Green Fritillary
* Glanville Fritillary
 | None | * Small Pearl-bordered Fritillary
* Wall
 | none |
| Species with their worst year on record | none | * Dingy Skipper
 | none | 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)