United Kingdom
Butterfly Monitoring Scheme

Annual Report 2022

UKBMS Annual Report 2022

The UKBMS

The UKBMS is organised and funded by Butterfly Conservation (BC), the UK Centre for Ecology & 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.

The members of the UKBMS Steering Group in 2022 were Ian Middlebrook, Megan Lowe, Rachael Conway, Richard Fox and Nigel Bourn (BC), David Roy and Marc Botham (CEH), David Noble and Sarah Harris (BTO), Anna Robinson, Chloe Brice and Kirsi Peck (JNCC), Simon Curson (NE), Dylan Lloyd (NRW), Simon Foster (NatureScot), Pauline Campbell (DAERA), Juli Titherington (SF) and Jay Doyle (FC).

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This report can be downloaded from
https://ukbms.org/publications

UKBMS partners

Butterfly Conservation
Saving butterflies, moths and our environment

Butterfly Conservation, Manor Yard, East Lulworth, Wareham, Dorset, BH20 5QP
https://www.butterfly-conservation.org

UK Centre for Ecology & Hydrology

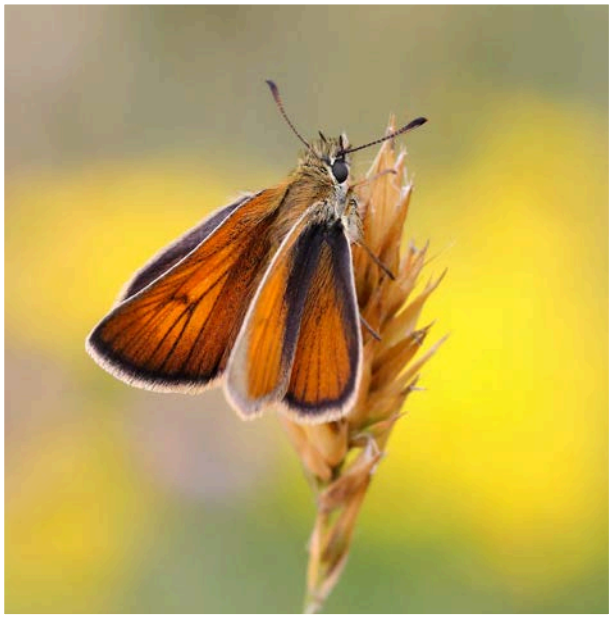
UK Centre for Ecology & Hydrology, Maclean Building, Benson Lane, Crowmarsh Gifford, Wallingford, Oxfordshire OX10 8BB
https://www.ceh.ac.uk

BTO
Looking out for birds

British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU
https://www.bto.org

JNCC
Joint Nature Conservation Committee

Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough, PE1 1JY
https://jncc.gov.uk



Small Skipper. *Photograph by Mark Searle.*

Acknowledgements

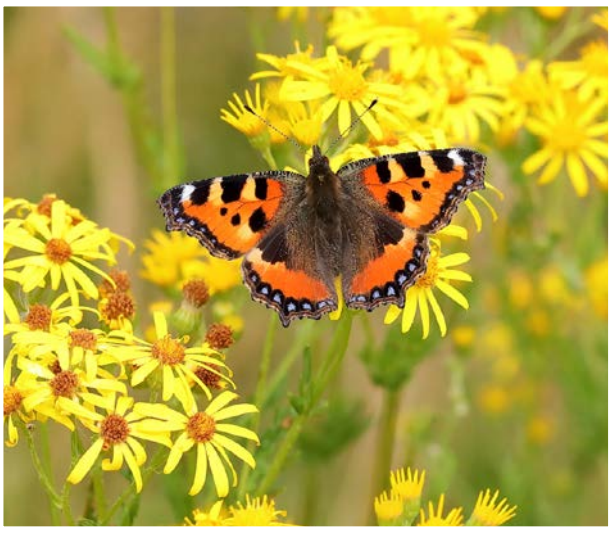
We would like to acknowledge the financial contribution by the Joint Nature Conservation Committee, Butterfly Conservation, the British Trust for Ornithology and the UK Centre for Ecology & Hydrology.

We are indebted to all the volunteers who co-ordinate and contribute data to the scheme throughout the United Kingdom, as well as to those who allow access to their land and in some cases actively promote butterfly monitoring thereon.

Finally we would like to thank Rachel Still at WILDGuides for designing the report, and Mark Searle for allowing his images to be used in this report.

Cover photograph of Small Pearl-bordered Fritillary. In 2022 this butterfly recorded its worst year in England and second worst year across the UK since monitoring began. *Photograph by Mark Searle.*

Contents and Online Resources



Small Tortoiseshell. *Photograph by Mark Searle.*

Dingy Skipper. *Photograph by Mark Searle.*

Online Resources

Further information on the UK Butterfly Monitoring Scheme, including individual species and site trends, and how to take part in butterfly monitoring can be found at:
https://ukbms.org

For the Wider Countryside Butterfly Survey go to
https://ukbms.org/wider-countryside-butterfly-survey

For online data entry go to
https://ukbms.org/MyData

For information on Biodiversity Indicators go to
https://jncc.gov.uk/our-work/uk-biodiversity-indicators

The following links provide more information on the UKBMS partner organisations:

Butterfly Conservation:
https://butterfly-conservation.org

UK Centre for Ecology & Hydrology:
https://www.ceh.ac.uk

British Trust for Ornithology:
https://www.bto.org

Joint Nature Conservation Committee:
https://jncc.gov.uk

UKBMS News

HIGHLIGHTS IN NUMBERS

47
The number of years of data contributing to the UKBMS

235
The number of days on which UKBMS counts were made in 2022

3,196
The number of UKBMS locations monitored in 2022

6,700
The total number of UKBMS locations monitored across all years

40,745
The number of recording visits made to standard transects and WCBS squares in 2022

2,036,621
The number of butterflies counted on standard transects and WCBS squares in 2022

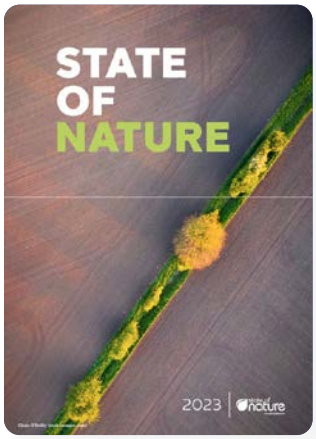
UKBMS FUNDING SECURED

We are delighted to announce that funding for the UKBMS has been secured for a further five years, taking us through to the spring of 2028. JNCC, UKCEH, BC and BTO all participated fully in the renegotiation process and were extremely keen to ensure the continuation of this long-running scheme. The level of funding and support agreed for the project will allow us to continue with business as usual, whilst also allowing scope for the development of additional training materials, testing of new monitoring methods for key species and enhancements for the website. This next five-year spell will also see the scheme celebrate its 50th anniversary, and plans to celebrate this event are already being formulated.

STATE OF NATURE REPORT 2023

The UK's wildlife is continuing to decline according to **State of Nature Report 2023**. This report uses the latest and best data from biological monitoring and recording schemes across the UK, collated by the incredible work of thousands of skilled people, including all those who contribute to the UKBMS.

The headline results across all taxa make for grim reading, with 151 species recognised as having become extinct since 1500, and 16% of our current species being under threat of extinction from Great Britain. On average, the distributions of invertebrate species have decreased by 13% since 1970 and the abundance of terrestrial and freshwater species has decreased by 19%. The report details the causes behind these declines, but also demonstrates the benefit of conservation action in addressing these problems.



The full 214-page report can be viewed or downloaded from the State of Nature website: **State of Nature Report 2023.pdf**

RESEARCH PUBLICATIONS

The following new research using UKBMS data has been published since the last UKBMS Annual Report:

Blomfield, A., Menendez, R. & Wilby, A. (2023). Population synchrony indicates functional connectivity in a threatened sedentary butterfly. *Oecologia* 201(4):1–11

Burns, F., Mordue, S., al Fulaij, N., Boersch-Supan, P.H., Boswell, J., Boyd, R.J., Bradfer-Lawrence, T., de Ornellas, P., de Palma, A., de Zylva, P., Dennis, E.B., Foster, S., Gilbert, G., Halliwell, L., Hawkins, K., Haysom, K.A., Holland, M.M., Hughes, J., Jackson, A.C., Mancini, F., Mathews, F., McQuatters-Gollop, A., Noble, D.G., O'Brien, D., Pescott, O.L., Purvis, A., Simkin, J., Smith, A., Stanbury, A.J., Villemot, J., Walker, K.J., Walton, P., Webb, T.J., Williams, J., Wilson, R. & Gregory, R.D. (2023). *State of Nature 2023.* The State of Nature partnership

Evans, L.C., Melero, Y., Schmucki, R., Boersch-Supan, P.H., Brotons, L., Fontaine, C., Jiguet, F., Kuussaari, M., Massimino, D., Robinson, R.A., Roy, D.B., Schweiger, O., Settele, J., Stefanescu, C., van Turnhout, C.A.M. & Oliver, T.H. (2023). Mechanisms underpinning community stability along a latitudinal gradient: Insights from a niche-based approach. *Global Change Biology* 29:3271–3284

Jones, R., Bourn, N.A.D., Maclean, I.M.D. & Wilson, R.J. (2023). Landscape-scale dynamics of a threatened species respond to local-scale conservation management. *Oikos* e09334

Plummer, K.E., Dadam, D., Brereton, T., Dennis, E.B., Massimino, D., Risely, K., Siriwardena, G.M. & Toms, M.P. (2023). Trends in butterfly populations in UK gardens – New evidence from citizen science monitoring. *Insect Conservation and Diversity* DOI:10.1111/icad.12645

Van Swaay, C.A.M., Dennis, E.B., Schmucki, R., Sevilleja, C.G., Arnberg, H., Åström, S., Balalaikins, M., Barea-Azcón, J.M., Bonelli, S., Botham, M., Cancela, J.P., Collins, S., De Flores, M., Dapporto, L., Dopagne, C., Dziekanska, I., Escobés, R., Faltynek Fric, Z., Fernández-García, J.M., Fontaine, B., Glogovčan, P., Gracianteparaluceta, A., Harpke, A., Harrower, C., Heliölä, J., Houard, X., Judge, M., Kolev, Z., Komac, B., Kühn, E., Kuussaari, M., Lang, A., Lysaght, L., Maes, D., McGowan,D., Mestdagh, X., Middlebrook, I., Monasterio, Y., Monteiro, E., Munguira, M.L., Musche, M., Olivares, F.J., Õunap, E., Ozden, O., Pavlíčko, A., Pendl, M., Pettersson, L.B., Rákosy, L., Roth, T., Rüdisser, J., Šašić, M., Scalercio, S., Settele, J., Sielezniew, M., Sobczyk-Moran, G., Stefanescu, C., Švitra, G., Szabadfalvi, A., Tiitsaar, A., Titeux, N., Tzirkalli, E., Ubach, A., Verovnik, R., Vray, S., Warren, M.S., Wynhoff, I. & Roy, D.B. (2022). *European Grassland Butterfly Indicator 1990–2020 Technical report.* Butterfly Conservation Europe & SPRING/eBMS & Vlinderstichting report VS2022.039

UKBMS background and methods

DATA COLLECTION

Data on the population status of UK butterflies are derived from a wide-scale program of site-based monitoring and sampling in randomly selected 1km squares. The original Butterfly Monitoring Scheme (BMS), operated by the Institute of Terrestrial Ecology (ITE), started in 1976. This scheme was rebranded as the UKBMS in 2006 when the Centre for Ecology & Hydrology (now UKCEH – successors to ITE) joined forces with Butterfly Conservation and, supported by JNCC and government agencies, incorporated all the additional butterfly monitoring data that Butterfly Conservation had been collating into the scheme. Trends in butterfly populations are now compiled from a network of 6,700 locations across all years, including 3,196 sample locations in 2022.

The majority of sites are monitored by butterfly transects, also known as 'Pollard walks'. The standard transect method involves weekly butterfly counts along fixed routes through the season made under strict criteria for weather conditions, recording area and time of day (Pollard & Yates 1993). Where possible, counts should be made each week from 1st April through to 29th September. The gaps in transect counts (i.e. weeks without data) due to periods of unsuitable weather or recorders being unavailable, are accounted for within the analysis of trends.

For a number of habitat-specialist species (especially the fritillaries) 'reduced effort' methods are also used to monitor annual abundance at the site level, especially in more remote parts of the UK. These include adult timed counts for fritillaries (Warren et al. 1981), larval web counts for **Marsh Fritillary** (Lewis & Hurford 1997) and egg counts for **Large Blue** (Thomas et al. 2009). For timed count and larval search methods, systematic recording is carried out on single days in suitable weather with the counts converted to a site index that accounts for both the size of the colony and the time in the season when the count was made. From 2015, winter egg counts for **Brown Hairstreak** have also been incorporated into the UKBMS.

Most site-based monitoring has historically been biased towards good quality semi-natural habitat relatively rich in butterflies, which does not accurately reflect the UK countryside as a whole, so the Wider Countryside Butterfly Survey (WCBS) was established in 2009 to improve the representativeness of our sampling network. In the WCBS, Butterfly Conservation recorders are allocated randomly selected 1km squares, whilst recorders from the BTO are given the opportunity to survey their existing Breeding Bird Survey squares, which have also been randomly selected. Surveyors are required to walk a standardised route across these squares, following the same methodology and criteria as standard transects. This should be done at least twice over the July and August period, while additional spring visits are also encouraged. Due to the low level of sampling effort (and unlike conventional transects), WCBS data are not routinely used to derive local measures of butterfly abundance.

SPECIES INDICES AND TRENDS

Techniques for analysing the UKBMS data have developed rapidly in recent years, with increased computing power allowing more complex statistical models to be applied to the data.

Weekly counts for each species are summed to generate annual site abundance indices. For sites with missing weekly counts, a Generalised Additive Model (GAM) is used to impute the missing values and to calculate a site index (Rothery & Roy 2001).

Since 2017, the compilation of annual species indices has used a Generalised Abundance Index (GAI) method developed by Dennis et al. (2016). There is an additional modification in the final stage of analysis, such that data are weighted relative to the proportion of the species flight period surveyed that year for that site. All butterfly counts collected at both UKBMS sites and WCBS squares are used to estimate the seasonal pattern of butterfly abundance for that year, and this is used to extrapolate from observed data to account for gaps in the recording. This ensures that observed data have a stronger effect upon the final indices than extrapolated data. This new method is used for all species and utilises data from all survey types.

Large Blue is primarily monitored through egg counts.
Photograph by Mark Searle

COMPOSITE MEASURES OF BUTTERFLY ABUNDANCE

Multi-species (composite) indices of butterfly abundance are calculated using a Generalised Linear Model (GLM) accounting for species and year. Grouped measures have been compiled for all resident species, wider countryside species, habitat specialists and the three regular migrants. In addition, sites are further categorised by broad habitat groupings (farmland and woodland) (Brereton *et al.* 2011). Within these measures, each individual species trend is given equal weight, and the annual figure is based on the geometric mean of the component species indices for that year. Populations of individual species within each measure may be increasing or decreasing, irrespective of the overall trends.

To identify underlying patterns in composite population trends, assessment of change is based on trends in the underlying smoothed indices. The calculation of smoothed indices, trends and confidence intervals are assessed by structural time-series analysis and the Kalman Filter as implemented in the program TrendSpotter (Soldaat *et al.* 2007). A statistical test is performed using the software TrendSpotter to compare the difference in the smoothed index in the latest year versus all other years in the series.

Analysis and modelling methods are constantly evolving and alternative methods are being tested, such as those proposed by Freeman *et al.* (2021).

These composite measures are increasingly used by government agencies as one of the indicators of the health of our national biodiversity. The most recently published indicators can be found via these links:

UK Biodiversity Indicators: C6. Insects of the wider countryside (butterflies)
https://jncc.gov.uk/our-work/ukbi-c6-insects-of-the-wider-countryside

England Biodiversity Indicators: 5. Farmland species
England Biodiversity Indicators: 6. Woodland species
https://www.gov.uk/government/statistics/england-biodiversity-indicators

Scotland's Indicators: Terrestrial Insect Abundance – Butterflies
https://www.nature.scot/doc/scotlands-indicators-terrestrial-insect-abundance-butterflies

Brereton T.M., Roy D.B., Middlebrook, I., Botham, M. & Warren, M. (2011). The development of butterfly indicators in the United Kingdom and assessments in 2010. *Journal of Insect Conservation* 15:139–151.

Dennis, E.B., Morgan, B.J.T., Freeman, S.N., Brereton, T.M. & Roy, D.B. (2016). A generalized abundance index for seasonal invertebrates. *Biometrics* 72:1305–1314.

Freeman, S.N., Isaac, N.J.B., Besbeas, P., Dennis, E.B. & Morgan, B.J.T. (2021). A generic method for estimating and smoothing multispecies biodiversity indicators using intermittent data. *Journal of Agricultural Biological and Environmental Statistics* 26(1)

Lewis, O.T. & Hurford, C. (1997). Assessing the status of the Marsh Fritillary (*Eurodryas aurinia* Rott.) – an example from Glamorgan (UK). *Journal of Insect Conservation* 1:159–161.

Pollard, E. & Yates, T.J. (1993). Monitoring Butterflies for Ecology and Conservation. Chapman and Hall, London 2.

Rothery, P. & Roy, D.B. (2001). Application of generalized additive models to butterfly transect count data. *Journal of Applied Statistics* 28:897–909.

Soldaat, L.L., Visser, P., van Roomen, M. & van Strien, A. (2007). Smoothing and trend detection in waterbird monitoring data using structural time-series analysis and the Kalman filter. *Journal of Ornithology* Vol. 148 suppl. 2: Dec. 2007.

Warren, M., Thomas, C.D. & Thomas, J.A. (1981). The Heath Fritillary. Survey and conservation report. Unpublished report to the Joint Committee for the Conservation of British Insects. Butterfly Conservation, Wareham.

Silver-spotted Skipper. *Photograph by Mark Searle*

The 2022 Season

UKBMS SAMPLE COVERAGE IN 2022

Standard transects

The commitment of UKBMS recorders to standard transects in 2022 meant that two milestones were reached, with over 40,000 walks across 2,000 sites being recorded for the first time. The number of sites increased by 174, reaching a record 2,091 (a rise of 9% over 2021), and the number of walks increased by 13% to a new record 40,745.

At the country level, there were exactly 1,800 standard transect sites in England, 166 in Scotland, 53 in Wales, 36 in Northern Ireland, 35 from the Channel Isles and one on the Isle of Man. Most branches of Butterfly Conservation returned data from more transects in 2022 than the previous year, and the East Midlands branch overtook Hampshire & Isle of Wight as the branch recording the most transects.

Rank	Butterfly Conservation Branch	No. of transects in 2022 (change from 2021)
1	East Midlands	184 (+21)
2	Hampshire & Isle of Wight	176 (–1)
3	Surrey & SW London	139 (+12)
4	West Midlands	97 (+12)
5	Upper Thames	94 (+10)

There were 210 new transects that contributed to the scheme for the first time in 2022 – comprising 183 in England, 20 in Scotland, four in Wales and three in Northern Ireland. Several branches continued their great work from the previous year in this regard, but the most productive area was in Warwickshire where Keith Warmington's growing collaboration with the Heart of England Forest has led to the establishment of several new transects.

Rank	Butterfly Conservation Branch	No. of transects new to the scheme in 2022
1	Warwickshire	18
2	East Midlands	16
3	East Scotland	15
=4	Cambridgeshire & Essex	13
=4	Kent & SE London	13
=4	Yorkshire	13

The pattern of transect walking was very consistent across most of the standard recording period, with over 1,200 walks in all weeks apart from the first and last weeks of the season (see figure 1). Transect walks were undertaken on every day of the season, with the most popular days coming in the spring. There were 570 walks on 14th May, with four other dates in April and May also seeing over 500 walks, while 29th July was the most popular day in the summer with 494 transect walks being recorded.

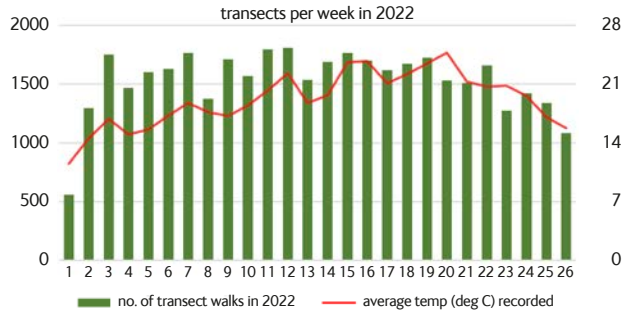


Figure 1. The number of standard transect walks per week in 2022 and the average temperature (°C) recorded on transects.

Wider Countryside Butterfly Survey (WCBS) squares

The WCBS ran for a 14th year in 2022, supplying count data that contribute towards the UKBMS collated indices – chiefly for common and widespread species. The number of squares visited during 2022 increased by more than 50 from the previous year, up to 843 squares which is the third best year in the scheme's history, and the total number of visits increased by 11.3% to 2,016.

Year	2009	2010	2011	2012	2013	2014	2015
Number of WCBS squares	767	690	723	774	876	840	806

Year	2016	2017	2018	2019	2020	2021	2022
Number of WCBS squares	774	774	790	846	725	790	843

The number of squares surveyed by BTO/JNCC/RSPB Breeding Bird Survey volunteers rose to 309 (up 25 from 2021), while Butterfly Conservation volunteers surveyed 534 squares (up by 29). At the country level, there were a total of 745 squares surveyed in England (up by 58 compared with 2021), 50 in Scotland (down 2), 31 in Wales (–3), 15 in Northern Ireland (–1), and two on the Isle of Man (+1).

Over the core period of July and August, 689 squares (82% of the total) received the required two visits, during which 78,394 butterflies of 45 species were recorded (one more species than 2021). There were also 161 spring visits to 126 squares, targeting early flyers, with Orange-tip being recorded in 68 of these squares.

Additional monitoring data for key species

Additional (non-transect) monitoring data were received from 262 sites, which was an increase of 24% from the previous year. These included adult timed counts, egg counts and larval web counts. We also received some important data retrospectively, including Large Blue egg counts and Chequered Skipper timed counts from 2021, which enabled us once again to produce long-term trends for these species.

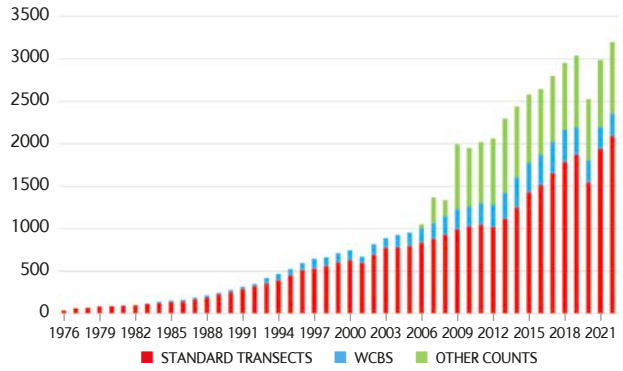


Figure 2. The total number of sites monitored by the UKBMS each year.

There was a recovery in the number of Brown Hairstreak egg counts, rising from five to 24, after two winters of COVID-affected surveys. Marsh Fritillary web counts were received from 107 sites (up from 100 in 2021), including all four countries of the UK, and Pearl-bordered Fritillary counts increased from 26 to 34 thanks to renewed survey effort in Scotland. The number of timed counts for Heath Fritillary, High Brown Fritillary and Duke of Burgundy remained on a par with the previous year.

Overall, the number of sites monitored for butterflies in 2022 exceeded 3,000 for only the second time (Figure 2). With nearly 3,200 sites being monitored, a new record was set, and it feels like we have finally picked up where we left off before the impact of COVID.

Silver-studded Blues. *Photograph by Mark Searle.*

THE WEATHER IN 2022

Winter preceding the 2022 butterfly season was relatively mild in terms of average temperatures – the eighth mildest since records began in 1884 – but otherwise provided very mixed conditions. The dullest December across the UK since 1956 was followed by the sunniest January in England since 1919. January was also very dry, with just 50% of average rainfall, but this was followed by the eighth wettest February since 1836.

Although the latter half of March was relatively mild and sunny, the clear skies also brought many overnight frosts. These frosts continued into the early part of April, which was rather unsettled and brought a slow start to the butterfly season. Sunshine totals in April were close to average, but dropped to 79% of average in May, which was also quite a wet month in Northern Ireland and on the western side of Scotland. After a mixed start to the recording season, June brought more settled weather across most areas, being slightly warmer, drier and sunnier than average – the only exception being in Northern Ireland, which experienced its ninth dullest June since 1919.

July of 2022 will be remembered for the heatwave which brought record temperatures during the middle of the month – a peak of 40.3 °C being recorded at Coningsby (Lincs) on 19th July, as well as new highs of 37.1 °C for Wales and 34.8 °C for Scotland. Overall, it was the seventh warmest July since 1884, and areas of the south-east saw less than 20% the average rainfall for the month. This warm, dry sunny weather continued well into August, with drought conditions developing in several areas before the arrival of thunderstorms in the middle of the month to break things up. Despite this, it was the fifth warmest August across the UK since 1884.

The weather became more unsettled in September, with rainfall figures above average, and a particularly cold spell with overnight frosts at the end of the month to see out the transect season. Nevertheless, the autumn as a whole would become the UK's third warmest since 1884.

Adapted from the monthly and season summaries published by the Met Office:
https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index

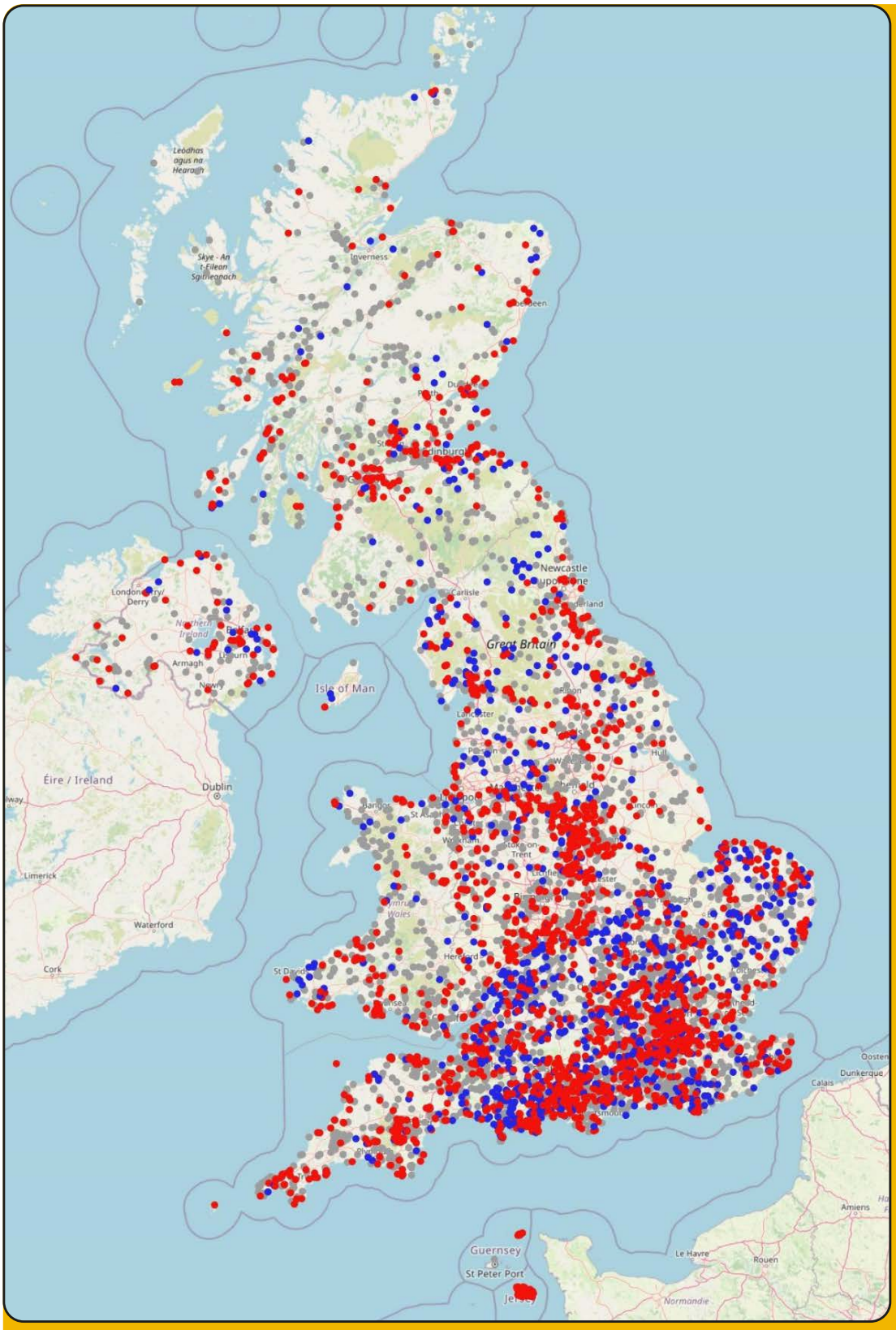


Figure 3. Location of UKBMS monitored sites in 2022. WCBS squares (blue), standard transects and other monitoring methods (red), previously monitored sites and squares (grey)

Summary

Overall, 2022 was an average year for butterflies, ranking as the 27th best year since 1976 (based on the average of the rankings for each species). Across the UK, no species had their best or worst year on record, while 28 species were recorded in above average numbers and 30 species fared worse than their long-term average.

National trends were calculated for 58 of the 59 resident species and regular migrants. At the UK level, both **Purple Emperor** and **Large Blue** recorded their second best year in 2022, while **Chequered Skipper** and **Dark Green Fritillary** had their third best year. At the other end of the scale, **Small Pearl-bordered Fritillary** had its second worst year and **Small Copper** its third worst year.

At the country level, **Small Pearl-bordered Fritillary** recorded its worst year in England, as did **Scotch Argus** in Scotland, while **Speckled Wood** recorded its best year in Scotland. Wales saw the second best year for **Green Hairstreak**, but second worst year for **Peacock**, while **Small Tortoiseshell** recorded its second best year in Northern Ireland, albeit over a shorter time series.

This year we were once again able to produce UK trends for **Large Blue** and **Chequered Skipper**, and a trend for **High Brown Fritillary** in Wales, which we had not been able to produce in 2021. This is due to the outstanding data for 2021 being received retrospectively, and monitoring levels being maintained through 2022.

The following species summaries for 2022 are based entirely on monitoring data submitted to the UKBMS.

Family: Papilionidae (Swallowtails)

Swallowtail was recorded on 10 transect sites in *Norfolk*, the earliest sightings being on 17th May at *Sutton Fen*, *Strumpshaw Fen* and *Bure Marshes*. *Sutton Fen* was the only site to record weekly counts higher than four, with the year's highest count of 19 coming on 21st June. The last count in *Norfolk* came at *How Hill* on 14th August, but there were a couple of later counts in August at *Victoria Tower* (*Jersey*) – the only transect site outside *Norfolk* to record Swallowtail this year.

Family: Hesperiidae (Skippers)

Dingy Skipper made its first transect appearance on 12th April at *Levin Down* (*West Sussex*), while the highest weekly counts were recorded at *Hoe Grange Quarry* (*Derbys*), where 86 were seen on 14th May, and *Ettington Cutting North* (*Warks*), where 85 had been recorded six days earlier. The highest count in Wales also came on 14th May, when 15 were seen at *Blackrock Quarry* (*Gwent*), while the species was also recorded on three transect sites in Scotland and two in Northern Ireland. Several sites had a strong second brood, notably in *Kent* and *Dorset*, while a few late records were also provided from counties in the East Midlands. The final individuals were seen on transect at *Bindon Hill* (*Dorset*) on 11th September.

Grizzled Skipper was still on the wing in August in south-east England.
Photograph by Mark Searle

The first **Grizzled Skipper** counts of the year came on 9th April at *Mill Hill* (*West Sussex*) and *Clubmens Down* (*Dorset*), while it was not recorded in Wales until 24th April at *Llanymynech* (*Powys*). The highest weekly count came from *Fontmell Down* (*Dorset*), where 26 were recorded on 27th May, while *Clubmens Down* and *Porton Down* (*Wilts*) also recorded counts above 20. Although the species was finished at most sites by late June, it was still being seen in August at a handful transect sites in *Kent* and *Sussex*.

Regular **Chequered Skipper** counts were only received from one site in Scotland – *Glasdrum* (*Argyll & Bute*), which revealed a season spanning 18th May to 25th June, with a peak count of 61 on 5th June. Timed-counts were received from seven sites in Scotland, while three other transect routes recorded this species on a single weekly walk. This included counts on 22nd May from the re-introduction site at *Fineshade Woods* (*Northants*).

The earliest transect records for **Essex Skipper** came on 3rd June from *How Hill* (*Norfolk*) and *Frensham* (*Surrey*), while the highest single count came from the *Liz Williams Butterfly Haven* (*East Sussex*) where 235 were seen on 9th July, along with three further counts above 50 in July at the same site. Two WCBS squares also recorded counts above 50 – these were *TL7673* (*Suffolk*) and *TF2105* (*Cambs*). There were no transect records beyond August for this species, with the final count coming on 30th August at *College Lake* (*Bucks*).

The **Small Skipper** season kicked-off in England on 19th May with records at *Lamledra* (*Cornwall*) and *Bradley Manor* (*Devon*), with the earliest record in Wales on 28th May at *Oxwich* (*West Glamorgan*) and in Scotland on 1st June at *Dunsapie Crag* (*Lothian*). The three highest weekly counts all came from *Gibraltar Point* (*Lincs*) – peaking with 577 on 11th July. A further 12 sites recorded weekly counts above 100, including *Aberlady Bay* (*Lothian*) and the WCBS square at *NY7906* (*Cumbria*). The highest count in Wales came on 8th July when 30 were seen at *Stackpole Warren* (*Dyfed*). Counts for this species continued right up to the last week of the recording season.

Lulworth Skipper was recorded on 13 transect routes and in four WCBS squares in *Dorset*, which matched the number of sites from 2021. *Bindon Hill* recorded the earliest transect count on 19th May, while the final count came from *Ballard Down* on 26th August. The highest count of the year was recorded at the WCBS square *SZ0176*, where 206 were seen on 16th July. This square is just west of *Durlston Country Park*, where the next highest count of 124 had been recorded three days earlier.

The first transect record for **Silver-spotted Skipper** came from *Bacombe Hill* (*Bucks*) on 8th July, which was followed by a sighting at *Lullington Heath* (*East Sussex*) the following day. The highest weekly counts both came on 10th August, when 61 were seen at *Porton Down (Wilts*) and 52 were seen at *Headley Heath* (*Surrey*). The latter site also provided the final transect record of the season on 13th September.

There were several early counts for **Large Skipper** this year, with the first English record coming on 25th April at *Kelly's Cove* (*Devon*), followed by first sightings in Wales on 20th May at *Bryn Pydew* (*Gwynedd*), in *Jersey* on 10th June at *The Elms* and in Scotland on 14th June at *Mersehead* (*Dumfries & Galloway*). The highest count of 85 was recorded in a WCBS square at *SZ0176* (*Dorset*) on 16th July, while transects at *Standing Hat* (*Hants*) and *Cavenham Heath* (*Suffolk*) also recorded weekly counts above 60. As with Small Skipper, counts continued up to the last week of the recording season.

Family: Pieridae (Whites etc.)

Wood White was recorded on 31 transect routes across 24 different sites in England, as well as a single WCBS square on the *Devon* coast at SY2288. *Meeth Quarry* (*Devon*) recorded the earliest count on 25th April, followed by *Sidney Wood* (*Surrey*) the following day, while the final counts came from the West Midlands on 20th August at *Grafton Wood* (*Worcs*) and *Bury Ditches* (*Salop*). The latter site also provided the highest weekly count during the first brood, when 57 were seen on 17th June, but the highest count of the year came during the second brood at *Chiddingfold Forest East* (*Surrey*) on 28th July, when 61 were seen.

Cryptic Wood White was recorded on six transects in Northern Ireland, with timed counts received from two additional sites. *Craigavon Lakes* (*Co. Armagh*) returned the earliest transect sighting on 29th April, and also recorded the five highest weekly counts for the year – peaking on 1st June when 57 were seen. The season was over within two months, as the final transect sighting was recorded on 27th June at *Cave Hill* (*Co. Antrim*).

The three highest weekly counts for **Orange-tip** all came from *Nene Wetlands* (*Northants*), with a peak of 182 seen on 30th April, while five other transects across Midland counties also recorded weekly counts of 50 or more. In other UK countries, the highest counts were at *Haddington* (*Lothian*) on 14th May, *Cave Hill* (*Co. Antrim*) on 8th May and *Oxwich* (*West Glamorgan*) on 29th April, with counts of 43, 22 and 21 respectively. Although spring visits are optional for WCBS squares, a total of 75 Orange-tip were recorded across three visits to *TM1797* (*Norfolk*) during April and May.

Already on the wing in England at the start of the transect season, **Large White** was first seen on transects in the Channel Isles on 11th April at *South Hill Park* (*Jersey*), in Wales on 15th April at *Great Orme* (*Gywnedd*), in Scotland on 20th April at *Straiton Pond* (*Lothian*) and in Northern Ireland on 26th April at *Banagher Glen* (*Co. Londonderry*). The WCBS square at *SU8204* (*West Sussex*) was the only site where a weekly count above 40 was recorded before the end of June, while another WCBS square at *TL4135* (*Herts*) provided the highest count of the year, when 175 were seen on 10th July. *Besford Court* (*Worcs*) was the only other site with a weekly count above 100, while *Nare Head* (*Cornwall*) saw the best count later in the season, with 66 recorded on 20th September.

Northern Ireland was the last UK country to record **Small White** on transects with a sighting on 20th April at *Crom Estate* (*Co. Fermanagh*), while *Gravel Hill* (*Herts*) saw the best of the spring generation – recording the highest weekly counts in both April and May. The highest count in summer was at *Breamore* (*Hants*) where 230 were seen on 17th July, and the same site produced six further weekly counts above 100. Two WCBS squares also produced counts over 100: *SU8204* (*West Sussex*) and *TL4135* (*Herts*). The highest count outside of England was 68 seen at *Somerton* (*Dyfed*) on 19th August, with counts above 50 also recorded at *Haddington* (*Lothian*) on 10th August and *Pwll Du* (*West Glamorgan*) on 16th September.

The highest spring counts for **Green-veined White** came in the north of England, with 52 recorded at both *Ainsdale Sand Dunes* (*Lancs*) on 24th April and *Malham Tarn* (*Yorks*) on 14th May. The title for highest summer count was also shared, with 94 recorded on 23rd July at *Bucknell Woods* (*Northants*) and *Crombie Country Park* (*Angus*). Other sites to record weekly counts above 80 were *Potton Wood* (*Beds*), *Wyre Forest* (*Salop/ Worcs*) and the WCBS square at *D2204* (*Co. Antrim*). The highest count in Wales came at *Fenn's Moss* (*Clwyd*) on 1st August when 31 were seen, and there were no weekly counts higher than four from the Channel Isles.

The highest counts for Orange-tip in 2022 came from Northants.
Photograph by Mark Searle

Clouded Yellow was recorded at 415 UKBMS sites in 2022, including seven transects in the Channel Isles, eight transects in Wales and 37 WCBS squares. The highest weekly count of 27 was recorded at *Kynance and Caerthillian* (*Cornwall*) on 23rd September. Five other transect sites returned weekly counts in double figures during August or September, while 11 were counted across two visits to the WCBS square at *SY7385* (*Dorset*).

Brimstone was recorded in every week of the transect season, and the highest counts in England all came in the spring – peaking with 72 on 20th April at *Breamore* (*Hants*). This was one of three sites – along with *Levin Down* (*West Sussex*) and *The Mount, Guildford* (*Surrey*) – which returned multiple counts of 50 or more during April and May. *Danebury Hill Fort* (*Hants*) saw the highest summer count, when 53 were seen on 24th July. In Wales, the highest weekly count was recorded at the height of summer, when 31 were seen on 8th August at *Fenn's Moss* (*Clwyd*), while *Cwm Clydach* (*West Glamorgan*) was the only other site in that country to record counts in double figures.

Family: Nymphalidae (Browns, Fritillaries, Admirals etc.)

The earliest record of **Wall** came from *Upton Towans* (*Cornwall*) on 10th April, closely followed by sightings in Wales, Scotland and Jersey all within the next 10 days. *Wiltshire* saw the highest weekly counts across the UK in both spring and summer, with the 50 seen on one of the transects at *Calstone Down* on 7th May only beaten by 59 seen at *Morgan's Hill* on 15th August. *Blaye* (*Alderney*) recorded the highest weekly count in the Channel Isles on 22nd May, when 32 were seen, while the highest count in Wales was the 16 seen at *Great Orme* (*Gwynedd*) on 16th August. In Scotland, *Carrick Shore* (*Dumfries & Galloway*) returned five weekly counts in double figures, including the highest count of 20 on 16th August, although it was *Gullane West* (*Lothian*) that saw the highest spring count, with 16 on 14th May.

Counts above 50 for **Speckled Wood** occurred on 35 occasions this year, though only twice before August – at *Bishop Wood* (*North Yorks*) on 25th June and *Painswick Beacon South* (*Glos*) three days later. *Brigsteer Park Wood* (*Cumbria*) recorded the highest count of the year on 30th August, when 109 were seen, while the WCBS square at *TL2222* (*Herts*) was one of just four other sites to record 80 or more on a weekly count. This species recorded its best year in Scotland, where the highest count came on 20th July at *Carron Woodlands* (*Grampian*) when 49 were seen. The highest count in Wales came on the same day, with 42 seen at *Newport Wetlands* (*Gwent*). Northern Ireland, however, did not see its highest counts until September, peaking with 52 at *Burntollet Wood* (*Co. Londonderry*) on the 21st of that month.

Large Heath was recorded on 15 transect sites across the UK in 2022, along with two WCBS squares and a timed-count in Scotland. The earliest counts in England and Wales both came on 27th May, at *Thorne Moors* (*South Yorks*) and *Cors Fochno* (*Dyfed*), while the highest weekly count of 42 was seen at *Fenn's Moss* (*Clwyd*) on 21st June. In Northern Ireland, the first

Scotch Argus recorded its worst year in 33 years of monitoring in Scotland.
Photograph by Mark Searle

sightings were recorded on 15th June at *Mullenakill Peatlands Park* (*Co. Armagh*), while the highest count of 13 was seen at *Killeter Bog* (*Co. Tyrone*) seven days later. There was no count higher than four in Scotland, with the final sighting coming on 19th July in the WCBS square *NC2234* (*Highland*).

The earliest **Small Heath** records came on 13th April at *Les Landes* (*Jersey*) and 14th April at *Cheriton Hill* (*Kent*). *Wallasea Island Marsh Flats* (*Essex*) recorded eight of the 10 highest weekly counts across the year, peaking on 26th August when 224 were seen. *Loch Fleet* (*Sutherland*) saw the highest count in Scotland, with 138 on 29th July, while *Aberlady Bay* (*Lothian*) also recorded a weekly count over 100. The highest count in Wales came on 11th July at *Great Orme* (*Gwynedd*) where 50 were seen and, in Northern Ireland, *Murlough* (*Co. Down*) saw six counts in double figures – peaking with 32 on 11th August.

Mountain Ringlet data were received from three transect sites and a single timed-count in 2022. *Hartsop Dodd* (*Cumbria*) provided both the earliest count on 13th June and the highest count of the year on 5th July, when 118 were recorded. The latest count of the year came from *Ben Lawers* (*Perthshire*) on 18th July.

Scotch Argus was recorded on six WCBS squares and 11 standard transect sites in 2022, including three sites in England. The earliest transect record came from *Arnside Knott* (*Cumbria*) on 16th July, first appearing in Scotland two days later at *Insh Marshes* (*Highland*). The latter site also provided the final count of the year on 8th September. The four highest weekly counts of the year all came from *Smardale Gill* (*Cumbria*), which saw a peak of 156 on 14th August, while *Glencoe* (*Argyll & Bute*) provided the highest count in Scotland when 40 were seen on 5th August. This species recorded its worst year in Scotland in a time series dating back to 1990.

The first transect count of **Ringlet** came on 30th May from *Sound Common* (*Cheshire*), though records were sparse until the middle of June. The highest count for the year came in the WCBS square at *TL4135* (*Herts*), where 548 were seen on 10th July, while transect sites with counts above 400 around the same time included *Minsmere* and *Dunwich Forest* (both *Suffolk*), *Weston & Waverley Woods* (*Warks*) and *Priddy Mineries* (*Somerset*). The highest weekly count in Scotland was recorded at *Robroyston Park* (*Glasgow*), with 223 seen on 5th July, while *Crom Estate* (*Co. Fermanagh*) saw the highest count in Northern Ireland when 106 were seen on 13th July. This was just one higher than the highest count in Wales, recorded on the same day at *Central Valley* (*Gwent*).

La Ville Machon (*Jersey*) reported sightings of **Meadow Brown** from 12th April onwards, though it did not emerge in most areas before early June. Four of the five highest weekly counts for this year, all above 800, were seen at *Heath's Meadows* (*Lincs*) where a peak of 1,009 was recorded on 9th July. The highest counts in other parts of the UK were 257 at *Stackpole Warren* (*Dyfed*) on 18th July, 216 at *Lower Meadow Valleyfield* (*Fife*) on 30th June, 144 at *Blaye* (*Alderney*) on 9th July and 87 at *Murlough* (*Co. Down*) on 22nd July. There were 13 WCBS squares in 10 different English counties that recorded counts over 200, with the highest return being 552 at *TL4135* (*Herts*) on 10th July.

The Channel Isles saw the best counts of **Gatekeeper** during the year, with eight weekly counts in excess of 300, peaking on 11th July when 1,070 were seen at *Longis* (*Alderney*). The highest count in England of 693 came on 21st July at *East Soar* (*Devon*), *Ainsdsale Sand Dunes* (*Lancs*) recorded three weekly counts in excess of 300, and 306 were seen in a WCBS square at *SZ0176* (*Dorset*) on 16th July. The highest count in Wales was recorded on 21st July, with 144 seen at *Lydstep Point* (*Dyfed*), while *Mynydd Marian* (*Clwyd*) saw three weekly counts in excess of 100 between 21st and 29th July. A few sites in England continued to record this species up to the end of September, though it was not seen in Wales beyond the 5th of that month.

Marbled White was on the wing from early June, with the first transect sighting recorded at *Green Down* (*Somerset*) on the first day of that month, and the highest weekly count for the year came just 15 days later when 304 were recorded at Bushy Bank (Oxon). This species was recorded on just two transect routes in Wales, with *Oxwich* (*West Glamorgan*) returning both the first count on 8th June and the highest count of 36 on 23rd June, while the highest count in a WCBS square came in *Dorset* where 215 were recorded at *SZ0176* on 16th July. Although this species was finished on most sites by mid–August, a count of 27 was recorded at *Wareham Walls* (*Dorset*) on the 16th of that month.

The earliest count for **Grayling** came at *Great Orme* (*Gwynedd*) on 2nd June, and the same site also provided the highest count of the year when 126 were seen on 11th July. The first sightings in England were two weeks later – simultaneously in the north and south – with records from *Arnside Knott* (*Cumbria*) and *East Soar* (*Devon*) on 16th June. The highest count in England was recorded in a WCBS square at *TM3549* (*Suffolk*), where 110 were seen on 20th July. The earliest count in Scotland came from *Duddingston* (*Lothian*) on 27th June, with a high of 42 recorded at *Holyrood Park* (*Lothian*) on 19th July, while records in the Channel Isles stretched from 22nd June through to the last week of September, with the highest weekly count of 95 seen at *Les Landes* (*Jersey*) on 13th July. *Murlough* (*Co. Down*) was the only transect site in Northern Ireland to record this species, with just two individuals counted on 22nd July and 21st August.

Aish Tor (*Devon*) recorded both the earliest weekly count for **Pearl-bordered Fritillary**, on 16th April, and the highest count on 13th May, when 64 were seen. The first transect sightings in Scotland came on 29th April at *Glasdrum* (*Strathclyde*) and *Arienas Wood* (*Highland*), while the highest count in that country was the 60 recorded at *Mabie Forest* (*Dumfries & Galloway*) on 24th May. Transect data were supplemented by timed counts from 34 sites across England, Scotland and Wales, with three sites returning counts above 40 – these were *Eyarth Rocks* (*Denbighshire*), *Dunsford* and *Hembury* (both *Devon*).

Small Pearl-bordered Fritillary recorded its worst year in England in 2022, after 45 years of monitoring. The earliest transect sightings came in south–west England, with the first record coming from *Tidna Valley* (*Cornwall*) on 26th April. Several sites in Cornwall also recorded a second brood, with the final sighting coming from *Kynance and Caerthillian* on 19th August. However, the highest counts for the year came from *Burn Hill* (*Durham*), where 69 were seen on 22nd June, and *Glasdrum* (*Strathclyde*), where 65 were seen on 5th June. *Hipperley Beck* (*North Yorks*) was the only other site to record a weekly count above 50. *Bennar Dunes* (*Gwynedd*) returned the highest count in Wales, with 18 recorded on 18th May, and nearly matched that number during a second brood when 17 were seen on 9th August.

The highest counts for Gatekeeper in 2022 came from the Channel Isles.
Photograph by Ian Middlebrook

The first **Silver-washed Fritillary** transect sighting came on 27th May at *Bubbenhall Meadow* (*Warks*), and records continued in England up to the middle of September. A shorter season was recorded in Wales, lasting from 6th July at *Bishopston Valley* (*West Glamorgan*) until 29th August at *Gwenffrwd Dinas* (*Dyfed*), but no counts there reached double figures. The highest weekly count of 67 came on 15th July at *Kemphill Moor Copse* (*Isle of Wight*), while 66 were seen on the same day at *Sidney Wood* (*Surrey*) and on 23rd July at *Minsmere* (*Suffolk*). In Northern Ireland, good numbers were seen at *Crom Estate* (*Co. Fermanagh*), with peak weekly counts of 48 recorded on both on 18th and 26th July, and records continuing up to 1st September.

The last two years have been the best two years for **Dark Green Fritillary** in England since monitoring began in 1976. The earliest record this year came from *Blatchford Down* (*Surrey*) on 22nd May, with the final sighting recorded at *Loch Fleet* (*Sutherland*) on 7th September. The two highest counts were recorded at *Porton Down* (*Wilts*), when the 309 seen on 22nd June were surpassed by 332 seen a week later. Three other sites returned weekly counts above 100 – *Broughton Down* (*Hants*), *Sharpenhoe Clappers* (*Beds*) and *Box Hill* (*Surrey*). The highest weekly count in Scotland was the 47 seen at *Aberlady Bay* (*Lothian*) on 11th July, in Wales it was 29 at *Stackpole Warren* (*Dyfed*) on 8th July, and in Northern Ireland it was 36 at *Portstewart Strand* (*Co. Londonderry*) on 21st July, while 26 were seen at *Calf of Man* (*Isle of Man*) on 23rd June.

The earliest weekly count for **High Brown Fritillary** came on 8th June at *Aish Tor* (*Devon*), which was 12 days earlier than the first transect sighting in *Cumbria*, which came at *Heathwaite*. Likewise at the end of the flight period, the final count from *Aish Tor* on 1st August came eight days earlier than the final counts in *Cumbria*. This species was recorded on seven transect sites in north–west England, with the highest weekly count being just seven – seen at *Arnside Knott* (*Cumbria*) on 16th July. In south–west England it is mainly monitored by timed counts, though none of these exceeded the 38 seen on the *Aish Tor* transect on 17th June. In Wales, the highest confirmed count came from *Alun Valley* (*Mid Glamorgan*) on 20th June, when 40 were seen.

The earliest transect counts for **White Admiral** came on 10th June at *Piddles Wood* (*Dorset*) and *Bricket Wood* (*Herts*), and it was only 10 days later that *Pamber Forest* (*Hants*) recorded its peak weekly count of 22. However, this number was exceeded at *Briddlesford Woods* (*Isle of Wight*) the following day, and the same site then returned the highest count of the year on 27th June when 35 were seen. Three other sites recorded counts of 20 or more – *Cole Wood* (*Kent*), *Foxley Wood* (*Norfolk*) and *Kemphill Moor Copse* (*Isle of Wight*).

Purple Emperor was recorded on 55 transects and in two WCBS squares during the year, with the first count coming on 21st June at *Chiddingfold Forest West* (*Surrey*) and the final count on 29th July at *Botley Wood* (*Hants*). The two highest weekly counts were for six individuals, at *Cotgrave Woods* (*Notts*) and *Grafton Wood* (*Worcs*), both on 8th July.

Dark Green Fritillary recorded one of its best years in England.
Photograph by Mark Searle

Heartwood Forest (*Herts*) and *Weston & Waverley Woods* (*Warks*) were the only other transects where a weekly count higher than two individuals was recorded. This species recorded its second best year on transects.

Red Admiral was recorded during every week of the transect season, though not seen in Northern Ireland until 24th April at *Springhill House* (*Co. Londonderry*). The highest spring counts came from the east of England, peaking at 38 at *Holme Fen* (*Cambs*), with *Scolt Head Island* (*Norfolk*), *Gibraltar Point* (*Lincs*) and *Cavenham Heath* (*Suffolk*) also recording weekly counts above 30 in June. However, in late summer, the highest counts came from northern England, with *Smardale Gill* (*Cumbria*) recording counts of 118 and 117 on 2nd September and 27th August respectively. Around the same time, *Waitby Greenriggs* (*Cumbria*) recorded two counts above 90, and 85 were recorded at *Malham Tarn* (*North Yorks*). *Kingshill* (*Strathclyde*) provided the two highest counts in Scotland with 46 seen on 25th August, followed by 34 recorded three days later, while *The Centre for Alternative Technology* (*Powys*) was the only site in Wales to record two weekly counts in double figures.

By recent standards, it was an unspectacular year for **Painted Lady**, despite being recorded throughout the transect season and in all parts of the UK. The first count to reach double figures came on 17th May at *Les Landes* (*Jersey*), followed by a count of 37 at *Weymouth Relief Road* (*Dorset*) the following day, which proved to be the highest count of the year. The highest summer count came at *Ryder Point Hopton* (*Derbys*) when 30 were recorded on 9th August, while *Clune* (*Fife*) was the only site across Scotland, Wales or Northern Ireland to reach double figures, with 29 seen on 29th August.

Peacock was out in good numbers before the transect season started, with 27 counts in double figures before 1st April. The highest spring count came on 15th April at *Wych Lodge Valley* (*Somerset*) when 54 were seen, while the highest count of the year in Wales also came in the spring, with 20 seen at *Newport Wetlands* (*Gwent*) on 24th April. The two highest counts of the year came from *Kingshill LNR* (*Strathclyde*), where 189 were recorded on 25th August, beaten by the 262 seen three days later. In England, the two highest counts were both at *Hipperley Beck* (*North Yorks*), peaking on 9th August when 168 were seen, while the highest count in Northern Ireland came from *Killykeeghan & Crossmurrin Nature Reserve* (*Co. Fermanagh*) on 11th August, with 14 recorded. The Channel Isles saw their highest counts in June, with 32 recorded at *Sorel* (*Jersey*) on 18th of that month, and 15 at *Blaye* (*Alderney*) ten days later.

The two highest early counts for **Small Tortoiseshell** came from *Murton Fields* (*Northumberland*), where 47 were seen on 17th April after having already peaked with 69 on 26th March. *Stow* (*Lincs*) was the only other site to return a weekly count above 25 during April. The highest count of the year came during the early–summer brood in the WCBS square *TF5918* (*Norfolk*), where 139 were seen on 12th June, with the next highest count coming from Northern Ireland, when 75 were seen on 22nd July at *Ecos Park* (*Co. Antrim*). The highest count in Wales came on 6th July at *Central Valley* (*Gwent*), when 24 were seen, and in Scotland a peak of 18 was shared between *Donmouth* (*Grampian*) and the WCBS square *NO2444* (*Tayside*) on 20th and 21st July respectively. A later brood in England saw two sites both record two counts of over 50 between 26th July and 25th August – these were *Ryder Point Hopton* (*Derbys*) and *Hucker's Bow* (*Somerset*).

Early counts for **Comma** reached double figures before the transect season started, including the highest spring count of 17 recorded at *Pickett Wood* (*Wilts*) on 19th March. The highest summer count came at *Minsmere* (*Suffolk*), where 44 were recorded on 9th July, while *Ladywalk* (*Warks*) and *Dunwich Forest* (*Suffolk*) also saw weekly counts over 25 during July. Late summer counts were generally smaller, with a peak of 16 at *Haddon Hall Estate* (*Derbys*) on 21st September. The highest count of the year outside England was on 13th September at *Llanymynech* (*Powys*) when eight were seen.

Peacock was seen in good numbers before the transect season started.
Photograph by Ian Middlebrook

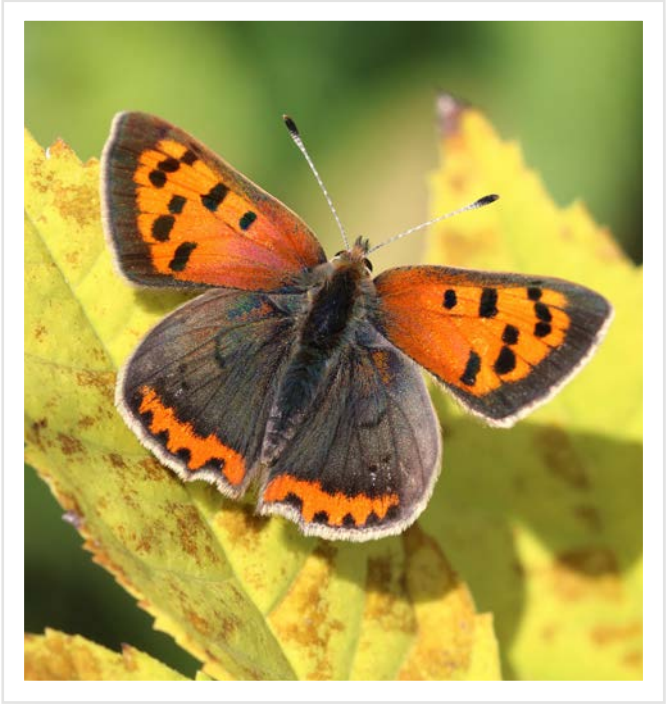
The first sighting of **Marsh Fritillary** on transects this year came on 30th April at *Magdalen Hill Down* (*Hants*), while the final count came from *Kynance & Caerthillian* (*Cornwall*) on 14th July. In Northern Ireland the transect records at *Murlough* (*Co. Down*) stretched from 19th May to 7th July. The highest weekly count there was for 140 on 7th June, but that total was bettered by two sites in *Wiltshire – Calstone* and *Barbury Castle* returning counts of 210 and 160 respectively, both on 27th May. Transect data were supplemented by 107 counts of larval webs from across the four UK countries, including a count of 375 from *Finglandrigg Woods* (*Cumbria*). The highest larval web counts from Wales and Scotland were 151 at *Blaen Cynon* (*Mid Glamorgan*) and 134 at *Ardtur* (*Argyll & Bute*).

Data for **Glanville Fritillary** were received from 12 transects in 2022, including five sites on *Alderney*. On the *Isle of Wight*, the transect season started at *Mottistone Down* on 14th May when 29 were seen, and this proved to be the highest count in England for the year. The same site recorded the final count in England on 28th June. The season on *Alderney* was somewhat later, starting on 28th May at *Trois Vaux* and ending on 21st July at *Bonne Terre* and *Trois Vaux*, while the highest weekly count of 30 came from *Longis* on 6th June.

Heath Fritillary was recorded on 11 transects this year, in addition to the 18 timed–counts that were received. The earliest sighting came on 14th May at *Cole Wood* (*Kent*), with *Greenscombe Wood* (*Cornwall*) following five days later. *East Blean Woods* (*Kent*) returned the highest weekly transect count of 145 on 22nd June, while a timed count of 307 was received from *Aller Coombe* (*Somerset*) on 17th June. The final transect count of the main brood came at *Thornden Wood East* (*Kent*) on 17th July, but a single late sighting was recorded at *Blean Woods* (*Kent*) on 10th September.

Family: Riodinidae (Metalmarks)

Duke of Burgundy was recorded on 28 transects in 10 different English counties during 2022, with the earliest record coming from *Dunstable Downs* (*Beds*) on 15th April, followed by *Noar Hill* (*Hants*) and *Rodborough Common* (*Glos*) the following day. The highest weekly count of 23 came from *Prestbury Hill* (*Wilts*) on 19th May, beating the 21 recorded at *Hawnby Hill* (*North Yorks*) the previous day, while the final transect count of the season was recorded on 22nd June at *Morgan's Hill* (*Wilts*). Timed count data were also received from the *North Yorkshire* populations, where the highest count of 56 was made at *Thorodale Wood* on 19th May.



Small Copper was recorded in every week of the transect season.
Photograph by Mark Searle

Family: Lycaenidae (Coppers, Hairstreaks and Blues)

Small Copper was recorded in each week of the transect season, with the first sighting coming on 3rd April at *West Park* (*Jersey*), followed by *Kynance & Caerthillian* (*Cornwall*) six days later. *Sorel* (*Jersey*) provided the highest count of the spring brood, with 38 recorded on 5th May, while 31 were seen at *Minsmere* (*Suffolk*) three days later. Northern areas saw higher counts in the summer brood, with 39 recorded at *Burn Hill* (*Durham*) on 17th August, and the highest count in Scotland being 28 at *Clune* (*Fife*) on 5th September. Just three sites in Wales saw counts in double figures – the highest being 16 at *Newport Wetlands* (*Gwent*) on 1st September – while *Whitepark Bay* (*Co. Antrim*) returned the highest count in Northern Ireland with four seen on 9th August.

The **Brown Hairstreak** transect season was underway on 18th July, with the earliest record from *Alners Gorse* (*Dorset*), and sightings continued through to 8th October at *Riddlesdown Quarry* (*Surrey*). Adult counts were received from 60 transects and these were combined with 24 egg counts from the previous winter. The highest transect count was of five individuals, and came from *Shipton Bellinger* (*Hants*) on 12th August, while *Grafton Wood* (*Worcs*) recorded four the following day. No other sites saw weekly counts exceed two adults. The highest egg count of 295 came from *West Williamston* (*Pembrokeshire*).

The earliest transect count for **Purple Hairstreak** came from *Ashtead Common* (*Surrey*) on 2nd June, while the final count of the year was recorded on 5th September at *Wyver Lane, Belper* (*Derbys*). Two counts of 60 plus were recorded on evening transects at *Ryton Wood* (*Warks*) – peaking with 73 on 11th July, but the highest count of the year came during a regular transect when a remarkable 128 were seen during a very hot day on 19th July at *Selsdon Wood* (*Surrey*). Just eight sites outside England returned counts of this species (four in Scotland, three in Wales and one on Jersey) – *Bryn Pydew* (*Gwynedd*) being the most productive of those with a peak weekly count of 10 on 18th July.

The first **Green Hairstreak** count came during the second week of the transect season, on 9th April at *Stinchcombe* (*Glos*), while Wales and Scotland saw their earliest records the following week – on 17th April at *Mynydd Marian* (*Clywyd*) and 20th April at *Glen Rosa* (*Strathclyde*). The highest transect count of the year came from *Deep Dale* (*Derbys*) on 14th May, when 123 were seen. In England, there were just a couple of records after mid–July, with the final record coming from *Upton Heath North* (*Dorset*) on 29th July. The season on *Jersey* was somewhat later, with the final record on 11th August at *Les Blanches Banques*, though *Les Landes* had provided the earliest count on 1st May and four counts above 50 – peaking with 89 on 13th July.

The first transect record for **White-letter Hairstreak** came at *Leftwich Woods* (*Cheshire*) on 15th June, while *Benfleet Downs* (*Essex*) was the only site to record double figures on a weekly count, with 11 seen on 4th July and another 10 seen four days later. *Marshall's Arm LNR* (*Cheshire*), *Bishop Middleham Quarry* (*Durham*), *Ramsey & Hintlesham Wood* and the WCBS square *TM0553* (both *Suffolk*) were the only other sites where more than five individuals were recorded on a single count. The final record came on 11th August at *Jacksons' Brickworks LNR* (*Cheshire*).

Black Hairstreak was recorded on 10 transect routes during 2022, with the season spanning just under a month from 27th May at *Monks Wood* (*Cambs*) to 25th June at *Little Linford Wood* (*Bucks*). There were no weekly counts in double figures, with the two highest counts of nine seen on 7th June at the *M40 Compensation Area* and three days later at *Grendon & Doddershall Woods* (both *Bucks*).

The earliest transect record of **Small Blue** came on 24th April at *Lydden Hill* (*Kent*), with the first sighting in Wales coming just two days later at *Pwlldu – Brandy Cove* (*West Glamorgan*). The four highest weekly counts all came from *Newton Tony* (*Wilts*), peaking on 8th June with 389, while *Prestbury Hill* (*Glos*) also recorded two counts of over 100 individuals in the spring. As usual, the summer brood was considerably smaller, with just three sites (all in *Dorset*) returning counts of 20 or more. Small Blue was recorded on six transect sites in Wales, where the highest count was 21 at *Cwm Ivy Tor* (*West Glamorgan*) on 2nd June, and seven sites in Scotland, with the highest count of six recorded at *Loch Fleet* (*Sutherland*) on 4th June.

Holly Blue was recorded in every week of the transect season in England, with the first count in double figures coming from *Breamore* (*Hants*) on 20th April. The highest spring count came from *Burgess Park North* (*Surrey*) where 27 were seen on 17th May. There were fewer high counts in the summer, although the highest count of the year came on 25th July at *Gunpowder Park* (*Essex*) when 34 were seen. The highest weekly count from the Channel Isles was the 23 recorded at *Longis* (*Alderney*) on 29th

May, while the highest count in Wales came on 7th May when eight were seen at *Bryn Pydew* (*Gwynedd*). This species was also recorded on six sites each in Scotland and Northern Ireland.

Large Blue was recorded on three transect sites in 2022, with records spanning from 7th June at *Collard Hill* (*Somerset*) to 5th July at *Green Down* (*Somerset*) – the latter site also returning the highest adult count of 31 on 22nd June. Egg counts were also received from 14 sites, and these all contribute to the published trend for the species, which showed that it recorded its second best year since being re-introduced to the country.

The earliest transect sightings of **Silver-studded Blue** all came on 27th May, at *Chapel Common* (*West Sussex*) as well as four sites in *Cornwall*, one of which – *Upton Towans* – returned the two highest weekly counts in England, with a peak of 1374 on 17th June. However, this total was surpassed in Wales three days later when 1835 were recorded at *Great Orme* (*Gwynedd*). Other sites with multiple high counts included *Prees Heath Common* (*Salop*), which returned three counts above 400, while *Buxton Heath* (*Norfolk*) and *Higher Hyde Heath* (*Dorset*) both saw two counts above 300. Just four sites were still recording this species in September, with the final transect sighting on 17th September at *St Gothians* (*Cornwall*).

Brown Argus was first seen on transects this year on 29th April, at *Upton Towans* (*Cornwall*), three sites on the *Isle of Wight* – *Bonchurch Down*, *Mottistone Down* and *St Boniface Down* – and *Fordon Chalk Bank* (*East Riding*). The latter site also returned the highest spring count, when 41 were seen on 10th May. The highest count of the year came from *Magdalen Hill Down* (*Hants*) on 5th August, when 71 were seen, while *Minsmere* (*Suffolk*) returned four weekly counts in excess of 40 individuals during July and August. This species was recorded on 11 transect sites and in one WCBS square in Wales, with the highest count of 16 coming from *Great Orme* (*Gwynedd*) on 5th May.

The first transect sighting of **Northern Brown Argus** in England came on 25th May at *Bishop Middleham Quarry* (*Durham*) and in Scotland on 5th June at *Carrick Shore* (*Dumfries & Galloway*). *Lea Green Bastow Wood* (*North Yorks*) recorded the highest count of the year on 15th June, when 49 were seen, while the four highest counts in Scotland all came from *Kingcraig* (*Fife*) – peaking at 23 on 23rd June. *Thrislington Plantation* (*Co. Durham*) was the only transect site to return multiple counts of 20 or more. The final count in Scotland was on 13th August at *Girdle Burn* (*Strathclyde*), while it survived slightly longer in England where the last count came from *Jack Scout* (*Lancs*) on 25th August.

Common Blue was first sighted on a transect on 16th April at *Upper Sand Dunes* (*Jersey*), and it was on the wing in England towards the end of April. The species was not seen in Wales until 5th May at *Great Orme* (*Gwynedd*), in Scotland on 30th May at *Fallin Bing* (*Stirlingshire*) and Northern Ireland on 1st June at *Craigavon Lakes* (*Co. Armagh*). The highest count for the spring generation came at *Porton Down* (*Wilts*) on 7th June, when 141 were seen, while the summer brood in England peaked with 190 at *Seaford Head West* (*East Sussex*) on 5th August. The second brood produced the highest counts in Wales, where 91 were recorded at *Stackpole Warren* (*Dyfed*) on 12th August and the single summer brood in Scotland peaked with a count of 40 on 11th July at *Aberlady Bay* (*Lothian*).

The earliest transect records for **Adonis Blue** came on 3rd May at *Bindon Hill* (*Dorset*), and there were sightings at 12 other transect sites across southern England within the next three days. *Calstone* (*Wilts*) provided the highest counts for both the spring and late-summer broods – with totals of 708 on 27th May and 904 on 29th August across two transect routes. *Anchor Bottom* (*East Sussex*) and *Cheriton Hill* (*Kent*) both returned three weekly counts of 100 or more, with their highest counts coming on 26th and 27th August respectively. Records continued right to the end of the transect season, with a count of 78 recorded as late as 20th September at *Milk Hill* (*Wilts*).

Chalk Hill Blue was first recorded on 22nd June at both *Denbies Landbarn* (*Surrey*) and *Devil's Dyke* (*Cambs*). Both of these sites returned multiple counts of over 500, but it was at *Coombe Hill* (*Glos*) where the two highest counts of the year were recorded, with a peak of 1,335 on 29th July. This came during a spell of five consecutive weekly counts over 500 at that site. *Brading Down* (*Isle of Wight*) was the only other site to record a count in four figures – reaching 1020 on 1st August – while the last counts in double figures came on 12th September at *Mottistone Down* (*Isle of Wight*) and *Beacon Hill* (*Hants*).

The highest Common Blue count came from Seaford Head in Sussex.
Photograph by Mark Searle

Long-term trends

Long–term trends, 10–year trends and annual % changes for butterfly species, at UK and country level, are presented in full at the end of this report (Tables 1–5). Further information on each species, including collated index plots, phenology charts and distribution maps of monitored sites, can be found on the UKBMS website at https://ukbms.org/species. What follows here is a brief summary of the long–term trends.

UNITED KINGDOM

For the UK we are able to report on long–term and 10–year trends to 2022 for 58 of the 59 regularly occurring species, with the exception being **Mountain Ringlet**. We are able to report trends for **Chequered Skipper** and **Large Blue** this year, after their omission in 2021.

Since 1976, about a third (33%) of butterfly species assessed in the UK show a significant long–term decline in abundance, compared to 29% showing a significant long–term increase. However, the situation over the last decade is slightly more positive, with four species (7%) showing a statistically significant increase and none showing a significant decline.

The species showing the greatest population increases since 1976 across the UK are (in order) **Large Blue**, **Clouded Yellow**, **Silver-spotted Skipper**, **Black Hairstreak**, **Large Heath**, **Ringlet**, **Dark Green Fritillary**, **Silver-washed Fritillary** and **Red Admiral**, which have all increased by 250% or more in that time.

The most severe long–term declines are demonstrated by (in order) **Heath Fritillary**, **Wall**, **Wood White**, **Small Tortoiseshell**, **White-letter Hairstreak**, **Lulworth Skipper**, **Small Skipper**, **Grayling**, **Small Pearl-bordered Fritillary** and **Pearl-bordered Fritillary**, which have all declined by 65% or more.

There have been a few changes in the 10–year UK trends, with five species no longer showing a significant increase. These are **Wood White**, **Glanville Fritillary**, **Heath Fritillary**, **White-letter Hairstreak** and **Black Hairstreak**. These changes should be treated with caution, as 10 years is quite a short time period to assess butterflies and the trends are sensitive to start and end year values.

Combined measures of butterfly abundance, published as biodiversity indicators by the UK Government, show that habitat specialist butterflies (26 species) have declined significantly between 1976 and 2022, whilst butterflies of the wider countryside (25 species) show no significant change over the same period (see figure 4). The smoothed indices for these groups have fallen by 30% and 5% respectively, comparing the 2022 value with the starting value in 1976.

ENGLAND

For England we are able to report on long–term and 10–year trends to 2022 for 55 of the 58 regularly occurring species. There are insufficient data to report trends for **Large Heath** and **Mountain Ringlet**, while we are not yet reporting a trend for **Chequered Skipper** in England, following its successful reintroduction.

Since 1976, over a third (38%) of butterfly species assessed in England have decreased significantly in abundance, compared to 29% of species that have shown significant long–term increases. The situation over the last decade is more positive, with four species (7%) showing a statistically significant increase compared to two (4%) that have declined significantly (**Small Skipper** and **Small Pearl-bordered Fritillary**). Since the previous year's assessment, the long–term trend class for four species have become significant, with **Orange-tip**, **Brimstone** and **Holly Blue** increasing while **Small Copper** is now in significant decline.

Combined measures of butterfly abundance, published by the UK Government, show that butterflies of the wider countryside at woodland sites in England (24 species) have declined significantly between 1990 and 2022, whilst those at farmland sites (22 species) show no significant change (see figure 5). The smoothed indices for these groups have fallen by 47% and 14% respectively, comparing the 2022 value with the starting value in 1990.

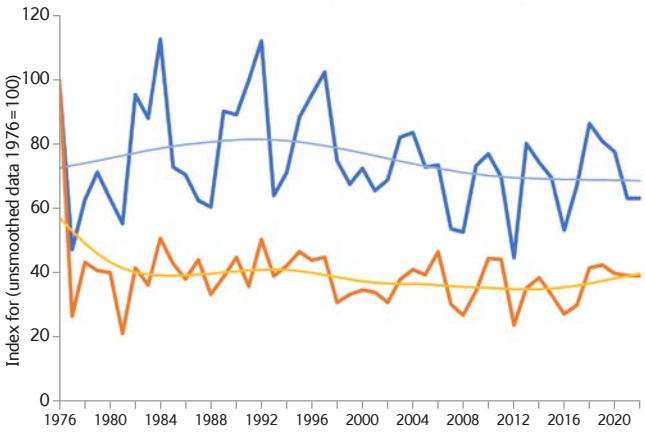


Figure 4. Composite indicators of UK butterfly populations for wider countryside species (blue) and habitat specialists (orange) 1976–2022. Darker lines are unsmoothed values, paler lines are smoothed indicators.

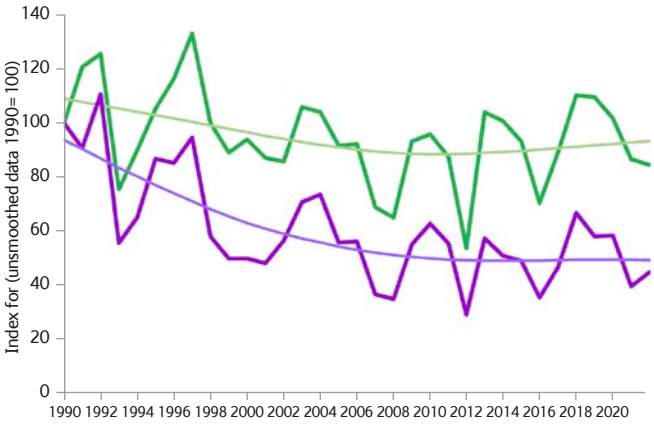


Figure 5. Composite indicators of butterfly populations for wider countryside species on farmland (green) and in woodland (purple) in England 1990–2022. Darker lines are unsmoothed values, paler lines are smoothed indicators.

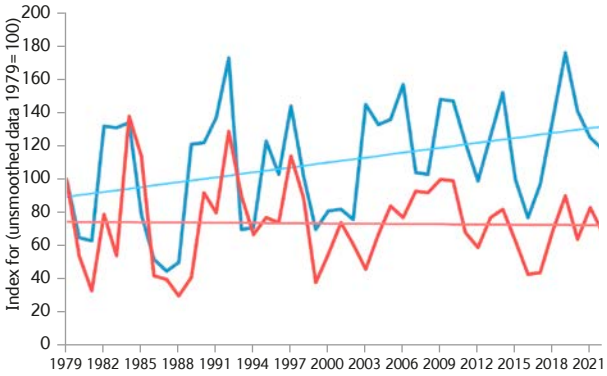


Figure 6. Composite indicators of Scotland butterfly populations for generalist species (blue) and habitat specialists (red) 1979–2022. Darker lines are unsmoothed values, paler lines are smoothed indicators.

SCOTLAND

For Scotland we are able to report on long–term and 10–year trends to 2022 for 26 of the 34 regularly occurring species. Since 1979, ten of these species (38%) have shown a significant increase, with three species (12%) in significant decline (**Grayling**, **Small Tortoiseshell** and **Small Copper**).

The species showing the greatest long–term population increases in Scotland are (in order) **Red Admiral**, **Wall**, **Orange–tip** and **Ringlet**, which have all increased by 250% or more. Note that trends for most of these rapidly increasing species only stretch back to the 1990s, as they were not recorded in sufficient numbers in Scotland in the earlier years of the UKBMS.

Combined measures of butterfly abundance, published by NatureScot, show that generalist butterflies in Scotland (14 species) have increased significantly between 1979 and 2022, whilst habitat specialists in Scotland (6 species) show no significant change over the same period (see figure 6). The smoothed indices for these groups have changed by +47% and –3% respectively, comparing the 2022 value with the starting value in 1979.

WALES

For Wales we are able to report on long–term and 10–year trends to 2022 for 33 of the 41 regularly occurring species. Since 1976, eight of these species (24%) show a significant increase in abundance, with nine species (27%) in significant decline.

The species showing the greatest population increases in Wales are (in order) **Orange–tip**, **Pearl–bordered Fritillary**, **Speckled Wood**, **Green Hairstreak** and **Ringlet**, which have all increased by 200% or more. The species in most severe long–term decline are (in order) **Grayling**, **Dark Green Fritillary** and **Small Pearl–bordered Fritillary**, which have all declined by 65% or more.

NORTHERN IRELAND

Trends to 2022 for butterflies in Northern Ireland are available for 14 species, covering time periods ranging from 13 to 19 years. Two of these species (**Large White** and **Small White**) show significant long–term declines. No other species show a significant change over their full time–series, but **Ringlet** and **Common Blue** have both decreased significantly over the last 10 years.

Northern Brown Argus. *Photograph by Mark Searle.*

Marsh Fritillary. *Photograph by Mark Searle.*

Drivers of change of butterfly populations

Butterflies are excellent indicators of environmental change due to their rapid and sensitive responses to subtle habitat or climatic changes and there are several factors considered to be driving the changes that we see in butterfly populations.

Weather and climate change

Short–term changes in butterfly populations are often driven by the weather. Being 'cold–blooded', they need the sun's energy to raise their body temperature to a level that enables them to function. The impact of weather on different butterfly species is influenced by factors such as the timing of their flight period, how many generations are produced in a year, and in what life stage they overwinter. Consequently, what could be considered to be good conditions for one species can be less favourable or even detrimental for another. Adverse weather conditions can result in a large drop in butterfly numbers. While butterflies can bounce back from the impacts of unsuitable weather, they can take a long time to recover from a run of adverse weather years.

Longer–term changes in weather patterns as a result of climate change can have an impact on where butterfly species are found, their population sizes, and the timing of their lifecycles. Spring–flying species have been emerging earlier in recent decades as springs have warmed, and a number of single–brooded species are now able to produce a second brood in warm years. However, there may be negative impacts, for example if butterfly species become active before their food sources are available. Any benefits of an earlier season may also be negated if the changing climate results in plants and flowers dying earlier than they used to, bringing a premature end to the flight season.

In recent years we have seen species historically restricted to warmer southern parts of the UK, expanding their range and becoming more abundant in northern areas. However, the scope for northward range expansion may be limited, particularly for habitat specialist species, if networks of suitable habitat are too isolated.

Habitat related drivers

Habitat loss, degradation, and changes in habitat management, continue to be major drivers of change in UK butterfly populations, often resulting in population declines and/or range contractions.

The UK has seen major changes in land use since the UKBMS started in the 1970s, as well as in the preceding decades and centuries. For example, the loss of important semi–natural habitats to conifer plantations, arable land, industrial, commercial or residential development. Wide–scale agricultural intensification has had a big impact on wildlife, with bigger fields and hence less wildlife–friendly margin habitat, and a greater use of herbicides and fertilisers. This has resulted in far fewer wildflowers, meaning reduced nectar sources for butterflies and a decline in some larval food plants.

Many semi–natural habitats in the UK depend on regular management to maintain their distinctive features that their component species rely on. A decline in traditional management activity can impact habitat quality, or even cause loss of that habitat completely due to successional change of the vegetation. Loss of habitat can have a disproportionately negative effect, as it can also increase habitat fragmentation and, therefore, the isolation of remaining butterfly populations. Habitat connectivity is key to a species being able to disperse to new sites and recover from population crashes.

Pesticides and pollution

Alongside the habitat mediated effects of agricultural intensification, the accompanying use of pesticides may have direct toxicity impacts on butterflies. Ongoing and future research into the effects of pesticides is an area of research where monitoring data is likely to help determine the extent to which butterflies are affected by farmland chemicals. Although little research exists on the direct effects of pollution on lepidoptera, nitrogen deposition is considered a major threat to biodiversity and ecosystem functioning. This nutrification, from both airborne pollution and the application of fertilisers, can affect the availability and quality of caterpillar foodplants, as well as the species composition and microclimate conditions within habitats.

Conservation action

Landscape–scale conservation efforts can play a very important role in improving the fortunes of declining butterfly species. As our understanding of butterfly ecology increases, conservationists have been able to restore suitable habitat to help many declining species. This is especially the case for species with specific habitat requirements or poor powers of dispersal, and where the appropriate conditions may often rely on active habitat management. These species can respond well to targeted habitat management, such as woodland coppicing to create more open areas or establishing a sympathetic grazing regime.

A more detailed, fully referenced review of the drivers of change of butterfly populations can be found on the UKBMS website at **https://ukbms.org/official-statistics**.

Notes on Summary Tables 1-5

In the following summary tables, where series trends have been provided, the number of sites monitored is a count of all sites monitored during the current year of analysis where the species was, or has previously been, recorded. This includes sites where the species may have been absent during the current year, but have still contributed to the national index.

Where there are insufficient data to calculate accurate trends for a species at country level (noted as N/A), the number of sites monitored refers only to the number of sites at which the species was recorded in the current year.

Note: some country–level changes are based on relatively small sample sizes and should be interpreted with caution.

Table 1. UK Summary of changes 2022. Summary of species abundance changes in the UK from 2021 to 2022 and long-term (over the entire time series; no. yrs max = 47) and short-term (last 10-years) changes. Significance of trends: * P < 0.05 (significant). ** P < 0.01 (highly significant). ***P < 0.001 (very highly significant).

Species	Start Year	No. years with Index in 2022	No. sites monitored in 2022	2022 rank	% change 2021-2022	Series trend (%)	10-year trend (%)
Swallowtail	1976	46	27	33	-17	19	13
Dingy Skipper	1976	47	723	7	15	-1	15
Grizzled Skipper	1976	47	427	39	-16	-45***	22
Chequered Skipper	2003	20	12	3	-26	69	357**
Essex Skipper	1977	46	1207	30	3	-20	-25
Small Skipper	1976	47	2220	36	11	-71***	-37
Lulworth Skipper	1992	31	25	10	99	-71**	-13
Silver-spotted Skipper	1979	44	78	16	4	542***	-10
Large Skipper	1976	47	2206	42	5	-27	-29
Wood White	1979	44	80	20	6	-81***	82
Cryptic Wood White	2009	14	16	4	86	25	-18
Orange-tip	1976	47	2134	8	10	40**	32
Large White	1976	47	2816	37	3	-32	-17
Small White	1976	47	2826	29	-13	-15	0
Green-veined White	1976	47	2713	40	9	-20	-40
Clouded Yellow	1979	44	1039	12	265	618*	-61
Brimstone	1976	47	2123	12	-2	33*	1
Wall	1976	47	870	35	15	-85***	-8
Speckled Wood	1976	47	2659	14	17	96***	-12
Large Heath	1990	33	41	8	-19	371***	43
Small Heath	1976	47	1991	36	-25	-45**	37
Mountain Ringlet	N/A	N/A	4	N/A	N/A	N/A	N/A
Scotch Argus	1979	44	36	40	-36	37	-39
Ringlet	1976	47	2682	8	38	318***	-27
Meadow Brown	1976	47	2859	34	-8	-1	4
Gatekeeper	1976	47	2463	29	17	-42**	11
Marbled White	1976	47	1527	12	-4	78***	10
Grayling	1976	47	364	37	5	-70***	-5
Pearl-bordered Fritillary	1976	47	170	41	-9	-66***	12
Small Pearl-bordered Fritillary	1976	47	219	46	-32	-69***	-24
Silver-washed Fritillary	1976	47	1121	9	5	268***	-9
Dark Green Fritillary	1976	47	852	3	-7	300***	61
High Brown Fritillary	1978	45	60	33	-17	-63**	13
White Admiral	1976	47	427	30	46	-61***	-11
Purple Emperor	1979	44	144	2	55	136**	9
Red Admiral	1976	47	2777	20	-46	261***	108
Painted Lady	1976	47	2484	17	7	104	162
Peacock	1976	47	2757	37	-30	3	-33
Small Tortoiseshell	1976	47	2699	44	-32	-80***	-59
Comma	1976	47	2457	14	38	178***	-9
Marsh Fritillary	1981	42	217	14	45	3	-9
Glanville Fritillary	1989	34	16	15	-55	125	939
Heath Fritillary	1981	42	36	34	-10	-90***	95
Duke of Burgundy	1979	44	112	20	26	-35*	20
Small Copper	1976	47	2279	45	-32	-41*	6
Brown Hairstreak	1983	40	186	26	-8	-11	-14
Purple Hairstreak	1976	47	765	30	0	-25	40
Green Hairstreak	1976	47	804	21	52	-29*	17
White-letter Hairstreak	1976	47	346	31	-7	-76***	74
Black Hairstreak	1995	28	15	5	-31	475**	634
Small Blue	1978	45	361	8	23	26	93*
Holly Blue	1976	47	2125	14	87	129	106
Large Blue	1983	40	20	2	70	2215***	225*
Silver-studded Blue	1979	44	136	10	-11	68*	93**
Brown Argus	1976	47	1326	27	0	22	-2
Northern Brown Argus	1979	44	69	41	-48	-58**	0
Common Blue	1976	47	2479	32	17	-20	-26
Adonis Blue	1979	44	211	26	-23	100*	-29
Chalk Hill Blue	1976	47	333	7	-15	3	5

Table 2. ENGLAND Summary of changes 2022. Summary of species abundance changes in England from 2021 to 2022 and long-term (over the entire time series; no. yrs max = 47) and short-term (last 10-years) changes. Significance of trends: * P < 0.05 (significant). ** P < 0.01 (highly significant). ***P < 0.001 (very highly significant). Red text has been used to highlight those species that had their worst year of the series in 2022.

Species	Start Year	No. years with Index in 2022	No. sites monitored in 2022	2022 rank	% change 2021-2022	Series trend (%)	10-year trend (%)
Swallowtail	1976	46	18	31	-15	25	9
Dingy Skipper	1976	47	687	7	13	5	21
Grizzled Skipper	1976	47	420	39	-16	-45***	23
Chequered Skipper	N/A	N/A	2	N/A	N/A	N/A	N/A
Essex Skipper	1977	46	1175	28	3	-22	-20
Small Skipper	1976	47	2114	37	9	-73***	-37*
Lulworth Skipper	1992	31	25	10	99	-71**	-13
Silver-spotted Skipper	1979	44	78	16	4	542***	-10
Large Skipper	1976	47	2117	41	5	-25	-29
Wood White	1979	44	80	20	6	-81***	82
Orange-tip	1976	47	1896	8	7	27*	34
Large White	1976	47	2487	36	5	-32	-19
Small White	1976	47	2487	28	-11	-12	1
Green-veined White	1976	47	2358	40	12	-23	-37
Clouded Yellow	1979	44	972	10	265	708*	-59
Brimstone	1976	47	2064	12	-2	30*	0
Wall	1976	47	745	34	38	-87***	4
Speckled Wood	1976	47	2409	16	18	95***	-13
Large Heath	N/A	N/A	8	N/A	N/A	N/A	N/A
Small Heath	1976	47	1750	35	-24	-50***	42
Mountain Ringlet	N/A	N/A	1	N/A	N/A	N/A	N/A
Scotch Argus	1995	28	12	21	-15	-74***	-12
Ringlet	1976	47	2373	9	41	322***	-28
Meadow Brown	1976	47	2500	34	-8	-2	4
Gatekeeper	1976	47	2350	30	14	-45***	14
Marbled White	1976	47	1513	12	-7	75**	9
Grayling	1976	47	274	37	0	-57***	8
Pearl-bordered Fritillary	1978	45	141	42	-6	-73***	21
Small Pearl-bordered Fritillary	1978	45	144	45	-30	-64***	-42**
Silver-washed Fritillary	1976	47	1090	9	7	293***	-9
Dark Green Fritillary	1976	47	717	2	-2	567***	74
High Brown Fritillary	1978	45	51	33	-17	-64**	15
White Admiral	1976	47	421	30	46	-61***	-10
Purple Emperor	1979	44	144	2	55	136**	9
Red Admiral	1976	47	2435	23	-49	264***	109
Painted Lady	1976	47	2195	17	5	98	152
Peacock	1976	47	2413	39	-34	1	-38
Small Tortoiseshell	1976	47	2337	43	-34	-80***	-61
Comma	1976	47	2297	14	42	177***	-10
Marsh Fritillary	1982	41	142	11	82	-58*	-6
Glanville Fritillary	1989	34	11	6	-68	167	2338*
Heath Fritillary	1981	42	36	34	-10	-90***	95
Duke of Burgundy	1979	44	112	20	26	-35*	20
Small Copper	1976	47	2000	45	-31	-37*	13
Brown Hairstreak	1983	40	171	23	-48	-6	32
Purple Hairstreak	1976	47	731	28	2	-26	47
Green Hairstreak	1976	47	729	22	73	-35*	46
White-letter Hairstreak	1976	47	333	30	-4	-76***	78
Black Hairstreak	1995	28	15	5	-31	475**	634
Small Blue	1979	44	335	8	23	-2	107**
Holly Blue	1976	47	2023	14	82	137*	119
Large Blue	1983	40	19	2	70	2215***	225*
Silver-studded Blue	1984	39	123	8	-9	16	117**
Brown Argus	1976	47	1282	25	2	24	-2
Northern Brown Argus	1979	44	49	41	-48	-60***	-16
Common Blue	1976	47	2223	31	20	-17	-27
Adonis Blue	1979	44	211	26	-23	100*	-29
Chalk Hill Blue	1976	47	333	7	-15	3	5

Table 3. SCOTLAND Summary of changes 2022. Summary of species abundance changes in Scotland from 2021 to 2022 and long-term (over the entire time series; no. yrs max = 44) and short-term (last 10-years) changes. Significance of trends: * P < 0.05 (significant). ** P < 0.01 (highly significant). ***P < 0.001 (very highly significant). Red text has been used to highlight those species that had their worst year of the series in 2022, and blue text for those species that had their best year of the series in 2022.

Species	Start Year	No. years with Index in 2022	No. sites monitored in 2022	2022 rank	% change 2021-2022	Series trend (%)	10-year trend (%)
Dingy Skipper	N/A	N/A	3	N/A	N/A	N/A	N/A
Chequered Skipper	2003	20	10	2	-13	92	460**
Small Skipper	N/A	N/A	34	N/A	N/A	N/A	N/A
Large Skipper	N/A	N/A	3	N/A	N/A	N/A	N/A
Orange-tip	1999	24	145	6	17	375***	57
Large White	1979	44	168	19	-11	106*	21
Small White	1979	44	177	14	41	72	18
Green-veined White	1979	44	200	38	-15	-5	-47
Clouded Yellow	N/A	N/A	0	N/A	N/A	N/A	N/A
Wall	1999	24	38	5	-65	786***	375*
Speckled Wood	2001	22	87	1	87	168***	191**
Large Heath	2003	20	20	6	62	-26	-35
Small Heath	1979	44	133	21	-40	145***	46
Mountain Ringlet	N/A	N/A	3	N/A	N/A	N/A	N/A
Scotch Argus	1990	33	24	33	-53	-11	-48*
Ringlet	1996	27	189	6	-2	280***	16
Meadow Brown	1979	44	189	12	0	1	36
Grayling	1990	33	25	26	6	-90***	-38
Pearl-bordered Fritillary	2002	21	16	9	-48	225***	98
Small Pearl-bordered Fritillary	1979	44	58	27	-57	98**	73
Dark Green Fritillary	1979	44	82	22	-26	17	-1
Red Admiral	1980	42	182	9	118	833***	272
Painted Lady	1980	39	145	15	124	141	344
Peacock	1995	28	189	4	52	224***	56
Small Tortoiseshell	1979	44	197	40	-31	-61**	-40
Comma	2006	17	66	12	13	99	-45
Marsh Fritillary	2006	17	41	10	-3	-67	-64*
Small Copper	1979	44	146	42	-38	-46*	-30
Purple Hairstreak	N/A	N/A	4	N/A	N/A	N/A	N/A
Green Hairstreak	1990	33	30	15	3	29	20
Small Blue	N/A	N/A	7	N/A	N/A	N/A	N/A
Holly Blue	N/A	N/A	6	N/A	N/A	N/A	N/A
Northern Brown Argus	1981	42	20	18	-46	41	125*
Common Blue	1979	44	123	33	-50	39	-25

Green-veined Whites. *Photograph by Mark Searle.*

Table 4. WALES Summary of changes 2022. Summary of species abundance changes in Wales from 2021 to 2022 and long-term (over the entire time series; no. yrs max = 46) and short-term (last 10-years) changes. Significance of trends: * P < 0.05 (significant). ** P < 0.01 (highly significant). ***P < 0.001 (very highly significant).

Species	Start Year	No. years with Index in 2022	No. sites monitored in 2022	2022 rank	% change 2021-2022	Series trend (%)	10-year trend (%)
Dingy Skipper	2004	19	26	17	30	-8	-61
Grizzled Skipper	N/A	N/A	3	N/A	N/A	N/A	N/A
Essex Skipper	N/A	N/A	1	N/A	N/A	N/A	N/A
Small Skipper	1984	39	65	36	26	-7	-81***
Large Skipper	1977	46	54	43	-28	-63***	-44
Orange-tip	1978	45	51	8	0	352***	1
Large White	1976	47	79	32	-9	-15	-18
Small White	1976	47	83	16	34	-41*	2
Green-veined White	1976	47	74	25	20	129**	-66*
Clouded Yellow	N/A	N/A	9	N/A	N/A	N/A	N/A
Brimstone	1998	25	40	7	45	48	12
Wall	1976	47	48	35	1	-58***	-47
Speckled Wood	1978	45	78	16	2	237***	-20
Large Heath	N/A	N/A	3	N/A	N/A	N/A	N/A
Small Heath	1976	47	53	42	-41	-5	-30
Ringlet	1983	40	69	14	11	230***	-55***
Meadow Brown	1976	47	84	39	-5	2	-26
Gatekeeper	1978	45	77	26	23	23	-37
Marbled White	N/A	N/A	3	N/A	N/A	N/A	N/A
Grayling	1976	47	32	26	39	-93***	-54
Pearl-bordered Fritillary	1997	26	13	9	7	263**	-44
Small Pearl-bordered Fritillary	1992	31	17	15	-11	-70*	-2
Silver-washed Fritillary	1995	26	22	20	-36	-75	-39*
Dark Green Fritillary	1979	44	37	20	0	-80***	20
High Brown Fritillary	1995	19	9	13	-17	6	-53
Red Admiral	1976	47	80	18	-2	144*	85
Painted Lady	1977	45	71	22	61	35	228
Peacock	1976	47	74	46	-26	-44*	-62*
Small Tortoiseshell	1976	47	81	39	-26	-42	-48
Comma	1992	31	62	18	-19	173**	-15
Marsh Fritillary	1990	33	20	21	-24	-61	-46
Small Copper	1976	47	63	27	2	-46*	-2
Brown Hairstreak	2004	19	15	12	70	-41*	-29
Purple Hairstreak	2002	21	15	18	-39	-57	-48
Green Hairstreak	1993	30	17	2	146	231**	-17
White-letter Hairstreak	N/A	N/A	0	N/A	N/A	N/A	N/A
Small Blue	N/A	N/A	6	N/A	N/A	N/A	N/A
Silver-studded Blue	N/A	N/A	9	N/A	N/A	N/A	N/A
Holly Blue	1999	24	43	10	24	14	150
Brown Argus	1997	26	19	15	-49	53	-14
Common Blue	1976	47	70	32	0	-30	-30

Table 5. NORTHERN IRELAND Summary of changes 2022. Summary of species abundance changes in Northern Ireland from 2021 to 2022 and long-term (over the entire time series; no. yrs max = 18) and short-term (last 10-years) changes. Significance of trends: * P < 0.05 (significant). ** P < 0.01 (highly significant). ***P < 0.001 (very highly significant).

Species	Start Year	No. years with Index in 2022	No. sites monitored in 2022	2022 rank	% change 2021-2022	Series trend (%)	10-year trend (%)
Dingy Skipper	N/A	N/A	2	N/A	N/A	N/A	N/A
Cryptic Wood White	2009	14	16	4	86	25	-18
Orange-tip	2007	16	33	8	67	-7	46
Large White	2006	17	44	16	-56	-58**	-51
Small White	2006	17	42	12	-19	-64**	-12
Green-veined White	2005	18	48	14	-19	-3	-62
Clouded Yellow	N/A	N/A	0	N/A	N/A	N/A	N/A
Wall	N/A	N/A	0	N/A	N/A	N/A	N/A
Speckled Wood	2007	16	47	5	-7	49	22
Large Heath	N/A	N/A	2	N/A	N/A	N/A	N/A
Small Heath	2004	19	21	12	-20	-38	34
Ringlet	2006	17	48	7	31	52	-47*
Meadow Brown	2009	14	48	10	0	-36*	-21
Grayling	N/A	N/A	1	N/A	N/A	N/A	N/A
Silver-washed Fritillary	N/A	N/A	5	N/A	N/A	N/A	N/A
Dark Green Fritillary	N/A	N/A	9	N/A	N/A	N/A	N/A
Red Admiral	N/A	N/A	30	N/A	N/A	N/A	N/A
Painted Lady	N/A	N/A	6	N/A	N/A	N/A	N/A
Peacock	2006	17	45	8	-17	35	215
Small Tortoiseshell	2010	13	47	2	8	74	203
Marsh Fritillary	2004	19	14	12	-33	59	44
Small Copper	2005	18	33	15	-70	-48	57
Purple Hairstreak	N/A	N/A	0	N/A	N/A	N/A	N/A
Green Hairstreak	N/A	N/A	1	N/A	N/A	N/A	N/A
Holly Blue	N/A	N/A	6	N/A	N/A	N/A	N/A
Common Blue	2005	18	26	17	-42	-36	-64*

Dingy Skipper. *Photograph by Mark Searle.*

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The British Trust for Ornithology (BTO) is an independent charitable research institute combining professional and citizen science aimed at using evidence of change in wildlife populations, particularly birds, to inform the public, opinion–formers and environmental policy– and decision–makers.

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to the UK Government and devolved administrations on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity and sustaining natural systems.