United Kingdom
Butterfly Monitoring Scheme

ANNUAL REPORT 2011

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Tracking changes in the abundance of UK butterflies

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Cover photograph of Orange-tip, *Anthocharis cardamines*. During a year in which the majority of butterflies emerged early Orange-tip led the way being recorded over three weeks earlier than the average since 1976 whilst also producing its highest index on record. *Photograph by Peter Eeles.*

This report should be cited as Botham, M.S., Brereton, T.M., Middlebrook, I., Randle, Z. & Roy, D.B. 2013. United Kingdom Butterfly Monitoring Scheme report for 2011. Centre for Ecology & Hydrology.

Butterfly Conservation
Saving butterflies, moths and their habitats

Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

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ACKNOWLEDGEMENTS (back cover)

About the UKBMS

Welcome to the seventh report of the United Kingdom Butterfly Monitoring Scheme (UKBMS).

Changes in the abundance of butterflies throughout the United Kingdom have been monitored using transects since 1976. Over the past 36 years, the huge network of recorders (more than 5,000) has collectively made almost a quarter of a million weekly visits to almost 2,000 different sites, covering over half a million kilometres and counting more than 17 million butterflies.

The UKBMS is based on a well-established and enjoyable recording method and has produced important insights into almost all aspects of butterfly ecology.

Butterflies are uniquely placed amongst British terrestrial insects and other invertebrate groups to act as indicators of the state of the environment, allowing us to assess the impacts of habitat change, climate change and the progress of government policy initiatives such as the UK Post-2010 Biodiversity Framework, National Biodiversity Strategies and Action Plans, agri-environment schemes and the condition of Sites of Special Scientific Interest (SSSIs). Not only are butterflies biologically suitable as indicator species, having rapid lifecycles and, in many cases, high sensitivity to environmental conditions, but the recording and monitoring volunteer networks and datasets built up by Butterfly Conservation (BC) and the Centre for Ecology & Hydrology (CEH) enable accurate assessment of their trends.

The UKBMS is run as a partnership between BC and CEH. The scheme also benefits from the active involvement of the National Trust (NT), the Royal Society for the Protection of Birds (RSPB), the Forestry Commission and several wildlife trusts and local authorities and is funded by a multi-agency consortium (see Acknowledgements on back cover).

UKBMS Objectives

The UKBMS mission is to assess the status and trends of UK butterfly populations for conservation, research and quality of life. The objectives of the scheme are:

- To maintain and develop a network of transect and other monitored sites in order to assess and interpret changes in the abundance and status of UK butterflies.
- To encourage participation in scientific butterfly monitoring by supporting volunteer recording networks.
- To ensure a high level of quality assurance for butterfly monitoring data by development and promotion of standards, and by applying rigorous data validation and verification procedures.
- To secure and manage butterfly monitoring data and provide access to academia, governments, industry and the public.
- To advance knowledge in butterfly ecology through interpretation of butterfly monitoring data.
- To provide scientific underpinning for solutions to butterfly conservation issues arising from habitat and climate change.
- To provide a knowledge base, including indicators of change, for government policies addressing environmental issues.
- To promote public awareness and understanding of butterflies through communication of the results of the scheme.

Further information on the UKBMS can be found at www.ukbms.org

Contacts

For general enquiries:
Ian Middlebrook, Butterfly Conservation, Manor Yard, East Lulworth, Dorset, BH20 5QP.
Tel: 01929 400209
email: **transect@butterfly-conservation.org**

For data requests:
Dr David Roy, CEH, Maclean Building, Benson Lane, Crowmarsh Gifford, Wallingford, Oxfordshire, OX10 8BB.
Tel 01491 692517
email: **ukbms@ceh.ac.uk**

Dr Marc Botham, CEH, Maclean Building, Benson Lane, Crowmarsh Gifford, Wallingford, Oxfordshire, OX10 8BB.
Tel 01491 692517
email: **ukbms@ceh.ac.uk**

Dr Tom Brereton, Butterfly Conservation, Manor Yard, East Lulworth, Dorset, BH20 5QP.
Tel: 01929 400209
email: **tbrereton@butterfly-conservation.org**

Survey methods

In the UKBMS, data on the population status of UK butterflies is derived from a wide-scale programme of site-based monitoring. The majority of sites are monitored by butterfly transects (Pollard & Yates 1993). The transect method, which was established in 1976, involves weekly butterfly counts along fixed routes through the season made under strict weather, recording area and time of day criteria. Weekly counts for each species are summed to generate annual abundance indices. For sites with missing weekly counts, a statistical model (a Generalised Additive Model, 'GAM') is used to impute the missing values and to calculate the index (Rothery & Roy 2001). For a number of specialist species (especially the fritillaries) two 'reduced effort' scientific methods, adult timed counts (Warren et al. 1981) and larval web counts (Lewis & Hurford 1997), are also used to monitor annual abundance, especially in more remote parts of the UK. In both methods, systematic recording is made on single days in suitable weather (when UKBMS recording criteria are met), with the counts converted to a robust index that accounts for both the size of the colony and the time in the season when the count was made.

Data from all past and present transects and timed counts/larval webs at monitored sites are combined each year to derive regional and national 'Collated' Indices (CI) and to estimate trends over time. Because not all sites are monitored each year, a statistical model (log-linear regression) is needed to estimate missing values and to produce indices and trends. The model takes into account the fact that, for a particular butterfly species, some years are better than others (a year effect), typically due to the weather, and some sites support larger populations than others (a site effect). The precision of indices and trends is estimated by a further statistical technique called 'bootstrapping'.

This is now the seventh year that data from a combined UKBMS dataset have been used to calculate trends in butterfly populations. In 2011 the number of UKBMS sites on which butterfly numbers were recorded was more than 1,000 for the third year running (966 transects and 127 larval web/timed counts). Figure 1 shows the UK coverage of these sites in 2011, once again demonstrating the immense commitment by volunteers. This enabled Collated Indices to be calculated for 56 of the 59 regular species of butterfly in the UK. This includes two species more than 2010, following the inclusion of Swallowtail and Glanville Fritillary which produced indices on five or more sites in 2011. In addition, for the first time we provide species accounts for all species recorded on UKBMS sites in 2011, including some of our rarer species for which statistical analyses are not yet possible. As in previous years, trends were assessed for a number of canopy species, Purple, White-letter and Brown Hairstreaks and the Purple Emperor, even though transects are generally not considered the ideal monitoring method for them. However, they are included because 'extreme' high or low years in the abundance of these species can be determined from transect monitoring and because there are a small number of transects and timed counts directed specifically towards some of these species.

The Collated Index for each species is updated each year with the inclusion of additional monitoring data and therefore indices may differ to those presented in earlier reports. Similarly, the rank order used to show those years in which butterflies fared better or worse compared to other years, may be modified by these additional data (see Table 1). As in recent reports, we have produced a combined single index for all sites for each species rather than separate indices for double-brooded species. We are currently working on new analytical techniques that will enable us to calculate separate indices for those species with more than one brood in a year and aim to present indices for different broods in the future.

Summary

HIGHLIGHTS

- For a third year in a row more than a thousand sites were monitored with the number of standard transects alone approaching one thousand. Trends were assessed for 56 of the 59 regularly occurring UK species, which is two more than ever before and includes two of our rarer butterflies: Swallowtail and Glanville Fritillary.
- 2011 was a record breaking year for butterflies being on the wing early as a result of the exceptionally warm spring, with 22 species showing their earliest mean emergence dates* since monitoring began in 1976. Several species including Orange-tip and Green Hairstreak were on the wing up to three weeks earlier on average than in 2010. A further 10 species recorded their second earliest mean emergence dates*.
- Spring species had a superb year with Orange-tip having its best year on record and a number of threatened species showing large annual increases: Pearl-bordered Fritillary and Duke of Burgundy did particularly well with abundance up by more than 50% over 2010.
- After a superb start the season repeated the pattern of 2007-2010 and fell away with cool and wet summer weather resulting in the majority of later summer species having a poor year. As a result, it was a distinctly average year overall, ranking 18 in the 36–year series.
- A number of species that had a superb year in 2010 showed large annual declines, including Marsh Fritillary, Wood White, Common Blue and Brown Argus.
- Of most concern, was the annual decrease of several species in long-term decline. Both Small Tortoiseshell and High Brown Fritillary produced their fourth lowest indices of the series.

*mean emergence dates were calculated as the mean of the first records across all sites a species was recorded at for each year

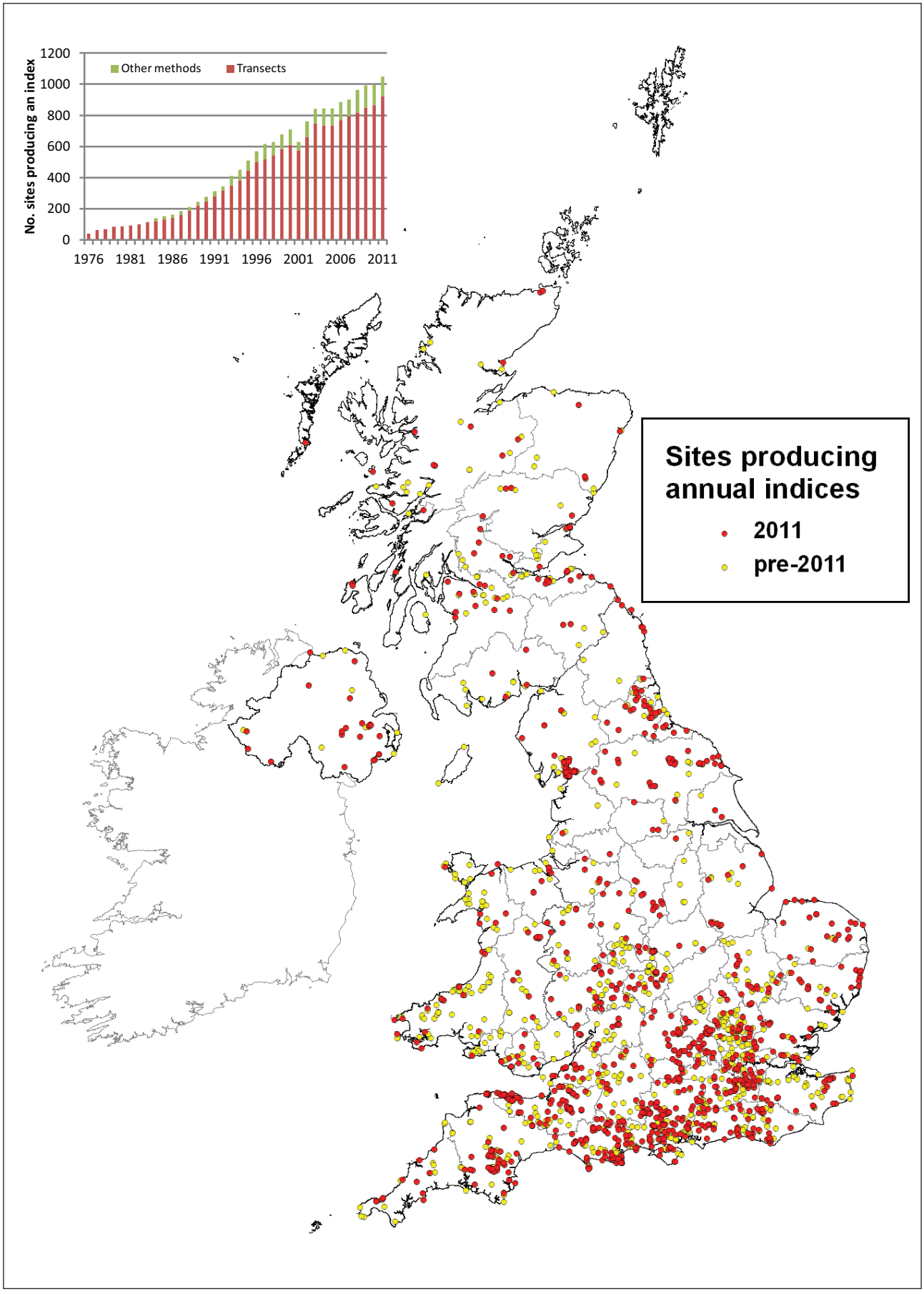


Figure 1. Location of UKBMS sites

January received above average sunshine and below average rainfall over the month. Following the coldest December in more than 100 years temperatures were closer to average, though a warm maximum of 14.5˚C was recorded at Pershore College (Worcestershire) on the 13th. Six species made an appearance, with Red Admiral being the first, welcoming in the new year in Cornwall on the 1st. Brimstone (Wiltshire) and Peacock (Isles of Scilly) followed a week later on the 8th and 9th respectively, which were then followed by Small Tortoiseshell on the 18th, in three different counties (Cornwall, Dorset and Yorkshire) and Comma on the 19th (Yorkshire). Back down in Cornwall on the 20th, assuming the Red Admiral on the 1st was probably an individual that overwintered in the UK, the first migrant butterfly was recorded – Painted Lady.

Mild weather was a feature of **February** with the mean temperature across the UK 2˚C above average and a maximum of 16˚C recorded at Edenbridge (Kent) on the 24th. However, the weather was unsettled with spells of rain and cloud. Only one new species was recorded in February, Speckled Wood on the 13th (Isles of Scilly). **March** saw more settled weather arrive, and above average temperature across the UK, with a maximum of 20˚C on the 25th at Saunton Sands (Devon). It was also a very dry month across much of the UK, with East Anglia recording the second driest March since 1910 and eastern England recording less than 20% of the normal rainfall for March. A further nine species emerged throughout the month, including Orange-tip, Small, Large and Green-veined White, Green Hairstreak, Small Copper, Holly Blue and Wall. The first Clouded Yellow of the year was also amongst these, recorded in Devon on the 26th, the observation likely related to successful overwintering.

April brought more fine weather with temperatures nearly four degrees above the 1971-2000 average, making it the hottest April since records began. Central England clocked the warmest April in more than 350 years and daily maximum temperatures in south-east England were up to 6˚C greater than the series average, with the highest temperature of 27.8˚C recorded at Wisley (Surrey) on the 23rd. Most of the UK was dry with less than 10% of the normal rainfall for April and there was plenty of sunshine. With great weather, it was not surprising that both butterfly abundance and diversity were well above average (Figure 2). A number of species including Green Hairstreak, Orange-tip and Grizzled and Dingy Skippers were recorded earlier on transects than ever before. Across the month 30 species were recorded on transects – five more than in 2010. The fabulous weather continued into **May** in south-east England but things started to change elsewhere and May was generally a much more variable month with less

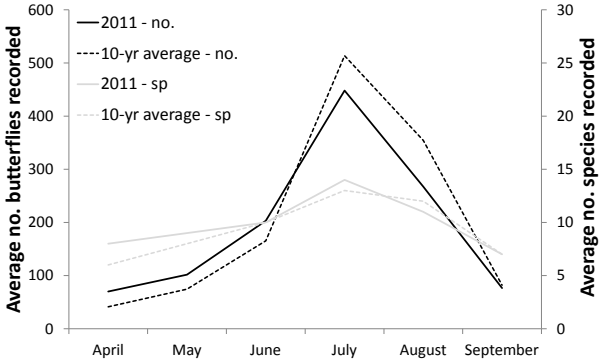


Figure 2. The average number of butterflies (on the left axis and denoted by black solid and dashed lines) and average number of species (on the right hand axis and denoted by grey solid and dashed lines) on transects each month in 2011 and averaged across the last 10 years.

sunshine and a lot more cloud. Whilst it was dry and hot in East Anglia and one of the driest years on record in Essex and Kent, Scotland endured the wettest May on record. The maximum temperature of 25.4˚C was recorded in Weybourne (Norfolk) on the 7th. Overall it was a good month, with butterfly abundance and diversity both higher than the May average over the last 10 years.

The warm spell continued into **June**, though it became much more unsettled with drought-ridden eastern England getting some much needed rain. Temperatures were close to the long-term (since 1910) average, though it was the coolest June in more than 10 years. Butterfly abundance was up slightly over the 10-year average (Figure 2). The highest June temperature, and in fact the highest temperature of 2011, was recorded towards the month end in Gravesend (Kent) with a scorching 33.1˚C. Things were shaping up to be one of the best years on record, and still seemed promising as **July** started with generally fine, warm weather. However, patterns of the previous few years were repeated and the weather became unsettled, with a low pressure front driving prolonged and sometimes heavy periods of rainfall. Mean temperatures were a degree cooler than the average, making it the coolest July since 2000. The maximum temperature of 27.4˚C at Hartpury College (Gloucestershire) was considerably lower than that achieved in June. So, once again, the weather became unfavourable at the peak time for butterflies in the UK. This was clearly evident as the number of butterflies recorded which, up until July, had been above the average over the last 10 years, reversed substantially, although the number of species recorded on transects was still greater than the average for July, because so many species had emerged earlier than usual with the preceding warm spring/earl summer weather (Figure 2).

Although temperatures briefly breached the thirties with a maximum of 30.3˚C at Gravesend (Kent) on the 3rd, **August** was generally a cool month with disappointing amounts of sunshine (only 75% of the normal amount at this time of year). It was especially cool across Scotland and Northern Ireland (coolest since August 1993). Rainfall levels were highly variable across the UK, with over twice the average amount in certain areas (eastern Scotland, north-east England, central southern England), and less rain than normal in other areas (Wales, west Midlands). The butterfly season, which had promised to be one of the best on record, had truly turned by this point and both the number of butterflies and number of species recorded on transects were well below the 10-year average.

It remained unsettled in the first three weeks of **September**, then, in the last week, unseasonably high temperatures were recorded including a monthly maximum of 29.2˚C at Cambridge (Cambridgeshire) and Sutton Bonington (Nottinghamshire) on the 30th. Butterfly numbers on monitored sites picked up as a consequence, and were close to the 10-year average (Figure 2). These unseasonal temperatures continued into **October** with the average temperature up by 2˚C. A maximum temperature of 29.9˚C at Gravesend (Kent) was the highest UK October temperature ever recorded. However, not all of the UK was blessed with these conditions: whilst rainfall was below average and sunshine above average over East Anglia and south-east England, the reverse was true for Northern Ireland and western Scotland, the former recording the dullest October on record. The balmy, mild weather stayed with us in **November**, with temperatures almost 3˚C above the 1971-2000 average making it the second warmest November in a hundred years. A maximum temperature of 19.2˚C was recorded on the 13th at Tregarth (Gwynedd) and northern Scotland endured the sunniest November on record. The year ended with another mild month, **December** 2011 being 0.6˚C above the 1971-2000 average and the mildest since 2006 with a maximum of 15.5˚C recorded at Fyvie Castle (Aberdeenshire) on the 26th. Unlike the previous two years where the year ended with cold, dry wintry conditions, 2011 was characterised by rainfall – it rained on most days, with more than 75% the normal amount. In western and northern Scotland it was one of the wettest Decembers on record. There was limited snowfall and few frosts. The last two years' cold and dry Decembers resulted in good numbers of spring butterflies, as we had expected, given these are the conditions widely regarded as beneficial to the overwintering survival of many UK butterfly species. 2011 was a stark contrast and we will have to wait to see what impact these conditions have on butterfly numbers in 2012. Certainly a number of plants and moths were affected by the warm year-end, with spring flowers popping up in late autumn and spring moths being seen around Christmas time.

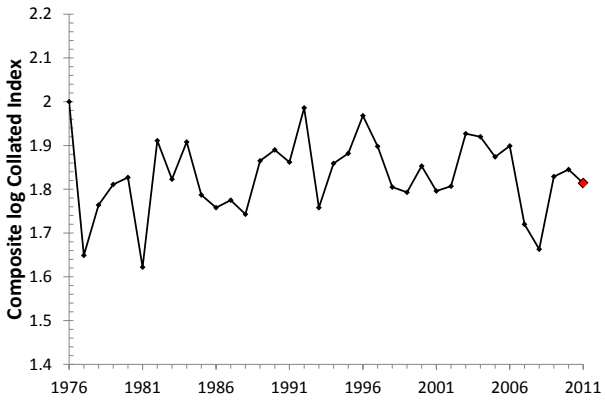


Figure 3. The combined Collated Index across all species for each year of monitoring. 2010 is highlighted in red.

2011 overall was a particularly average year (Figure 3) ranking 18th in the 36-year series (Table 1) with the total number of butterflies counted lower than in the last two years.

Table 1. UKBMS years ranked according to how good each year was relative to the others (1 = best, 36 = worst).

Year	Rank	Year	Rank
1976	5	**1994**	19
1977	35	**1995**	7
1978	28	**1996**	4
1979	17	**1997**	2
1980	23	**1998**	24
1981	36	**1999**	29
1982	6	**2000**	20
1983	16	**2001**	32
1984	3	**2002**	30
1985	21	**2003**	10
1986	26	**2004**	8
1987	25	**2005**	9
1988	31	**2006**	14
1989	15	**2007**	33
1990	11	**2008**	34
1991	12	**2009**	22
1992	1	**2010**	13
1993	27	**2011**	18

Despite the fantastic start for some of our threatened specialist butterflies in the spring and early summer, the composite measurement of habitat specialist species abundance was 11% lower than in 2010, ending a short run of two successive annual increases (Figure 4). Despite this small decline, numbers of habitat specialists overall were still pretty good and the long-

term trend of decline is now classed as stable. The results indicate that targeted conservation work has now halted the overall decline of specialist species, though problems still remain for individual species. Wider countryside species, which until recently had been faring rather better than habitat specialists, declined again with the 2011 index down by 9%. Given that a large number of our wider countryside species fly during July and August, when they can be extremely abundant in good years (for example Meadow Brown, Gatekeeper and Small Skipper), this is not so surprising. However, it further highlights the need to keep an eye on those species we pay less attention to because they are generally considered common and widespread. Although it was not a fantastic year for migrant butterflies, abundance was up 39% over 2010. However, the composite index was still below average, with the group of butterflies showing a significant long-term increase since 1976 (Figure 4). Painted Lady and Clouded Yellow numbers were still low after a slight increase over 2010, whilst Red Admiral had a good year with large numbers being recorded towards the tail end of the season.

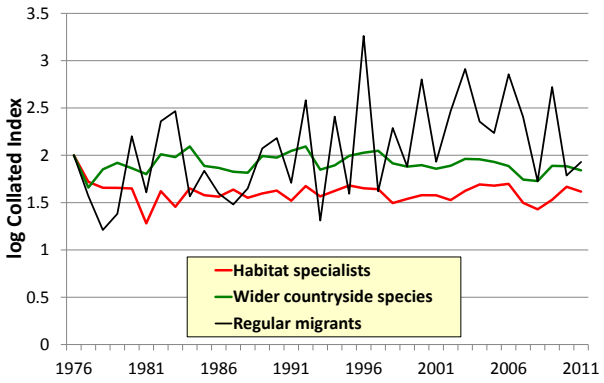


Figure 4. The Composite Collated Index for habitat specialists (n=28), wider countryside species (n=25) and regular migrants (n=3).

With the inclusion of Swallowtail and Glanville Fritillary (Appendix I) we are able to report on 23 Biodiversity Action Plan# (BAP) priority species. Of these, 13 species increased between 2010 and 2011 whilst 10 declined, with a higher proportion of increasing species representing a reversal of fortunes. Priority species have significantly declined since 1976, by almost 50%, so year on year increases in both 2010 and 2011 are welcome. As mentioned, a number of the spring and early summer species, such as Pearl-bordered Fritillary and Duke of Burgundy, did well but this was counterbalanced by those flying later in the year, such as Brown Hairstreak and White Admiral, which were badly affected by the poor weather.

The 'UK Post-2010 Biodiversity Framework' succeeded UK BAP in July 2012.

Phenology 2011

Here we give a brief summary of butterfly phenology in 2011 using the weighted mean date of counts as a standardised measure (Botham et al 2008). Individual species phenologies are presented in the species accounts.

In 2010 the cool spring weather caused a number of species that have been showing advances in their flight period over the long-term (e.g. Orange-tip and Green Hairstreak) to come out relatively late. 2011 started rather differently however, with unseasonably warm weather which caused many species to emerge early, especially in comparison to 2010. For example, Orange-tip and Green Hairstreak were recorded around three weeks earlier than in 2010. All but four species peaked earlier in their date of mean abundance than the average since 1976. These advances were greater the earlier a species flies in the year (Figure 5). As the weather took a turn for the worse in mid-late summer, those species emerging at this time of year showed only small advances or in fact came out a little later – Chalkhill Blue being the most extreme example, being almost two weeks later than average.

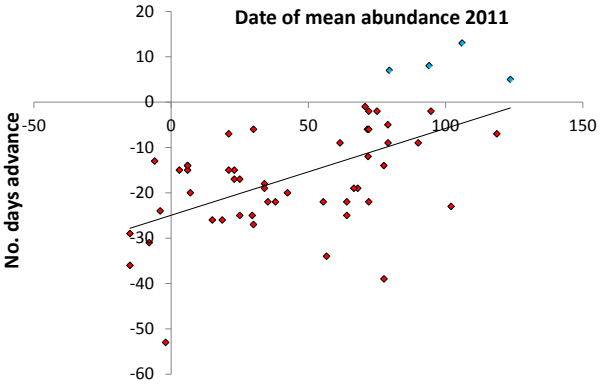


Figure 5. The advance in flight periods in 2011 measured as the difference between the earliest date of mean abundance in 2011 and the average earliest date of mean abundance for the series (1976-2011). Negative values represent advances (red points) whereas positive values show a delay in the flight period (blue points).

As one might expect, the stage at which a butterfly overwinters affects its phenological response. Those species that spend winter in the adult stage (n = 4) showed the largest advances, being able to take advantage of any warm weather by emerging from overwintering without any development required (Figure 6). The next greatest advances were shown by those species that overwinter in the pupal stage (n = 10), with no difference between species overwintering in larval (n = 30) or egg (n = 9) stages for which the smallest advances were shown. Although one might expect that warmer temperatures should advance the

development of the larvae and allow them to feed earlier in the year, many of these species will have been in the pupal stage when the weather became cooler. In addition, it was a cold winter, which will have prevented overwintering larvae from feeding during the winter months as they can do if it becomes mild enough. Cold winters are unlikely to have such pronounced effects on pupal development in this way.

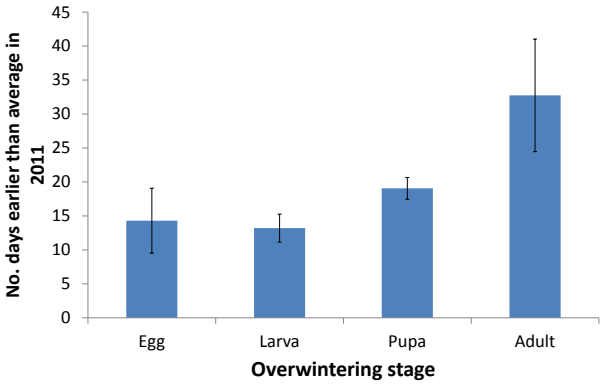


Figure 6. Themean (+/- standard error) number of days earlier species' flight periods were in 2011 compared to the series (1976-2011) average, grouped by the overwintering stage of individual species.

There seemed to be no phenological differences between butterflies based on adult size, with smaller species showing similar advances to larger species. However, those species that feed on grasses (n = 15) showed the smallest advances with species feeding on herbaceous forbs (n = 31) showing the greatest advances and species feeding on woody plants and trees (n = 7) intermediate between the two (Figure 7). Whilst the majority of grass feeders are mid-late summer species (the browns and the golden skippers) and therefore we might expect to see them showing the smallest advances, there are some that appear earlier in the year such as Speckled Wood and Wall Brown and equally there are a number of species that fly later in the year that feed on woody and herbaceous plants, including the second generations of a number of species.

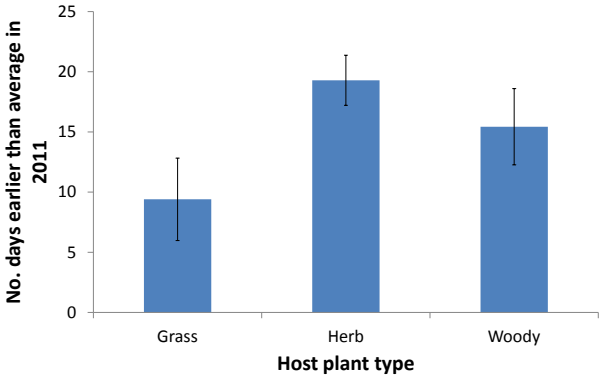


Figure 7. The mean (+/- standard error) number of days earlier species' flight periods were in 2011 compared to the series (1976-2011) average, grouped by the type of larval host plant of individual species.

Table 2a. Summary of species abundance changes in the UK from 2010 to 2011 and long-term (over the entire time series; no. yrs max = 36) 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 2011, and blue text for those species that had their best year of the series in 2011.

SPECIES	Start Year	No. sites with Index in 2011	No. years with Index in 2011	2011 rank	% change 2010-2011	Series trend	10-year trend
Small Skipper	1976	517	36	34	-3	-70***	-66**
Essex Skipper	1977	286	35	33	10	-56	-92**
Lulworth Skipper	1992	12	20	17	84	-87***	-92***
Silver-spotted Skipper	1979	32	33	9	-13	>1,000***	-19
Large Skipper	1976	576	36	16	-3	-14	3
Dingy Skipper	1976	281	36	4	26	-31*	31
Grizzled Skipper	1976	232	36	4	96	-34	23
Swallowtail	1976	5	32	2	41	95*	18
Wood White	1979	52	33	18	-41	-83**	-55
Clouded Yellow	1979	319	33	20	41	580	-97*
Brimstone	1976	546	36	15	7	16	-5
Large White	1976	619	36	30	-19	-26	8
Small White	1976	613	36	21	-4	-17	-14
Green-veined White	1976	609	36	11	-5	-1	20
Orange-tip	1976	666	36	1	32	17	36
Green Hairstreak	1976	315	36	11	20	-34*	-15
Brown Hairstreak	1983	50	29	26	-27	12	-50
Purple Hairstreak	1976	266	36	15	-7	-3	-15
White-letter Hairstreak	1976	124	36	31	-16	-82***	-22
Black Hairstreak	1995	10	16	7	-65	85	319
Small Copper	1976	547	36	17	-19	-19	30
Small Blue	1978	137	34	6	26	24	83
Silver-studded Blue	1979	55	33	11	4	17	-15
Brown Argus	1976	365	36	9	-31	26	44
Northern Brown Argus	1979	34	33	23	21	-58*	-20
Common Blue	1976	578	36	21	-59	-1	-11
Chalkhill Blue	1976	153	36	11	-17	14	15
Adonis Blue	1979	81	33	14	-50	167*	-1
Holly Blue	1976	563	36	16	-5	157	-28
Large Blue	1983	21	29	7	-21	>1,000***	-7
Duke of Burgundy	1979	93	32	24	65	-44*	-51
White Admiral	1976	179	36	28	-51	-52**	21
Purple Emperor	1979	57	33	23	-50	48	-24
Red Admiral	1976	612	36	5	123	326***	-13
Painted Lady	1976	472	36	29	-16	341	-84
Small Tortoiseshell	1976	605	36	33	-22	-69**	-75*
Peacock	1976	657	36	33	-35	29	-17
Comma	1976	582	36	16	-22	296***	-6
Small Pearl-bordered Fritillary	1976	109	36	13	17	-56***	40
Pearl-bordered Fritillary	1976	99	36	8	103	-72***	-11
High Brown Fritillary	1978	68	34	31	0	-50	-64*
Dark Green Fritillary	1976	264	36	2	23	149**	88
Silver-washed Fritillary	1976	325	36	4	-31	116**	80
Marsh Fritillary	1981	87	31	18	-67	42	42
Glanville Fritillary	1992	11	20	2	129	-35	>1,000***
Heath Fritillary	1981	32	31	29	-5	-78***	-72**
Speckled Wood	1976	586	36	4	12	145***	12
Wall Brown	1976	289	36	35	-20	-83***	-62**
Scotch Argus	1979	9	33	14	10	136*	-44
Marbled White	1976	391	36	20	18	53	-16
Grayling	1976	134	36	28	-38	-59***	43
Gatekeeper	1976	587	36	33	-13	-30	-46*
Meadow Brown	1976	638	36	26	28	4	-30
Small Heath	1976	479	36	17	5	-55**	7
Large Heath	1990	11	22	1	12	362***	130
Ringlet	1976	633	36	4	-13	334***	38

Table 2b. Summary of species abundance changes for England, Scotland and Wales (where calculable) from 2010 to 2011 and long-term (over the entire time series; no. yrs max = 36 for England and Wales, 33 for Scotland) 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). *Note: some country-level changes are based on relatively small sample sizes and thus should be interpreted with caution.*

	No. sites used for trend			% Change in Collated Index 2010-2011			SERIES TREND			10-YEAR TREND		
SPECIES	Eng	Scot	Wales	Eng	Scot	Wales	Eng	Scot	Wales	Eng	Scot	Wales
Small Skipper	502	-	14	0	-	-20	-71***	-	-27	-67**	-	-30
Essex Skipper	286	-	-	10	-	-	-56	-	-	-92**	-	-
Lulworth Skipper	12	-	-	84	-	-	-87***	-	-	-92***	-	-
Silver-spotted Skipper	32	-	-	-13	-	-	>1,000***	-	-	-19	-	-
Large Skipper	561	-	13	-4	-	-9	-10	-	-66***	2	-	-19
Dingy Skipper	276	-	4	26	-	-	-26	-	-	33	-	-
Grizzled Skipper	231	-	-	96	-	-	-35*	-	-	23	-	-
Swallowtail	5	-	-	41	-	-	95*	-	-	18	-	-
Wood White	50	-	-	-26	-	-	-82**	-	-	-53	-	-
Clouded Yellow	309	-	5	31	-	-	610	-	-98	-97*	-	-100
Brimstone	542	-	-	4	-	-	16	-	51	-6	-	-
Large White	578	15	15	-17	-54	-36	-25	114	-22	7	-16	22
Small White	579	13	13	-2	-80	-72	-13	6	-69***	-15	-49	-17
Green-veined White	571	16	15	0	-24	-43	-4	-4	102	17	11	261*
Orange-tip	630	17	13	35	58	32	6	500***	367**	27	410***	94*
Green Hairstreak	304	6	-	21	32	-	-39	91**	-	11	74	-
Brown Hairstreak	49	-	-	-27	-	-	12	-	-	-49	-	-
Purple Hairstreak	259	-	-	-7	-	-	-6	-	-	-16	-	-
White-letter Hairstreak	122	-	-	-14	-	-	-82**	-	-	-29	-	-
Black Hairstreak	10	-	-	-65	-	-	85	-	-	319	-	-
Small Copper	517	12	10	-24	35	-5	-12	-23	-41	30	267	40
Small Blue	137	-	-	26	-	-	25	-	-	84	-	-
Silver-studded Blue	52	-	-	3	-	-	-23	-	-	-28	-	-
Brown Argus	359	-	-	-31	-	-	30	-	-	44	-	-
Northern Brown Argus	30	-	-	20	-	-	-71***	-	-	-20	-100	-
Common Blue	541	18	10	-60	15	-18	0	26	33	-11	-22	38
Chalkhill Blue	153	-	-	-17	-	-	14	-	-	15	-	-
Adonis Blue	81	-	-	-50	-	-	167*	-	-	-1	-	-
Holly Blue	551	-	7	-7	-	24	168	-	-13	-27	-	27
Large Blue	21	-	-	-21	-	-	>1,000***	-	-	-7	-	-
Duke of Burgundy	93	-	-	65	-	-	-44*	-	-	-51	-	-
White Admiral	179	-	-	-51	-	-	-52**	-	-	21	-	-
Purple Emperor	57	-	-	-50	-	-	48	-	-	-24	-	-
Red Admiral	568	22	14	131	62	-13	334***	>1,000*	214**	-16	-20	10
Painted Lady	450	11	7	-14	-52	-62	360	-41	23	-84	-73	-87
Small Tortoiseshell	557	25	12	-24	-28	15	-70**	-44	-29	-76*	-17	-50
Peacock	611	22	16	-35	-24	-35	31	338**	-25	-17	94	-22
Comma	563	6	10	-22	32	-47	299***	-2	61	-6	-2	154
Small Pearl-bordered Fritillary	90	13	6	29	-65	17	-33	-33	-29	40	-19	80*
Pearl-bordered Fritillary	86	2	11	130	48	23	-51*	33	86	-21	33	9
High Brown Fritillary	59	-	9	0	-	-	-51	-	-	-65*	-	-
Dark Green Fritillary	231	20	11	20	7	32	355***	-36	-84***	70	176***	56
Silver-washed Fritillary	315	-	6	-29	-	-	131***	-	-	77	-	-
Marsh Fritillary	74	-	-	-69	-	-	-58	-	-83**	40	-	-
Glanville Fritillary	6	-	-	128	-	-	-33	-	-	>1,000**	-	-
Heath Fritillary	32	-	-	-5	-	-	-78***	-	-	-72**	-	-
Speckled Wood	559	7	10	12	15	-34	145***	25	170***	12	46	12
Wall Brown	274	-	11	-11	-	-64*	-85***	-	-62**	-63*	-	-52
Scotch Argus	-	5	-	-	11	-	-	21	-	-	-37	-
Marbled White	389	-	-	21	-	-	51	-	-	-17	-	-
Grayling	115	7	7	-36	-47	0	-37*	-64**	-90***	44	-38	184*
Gatekeeper	568	-	13	-13	-	-36	-35*	-	100**	-46*	-	-24
Meadow Brown	588	25	14	31	-34	24	4	19	44	-29	-50	-8
Small Heath	434	25	11	8	-33	-9	-60***	160**	23	4	63	23
Large Heath	-	6	-	-	-51	-	-	-	-	-	-	-
Ringlet	584	28	15	-13	-17	2	341***	71	197***	41	-10	63

Family overview

For each family of butterflies we provide brief descriptions of trends from composite analyses. These composite analyses exclude migrants and rare species with insufficient data.

Skippers (*Hesperiidae*)
Skippers had a good year, with a 23% increase over 2010 in the combined index for this group. Four of the seven species showed annual increases. However, in the last 10 years there have been significant declines in a number of species and the short-term trend for this group is of a significant decline of almost 60%. Much of this recent decline is attributable to the declines observed in the 'golden' skippers.

Swallowtails (*Papilionidae*)
There is only one representative species, the **Swallowtail**, in this group found on monitored sites, for which details are provided in the species account. Most of the data is for the resident subspecies *Papilio machaon britannicus*, but there are occasional records of migrant individuals on monitored sites away from the resident East Anglian populations, presumed to be the continental form (*P.m.gorganus*).

Whites (*Pieridae*)
Despite a superb year for **Orange-tip**, the whites as a group had a below average year, with the combined index 8% lower than in 2010. Four species showed annual declines, including the three commonest UK species, Large, Small and Green-veined Whites. The long-term trend for this group is classed as stable.

Blues, Coppers and Hairstreaks (*Lycaenidae*)
It was a mixed, but generally poor year for this group with abundance reduced by about a fifth from 2010. The combined long-term trend for this group is classed as stable. Overall they declined by 21% in 2011 compared to 2010. The decline was attributable to the grassland blues which had a great year in 2010 and inevitably produced lower indices in 2011 given the poor late summer weather. The hairstreaks also fared rather poorly with the exception of **Green Hairstreak**, notably the only early flying member of this family.

Metalmarks (*Riodinidae*)
The metalmarks are represented by just one species in the UK, the **Duke of Burgundy**. This is one of our rarer butterflies and has declined significantly since monitoring began in 1976. It recovered somewhat in 2011.

Vanessids, Emperors and Admirals (*Nymphalidae*)
The five resident Vanessids had a particularly poor year in 2011, with all species showing annual declines and the grouped measure of abundance down by over a third. However the long-term trend for this group is classed as stable. It was a mixed year for migrant species - Painted Lady declined and had a below average year, whilst Red Admiral showed a large increase and produced its fifth best year on record.

Fritillaries (*Nymphalidae*)
The fritillaries had a mixed year in 2011 with four species having a good year (particularly **Pearl-bordered** and **Glanville Fritillaries**), one species showing no annual change, and three species showing declines from 2010 levels. Over the long-term, this group of butterflies has declined significantly by a third since 1976, but, thanks to conservation management at a number of sites throughout the UK, it has stabilised over the last 10 years, even showing a small increase (18%). Some species still remain rare and are of high conservation concern.

Browns (*Satyridae*)
This group of butterflies (10 species) consists of a number of our most abundant species which characterise mid-late summer transects. Populations of such species have tended to remain relatively stable, with the exception of **Small Heath**, whilst there are contrasting fortunes for a number of other browns such as the **Speckled Wood** which has shown a significant increase, and the **Wall Brown** which has significantly declined. Overall the group had a very average year in 2011, showing a small decline of 2% over 2010 with six species showing annual increases and four species showing annual declines. The long-term and 10-year trends for the browns as a group are both classed as stable, showing little or no overall change. Although the majority of UK butterflies had mean flight dates advanced by a week or more in 2011, six of the nine browns assessed had mean dates within a week of the series average.

Bure Marshes – one of the top transect sites for the Swallowtail with records going back to the beginning of monitoring in 1976. Photo by Alan Dawson

Species accounts

In the following species accounts we present a summary of how each species fared on UKBMS sites in 2011. For species with insufficient data we briefly describe patterns on their main sites. The mean flight date is calculated as the weighted mean date of counts as described in the phenology article in the 2008 UKBMS annual report (Botham et al. 2008). This is highly correlated to both first appearance and the peak flight date. A Collated Index plot is included for each species. Horizontal dashed lines show the average index value for the series. Red lines show significant negative long-term trends, and blue lines show significant positive long-term trends (see Table 2a for trend details). Where neither of these lines are present the long-term trend is not statistically significant. The shaded area highlights the last ten years of indices, with the trends presented in Table 2a. Country level statistics are presented for each species, where this is calculable (Table 2b).

denotes that the species is listed on the recent Butterfly Red List for Great Britain (Fox et al 2011) under one of the following categories: Critically Endangered, Endangered, Vulnerable or Near Threatened.

denotes that the species was listed as a UK BAP priority species between 1992 and 2012 (http://www.ukbap.org.uk)

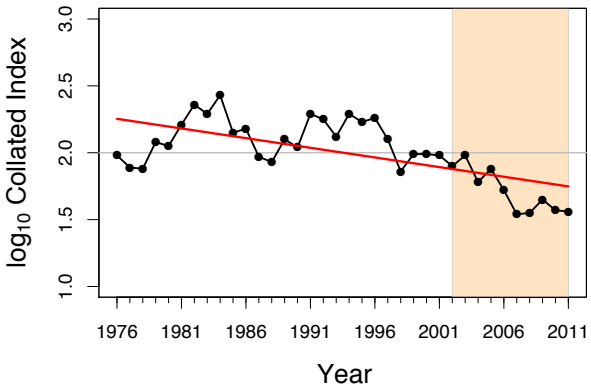
Chequered Skipper. *Photo by Chris Barlow'*

Chequered Skipper (*Carterocephalus palaemon*)

Chequered Skipper produced an annual index on just a single site in 2011, Glasdrum in Strathclyde. It has been recorded at this site for nine years during which there has been a very small and non-significant decline in abundance and the population is classed as stable. Like other species flying early in the year, Chequered Skipper was out almost a week earlier than the average across all years it has been recorded at Glasdrum, with a mean flight date of 26th May.

Small Skipper (*Thymelicus sylvestris*)			
No. years with Collated Index:	**36**	2011 Rank:	**34**
Change in Collated Index 2010-11 (%):	**-3**	Long-term trend (%):	**-71*** **
Mean flight date 2011:	**12-July**	Series mean flight date:	**20-July**

Collated Index plot:

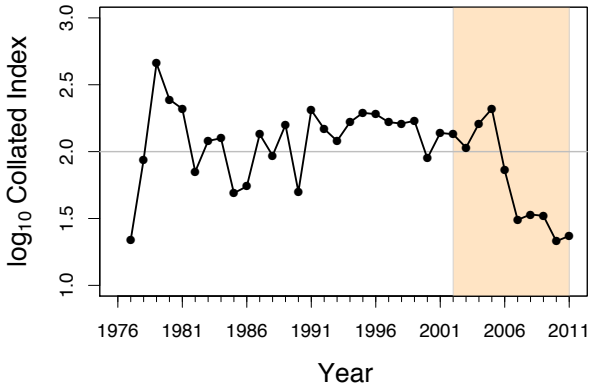


The Small Skipper remains at a low ebb with 2011 the third worst year on record. The Collated Index has been below average each year since 1997, whilst abundance has dropped by more than 70% since 1976. The largest annual index of 311 was recorded at Botley Wood in Hampshire. Almost 50% of the top ten transect counts came from Hampshire with Southwood Meadows topping the list on 2nd July with 94.

The mean flight date was the same as in 2010, being eight days earlier than the series average.

Essex Skipper (*Thymelicus lineola*)			
No. years with Collated Index:	**35**	2011 Rank:	**33**
Change in Collated Index 2010-11 (%):	**10**	Long-term trend (%):	**-56**
Mean flight date 2011:	**14-July**	Series mean flight date:	**24-July**

Collated Index plot:



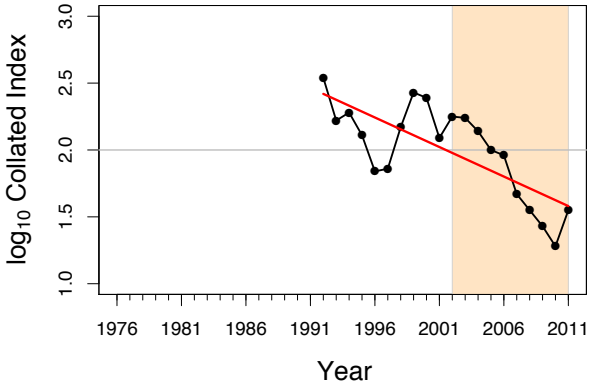
The Essex Skipper has been in progressive decline since the mid-2000s, with 2011 producing the second worst index of the series. There were few three-figure indices, the largest being 142 at Little Wittenham, Hill Farm in Oxfordshire and 131 at Pilot Hill in Hampshire.

Although very similar in appearance to the Small Skipper, the Essex Skipper overwinters as an egg rather than a larva, and perhaps this has something to do with why the two species had different fortunes in 2011?

Essex Skipper. *Photo by Guy Freeman*

Lulworth Skipper (*Thymelicus acteon*)			
No. years with Collated Index:	**20**	2011 Rank:	**17**
Change in Collated Index 2010-11 (%):	**84**	Long-term trend (%):	**-87*** **
Mean flight date 2011:	**18-July**	Series mean flight date:	**28-July**

Collated Index plot:

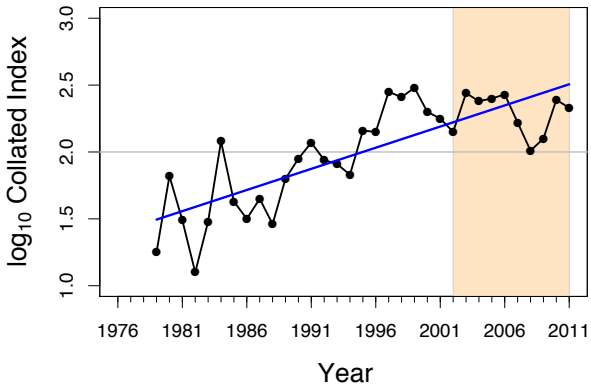


The rarest of our golden skippers, the Lulworth Skipper has declined significantly by a shocking 87% since the start of monitoring. Having produced its lowest index for four years in a row in 2010, it was good to see some recovery in 2011, although numbers were still well below average and this remains a species of conservation concern. A repeat survey of sites is currently being undertaken to investigate the scale of the decline and possible causes.

The highest site index (and the only one in three figures) of 266 was recorded at Durlston Country Park West in Dorset. The maximum count (again at Durlston) was 63 on 1st August. The hot spring weather had a great impact on this species with the average mean flight date 10 days earlier than the series average.

Silver-spotted Skipper (*Hesperia comma*)			
No. years with Collated Index:	**33**	2011 Rank:	**9**
Change in Collated Index 2010-11 (%):	**-13**	Long-term trend (%):	**>1000*** **
Mean flight date 2011:	**16-Aug**	Series mean flight date:	**15-Aug**

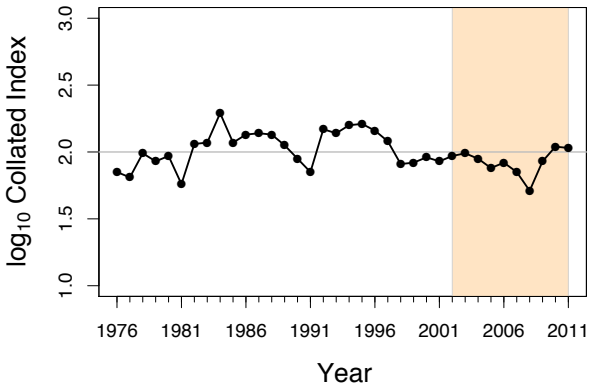
Collated Index plot:



Although there was a modest drop in numbers, 2011 was still well above average for Silver-spotted Skipper. This butterfly has been doing extremely well since the mid 1990s, with abundance over the series up by more than 1,000%. Four sites recorded three-figure indices, the maximum being 303 at Malling Down in East Sussex. This site also recorded the largest day count of 109 on 5th August.

Large Skipper (*Ochlodes sylvanus*)			
No. years with Collated Index:	**36**	2011 Rank:	**16**
Change in Collated Index 2010-11 (%):	**-3**	Long-term trend (%):	**-14**
Mean flight date 2011:	**25-June**	Series mean flight date:	**05-July**

Collated Index plot:



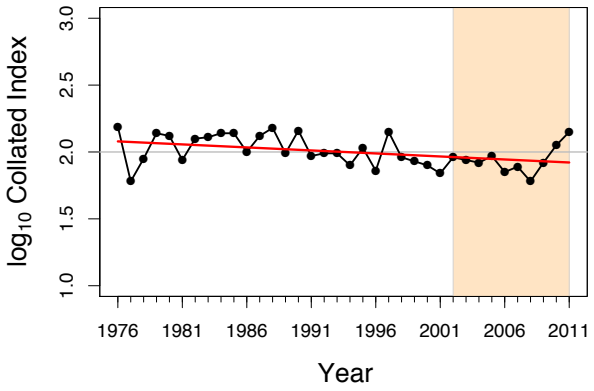
There was a small drop in Large Skipper abundance in 2011 and considerably fewer sites recorded three-figure indices (33 compared to 44 in 2010). Whilst Pamber Forest in Hampshire produced the highest of these (482), it was at Middle Harling Heath in Norfolk that the maximum weekly count of 110 was recorded. The long-term trend for the butterfly is classed as stable.

It was an early year, with the mean flight date advanced by 10 days from the series average.

Silver-spotted Skipper habitat at Malling Down, East Sussex. *Photo by Ian Cunliffe*

Dingy Skipper (*Ennis tages*)			
No. years with Collated Index:	**36**	2011 Rank:	**4**
Change in Collated Index 2010-11 (%):	**26**	Long-term trend (%):	**-31***
Mean flight date 2011:	**14-May**	Series mean flight date:	**01-June**

Collated Index plot:



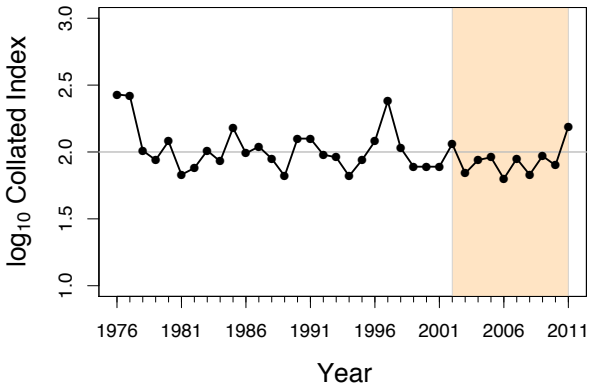
Dingy Skipper had its fourth best year on record with annual abundance up by a quarter. There was some evidence for range expansion with five long-running transects recording the butterfly for the first time. Three-figure indices were recorded at 11 sites with a maximum of 244 at Folkestone Escarpment in Kent. Most of the larger site indices were obtained from central and southern England (Figure 8). The maximum day count was 81 at Lullington Heath in East Sussex on 10th May.

This is now the second year running in which the Dingy Skipper has produced an index above the series average and the third year in a row in which it has shown an annual increase. However, the butterfly remains in long-term decline with abundance reduced by almost a third since 1976. The mean flight date was more than two weeks earlier than 2010 and the series average.

Dingy Skipper. *Photo by Ben Woodward*

Grizzled Skipper (*Pyrgus malvae*)			
No. years with Collated Index:	**36**	2011 Rank:	**4**
Change in Collated Index 2010-11 (%):	**96**	Long-term trend (%):	**-34**
Mean flight date 2011:	**07-May**	Series mean flight date:	**29-May**

Collated Index plot:



Grizzled Skipper had a fantastic year with abundance almost double that of 2010. For the first time since 2002 more than a single site produced a three-figure index and there were 21 sites where abundance exceeded 50 (Figure 8). Levin Down in West Sussex recorded the highest index (165) as well as the maximum weekly count of 40 on 20th April. Grizzled Skipper was recorded extremely early on transects in 2011,with the mean flight date over three weeks earlier than the long-term average. The first transect records on 6th April at Fontmell Down in Dorset and Magdalen Hill Down in Hampshire were more than a week earlier than 2010.

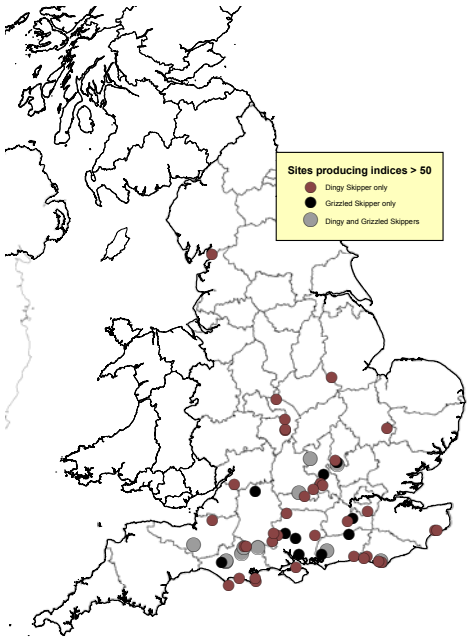
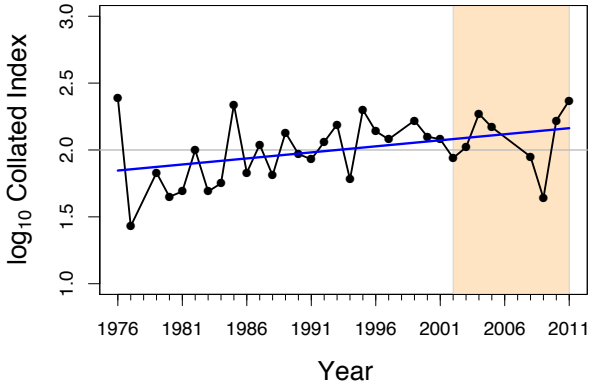


Figure 8. Sites producing an index of 50 or greater for Dingy and/or Grizzled Skippers in 2011.

Swallowtail (*Papilio machaon*)			
No. years with Collated Index:	**32**	2011 Rank:	**2**
Change in Collated Index 2010-11 (%):	**41**	Long-term trend (%):	**95***
Mean flight date 2011:	**15-June**	Series mean flight date:	**18-June**

Collated Index plot:



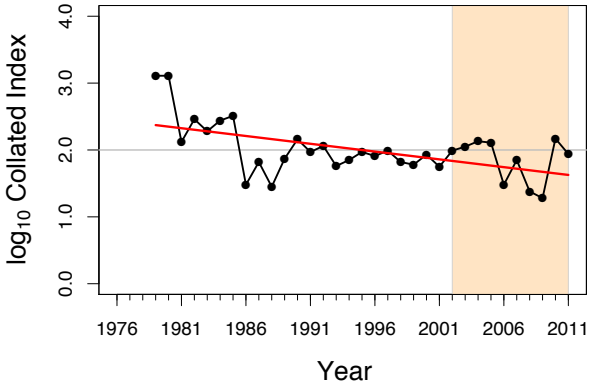
Indices for Swallowtail were generated from five Norfolk fens in 2011. Annual abundance was up by 40% and it was the second best year on record. Here we present a long-term trend for the first time, which shows a significant 95% increase on monitored sites since 1980.

Swallowtail. *Photo by Matthew Berry*

The highest site index was 117 at Sutton Fen where the maximum day count of 26 was recorded on 1st June. A site index of 53 was the highest in over 15 years and the third highest since 1976.

Wood White (*Leptidea sinapis*)			
No. years with Collated Index:	**33**	2011 Rank:	**18**
Change in Collated Index 2010-11 (%):	**-41**	Long-term trend (%):	**-83****
Mean flight date 2011:	**01-June**	Series mean flight date:	**18-June**

Collated Index plot:



Although down from the previous year, 2011 abundance was around the long-term average and well above levels between 2006 and 2009. Given that the butterfly has become extinct from so many monitored sites new monitored sites are needed to improve coverage. It is pleasing to report that the butterfly was monitored at more sites than ever before.

The largest site index was 418 at Wigmore Rolls in the West Midlands. This site also recorded the maximum count with 83 on 24th May. Although there is no apparent short-term trend, this is still a species in trouble with a significant decline of more than 80% since 1979.

Our knowledge of the Wood White phenology has been updated thanks to collaboration with Stephen Jeffcoate who has studied the species in detail. At the beginning of monitoring Wood White generally produced just one brood on monitored sites, but over time it has produced a second brood on most sites.

Wood White voltinism seems highly variable, like a number of other species such as Dingy Skipper, and in warm years most sites produce a second brood, whilst in cooler years many do not. This variability is demonstrated by the mean flight date being more than two weeks earlier than the long-term average.

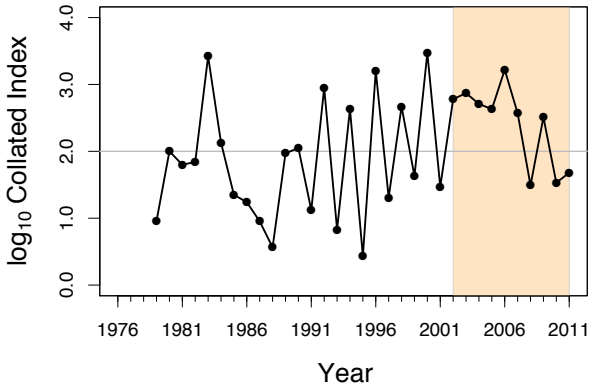
Cryptic Wood White (*Leptidea juvernica*)

The Cryptic Wood White has been regularly recorded at three UKBMS sites in recent years, but has been recorded on 10 different sites over the series. At the longest running of these sites, Murlough in County Down, abundance has significantly increased since 1981.

Only Killykeeghan & Crossmurrin Nature Reserve in Fermanagh produced an index in 2011 although the butterfly was recorded on four sites including Murlough, and Craigavon Lakes and Oxford Island in Armagh. The maximum day count was recorded at Craigavon Lakes with 68 on 13th of May.

Clouded Yellow (*Colias croceus*)			
No. years with Collated Index:	**33**	2011 Rank:	**20**
Change in Collated Index 2010-11 (%):	**41**	Long-term trend (%):	**580**
Mean flight date 2011:	**23-Aug**	Series mean flight date:	**09-Aug**

Collated Index plot:

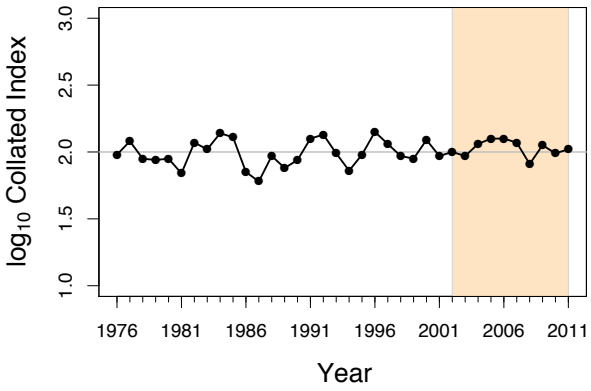


2011 was a below average year for Clouded Yellow, but still an improvement over 2010, with an annual increase of more than 40%. Though numbers on individual sites were relatively low, it was recorded on 319 different sites, the most since 2006, and more than 50 more than in 2010. The main influx of this migrant butterfly was later than in 2010, and was generally quite late with the mean flight date two weeks later than the series average.

The largest site index was recorded at Longis on Alderney with a meagre 17, most of which were recorded on one visit on 14th June. On mainland UK, Alton Water in Suffolk recorded the highest index of nine with a maximum count of eight on 2nd August.

Brimstone (*Gonepteryx rhamni*)			
No. years with Collated Index:	**36**	2011 Rank:	**15**
Change in Collated Index 2010-11 (%):	**7**	Long-term trend (%):	**16**
Mean flight date 2011:	**18-May**	Series mean flight date:	**09-June**

Collated Index plot:



2011 was a slightly above average year, with a modest annual increase of 7%. However, three-figure indices were produced at more than 50 sites, 20 more than in 2010, the largest of which was 442 at Stockbridge Down in Hampshire. The same site recorded a maximum count of 72 on 3rd May.

Brimstone shows a particularly stable trend over time with small fluctuations annually. If one separates the counts into those for the spring period (post-overwintering adults from the previous year) and those for the summer period (offspring of those adults that overwintered from the previous year) these annual fluctuations can be seen even more clearly (Figure 9). 2011 was dominated by spring period records with 83% of counts of 20 or more individuals before July.

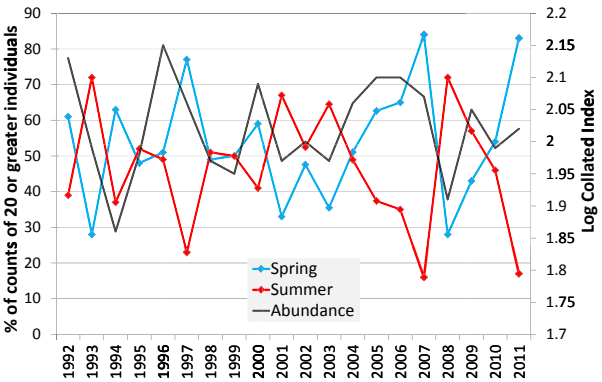


Figure 9. Percentage of counts that were of 20 or more individuals made on transects in the spring period (post-overwintering adults) and the summer period (offspring of previous year's adults/pre-overwintering adults) over the last 20 years. The log Collated Index is also shown on the right-hand axis.

Brimstone. *Photo by Chris Bradbury*

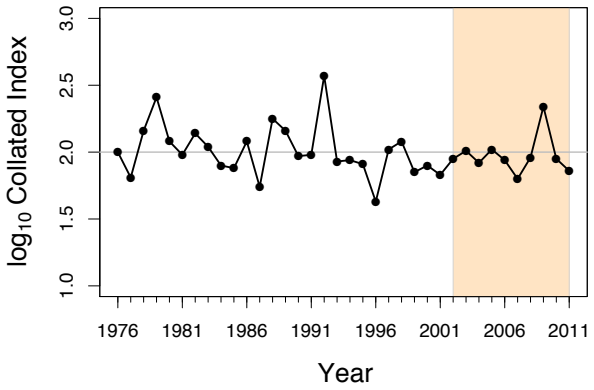
In 2010 the percentage of records was similar between the spring and summer periods, but in 2009 there was a slightly greater percentage for the summer period and in 2008 the reverse of 2011 was true, with more than 70% of counts of 20 or more individuals in the summer period.

Interestingly, the annual collated indices closely follow the spring period counts, such that when a greater percentage of all the high counts are made during the spring period the annual index is high, whereas in years when a greater percentage of the high counts are made in the summer period the index is low. With this in mind one might expect low numbers of high counts in the spring period for 2012 and a subsequently lower collated index?

Brimstone was on the wing early in 2011with the mean flight date three weeks earlier than the average since 1976.

Large White (*Pieris brassicae*)			
No. years with Collated Index:	**36**	2011 Rank:	**30**
Change in Collated Index 2010-11 (%):	**-19**	Long-term trend (%):	**-26**
Mean flight date 2011:	**09-July**	Series mean flight date:	**21-July**

Collated Index plot:



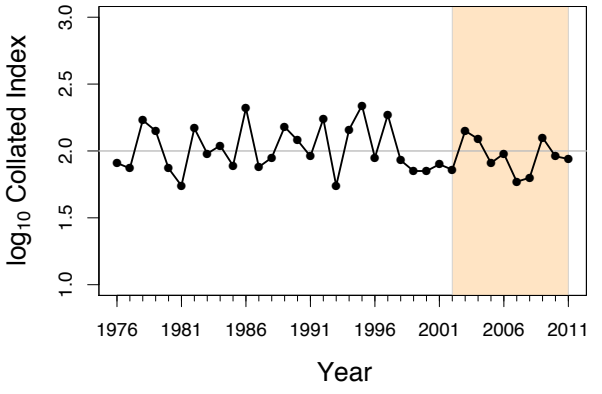
Annual abundance was down by about a fifth, with 2011 the seventh worst year in the 36-year series. Some of the largest annual declines occurred at sites with large populations in south-east and eastern England, with greater than 80% declines at Wood Lane Pirton in Hertfordshire, Hounslow Heath in Middlesex and Holkham in Norfolk.

The number of three-figure indices in 2011 was the third lowest in the last 10 years, almost half of that in 2010 and less than a quarter of that in 2009 (which was a record year). The largest site index was 363 at Windmill Hill, Chalton in Hampshire where a maximum count of 182 was recorded on 19th July. Populations on monitored sites fluctuate greatly from year to year with no apparent trend over the long-term.

Large White was another species whose flight period was greatly affected by the incredible spring weather – the mean flight date was almost two weeks earlier than the series average.

Small White (*Pieris rapae*)			
No. years with Collated Index:	**36**	2011 Rank:	**21**
Change in Collated Index 2010-11 (%):	**-4**	Long-term trend (%):	**-17**
Mean flight date 2011:	**10-July**	Series mean flight date:	**23-July**

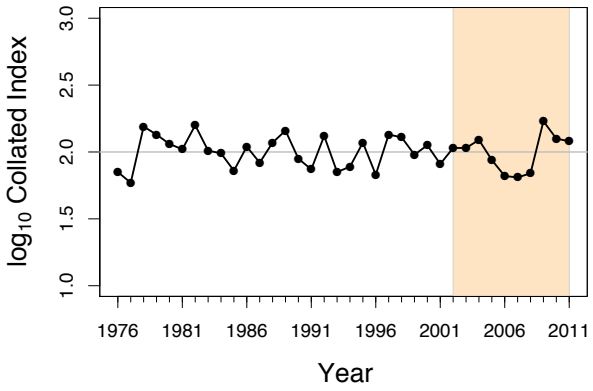
Collated Index plot:



Annual abundance dropped by 4% with 2011 ranking as a below average year. Barking Riverside in Greater London, a site new to the scheme in 2011, recorded an index of 2,051, with three-figure counts in five different weeks. This is the third highest index on record. However, the maximum count was recorded at Windmill Hill, Chalton in Hampshire, with an impressive 315 on 4th July, almost double the maximum count across the UK for 2010. In spite of an apparent decline, the long-term trend is classed as stable. The mean flight date was almost two weeks earlier than the long-term average.

Green-veined White (*Pieris napi*)			
No. years with Collated Index:	**36**	2010 Rank:	**11**
Change in Collated Index 2010-11 (%):	**-5**	Long-term trend (%):	**-1**
Mean flight date 2010:	**26-June**	Series mean flight date:	**09-July**

Collated Index plot:

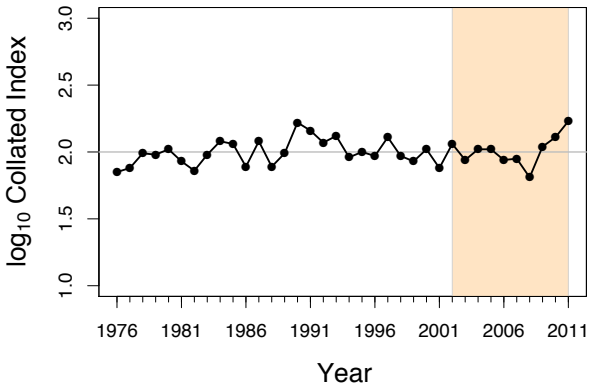


There was a slight drop in numbers but it was still an above average year, ranking just outside the top 10. As for the Small White, Barking Riverside took top spot for Green-veined White with an index of 1,438 and a maximum count of 361 on 17th August. In Wales, a third of sites recorded three-figure indices with 213 being the highest at Nine Wells in Pembrokeshire. The butterfly has been doing well at a number of monitored sites in Wales over the last decade. Numbers have increased by almost 20% at Whixall Fens and Mosses in Clwyd, by more than 20% at Newport Wetlands in Gwent and Whixall Moss in Clwyd and by almost 40% at Coed Maidie B Goddard in Ceredigion. Across the UK the long-term trend is classed as stable.

Green-veined White. *Photo by Tim Melling*

Orange-tip (*Anthocharis cardamines*)			
No. years with Collated Index:	**36**	2011 Rank:	**1**
Change in Collated Index 2010-11 (%):	**32**	Long-term trend (%):	**17**
Mean flight date 2011:	**25-Apr**	Series mean flight date:	**17-May**

Collated Index plot:



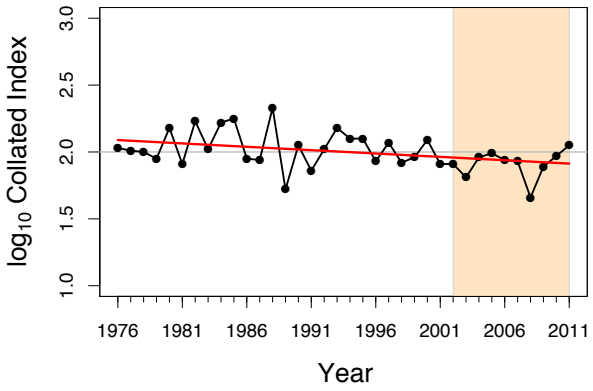
This univoltine spring species was one of the greatest benefactors of the superb spring weather in 2011, producing its best index of the series with an increase of almost a third over 2010. This is on the back of a good year in 2010 and is the third year in succession that it has shown an annual increase. No less than 23 different sites recorded three-figure indices in 2011, by far the most on record, with six in 1990 being the next highest. The UK trend is classed as stable, though it has been spreading throughout Scotland. The combined site trend for Scotland shows a large increase over the series.

The highest site indices of 2011 were produced in Scotland, both in East Lothian with 175 at Haddington Clerkington and 164 at Aberlady Bay. The maximum count was 67 on 28th April at Slievencloy in Antrim, but with a Scottish count close behind with 60 on the same day at Robroyston Parl Local Nature Reserve in Lanarkshire.

The Orange-tip is one of the species that has shifted its flight period the greatest as a result of recent climate warming. Its mean flight date was more than three weeks earlier than the series average in 2011 and it was first recorded on transects before the season began properly in late March.

Green Hairstreak (*Callophrys rubi*)			
No. years with Collated Index:	**36**	2011 Rank:	**11**
Change in Collated Index 2010-11 (%):	**20**	Long-term trend (%):	**-34***
Mean flight date 2011:	**10-May**	Series mean flight date:	**29-May**

Collated Index plot:



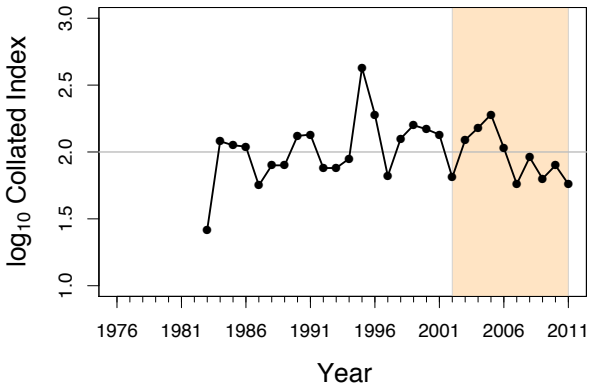
Another of our spring species, the Green Hairstreak also had a good year. This comes as particularly good news after reaching a series low in 2009 and marks a third successive year of increase and a return to above average numbers on monitored sites.

Long-term, the Green Hairstreak has declined significantly, but over the last 10 years the population has stabilised. As usual, the impressive numbers at Meathop Moss in Cumbria topped the leader board with an impressive index of 1,532 and three weekly counts above 300, with the maximum being 410 on 23rd April.

Green Hairstreak. *Photo by Matthew Berry*

Brown Hairstreak (*Thecla betulae*)			
No. years with Collated Index:	**29**	2011 Rank:	**26**
Change in Collated Index 2010-11 (%):	**-27**	Long-term trend (%):	**12**
Mean flight date 2011:	**20-Aug**	Series mean flight date:	**25-Aug**

Collated Index plot:



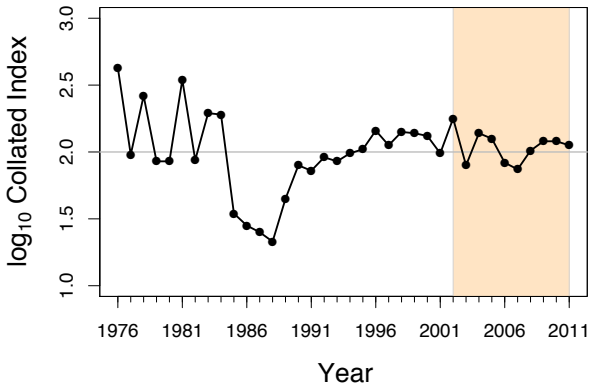
Flying late in the season, it is probably little surprise that Brown Hairstreak had a poor year. Annual abundance was reduced by more than a quarter, with 2011 being the fourth worst year in the series.

This localised species is already extremely elusive and thus numbers on transects are always quite low – few sites produce double figure indices and only in good years. One such site is Noar Hill in Hampshire which, with 13, recorded the highest index of 2011. Alners Gorse in Dorset, with an index of seven, recorded the maximum count of five on 31st July.

The mean flight date was close to the series average, reflecting the cooler temperatures typifying the late summer period.

Purple Hairstreak (*Favonius quercus*)			
No. years with Collated Index:	**36**	2011 Rank:	**15**
Change in Collated Index 2010-11 (%):	**-7**	Long-term trend (%):	**-3**
Mean flight date 2011:	**18-July**	Series mean flight date:	**30-July**

Collated Index plot:



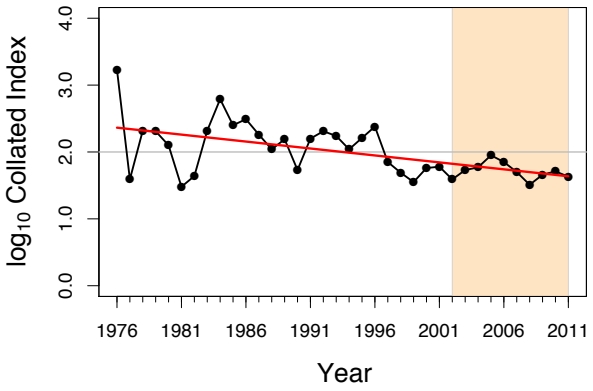
The Purple Hairstreak had a mediocre 2011, with a slight drop in annual abundance and a year rank of 15 out of 36. On standard transects, the largest index was 88 at Woodford Golf Course in Essex, whilst the maximum weekly count was 30 at Minsmere in Suffolk on 19th July.

The largest annual change noted came from Bedelands Farm Nature Reserve in West Sussex, with 15 in 2010 and 38 in 2011, whilst it was a poor year at Whippingham (fields) on the Isle of Wight with 82 in 2010 and 21 in 2011. Following a sharp decline in the mid 1980s, Purple Hairstreak abundance has stabilised on monitored sites with seven of the last 10 years above the series average.

Although the mean flight date was almost two weeks earlier than the series average, Purple Hairstreak was first recorded as early as 3rd June on a transect and the first sighting as posted on the Butterfly Conservation website was even earlier – on 11th May.

White-letter Hairstreak (*Satyrium w-album*)			
No. years with Collated Index:	**36**	10 Rank:	**31**
Change in Collated Index 2010-11 (%):	**-16**	Long-term trend (%):	**-82*** **
Mean flight date 2011:	**08-July**	Series mean flight date:	**26-July**

Collated Index plot:



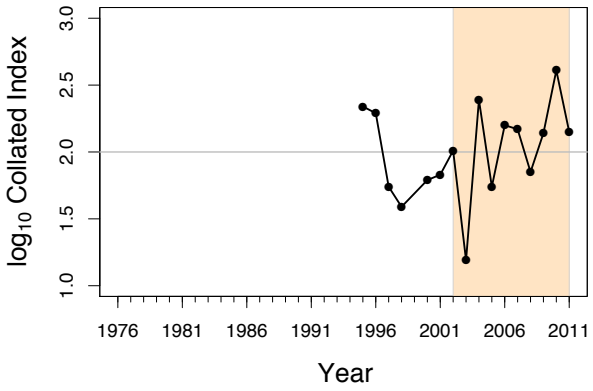
It was another disappointing year for the White-letter Hairstreak, the sixth worst on record. Indices were low, except at Benfleet Down in Essex, where there was an increase from 50 in 2010 to 72 in 2011. This site also recorded the maximum weekly count with 39 on the 1st July – this count being higher than the annual totals for all other sites.

Abundance across the UK has declined significantly since monitoring began, though much of this decline happened in the 1980s and 1990s. Since then the population on monitored sites has stabilised but it is found in only small numbers on most sites.

The mean flight date was more than two weeks ahead of the series average.

Black Hairstreak (*Satyrium pruni*)			
No. years with Collated Index:	**16**	2011 Rank:	**7**
Change in Collated Index 2010-11 (%):	**-65**	Long-term trend (%):	**85**
Mean flight date 2011:	**09-June**	Series mean flight date:	**29-June**

Collated Index plot:



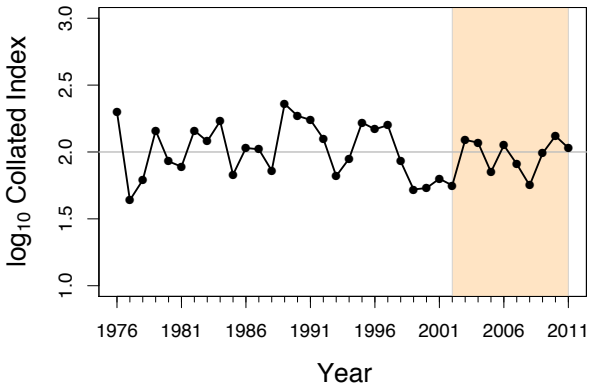
Following a series peak in 2011, abundance dropped by two-thirds. This is our rarest hairstreak, with only a very restricted range and thus there are only a few sites contributing data, 10 sites being the highest number in any one year.

It also has a very narrow flight period and so can be highly susceptible to even short periods of bad weather. However, the temperatures were still warm and there was plenty of sunshine in June 2011 when Black Hairstreak was on the wing almost three weeks earlier than the series average, which suggests another factor such as parasitoids is more likely to have driven the annual decline. This is a species which shows considerable annual fluctuations and the apparent long-term increase is not significant.

In the previous two years the M40 Compensation Area in Buckinghamshire recorded the highest indices, with a maximum of 45 in 2010. However, this population was reduced by almost 60% in 2011. A timed count set up in 2011 at Brampton Wood in Cambridgeshire took top spot for 2011, and for the series, with an index of 54.

Small Copper (*Lycaena phlaeas*)			
No. years with Collated Index:	**36**	2011 Rank:	**17**
Change in Collated Index 2010-11 (%):	**-19**	Long-term trend (%):	**-19**
Mean flight date 2011:	**14-July**	Series mean flight date:	**03-Aug**

Collated Index plot:



Small Copper annual abundance was down by 19 % with 2011 classed as an average year (ranked 17 of 36). There were substantial annual decreases at a number of sites including from 284 to 76 at Sand Point in Avon, from 300 to 94 at Barbury Castle in Wiltshire and from 114 down to 22 at Westbury Beacon in Somerset.

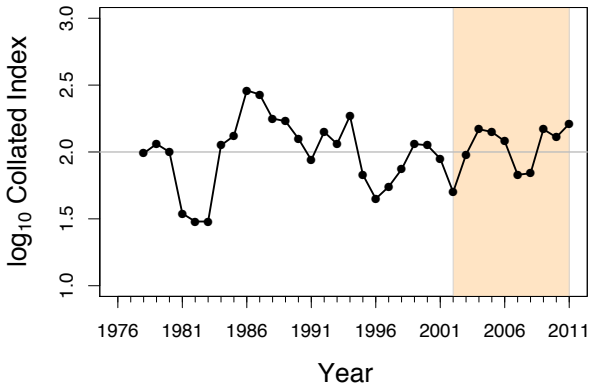
Cavenham Heath in Suffolk recorded the highest index (521), as it has done for the previous two years, but the maximum count was 92 on 24th July at St. Abb's Head in the Borders. Only one of the top ten counts was from the southern half of England, with sites in Scotland and northern England recording most of the highest counts. The Small Copper trend shows little or no overall change over the series.

Small Copper is continuously brooded on many sites with the first brood out in spring. It was first recorded on a transect in the third week of March at Walton Nature Park in West Yorkshire and the mean flight date was almost three weeks earlier than the series average.

Although it is difficult to tease out third and fourth generations from the second, as they tend to overlap greatly, it is likely that there were multiple broods at a lot of sites due to the warm start to the year. However, numbers are often greater in the later broods with August or September registering the greatest numbers in all but one year since 1976. And, with the weather so poor in August 2011, numbers were less than 50% of those for the same month in 2010.

Small Blue (*Cupido minimus*)			
No. years with Collated Index:	**34**	2011 Rank:	**6**
Change in Collated Index 2010-11 (%):	**26**	Long-term trend (%):	**24**
Mean flight date 2011:	**07-June**	Series mean flight date:	**30-June**

Collated Index plot:



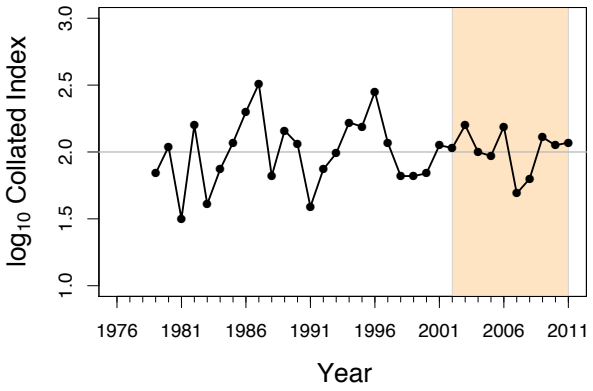
There was a modest increase in Small Blue abundance, with 2011 classed as the sixth best in the series. There were a number of notable increases on sites with smaller colonies such as Banstead Downs in Surrey with an increase from 2 to 14, and Magdalen Hill Down North in Hampshire with an increase from 18 to 51 (nearby Magdalen Hill Down extension also recorded an increase from 2 to 15).

By far the largest index of 2011 was recorded at Durlston Meadows in Dorset, with an impressive 608, the sixth highest on record, and more than double that for any other site. A peak count of 177 was made on 19th May at the same site. In spite of a modest increase across the UK in 2011, the long-term trend since 1978 shows little or no overall change. It was an early year with the mean flight date more than three weeks ahead of the series average.

Small Blue. *Photo by Tony Morris*

Silver-studded Blue (*Plebejus argus*)			
No. years with Collated Index:	**33**	2011 Rank:	**11**
Change in Collated Index 2010-11 (%):	**4**	Long-term trend (%):	**17**
Mean flight date 2011:	**25-June**	Series mean flight date:	**17-July**

Collated Index plot:

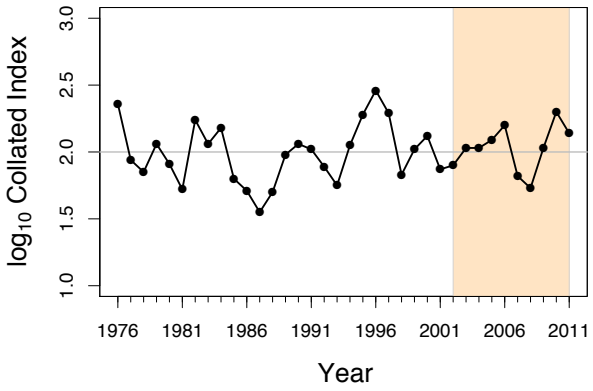


For the third year in succession, there was little change in Silver-studded Blue abundance, with 2011 ranked 11th in the 33-year series. The largest site index was 2,504 at Upton Towans in Cornwall, with a peak count of 687 on 6th June.

It was an early year for the butterfly, with the mean flight date more than a week earlier than the series average. In spite of an apparent increase, the long-term trend is classed as showing little or no overall change. The mean flight date was more than three weeks earlier than the series average.

Brown Argus (*Aricia agestis*)			
No. years with Collated Index:	**36**	2011 Rank:	**9**
Change in Collated Index 2010-11 (%):	**-31**	Long-term trend (%):	**26**
Mean flight date 2011:	**09-July**	Series mean flight date:	**01-Aug**

Collated Index plot:



Following a good year, it was not surprising that there were fewer Brown Argus butterflies seen in 2011, with abundance reduced by almost a third. There were 20 sites where annual abundance decreased by 75% or more, including Pewsey Down in Wiltshire where the index went from 325 to 37.

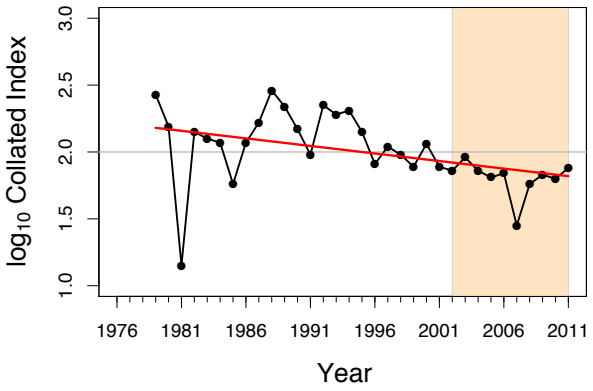
A number of sites bucked the trend, including Bonchurch Down on the Isle of Wight where the index increased from 64 to 193. The three largest indices all came from Somerset, with the maximum being 395 at Shute Shelve Hill. This site also recorded the highest weekly count with 110 on 3rd May.

Though the apparent increase in Brown Argus abundance since 1976 is not significant, there has been a range expansion in recent decades. A recent study led by Rachel Pateman and published in *Science* shows that this spread is attributable to a change in host plant use driven by climate change (Pateman et al. 2012).

In common with many other species, it was an early year, with the mean flight date more than three weeks ahead of the series average.

Northern Brown Argus (*Aricia artaxerxes*)			
No. years with Collated Index:	**33**	2011 Rank:	**23**
Change in Collated Index 2010-11 (%):	**21**	Long-term trend (%):	**-58***
Mean flight date 2011:	**26-June**	Series mean flight date:	**12-July**

Collated Index plot:



For the fourth year in a row Northern Brown Argus increased in abundance, though 2011 was still classed as a below average year.

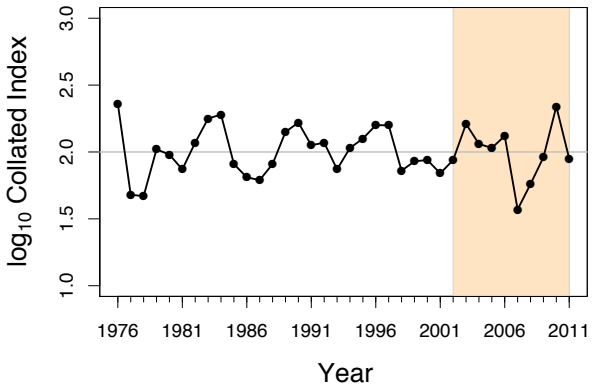
There were some positive counts in north-west England, with abundance more than doubling at Witherslack Hall Woods and Lancelot Clark Storth. The largest site indices were also recorded in this region, with the maximum being 267 at Warton Crags RSPB Reserve.

The largest weekly count was also recorded here, with 103 on 20th June. The last above average year for this butterfly was as far back as the late 1990s and there has been a significant decline of 58% since the start of the series in 1979.

The mean flight date was more than two weeks earlier than the long-term average.

Common Blue (*Polyommatus icarus*)			
No. years with Collated Index:	**36**	2011 Rank:	**21**
Change in Collated Index 2010-11 (%):	**-59**	Long-term trend (%):	**-1**
Mean flight date 2011:	**01-July**	Series mean flight date:	**26-July**

Collated Index plot:

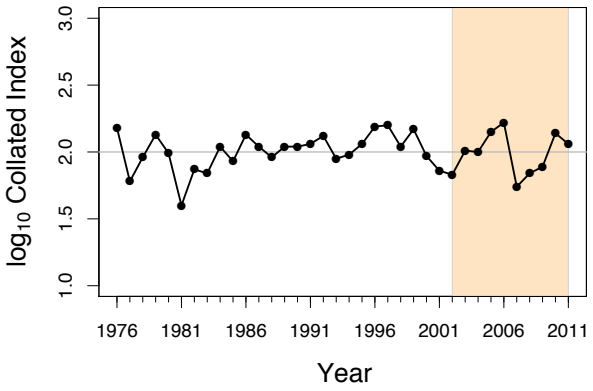


Common Blue annual abundance dropped sharply in 2011, with the butterfly going from having its second best year on record to having a below average year. There were 26 sites where abundance dropped by 90% or more, with the most spectacular being at Blunts Wood & Paiges Meadows in Sussex where an index of 2,669 in 2010 was followed by an index of 112 in 2011.

A small number of sites did manage to produce substantial increases though, with perhaps the most impressive at Cubert in Cornwall, where the index more than doubled from 123 to 304. The maximum day count of the year was 242 at Buckland Wood in Somerset on 19th May. It was an advanced season for the Common Blue, with the mean flight date being more than three weeks earlier than the series average.

Chalkhill Blue (*Polyommatus coridon*)			
No. years with Collated Index:	**36**	2011 Rank:	**11**
Change in Collated Index 2010-11 (%):	**-17**	Long-term trend (%):	**14**
Mean flight date 2010:	**05-Aug**	Series mean flight date:	**09-Aug**

Collated Index plot:



There was a modest decline in Chalkhill Blue abundance in 2011, though it was still classed as an above average year, ranked 11 out of 33. The largest annual index of 4,404 was logged at Devil's Dyke, near Newmarket in Cambridgeshire, whilst the largest single count was 2,306 on 30th July at Friston Hill in Sussex.

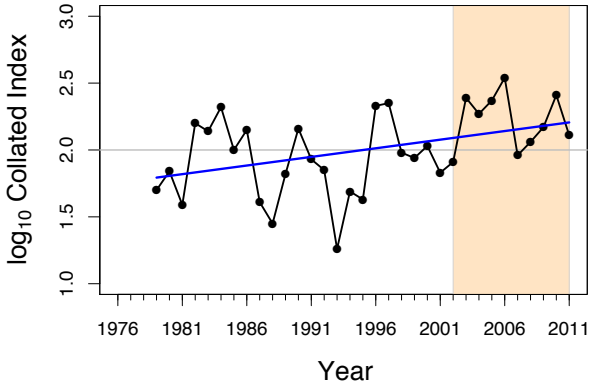
The long-term trend across UK sites is classed as showing little or no overall change.

Flying later in the year than the first broods of other grassland blues, Chalkhill Blue did not show the impact of spring temperatures on its flight period that other species did and the mean flight date was similar to the series average, earlier by just four days.

Bindon Hill, Dorset - grassland Lycaenids such as Chalkhill Blues are abundant on this chalk grassland transect. *Photo by Tom Brereton*

Adonis Blue (*Polyommatus bellargus*)			
No. years with Collated Index:	**33**	2011 Rank:	**14**
Change in Collated Index 2010-11 (%):	**-50**	Long-term trend (%):	**167***
Mean flight date 2011:	**29-June**	Series mean flight date:	**25-July**

Collated Index plot:



Although Adonis Blue abundance was half that in 2010, it was still an above average year, ranked 14 in the 33-year series. Unsurprisingly, there were far fewer large counts than in 2010 (second best year on record), with the maximum index being 1,970 at Anchor Bottom in Sussex. The largest weekly count was made at Swanage in Dorset, with 446 on 6th May – a very early date for such a count when compared to other years.

Unusually, all of the highest counts were associated with the first brood and many were very early. In fact, first brood counts were much higher than on average across the series, whilst second brood counts were considerably lower (Figure 10).

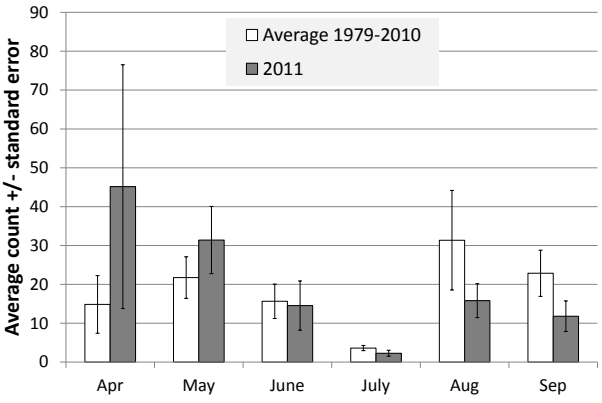


Figure 10. Average monthly counts of Adonis Blue in 2011 against the average across all previous years (1979-2010) with standard error as error bars

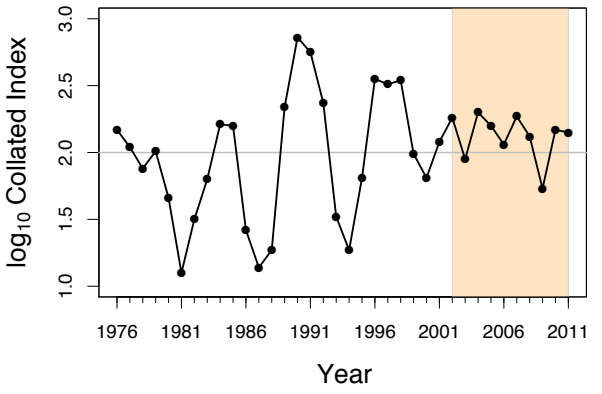
Since 1979, this butterfly has increased significantly in abundance by around 170%.

The first record on a transect, and potentially the earliest sighting of Adonis Blue for the year, was on 23rd April at White Sheet Hill Quarry, a National Trust site in Wiltshire. The superb spring weather clearly favoured this highly thermophilic butterfly which utilises habitats where ground temperatures are greatest.

The mean flight date was almost a month earlier than the series average.

Holly Blue (*Celastrina argiolus*)			
No. years with Collated Index:	**36**	2011 Rank:	**16**
Change in Collated Index 2010-11 (%):	**-5**	Long-term trend (%):	**157**
Mean flight date 2011:	**11-June**	Series mean flight date:	**29-June**

Collated Index plot:



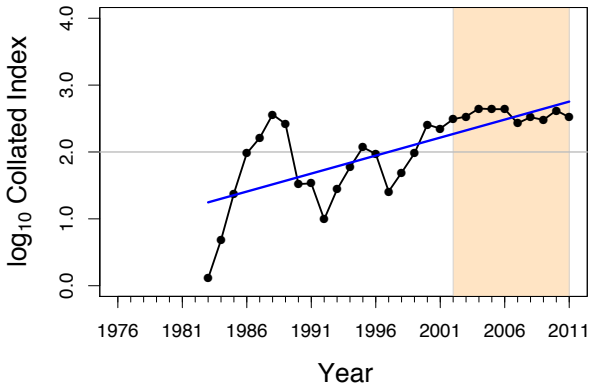
There was little change in Holly Blue abundance in 2011. It was an average year, though the butterfly was recorded more widely than ever before (over 100 more sites than in any other year). However there was only one three-figure index (compared to three in 2010), this 105 at Tower Hamlets Cemetery in Inner London.

The Holly Blue has fluctuated markedly in abundance since 1976, with the long-term trend classed as showing little or no overall change.

The good weather at the start of the year brought the first generation out early, and the mean flight date for the whole year was more than two weeks earlier than the series average. Very few sites recorded double figures day counts.

Large Blue (*Phengaris arion*)			
No. years with Collated Index:	**29**	2011 Rank:	**7**
Change in Collated Index 2010-11 (%):	**-21**	Long-term trend (%):	**>1000*** **
Mean flight date 2011:	**28-June**	Series mean flight date:	**25-June**

Collated Index plot:

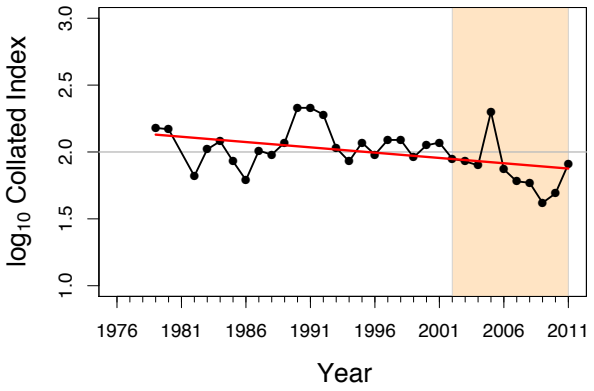


Large Blue abundance was reduced by 20% in 2011, though it was an above average year ranked seventh in the 29-year series. Of the public sites contributing indices, Green Down in Somerset produced the largest index of 28. The mean flight date for Large Blue was later in 2011 than the series average.

Large Blue habitat at Collard Down, Somerset. *Photo by Morag McCracken*

Duke of Burgundy (*Hamearis lucina*)			
No. years with Collated Index:	**32**	2011 Rank:	**24**
Change in Collated Index 2010-11 (%):	**65**	Long-term trend (%):	**-44***
Mean flight date 2011:	**04-May**	Series mean flight date:	**31-May**

Collated Index plot:



The Duke of Burgundy increased in abundance by almost two-thirds between 2010 and 2011. An increase of this rare and threatened species was extremely welcome news, though in context, it was still a below average year ranked 24 in the 32-year series and the butterfly remains in long-term decline.

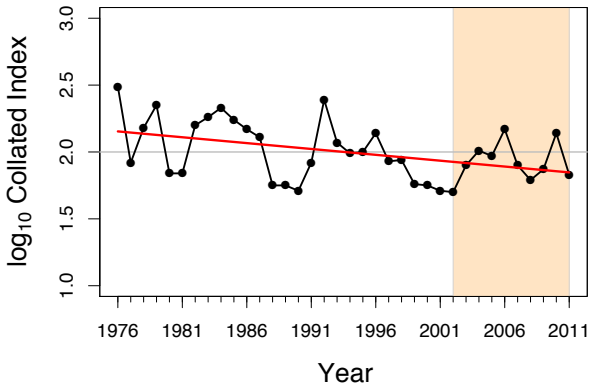
Another positive from the season was that there were new records (counts of ones and twos) at four regularly monitored sites, bringing hope that new colonies will be established at these sites.

There were substantial annual increases at a number of sites including from 3 to 30 at Cerne Abbas Giant in Dorset, 8 to 25 at Thurlbear Quarrylands in Somerset and 25 to 75 at Whipsnade Downs in Bedfordshire. The largest site index was 201 at Noar Hill in Hampshire, where counts in excess of 50 were made on three days over the season. An index of 113 at The Mountain (Meon Valley) in Hampshire was also noteworthy.

It was an early year, with the mean flight date almost four weeks ahead of the long-term average.

White Admiral (*Limenitis camilla*)			
No. years with Collated Index:	**36**	2011 Rank:	**28**
Change in Collated Index 2010-11 (%):	**-51**	Long-term trend (%):	**-52****
Mean flight date 2011:	**02-July**	Series mean flight date:	**18-July**

Collated Index plot:



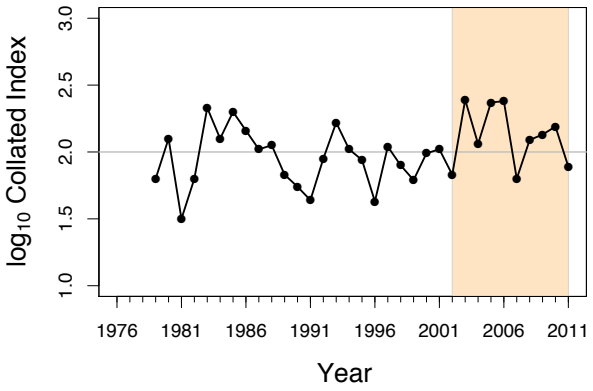
Following on from a good year in 2010, White Admiral abundance dropped substantially in 2011 by more than 50%. The combination of drought in the spring (to which the larval hostplant Honeysuckle is susceptible) and unsettled weather over the adult flight season are likely to have been contributory factors to the butterfly having a poor year – the ninth worst in the series.

Substantial declines included from 139 in 2010 to 39 in 2011 at Burnt Oak Wood in Kent and from 181 to 87 at Pamber Forest in Hampshire. There were no major increases noted. The butterfly has declined significantly in abundance since 1976 by more than 50%.

In spite of poor summer weather, the mean flight date was advanced by more than two weeks.

Purple Emperor (*Apatura iris*)			
No. years with Collated Index:	**33**	2011 Rank:	**23**
Change in Collated Index 2010-11 (%):	**-50**	Long-term trend (%):	**48**
Mean flight date 2011:	**07-July**	Series mean flight date:	**22-July**

Collated Index plot:



Following three good years, Purple Emperor abundance halved in 2011, with the year ranking 23 in the 33-year series.

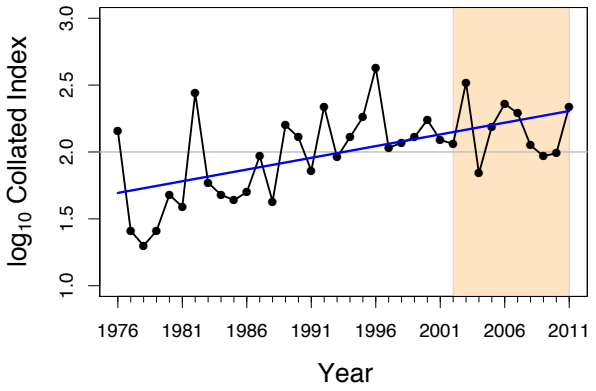
Of these, there were none where abundance was up on 2010 levels, and very few were seen, with the maximum day count being just three at Oakley Woods in Buckinghamshire on 1st July.

The apparent increase in abundance since 1979 is not significant and the long-term trend is classed as showing little or no overall change. In common with the White Admiral, the mean flight date was advanced by more than two weeks.

Purple Emperor and White Admiral are recorded together on transects in deciduous woodland with open rides in southern England such as Bernwood Forest, Buckinghamshire (pictured). *Photo by Jackie Harman*

Red Admiral (*Vanessa atalanta*)			
No. years with Collated Index:	**36**	2011 Rank:	**5**
Change in Collated Index 2010-11 (%):	**123**	Long-term trend (%):	**326*** **
Mean flight date 2011:	**28-July**	Series mean flight date:	**07-Aug**

Collated Index plot:



It proved to be a very good year for Red Admiral with an impressive 123% increase over 2010 levels, making it the fifth best year on record. Transect numbers peaked in July with a total of 5,934 counted across 724 sites. Numbers dropped slightly but remained high throughout August and then rose again in September, when the average number per transect was equal to that in July, though the butterfly was recorded from approximately one hundred fewer sites.

Red Admiral. *Photo by Matthew Berry*

As might be expected, the majority of large indices were recorded at sites on or near the coast (Figure 11), especially in southern England. Somerset was the standout county, logging the three highest indices.

These were: 370 at Ham Wall, 360 at Shapwick Heath, and 274 at Long Wood. It was a very good year in Suffolk as well, with three-figure indices at four sites, and the UK's highest day count of 89 at Upper Abbey Farm on 13th September.

The Red Admiral has increased significantly in recent decades, by more than 300%.

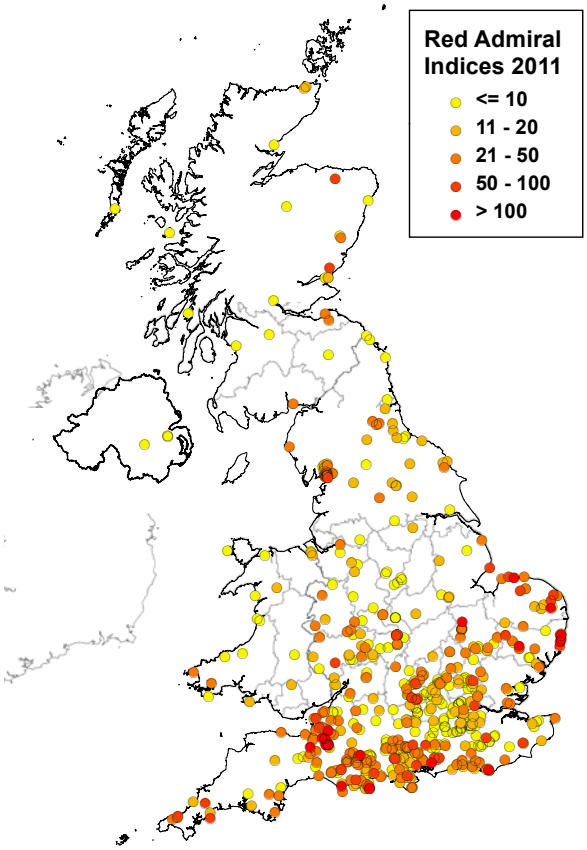
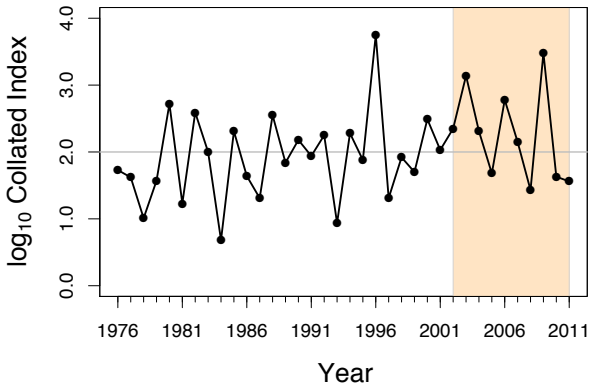


Figure 11. Site indices for Red Admiral in 2011.

Painted Lady (*Vanessa cardui*)			
No. years with Collated Index:	**36**	2011 Rank:	**29**
Change in Collated Index 2010-11 (%):	**-16**	Long-term trend (%):	**341**
Mean flight date 2011:	**21-July**	Series mean flight date:	**31-July**

Collated Index plot:



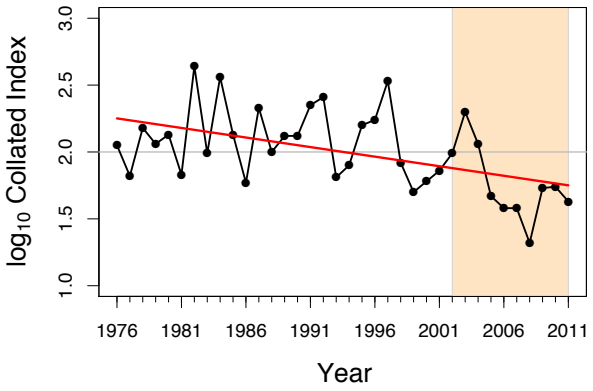
It was a below average year for the Painted Lady with a modest decline following 2010's crash in numbers after the huge 2009 influx. Only 10 sites produced double figure indices, the maximum being 85 at Wootton Coppice in Hampshire.

The maximum day count of 22 was recorded considerably further north at the Caerlaverock Wildlife & Wetlands Trust Reserve in Dumfries and Galloway on 21st July.

In spite of an apparent increase, the long-term trend is classed as showing little or no overall change due to large annual fluctuations.

Small Tortoiseshell (*Aglais urticae*)			
No. years with Collated Index:	**36**	2011 Rank:	**33**
Change in Collated Index 2010-11 (%):	**-22**	Long-term trend (%):	**-69****
Mean flight date 2011:	**20-June**	Series mean flight date:	**11-July**

Collated Index plot:



Following two years of an improvement in fortunes, Small Tortoiseshell declined in abundance once again in 2011, with abundance down by more than a fifth.

Abundance has been below average for 12 out of the last 14 years. Just seven sites produced a three-figure index, with the transect at Harper Adams in Shropshire recording the maximum of 326. This site also recorded the highest and only three-figure day count with 103 on the 24th June.

There seemed to be a western bias with all of the top 20 indices being in western England, Wales, or Scotland with the exception of one site, Sutton Fen in Norfolk, in eastern England.

On the positive side, the butterfly remains widespread, being recorded on almost two-thirds of transects in 2011. The Small Tortoiseshell is now one of our most rapidly declining butterflies with abundance significantly reduced by nearly 70% since 1976.

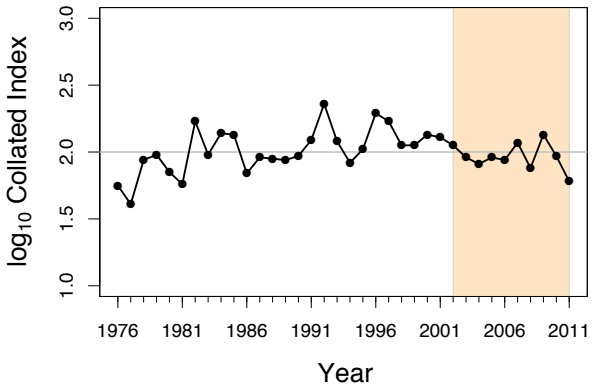
The mean flight date was extremely early, being more than three weeks ahead of the series average.

Large Tortoiseshell (*Nympalis polychloros*)

Encouragingly, there has been an increasing number of Large Tortoiseshell records on UKBMS sites in recent years. In 2011 there were six records including a presumed migrant at Holkham in Norfolk on 11th July, and four sightings from the Isle of Wight in the early spring. The latter records from the Isle of Wight give hope that this butterfly may once again re-establish as a regular breeding species in the UK.

Peacock (*Aglais io*)			
No. years with Collated Index:	**36**	2011 Rank:	**33**
Change in Collated Index 2010-11 (%):	**-35**	Long-term trend (%):	**29**
Mean flight date 2011:	**07-June**	Series mean flight date:	**03-July**

Collated Index plot:



For the second year in a row Peacock abundance declined with an annual decrease of 35%, following on from the previous year's drop of 30%, making 2011 the fourth worst year on record.

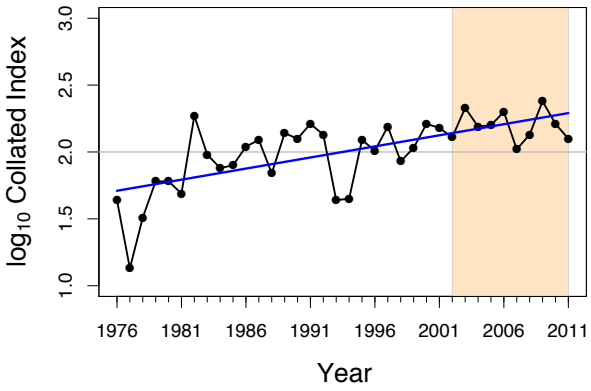
A number of substantial annual declines were noted including from 105 to 18 at Whipsnade Downs in Bedfordshire and 115 to 19 at West Hallam Ash Tip in Derbyshire. However, a few sites performed well, with substantial annual increases noted at Ham Wall in Somerset (from 93 to 249) and at Cocklawburn Dunes in Northumberland (from 21 to 107).

During the 1990s the UK trend was classed as increasing, much of which was attributable to an expansion in range in Scotland.

The mean flight date was almost a month ahead of the long-term average. Through a run of poor years in the 2000s, the long-term trend is now classed as showing little or no overall change.

Comma (*Polygonia c-album*)			
No. years with Collated Index:	**36**	2011 Rank:	**16**
Change in Collated Index 2010-11 (%):	**-22**	Long-term trend (%):	**296*** **
Mean flight date 2011:	**08-July**	Series mean flight date:	**21-July**

Collated Index plot:



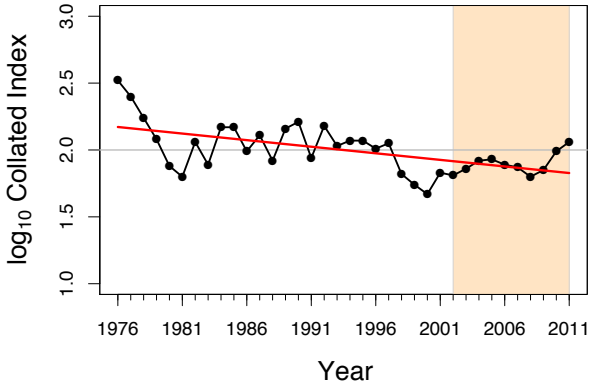
The Comma declined in annual abundance by 22% in 2011, though it was still an above average year. Three-figure indices were produced at only two sites (the joint lowest number since 1990), compared to six sites in 2010 and 18 in 2009. The highest site index was at Wyre Forest West in Hereford and Worcester, where abundance rose from 50 in 2010 to 335 in 2011. This site also recorded the highest day count with 93 on 13th May.

The Comma has been expanding in range rapidly and abundance has increased significantly by almost 300% since 1976. The increase in abundance has stabilised over the last decade, but the range expansion continues with at least two UKBMS transects recording the butterfly for the first time in 2011, including Sanford Moor in Lanarkshire, Scotland.

Peacock. *Photo by Tim Melling*

Small Pearl-bordered Fritillary (*Boloria selene*)			
No. years with Collated Index:	**36**	2011 Rank:	**13**
Change in Collated Index 2010-11 (%):	**17**	Long-term trend (%):	**-56*** **
Mean flight date 2011:	**16-June**	Series mean flight date:	**25-June**

Collated Index plot:



For the third year in a row the Small Pearl-bordered Fritillary increased, with abundance up by nearly a fifth over the 2010 level. For the first time since 1997, the index was above the series average, with 2011 being the thirteenth best year in the series.

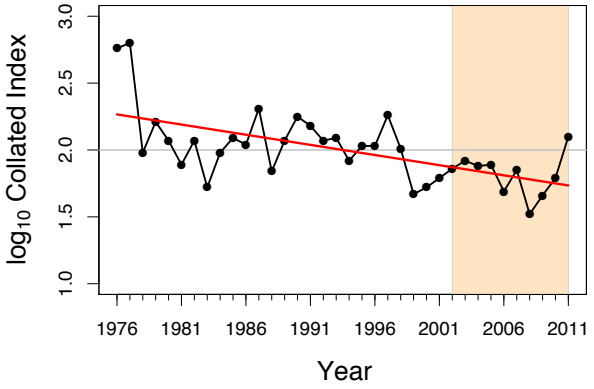
There were some impressive annual increases including from 23 in 2010 to 140 in 2011 at Wyre Forest in Hereford and Worcester and from 21 to 96 at Bentley Wood (North) in Wiltshire. The highest index of 436 was logged at West Down in Devon, where annual abundance was up bymore more than 75%. This site recorded the only three-figure day count with 106 on the 29th April, with this being remarkably high for so early in the season.

In spite of an apparent increase over the last decade, the butterfly remains in significant long-term decline with abundance reduced by more than 50% since 1976.

Small Pearl-bordered Fritillary phenology is highly variable across the UK, though overall the 2011 season was a week earlier than the series average.

Pearl-bordered Fritillary (*Boloria euphrosyne*)			
No. years with Collated Index:	**36**	2011 Rank:	**8**
Change in Collated Index 2010-11 (%):	**103**	Long-term trend (%):	**-72*** **
Mean flight date 2010:	**08-May**	Series mean flight date:	**03-June**

Collated Index plot:



Pearl-bordered Fritillary annual abundance more than doubled in 2011, with this being the best year for the butterfly since 1997 and the eighth best in the 36-year series.

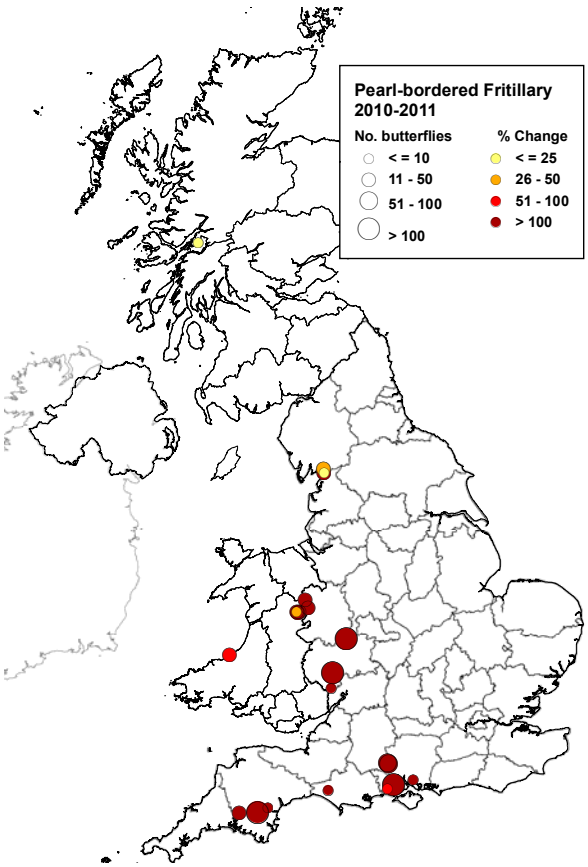


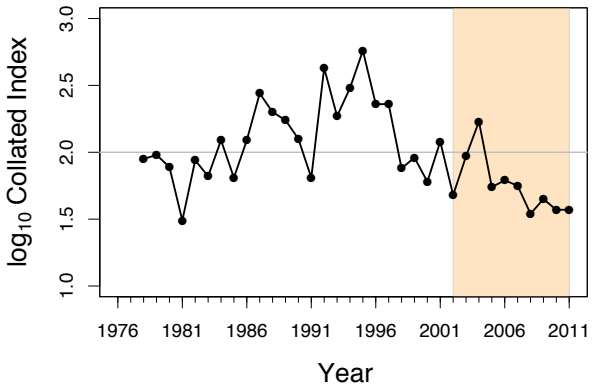
Figure 12. Sites showing annual increases in Pearl-bordered Fritillary between 2010 and 2011. The size of the point refers to the absolute difference in the indices from 2010-2011 whilst the colour of the point refers to the percentage change in the indices.

Increases were widespread (Figure 12), and were most substantial in south-west England. Noteworthy increases included from 17 in 2010 to 100 in 2011 at Bentley Wood - Barnridge, from 23 to 99 at Bentley Wood – South, both in Wiltshire, from 96 to 274 at Pignal Inclosure in Hampshire, from 129 to 298 at Aish Tor in Devon, from 31 to 160 at Haugh Wood South in Hereford and Worcester and from 43 to 169 at Wyre Forest in Hereford and Worcester.

The largest site index was 356 at Hawksgrove in Bentley Wood, whilst the maximum weekly count was 148 on 24th April at Aish Tor. Annual declines were detected at only 5% of sites, but included a worrying drop from 150 in 2010 to 67 in 2011 at Eyarth Rocks Reserve in Clwyd. In spite of an increase in each of the last three years, the butterfly remains in significant long-term decline with abundance reduced by almost three-quarters since 1976. The butterfly was out almost a month earlier than the series average on monitored sites.

High Brown Fritillary (*Argynnis adippe*)			
No. years with Collated Index:	**34**	2011 Rank:	**31**
Change in Collated Index 2010-11 (%):	**0**	Long-term trend (%):	**-50**
Mean flight date 2011:	**10-July**	Series mean flight date:	**16-July**

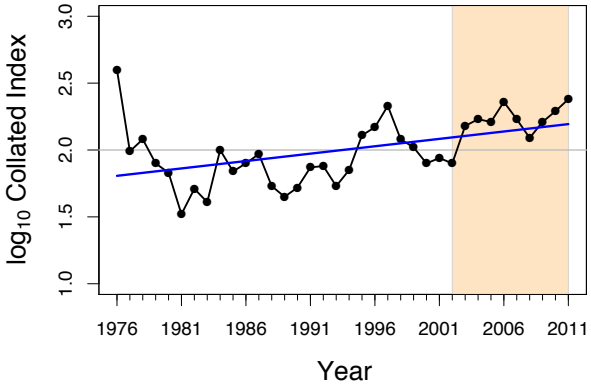
Collated Index plot:



High Brown Fritillary abundance showed no change in 2011, making it seven poor years in succession and one of the worst on record. Just 10 sites recorded three-figure indices (a third of the number recorded in previous good years), with the maximum being 670 at Trentishore Combe in Devon (a timed count site). The maximum weekly transect count was 52 on 27th June at Warton Crag RPB Reserve in Lancashire. Due to large annual fluctuations in earlier years, the apparent long-term decline is not significant and the long-term trend is classed as showing little or no overall change. However, there has been a significant decline over the last decade with abundance reduced by more than two-thirds.

Dark Green Fritillary (*Argynnis adippe*)			
No. years with Collated Index:	**36**	2011 Rank:	**2**
Change in Collated Index 2010-11 (%):	**23**	Long-term trend (%):	**149****
Mean flight date 2011:	**14-July**	Series mean flight date:	**22-July**

Collated Index plot:



Dark Green Fritillary abundance was above average for the ninth consecutive year, with the annual rise of 23% qualifying 2011 as the second best year on record. Substantial increases included: from 13 in 2010 to 105 in 2011 at Holkham in Norfolk, from 36 to 177 at Mottistone Down on the Isle of Wight and from 50 to 224 at Castle Hill in East Sussex.

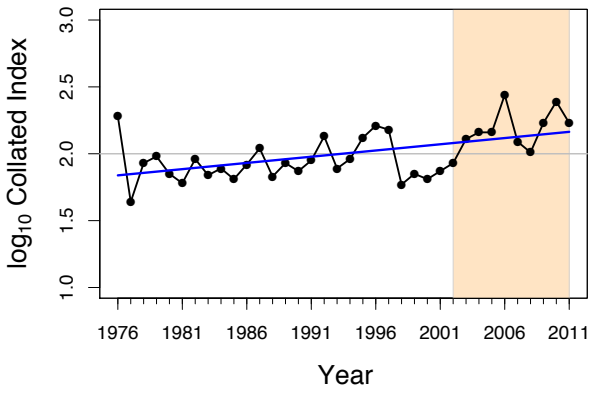
The butterfly fared less well in north-west England with only 4 of 17 sites showing an increase, all of which were relatively small. In the region, substantial declines were noted at Gait Barrows where the index dropped from 143 in 2010 to 22 in 2011 and at the National Trust transect at Eaves Wood where numbers were down from 62 in 2010 to 9 in 2011.

The maximum day count was recorded on the Tower Hill Wood transect at Porton Down in Wiltshire with an impressive 391 on 4th July. On the same day Lullington Heath in East Sussex also recorded its highest day count of 218.

The Dark Green Fritillary has increased significantly on monitored sites by almost 150% since 1976. In 2011, the mean flight date was advanced by just over a week compared to the long-term average.

Silver-washed Fritillary (*Argynnis paphia*)			
No. years with Collated Index:	**36**	2011 Rank:	**4**
Change in Collated Index 2010-11 (%):	**-31**	Long-term trend (%):	**116****
Mean flight date 2011:	**17-July**	Series mean flight date:	**26-July**

Collated Index plot:



Silver-washed Fritillary abundance dropped by almost a third in 2011, though numbers were still well above average with the year classed as the fourth best in the series.

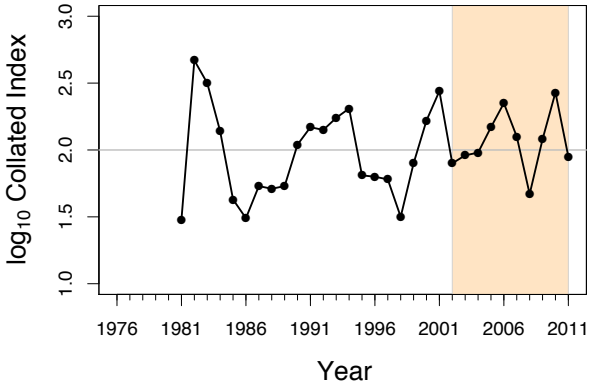
The largest site indices were 569 at Pamber Forest in Hampshire and 723 at Bentley Wood (Hawksgrove) in Wiltshire, the latter site recording the day maxima of 141 on 11th July.

There were first records from 13 regularly monitored sites (walked for at least the last five years), suggesting that the species is continuing to expand in range.

For the last nine years the index has been above the series average and there has been a significant increase in abundance since 1976 of more than 100%. The mean flight date was over a week earlier than the series average.

Marsh Fritillary (*Euphydryas aurinia*)			
No. years with Collated Index:	**29**	2011 Rank:	**18**
Change in Collated Index 2010-11 (%):	**-67**	Long-term trend (%):	**42**
Mean flight date 2011:	**20-May**	Series mean flight date:	**06-June**

Collated Index plot:



There was a substantial drop in Marsh Fritillary abundance in 2011 of more than two-thirds, with the year ranked below average. The largest site index was 316 at Cerne Abbas Giant in Dorset.

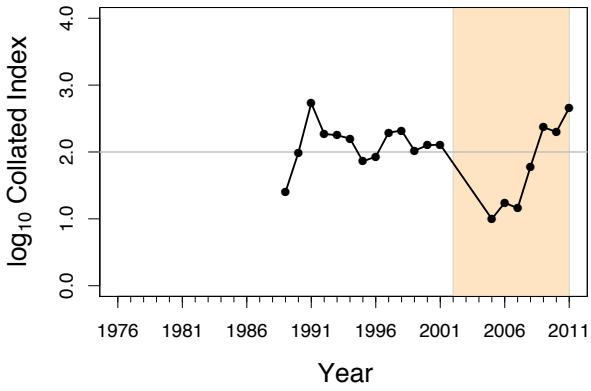
Interestingly, whilst the adult count at this site was up by more than double over 2010, the larval web count later in the year was down by 90% and by more than a factor of 10 compared to 2010.

The Marsh Fritillary can fluctuate considerably in abundance from year to year due to parasitism, weather and management effects (e.g. burning) and the apparent long-term increase is not significant.

The earliest record on monitored sites in 2011 was the 6th May at Clubmens Down in Dorset and the mean flight date was almost three weeks earlier than the series average.

Glanville Fritillary (*Melitaea cinxia*)			
No. years with Collated Index:	**20**	2011 Rank:	**2**
Change in Collated Index 2010-11 (%):	**129**	Long-term trend (%):	**-35**
Mean flight date 2011:	**31-May**	Series mean flight date:	**08-June**

Collated Index plot:



Glanville Fritillary abundance more than doubled in 2011, with the year being the second best in the series.

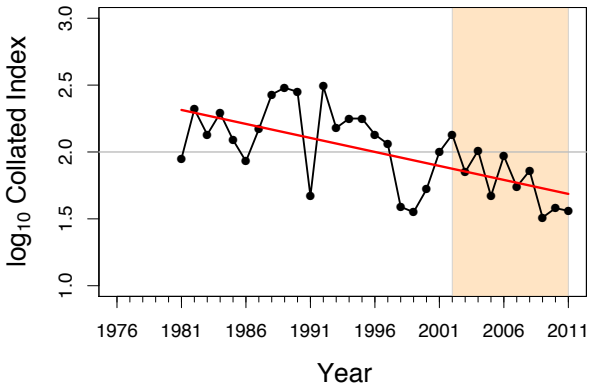
The trend for the Glanville Fritillary has been compiled from six English (including two introduction sites) and five Alderney, Channel Isles sites. On mainland UK, abundance increased at Sand Point in Avon (an introduction site) from 15 in 2010 to 36 in 2011. The highest UK index of 122 came from Mottistone Down on the Isle of Wight, whilst the maximum on Alderney was 154 at Trois Vaux.

The apparent decline across all sites since 1992 is not significant and the long-term trend is therefore classed as showing little or no overall change. The mean flight date was nine days earlier than the series average.

Glanville. *Photo by Nigel Jones*

Heath Fritillary (*Melitaea athalia*)			
No. years with Collated Index:	**31**	2011 Rank:	**29**
Change in Collated Index 2010-11 (%):	**-5**	Long-term trend (%):	**-78*****
Mean flight date 2011:	**07-June**	Series mean flight date:	**05-July**

Collated Index plot:



There was no overall improvement in the fortunes of the Heath Fritillary, with abundance reduced by 5% from 2010 levels, and 2011 classed as the third worst year in the series. However, there have been positive signs in recent years that this rare and threatened species is responding to targeted conservation management in some areas.

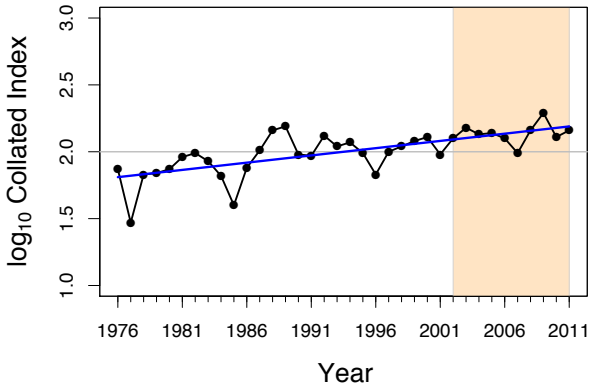
In 2011, positive annual changes on Exmoor sites monitored by timed counts included from 9 in 2010 to 259 in 2011 at Hollow Combe, from 90 to 887 at Spangate, from 457 to 1,364 at Hanny Combe and from 503 to 1,214 at Aller Combe. The butterfly had mixed fortunes in Blean Woods in Kent.

The largest index on a standard transect was 263 at Blean Woods RSPB Reserve and numbers were down at the Devon re-introduced site. The long-term trend remains a cause of conservation concern, with abundance reduced significantly by almost four-fifths since the early 1980s.

The Heath Fritillary was one of the species which showed the greatest advance in flight period in 2011, with the mean flight date almost a month earlier than the series average. The first record on a transect was on 19th May at Blean Woods but they were first seen as early as 6th May in Devon.

Speckled Wood (*Pararge aegeria*)			
No. years with Collated Index:	**36**	2011 Rank:	**4**
Change in Collated Index 2010-11 (%):	**12**	Long-term trend (%):	**145*** **
Mean flight date 2011:	**11-July**	Series mean flight date:	**27-July**

Collated Index plot:

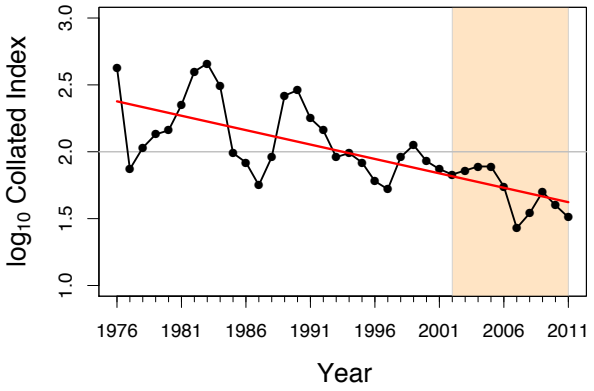


Speckled Wood annual abundance increased by 12%, continuing the run of good years over the last decade, with the 2011 index being the fourth best in the series. The largest annual increases included from 66 in 2010 to 202 in 2011 at Cavenham Heath in Suffolk and from 54 to 162 at Moors Valley in Dorset.

The largest site index was 577 at Pamber Forest in Hampshire, though this value was somewhat lower than the 915 recorded in 2010. The highest day count was 88 on 30th July at Itchen Valley Country Park (3 Copses) in Hampshire. Over the long-term, Speckled Wood abundance has increased significantly across the UK by almost 150%. The mean flight date was more than two weeks earlier than the series average.

Wall Brown (*Lasiommata megera*)			
No. years with Collated Index:	**36**	2011 Rank:	**35**
Change in Collated Index 2010-11 (%):	**-20**	Long-term trend (%):	**-83*** **
Mean flight date 2011:	**08-July**	Series mean flight date:	**28-July**

Collated Index plot:



It was another poor year for the Wall Brown, with annual abundance down by 20%. There hasn't been a run of good years since the late 1980s, and 2011 was the second worst year on record.

The only three-figure index was 133 at Dodman in Cornwall. The butterfly had a poor year at many sites, including Hucker's Bow, Sand Point in Avon and Southfield Hog Cliff in Dorset where, at each, none were seen in 2011 despite double figure indices in 2010.

Sites which bucked the trend included Bury Ditches in Shropshire where the index went from 1 in 2010 to 42 in 2011.

The Wall Brown has significantly declined by more than 80% since 1976 on monitored sites and has been lost from a lot of inland sites as its range in southern Britain has become increasingly restricted to the coast.

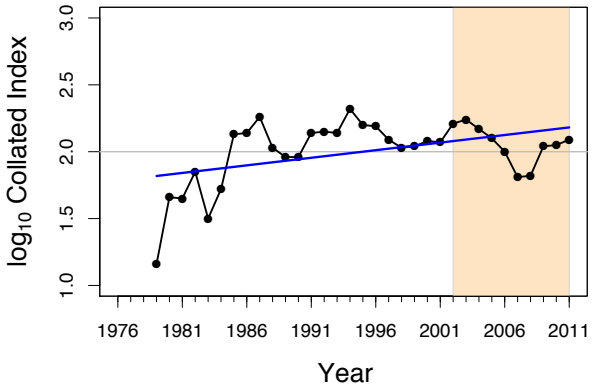
The mean flight date was 20 days earlier than the long-term average.

Mountain Ringlet (*Erebia epiphron*)

The Mountain Ringlet is our rarest resident brown, being restricted to high altitude grassland habitats in Scotland and northern England. This is a species for which we lack consistent data on any site, let alone across a number of sites, due to the difficulties of walking transects imposed by the changeable weather in such remote habitats. Thus, site indices are rarely produced. Monitoring of this species has been carried out since 1977 at Ben Lawers (Tayside) and counts were considerably higher in 2011 than in 2010. However, at the only other site with a good run of annual counts, Glasdrum (Argyllshire), numbers were down in 2011 compared with 2010, but were the second highest on record for this site since 2002. Improving the coverage of this rare and threatened species is a difficult task, but will enable us to determine more accurately its population status.

Scotch Argus (*Erebia aethiops*)			
No. years with Collated Index:	**33**	2011 Rank:	**14**
Change in Collated Index 2010-11 (%):	**10**	Long-term trend (%):	**136****
Mean flight date 2011:	**13-Aug**	Series mean flight date:	**10-Aug**

Collated Index plot:



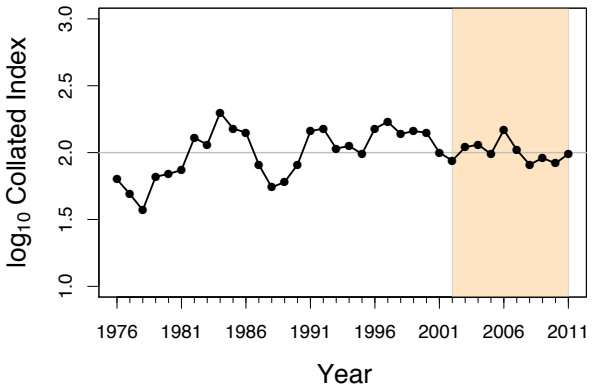
For the last three years there has been little change in Scotch Argus abundance, with a modest increase of 10% detected in 2011. The largest site index was 1,294 at Glasdrum in Strathclyde where there were four consecutive three-figure counts between 8th August and 1st September. Four other sites recorded three-figure indices, with the largest increase being from 275 in 2010 to 515 in 2011 at Arnside Knott in Cumbria.

There has been a significant increase in Scotch Argus abundance at monitored sites, although the species range is undersampled in Scotland so the trend may not be fully representative. There is a need to boost sample coverage, especially given that the number of monitored sites producing indices has waned from a series high of 20 sites in 2005 to just six in 2011. The Scotch Argus was one of the very few species to show a later flight period in 2011 than the series average, presumably a result of the poor weather during the flight period of this late summer species.

Scotch Argus. *Photo by Tim Melling*

Marbled White (*Melanargia galathea*)			
No. years with Collated Index:	**36**	2011 Rank:	**20**
Change in Collated Index 2010-11 (%):	**18**	Long-term trend (%):	**53**
Mean flight date 2011:	**04-July**	Series mean flight date:	**15-July**

Collated Index plot:



Marbled White abundance increased by a fifth in 2011, with the year classed as being at or just below average for the series. Three-figure indices were recorded at 96 sites, the largest of which was 2,275 at Whippingham (fields) on the Isle of Wight, over 800 more than 2010 at the same site and more than double the next highest index of 839 recorded at West Sedgemoor in Somerset. This was the fourth highest index on record with a peak count of 803 on 1st July. Five sites recorded the butterfly for the first time in 2011.

The Marbled White abundance trend is classed as showing little or no overall change across the UK since 1976, though there have been several periods of change. In the late 1970s and early 1980s there was a large increase coinciding with a range expansion.

There was then a substantial decline over a four-year period during which numbers dropped to the 1976 base year level. This was followed by another period of increase after which the population has remained relatively stable with small, regular annual fluctuations.

A plot of site trends is given in Figure 13. This shows that the majority (>50%) of site trends are classed as stable (no overall change), whilst there are proportionately more increasing sites in south-east England and at the northern range margin, and proportionately more decreasing sites in central-southern and south-western areas.

In 2011, the mean flight date was advanced by 10 days.

Marbled White. *Photo by Tony Cox*

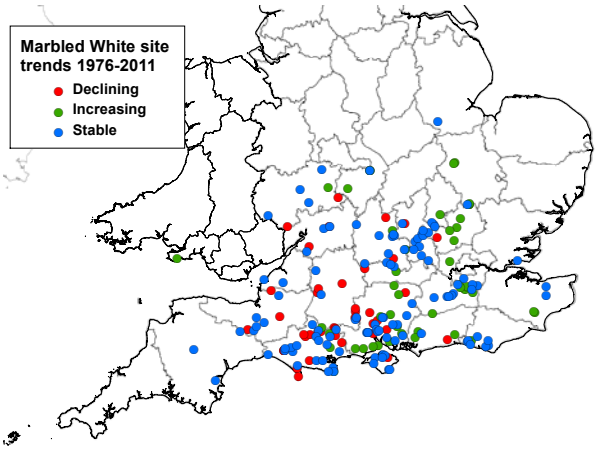
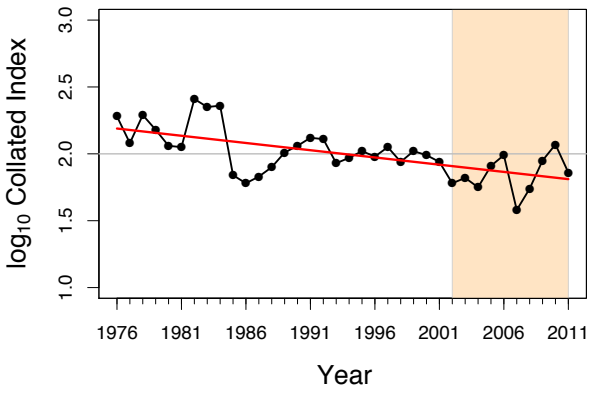


Figure 13. Long-term site trends for Marbled White since 1976 on sites with sufficient data.

Grayling (*Hipparchia semele*)			
No. years with Collated Index:	**36**	2011 Rank:	**28**
Change in Collated Index 2010-11 (%):	**-38**	Long-term trend (%):	**-59*****
Mean flight date 2011:	**02-Aug**	Series mean flight date:	**05-Aug**

Collated Index plot:

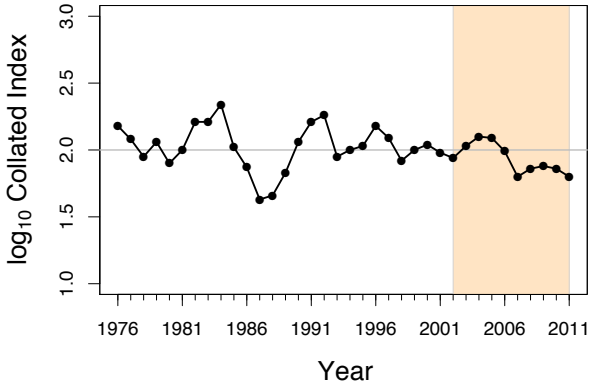


It was a poor year for Grayling, the ninth worst in the series, with annual abundance reduced by more than a third. Substantial declines included from 372 in 2010 to 98 in 2011 at North Warren in Suffolk and from 172 to 96 at Upton Heath North in Dorset.

There were nine indices which reached three-figures, the highest being 244 at Arnside Knott (National Trust) in Cumbria. The highest day count was 133 on 3rd July at the Great Orme Country Park in Gwynedd. Just to demonstrate how variable trends can be across sites, there was a spectacular increase at Crook Peak in Somerset, with an index of 140 in 2011 compared with eight in 2010. Grayling has declined significantly in abundance across the UK by almost 60% since 1976.

Gatekeeper (*Pyronia tithonus*)			
No. years with Collated Index:	**36**	2011 Rank:	**33**
Change in Collated Index 2010-11 (%):	**-13**	Long-term trend (%):	**-30**
Mean flight date 2011:	**01-Aug**	Series mean flight date:	**02-Aug**

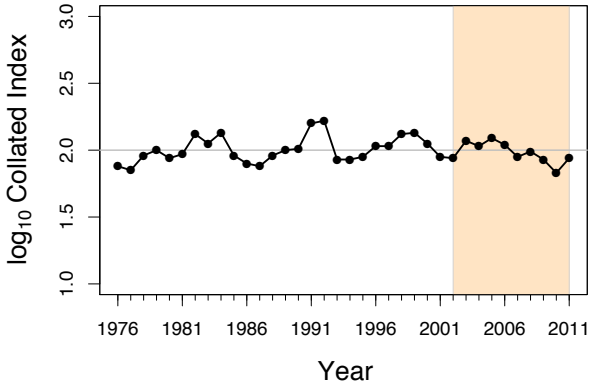
Collated Index plot:



For the fifth year in a row Gatekeeper abundance was well below the series average, with 2011 ranking as the fourth worst year since the start of monitoring. Across all sites, abundance was reduced by 13% between 2010 and 2011, though some sites fared substantially worse. At Fairmead in Essex there was a drop from 461 in 2010 to 114 in 2011 and at Hatfield Forest from 280 to 46. Four-figure indices were recorded at five sites, the maximum being 2,366 at Whippingham fields on the Isle of Wight. The long-term trend for Gatekeeper shows little or no overall change. The mean flight date in 2011 was very similar to the series average.

Meadow Brown (*Maniola jurtina*)			
No. years with Collated Index:	**36**	2011 Rank:	**26**
Change in Collated Index 2010-11 (%):	**28**	Long-term trend (%):	**4**
Mean flight date 2011:	**18-July**	Series mean flight date:	**21-July**

Collated Index plot:



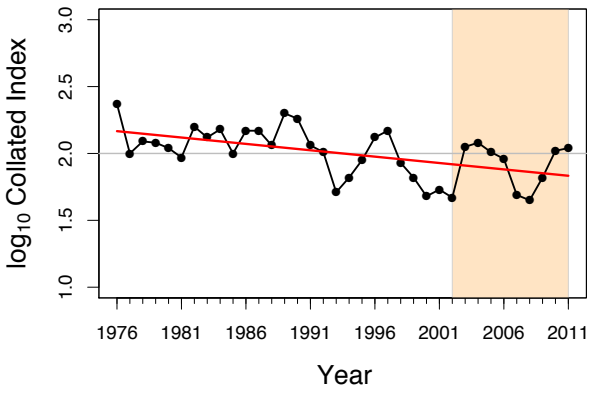
Meadow Brown abundance was up by 28% in 2011, though it was still a below average year, ranked 26 out of 36. Noteworthy increases included from 289 in 2010 to 1,092 in 2011 at Winspit Valley in Dorset and from 747 to 2,201 at Swan Barn Farm in Surrey. The largest index was an impressive 11,604 at Whippingham fields on the Isle of Wight, this being the fourth highest on record and the highest since 2003.

Sites which had a poor year with annual abundance decreasing by more than 80% included Breadsall Cutting in Derbyshire and the Gulley & Walcombe Slade in Somerset.

The long-term trend across monitored sites is classed as showing little or no overall change, with annual fluctuations small comparative to many other UK butterflies. The mean flight date was close to the series average.

Small Heath (*Coenonympha pamphilus*)			
No. years with Collated Index:	**36**	2011 Rank:	**17**
Change in Collated Index 2010-11 (%):	**5**	Long-term trend (%):	**-55****
Mean flight date 2011:	**07-July**	Series mean flight date:	**09-July**

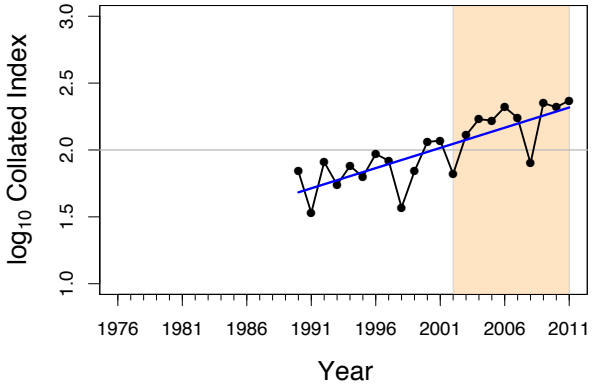
Collated Index plot:



Following an improved year in 2010, Small Heath received a further boost in 2011 with a modest 5% increase in abundance detected. Increases included from 360 in 2010 to 927 in 2011 at Frog Firle Farm in East Sussex and from 382 to 744 at Kingley Vale in West Sussex. The largest index of 1,820 was recorded at Friston Hill in Sussex, this being the fifth highest index on record for this butterfly. The Small Heath fluctuates considerably from year to year, though there has been a significant decline in abundance of more than 50% over the long-term. The available data suggests the butterfly is doing better in Wales and Scotland than in England. The mean flight date in 2011 was around the series average.

Large Heath (*Coenonympha tullia*)			
No. years with Collated Index:	**22**	2011 Rank:	**1**
Change in Collated Index 2010-11 (%):	**12**	Long-term trend (%):	**362*** **
Mean flight date 2011:	**05-July**	Series mean flight date:	**09-July**

Collated Index plot:



Although annual abundance was up by only 12%, Large Heath produced its highest index of the 22-year series. The largest increase was at Meathop Moss in Cumbria where there was a rise from 605 in 2010 to789 (a series high) in 2011.

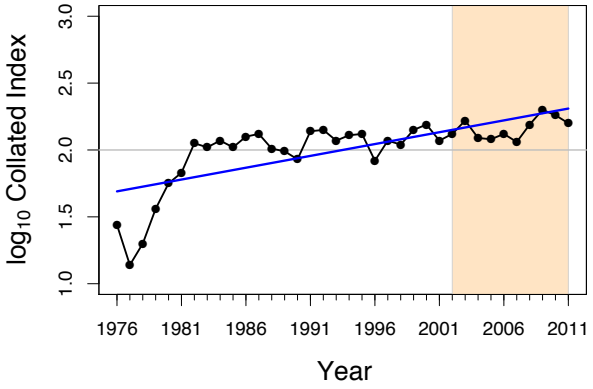
Cors Fochno in Ceredigion produced the highest Welsh index of 136, whilst Knowetop Lochs in Dumfries and Galloway topped the Scottish sites with 41. The peak day count, not too surprisingly, was recorded at Meathop Moss with an impressive 529 on 28th June.

In 8 of the last 10 years Large Heath has produced above average indices and there has been a significant increase in abundance of more than 350% over the series. However, with relatively few monitored sites (11 over the series) these results should be treated with caution, as they may not fully reflect the national picture.

The mean flight date in 2011 was within four days of the long-term average.

Ringlet (*Aphantopus hyperantus*)			
No. years with Collated Index:	**36**	2011 Rank:	**4**
Change in Collated Index 2010-11 (%):	**-13**	Long-term trend (%):	**334*** **
Mean flight date 2011:	**06-July**	Series mean flight date:	**15-July**

Collated Index plot:



For the second year in succession Ringlet abundance was down, with a 13% reduction from 2010. However, it was still a well above average year – the fourth best in the series. Sharp declines included from 238 in 2010 to 32 in 2011 at Friargate Station in Derbyshire, from 750 to 193 at Blunts Wood & Paiges Meadow in East Sussex and from 695 to 202 at Carrinton's New Farm in Buckinghamshire. The largest substantial increase was from 44 to 188 at Craigavon Lakes in Armagh, Northern Ireland. The largest site indices were 1,362 at Bradfield Woods in Suffolk and 1,005 at Wyre Forest West in Hereford and Worcester.

The Ringlet has increased significantly by more than 300% since 1976, though much of this increase was in the earlier years of the scheme and the population on monitored sites has since stabilised. Frequenting damper grassland habitats than some of the other browns on the wing at the same time, one might expect the Ringlet to have not declined in this recent run of wetter late-summers. However, temperatures were also down in July 2011 and the exceedingly dry spring may have had a deleterious effect on larval survival.

Ringlet was out exceptionally early in 2011 with transect records as early as 21st April in Northern Ireland at Breen Oakwood in Antrim and on 22nd April at Scadbury Park in Kent. However, these were two standout records with no more seen until 19th May and the mean flight date was just a week and a half earlier than the series average.

Online Data Entry for Transect Walkers

Last year we reported that online recording for the UKBMS was under development, and work on this feature has been progressing well. A test version has been examined by UKBMS staff and will receive further testing from a group of volunteers over the 2012/13 winter. We are now confident that this feature will be up and running for any volunteers who wish to use it during the 2013 season.

With the current version of Transect Walker (TW2.5) now seven years old, it is becoming rather out-dated and seems to pose new problems each time a new Windows operating system is released. Using an online system means that recorders are no longer required to install or operate proprietary software. You will just need access to the internet and your own login details.

The online system will help us to speed up data capture each year, as recorders will be entering their data directly onto a central database, rather than the current stand-alone version of Transect Walker which needs to be packaged and distributed at the end of each season. Many of the key features from Transect Walker will be carried over to the new system, with annual charts and plots available.

One key advantage is that you will not need to wait to the end of the season before you submit data, as you will now be able to do so, on a weekly basis. This also means that you will be able to see a summary of other transect data being entered week-by-week across the UK. County/Branch Co-ordinators will still have a very important role to play, and they will be able to access and examine all data from their area as it is submitted.

Transect Walker has served us very well for more than a decade and we will still be able to receive data in that format if preferred. However, we do see the online development as a big step forward and will be sending out further details to recorders in good time for you to set up your accounts prior to the 2013 season.

A new way of analysing UKBMS data

Emily Dennis, Steve Freeman, Tom Brereton, David Roy

We have been developing a new statistical method for analysing UKBMS data to make more efficient use of this fantastic dataset. Our existing methods are relatively inefficient at taking account of gaps in recording, for example, when there are unsuitable weather conditions. On average across the whole UKBMS dataset, 38% of visits are missed, with a higher proportion of weeks missed at the beginning and end of the season and a higher proportion missing from northerly versus southerly sites.

We are currently testing a new analytical approach which uses all data in the calculation of national and regional indices of butterfly populations (e.g. Log Collated Index plots over time). The method estimates the seasonal pattern (flight period) for each species each year (and for different geographic regions), to enable us to estimate missing counts. We then combine the estimated and observed counts, and correct for different sites recorded in different years, to calculate a national or regional index of abundance.

Compared to the existing approach, we have found that the new method provides more accurate and powerful estimates of trends over time in butterfly populations. In addition, the new method allows all volunteer records to contribute to the indices and thus incorporates data from more sites within the geographic range of species. On average, the new model enables 60 extra sites per species (range = 1 to 126 sites) to be included within calculations of national indices. We are currently finalising the description of the new method for publication and automating the new method within the data processing routines for the UKBMS. We aim to adopt the new analysis approach for reporting of 2012 UKBMS data, alongside a full comparison between the current and new method to be included in next year's report to recorders. We also aim to use the new method to incorporate data from the Wider Countryside Butterfly Survey within national and regional indices.

The Wider Countryside Butterfly Survey in 2011

Zoë Randle, Tom Brereton, Kate Riseley & David Roy

Introduction

In 2011 the Wider Countryside Butterfly Survey (WCBS) ran for a third successful year. Resources were at similar levels to previous years in England, Wales and Northern Ireland, though thanks to additional funding from Scottish Natural Heritage coverage was boosted considerably in Scotland. In total, 523 recorders made 1,467 visits to 723 squares, walking almost 3,000km of survey line and counting 67,570 butterflies of 45 species. There was a welcome 4% increase in the number of squares sampled from 693 in 2010 to 723 in 2011. However, there remained a 5% reduction in squares covered compared to 2009, the year the WCBS was launched.

Scheme organisation and participation

The WCBS runs as a partnership between Butterfly Conservation (BC), the British Trust for Ornithology (BTO) and the Centre for Ecology & Hydrology (CEH). Participants include recorders from the BTO/JNCC/RSPB Breeding Bird Survey (BBS) and BC volunteers. BC recorders were co-ordinated at the local level within BC branches through a network of WCBS Champions. National co-ordination was undertaken by Zoë Randle for BC with support for BBS recorders provided by Kate Risely at BTO HQ.

Survey coverage comprised 276 BBS squares sampled by BTO recorders, 362 squares sampled by BC recorders and a further 85 squares sampled by nine contractors in Scotland (Figure 14). BC coverage increased by 2% over the previous year, whereas BTO fell by 16%. Lack of promotion and uncertainty over the future of the scheme were likely to have contributed to this reduction. The weather may also have been a factor: the Met Office reported that summer 2011 was the coolest since 1993 and that summer rainfall was 18% above the norm, leading to many days that were unsuitable for butterfly recording.

The best BC Branch coverage (excluding any additional BBS squares) was achieved in Dorset and Norfolk with each covering 32 squares; Sussex came in second with 26 squares surveyed and Gloucestershire third with 22. BTO BBS square coverage was greatest in Sussex and Yorkshire (21 squares each), Kent (18), Upper Thames (18), South Wales (16) and West Midlands (16). The biggest increase in coverage was in Scotland with 73 more squares being surveyed than in 2010. However, in Scotland there are still large gaps in coverage. Scotland extends over ca. 32% of the UK land surface, yet accounted for only 17% of squares sampled, so ideally a doubling of effort is needed to eliminate the under sampling bias.

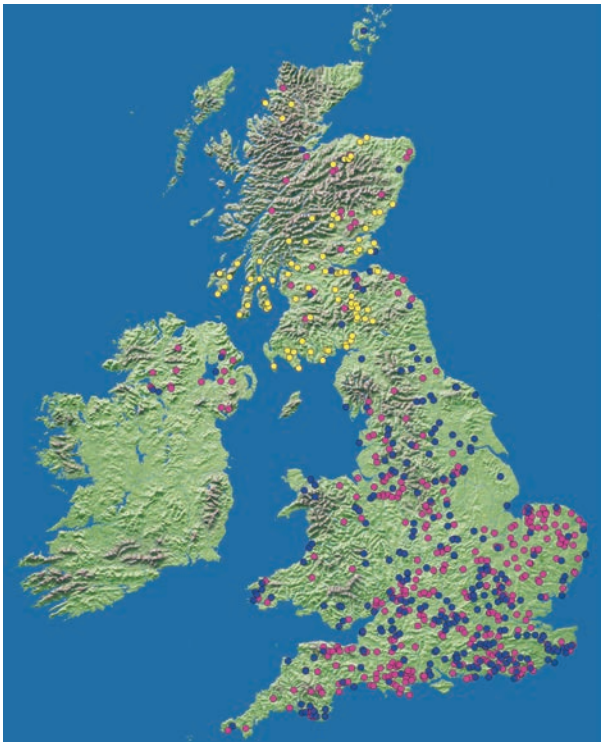


Figure 14. Location of the WCBS squares covered by BC (pink circles), BTO (blue) and contract (yellow).

We now have five years of WCBS data (if the pilot years of 2007 and 2008 are included) meaning that the time series of repeat samples squares is developing well, with 404 squares sampled in each of the three years of the survey and 78 squares with a five-year data run (including pilot surveys). In 2011, 172 new squares were established, 13% by BTO recorders, 38% by BC recorders and 49% by contractors in Scotland. During the core July to August survey period 1,306 surveys were completed, with 77% of squares (559 in total) receiving the required two visits (4% fewer than in 2010). Additional visits to squares included 135 in spring, 25 in September and 188 over the core period. Optional spring visits again proved valuable, providing records for species with spring flight periods. For example, Orange-tip was recorded in 32 squares.

The majority of recorders (82%) surveyed single squares, the maximum being six by Dave Ayling in Somerset. The most visits to a single square was seven (one more than last year) made by David Warren in Radnorshire, Wales. The busiest survey day was Monday 22nd August when 51 visits were made (3.4% of the year total), followed by Saturday 23rd July, with 48 visits. Data quality and recording standards were considered high again, with less than 0.01% of the records being obvious misidentifications, based on species known flight times and distributions. Efficiency in data collation was slightly up on 2010, with 82% of data being entered online (80% in 2010, 70% in 2009).

Red Admiral. *Photo by John Money*

Butterfly sightings

More than three-quarters of the UK's regularly occurring butterfly species were recorded, with the total of 45 being one fewer than in 2010 and two fewer than in 2009. Swallowtail and Silver-spotted Skipper were recorded for the first time in the survey, whilst absences included Grizzled Skipper, Marsh Fritillary, Purple Emperor and Wood White. Twenty-five species were recorded in 30 or more squares (the same number as in 2010), whilst 17 of these were recorded in more than 100 squares (see Table 3).

The WCBS continues to contribute data to the Butterflies for the New Millennium (BNM) database, with 44 new 10km square records generated for 19 species. Discoveries included new 10km records for Grayling in the Scottish Borders and Dumfries and Galloway and Dark Green Fritillary in Aberdeenshire, Argyll and Bute, Cambridgeshire, North Lanarkshire and West Lothian.

Comparisons with previous years

On average, recorders counted 47 butterflies of seven species per survey made over the July and August period. These figures represent a 22% reduction in numbers from 2010 and an alarming 41% from 2009, when recorders saw an average of 80 butterflies.

The figures from the WCBS concur with those from UKBMS transect sites and indicate that it was another relatively poor year for common and widespread butterflies. Species richness per survey was the same as 2010, but one fewer than in 2009.

The majority of wider countryside species were 'non-movers' having a similar distribution and abundance ranking in 2011 to what they had in 2010. In July and August, Meadow Brown was the most abundant species for the third year in a row with 9736 individuals counted, and the most widespread species for the second successive year, being found in over 80% of squares. Once again, a small suite of species accounted for the majority of individuals counted: Meadow Brown, Small White, Green-veined White, Large White and Gatekeeper comprised 63% of all butterflies seen (Table 3). It was an improved year for the Red Admiral, rising five places to become the 6th most frequently encountered butterfly.

A similar increase was mirrored in Butterfly Conservation's Big Butterfly Count **www.bigbutterflycount.org** where the Red Admiral rose from being the eighth most abundant species in 2010 to the fifth most abundant in 2011 and in the Garden Butterfly Survey (recorded in 91% of gardens in 2010 and 96% in 2011).

Scotch Argus attained a higher (and likely more representative) UK ranking, rising 11 places to become the eleventh most abundant species due to the coverage boost in Scotland. This butterfly was twice as abundant as Meadow Brown in squares where both species occurred. A better year was had by two of the 'golden skippers', for example, Essex Skipper was up six places in rank occupancy and five places in abundance. Both Small Tortoiseshell and Common Blue fared poorly in 2011, the latter being found in only a third of squares compared to 56% in 2010. The WCBS once again showed the current scarcity of the Small Tortoiseshell, with, on average, less than one likely to be seen per kilometre walked in the general countryside.

Wall Brown *Photo by Peter Eeles*

For a third consecutive year Wall Brown declined in distribution and for the first time was found in less than 10% of squares, qualifying it to be about as widespread as Silver-washed Fritillary and less so than Brown Argus. Figure 15 shows the distribution of Wall Brown and its associated change in abundance in WCBS squares for which there are two or more years of data. This

Table 3. Occurrence and abundance data for butterflies recorded during repeat summer visits to 559 WCBS squares

Species	Occupancy			Abundance		
	No. Squares	2011 % (2010)	2011 Rank (2010)	2011 Total counted	2011 % of all counted (2010)	2011 Rank (2010 Rank)
Meadow Brown	454	81.2 (81.3)	1 (1)	9736	18.4 (17.0)	1 (1)
Small White	426	76.2 (80.6)	2 (2)	8113	15.4 (16.2)	2 (2)
Green-veined White	409	73.2 (69.6)	3 (5)	4817	9.1 (9.0)	5 (6)
Large White	408	73.0 (79.6)	4 (3)	4411	8.4 (9.4)	6 (5)
Gatekeeper	386	69.1 (71.9)	5 (4)	6408	12.1 (13.7)	3 (3)
Red Admiral	368	65.8 (46.1)	6 (11)	1488	2.8 (1.2)	9 (11)
Speckled Wood	332	59.4 (63.1)	7 (6)	2736	5.2 (3.7)	7 (8)
Small Tortoiseshell	297	53.1 (56.8)	8 (7)	1884	3.6 (3.0)	8 (9)
Ringlet	275	49.2 (53.7)	9 (9)	5016	9.5 (9.4)	4 (4)
Peacock	266	47.6 (53.6)	10 (10)	1066	2.0 (2.2)	12 (10)
Comma	203	36.3 (45.7)	11 (12)	424	0.8 (1.0)	16 (13)
Common Blue	186	33.3 (56.0)	12 (8)	748	1.4 (5.2)	13 (7)
Small Skipper	140	25.0 (21.6)	13 (15)	1109	2.1 (1.2)	10 (12)
Holly Blue	124	22.2 (28.4)	14 (14)	314	0.6 (0.6)	19 (18)
Small Copper	121	21.6 (33.7)	15 (13)	310	0.6 (0.9)	20 (14)
Small Heath	99	17.7 (15.1)	16 (18)	632	1.2 (0.8)	14 (15)
Large Skipper	96	17.2 (19.2)	17 (16)	325	0.6 (0.7)	18 (17)
Small/Essex Skipper	62	11.1 (12.6)	18 (20)	355	0.7 (0.8)	17 (16)
Essex Skipper	59	10.5 (7.3)	19 (25)	287	0.5 (0.2)	21 (26)
Brimstone	53	9.5 (16.5)	20 (17)	109	0.2 (0.3)	26 (24)
Brown Argus	52	9.3 (13.4)	21 (19)	161	0.3 (0.6)	23 (19)
Marbled White	48	8.6 (11.4)	22 (21)	538	1.0 (0.6)	15 (20)
Wall Brown	41	7.3 (9.0)	23 (23)	158	0.3 (0.4)	24 (23)
Silver-washed Fritillary	40	7.2 (8.0)	24 (24)	142	0.3 (0.5)	25 (21)
Painted Lady	35	6.3 (10.5)	25 (22)	56	0.1 (0.2)	30 (27)
Purple Hairstreak	26	4.7 (3.7)	26 (26)	71	0.1 (0.1)	28 (30)
Scotch Argus	26	4.7 (1.4)	26 (31)	1068	2.0 (0.4)	11 (22)
Dark Green Fritillary	23	4.1 (2.4)	28 (27)	70	0.1 (0.1)	29 (33)
Grayling	13	2.3 (2.0)	29 (29)	164	0.3 (0.2)	22 (25)
Small Pearl-bordered Fritillary	13	2.3 (0.9)	29 (32)	78	0.1 (0.1)	27 (34)
White Admiral	8	1.4 (2.2)	31 (28)	9	0.0 (0.1)	35 (29)
Clouded Yellow	5	0.9 (1.5)	32 (30)	48	0.1 (0.1)	31 (28)
Chalk-hill Blue	4	0.7 (0.7)	33 (33)	13	0.0 (0.1)	34 (32)
Green Hairstreak	3	0.5 (0.3)	34 (-)	5	0.0 (-)	36 (-)
Orange-tip	3	0.5 (0.7)	34 (33)	6	0.0 (0.03)	37 (35)
Large Heath	2	0.4 (0.3)	36 (37)	34	0.1 (<0.01)	32 (39)
Lulworth Skipper	2	0.4 (0.2)	36 (38)	29	0.1 (0.02)	33 (36)
Northern Brown Argus	1	0.2 (-)	38 (-)	3	0.0 (-)	38 (-)
Silver-studded Blue	1	0.2 (-)	38 (-)	1	<0.01 (-)	39 (-)
Brown Hairstreak	1	0.2 (0.7)	38 (33)	1	<0.01 (0.01)	40 (37)
White-letter Hairstreak	1	0.2 (0.7)	38 (33)	2	<0.01 (0.01)	40 (38)
Dingy Skipper	1	0.2 (0.2)	38 (38)	1	<0.01 (<0.01)	40 (42)
Small Blue	1	0.2 (0.2)	38 (38)	1	<0.01 (<0.01)	40 (41)
Pearl-bordered Fritillary	0	- (-)	- (-)	-	- (-)	- (-)
Purple Emperor	0	- (-)	- (-)	-	- (-)	- (-)
Adonis Blue	0	- (0.2)	- (38)	-	- (0.08)	- (31)
Wood White	0	- (0.2)	- (38)	-	- (<0.01)	- (39)

confirms (as documented through BNM distribution surveys) that the butterfly is now highly localised in inland areas of Central and Southern England, and also shows that the pattern of increases and decreases across the UK in recent years is highly mixed. In squares where the butterfly was seen, the average number of individuals counted fell by a third (5.7 in 2009 to 3.8 in 2011), compared with a 35% decline on UKBMS monitored sites over the same period. Occupancy also fell - Wall Brown occurred in 46 squares in 2009 (6%) and 30 squares in 2011 (4%). The BC National Garden Butterfly Survey also showed that the number of gardens where Wall Brown was present fell by 33% from 2009 to 2011.

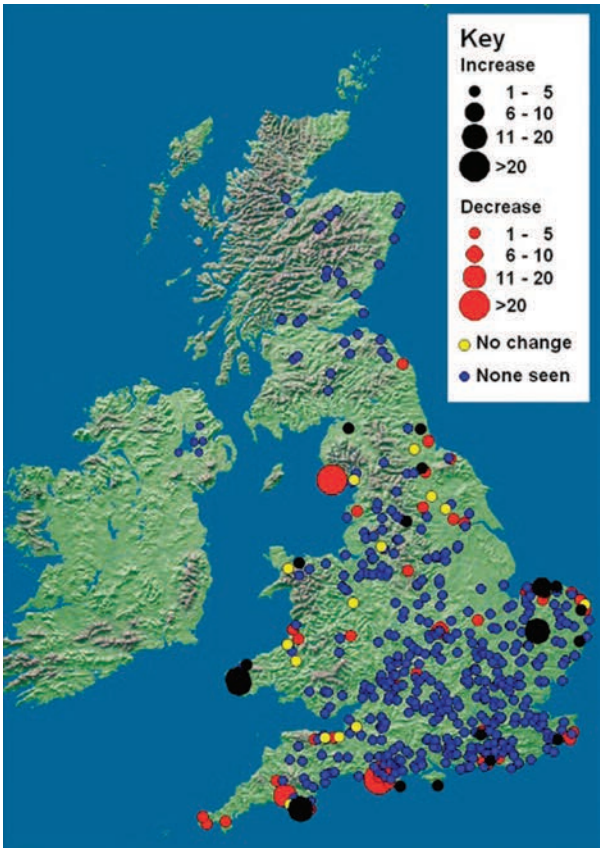


Figure 15. Distribution and abundance change of the Wall Brown on WCBS squares (with two more years of data 2009-2011). Black circles (increase), red circles (decrease), yellow circles (no change), blue circles (not seen).

Other Insects

Moth records were collected across 146 squares, with 754 individuals counted (52% fewer than in 2010) of 41 species (three less than in 2010). These figures were all down on 2010 levels, with recording in 26% fewer squares, 52% fewer moths counted and with three less species.

On average five moths per square were seen in 2011 compared to eight in 2011, representing a reduction in mean species richness of 38%. On the positive side, 40 new 10km square records were generated. The migrant Silver Y was the most widespread species, with 63 individuals counted in 40 squares. However, occupancy and abundance of this species declined by 53% and 76% respectively from 2010 levels. The Six-spot Burnet was the most abundant species with 133 individuals counted in 27 squares. In spite of this, as with the Silver Y, abundance of Six-spot Burnet fell by 30% compared to 2010. Occupancy and abundance of the remaining eight most frequent and abundant moths is given in Table 4.

Species	Squares	Total counted
Moths		
Silver Y	40	63
Six-spot Burnet	27	133
Yellow Shell	19	34
Common Carpet	16	35
Cinnabar	15	112
Humming-bird Hawk-moth	13	19
Shaded Broad-bar	12	19
Chimney Sweeper	11	92
Silver-ground Carpet	9	23
Narrow-bordered five-spot Burnet	6	43
Dragonflies		
Common Darter	56	249
Brown Hawker	52	94
Southern Hawker	41	77
Common Blue Damselfly	38	207
Banded Demoiselle	27	163
Golden-ringed Dragonfly	25	44
Migrant Hawker	22	72
Emperor Dragonfly	21	35
Common Hawker	13	34
Azure Damselfly	10	126

Table 4. Top ten most widespread and abundant day-flying moths and dragonflies

There were 25 species of dragonfly recorded, with 1,598 individuals counted across 222 squares (115 BTO, 95 BC, 12 contract). Dragonfly numbers were down by 50% compared with 2010, with recording in 40 fewer squares. The Common Darter was the most widespread species for the third year running, being detected in 25% of squares with dragonfly records (the same level as in 2010). This insect was also the most abundant species, replacing the Common Blue which held this position in 2009 and 2010.

It was a good year for the Migrant Hawker, with abundance up on 2010 levels.

Common Darter *Photo by Stephen Burch* (www.stephenburch.com)

Future plans

The WCBS will be organised in the same way for at least the next two years, with Zoë Randle co-ordinating the scheme for Butterfly Conservation. We hope to recruit more volunteers to continue to grow the scheme. Please contact Zoë at Butterfly Conservation if you would like to take part.

Magdalen Hill Down – restoring butterfly populations over the long-term

Dr Andy Barker

Situated in central Hampshire, Butterfly Conservation's Magdalen Hill Down (MHD) Reserve, near Winchester, is one of the top chalk grassland sites in the county. It records around 30 butterfly species annually and, with others turning up as strays, the overall tally for the site exceeds 35 species. The reserve can be considered in three parts, each of which has a butterfly transect. These transects are organised on a rota basis involving five people per site. This seems to work well, producing consistent data, and few missed weeks (usually 24+ weeks covered annually). This article summarises the history of the site, its monitoring, and some of the noteworthy trends.

High quality chalk grassland at Magdalen Hill Down (original)

The initial transect, known as 'Magdalen Hill Down (original)' was set up in 1990, when Butterfly Conservation began to manage what had become a heavily scrubbed-over piece of south-facing chalk downland. Despite the scrub, the site retained small populations of many chalk grassland butterflies in sheltered pockets. With appropriate conservation management, many of these species have since shown dramatic increases.

The original area of downland extending over nine hectares was added to in 1996, when an opportunity arose to acquire an adjacent field to the east. This site, known as 'Magdalen Hill Down (extension), added a further 13 hectares to the reserve. With the exception of a tiny fragment of unimproved chalk grassland in the south-west corner, this new addition was an arable field. With Heritage Lottery funding it was transformed in 1997 by re-seeding with a local provenance chalk grassland mix. Although still a long way from chalk downland, it has since then become high quality butterfly habitat.

Chalkhill Blue *Photo by Keith Warmington*

The most recent acquisition is a 23 hectare area known as 'Magdalen Hill Down (north)'. This, another former arable field, came under the management of Butterfly Conservation in 2004, when it too was re-seeded. It adjoins both the 'original' and 'extension', to make a nature reserve of 45 hectares (110 acres), 36 hectares of which is arable reversion, and nine hectares of restored downland. All sites are managed by cattle and sheep grazing, with varying levels of rabbit activity, especially on MHD original. Some of the key results from the butterfly transect monitoring will now be considered.

Rise of the Chalkhill Blue (*Polyommatus coridon*)
Since scrub clearance in the early 1990s, and subsequent introduction of cattle and sheep grazing, the chalk grassland condition at MHD 'original' has improved considerably. This has resulted in a 10-fold increase in numbers of Chalkhill Blues. It showed a rapid year on year rise from an Annual Index of 317 in 1991 to 1,345 in 1996 at a time when many sites were declining (Figure 16). Since then the Annual index has always exceeded 1,000, peaking at 3,923 in 2010.

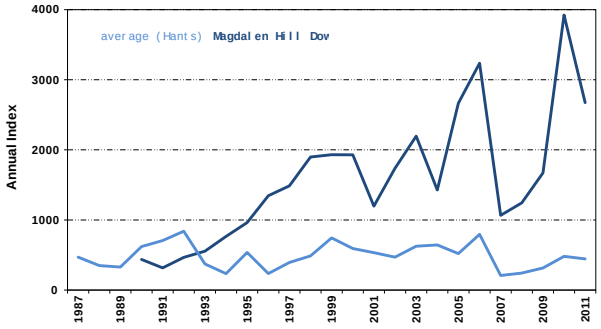


Figure 16. Annual changes in Chalkhill Blue abundance at Magdalen Hill Down Reserve compared with the average across Hampshire

Common Blue bonanza
The Common Blue is one of Britain's most widely distributed butterflies, yet to find sites where the butterfly truly thrives is not as easy now as it used to be. Fortunately, Magdalen Hill Down is one of those sites where the species does really well. Most encouraging of all, it has established a major breeding population on MHD 'extension', which as mentioned previously, was an arable field until 1996. From an Annual Index of 50 in 1996, the re-seeded grassland mix, with lots of Bird's-foot Trefoil, clearly produced ideal habitat. By 1999 the Annual Index reached 575, and after, a decade producing indices averaging around 500, the 2010 summer produced the remarkable Annual Index of 1,507. In 2011, this figure crashed to a lowly 257, as indeed was the case throughout Hampshire, but the long-term trend at the site is clearly upward.

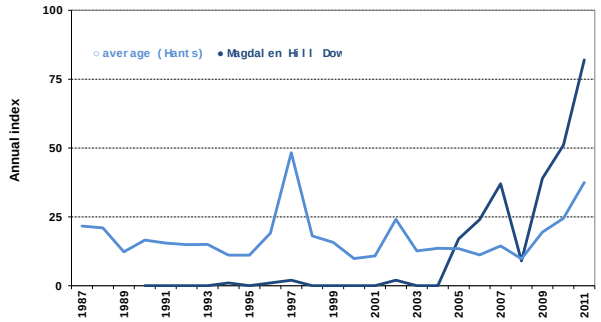


Figure 17. Annual changes in Grizzled Skipper abundance at Magdalen Hill Down Reserve compared with the average across Hampshire

Return of Grizzled Skippers
One of the most amazing stories since butterfly transect monitoring began at Magdalen Hill Down has got to be the return of the Grizzled Skippers to MHD 'original'. It was extremely rare to see the butterfly on the site during the 1990s, with annual indices of zero in all bar four of the first 15 years (Figure 17). Only 1994 (1), 1996 (1), 1997 (2) and 2002 (2) produced any Grizzled Skippers. Imagine the surprise of the transect walkers, when suddenly in 2005 the species turned up throughout the early part of the season to produce an Annual Index of 17. With the exception of a dip in 2008, the numbers have risen ever since, with 2011 producing a remarkable Annual Index of 82. Whether this is a natural recolonisation or the recovery of a tiny population that was always present is not entirely clear, but whatever the case, the site has now become one of the best sites in Hampshire for the species. It should be added that Dingy Skipper also occurs at the site and, despite all the Bird's-foot Trefoil, it has only been recorded on transect intermittently in 9 of the 22 transect years from 1990 to 2011, producing a maximum annual index of four. Even so, I remain convinced that it is only a matter of time before it too will undertake an expansion like the Grizzled Skipper has.

Small Blues take off in 2011
The Small Blue is currently known from about 15-20 sites in Hampshire, including a concentration of sites around Winchester. Despite locally frequent Kidney Vetch, Magdalen Hill Down 'original' has never produced many Small Blues on transect. The short turf and heavy rabbit grazing in the mid 1990s didn't really provide much suitable habitat, and half the transect years from 1990 to 2009 produced blanks. Other years recorded occasional individuals.

By contrast, the re-seeded grasslands of MHD 'extension' and more recently MHD 'north' have provided transitional swards that are ideal for the species. In each case it was found that Kidney Vetch, a key species of the grassland mix, thrived in the early years, when the sward was open with a lot of bare earth. As the sward matures, it tends to close in and Kidney Vetch does less well. To counteract this, bare earth scrapes have been created, and flowering Kidney Vetch thrives in and around these. Populations are perhaps too small to comment on trends, except to say that at MHD 'north', from an arable field with no Small Blues in 2004, single figure annual indices were produced from 2006-2009, then rising to 18 in 2010, and an impressive 48 in 2011. On this form, it now rates as one of the best sites in Hampshire. MHD 'extension' and MHD 'original' also produced double-figure annual indices in 2011, with tallies of 14 and 11 respectively, making it the best year for the species since transect recording began.

Restored grassland at Magdalen Hill Down, with abundant Kidney Vetch

Satyrids respond well to re-seeded grassland
Starting butterfly transects in year zero prior to arable reversion to flower-rich grassland by re-seeding has proved extremely interesting in understanding which species colonise the newly created habitat. The response of Common Blue has already been described, but let us now consider the Satyrids, some of which colonised very well, but others are still to get going.

Magdalen Hill Down 'original' and the tiny remnant of unimproved chalk grassland in one corner of MHD 'extension' had known populations of Meadow Brown, Gatekeeper, Ringlet, Marbled White and Small Heath prior to arable reversion, so which of these would colonise the re-seeded grasslands?

Undoubtedly the best coloniser has been the **Meadow Brown**, which on MHD 'extension' started with an Annual Index of 189 in 1996, but rose steadily to 1,083 in 2001, before fluctuating at around 1,000-1,200 since then, apart from a peak of 2,615 in 2004. The levelling-off may suggest that it has reached the carrying capacity of the habitat. Of the 10 main grasses present in the sward, Smooth Meadow Grass (*Poa pratensis*) is considered as the main species used by the Meadow Brown, even though it isn't the dominant grass (see Jeffreys & Barker, 2011 – available here **http://www.hantsiow-butterflies.org.uk/conservation/mhd%20botany.pdf**). The more recently re-seeded MHD 'north' has also shown good colonisation by Meadow Brown, rising from an Annual Index of 55 in 2005 to 730 in 2011, with further increases expected.

Although showing a rapid initial response at MHD 'extension' from an Annual Index of 175 in 1996 to 430 in 1998, **Marbled White** numbers then fluctuated in the 100-300 range before rising to 453 in 2011. Interestingly, the individuals were largely concentrated in the small area of remnant grassland (Section 6 of transect) up to 1998, but since then they have spread across the re-seeded grassland with numbers in Section 6 greatly reduced. On MHD 'north', Marbled White has shown an amazing rise in just seven years, with zero on transect in 2004, to a spectacular Annual Index of 623 in 2011. Clearly it likes the newly created habitat.

From 1996 to 2005, the **Ringlet** annual indices at MHD 'extension' fluctuated in the seven to 30 range before rising to approximately 60-70 over the period 2006-2008, then more than 200 in each year since 2009, peaking at 272 in 2011. It is unclear to what extent this species breeds in the re-seeded area, but the population appears to be strengthening. The same pattern is also reflected at MHD 'north', rising steadily, year on year, from an Annual Index of seven in 2005 to 140 in 2011.

Gatekeeper is seen with Meadow Brown at grassland sites throughout Hampshire, but their habitat needs are clearly different. At both MHD 'extension' and MHD 'north' it hasn't really taken to the re-seeded grasslands, but has simply shown fluctuating annual indices. The same is also true for the **Small Heath**, but given the negligible amounts of Sheep's Fescue in the re-seeded habitat it is perhaps not surprising, as this is the favoured larval foodplant. Nevertheless, Small Heath did produce 2011 Annual Indices of 43 at MHD 'extension' and 48 at MHD 'north', which is fairly respectable given that the downland of MHD 'original' only had an index of 93.

Marbled White Photo by *Keith Warmington*

Hampshire's flagship Brown Argus site
Magdalen Hill Down 'original' is probably the best Brown Argus site in Hampshire. However, it has to be said that the numbers of this species seen on transect vary greatly from one year to the next. In 1990 an Annual Index of 390 was recorded, but undoubtedly the best years were in the mid-1990s, peaking with a massive Annual Index of 921 in 1995. At this time rabbit pressure on the site was high and Common Rock-rose flourished in a short turf (5-8cm), open sward, with

plenty of bare earth. Since then rabbit pressure has eased considerably and, despite annual grazing with cattle and sheep, a combination of warm wet summers and mild winters has caused turf heights to rise to 10-15cm and the sward to become tighter. This has caused Brown Argus Annual Indices to reduce to the 200-500 range, which is still good, but not perhaps as good as it could be. It should be pointed out, however, that Chalkhill Blue has thrived under these slightly longer turf heights.

Brown Argus *Photo by Neil Hulme*

The Clouded Yellow years

The 1990s saw a good run of Clouded Yellow years in Hampshire, with every even-numbered year being good, and each odd-numbered year being poor. This was reflected in the MHD 'original' transect annual indices, but only 1996 (23) and 2000 (22) produced Annual Indices of note. After a zero index in 2001, the period 2002-2006 was a remarkable period for Clouded Yellow, with each year producing a double-figure annual index.

The same pattern also occurred at MHD 'extension'. Indeed, the re-seeded grassland, rich in Bird's-foot Trefoil, proved ideal breeding habitat for the species, with a series high Annual Index of 69 in 2000. The last couple of years have been very poor, with none seen on any of the Magdalen Hill Down transects in 2011.

Painted Lady invasions

There is no doubt that 1996 and 2009 were truly exceptional Painted Lady years, and south-facing chalk grassland sites like Magdalen Hill Down recorded very high numbers of this species, although depending on which day you did the transect at the key period made some difference. A typical year on the MHD 'original' transect produces a Painted Lady Annual Index of c.1-8, whereas in 1996 and 2009, the figures were 165 and 185 respectively. Even these seem fairly modest when compared with MHD 'extension', where values of 517 in 1996, and 1,940 in 2009 were achieved. This magnificent Painted Lady invasion has been well documented in other publications, but is still worthy of mention here, as it undoubtedly ranks as one of the greatest butterfly events recorded on the Magdalen Hill Down butterfly transects.

Final remarks

Space does not permit a full account of all the other species, but I should perhaps mention that Magdalen Hill Down has a strong population of Green Hairstreaks, with Annual Indices on MHD 'original' ranging from 15-80, and peaking at 110 in 1996. Dark Green Fritillary and Duke of Burgundy are occasionally seen, and sometimes on transect, but are not currently regarded as breeding species at the site.

I have been fortunate enough to have been involved with Magdalen Hill Down and transect recording at the site since Butterfly Conservation started there in 1990. It is a truly inspirational site that has demonstrated what can be achieved with direct conservation action and long-term commitment, coupled with detailed monitoring.

Some of the butterfly trends have been anticipated, some have been a complete surprise, and others have been truly spectacular, but above all it is a site that through a combination of the efforts of professional staff and volunteers has demonstrated butterfly populations can recover and natural recolonisations are possible, especially if the site is of a reasonable size and well managed.

Contact details for local co-ordinators

RECORDING AREAS	NAME & ADDRESS OF CO-ORDINATOR	TELEPHONE	EMAIL
UK	Ian Middlebrook Butterfly Conservation, Manor Yard, East Lulworth, Wareham, Dorset, BH20 5QP.	01929 400209	transect@butterfly-conservation.org
SCOTLAND (overall)	Vacant		
NORTHERN IRELAND	Catherine Bertrand Butterfly Conservation, Slemish Complex, Knockbracken Healthcare Park, Saintfield Road, Belfast, BT8 8BH	07584 597690	cbertrand@butterfly-conservation.org
WALES (overall)	Clare Williams Butterfly Conservation (Wales), 10 Calvert Terrace, Swansea, SA1 6AR	01792 642972	cwilliams@butterfly-conservation.org
ISLE OF MAN	Vacant		
ENGLAND			
NORTHERN ENGLAND (Fritillaries)	Dave Wainwright Butterfly Conservation, Low Barns Visitor Centre, Witton-le-Wear, Bishop Auckland, DL14 0AG	01388 488428	dwainwright@butterfly-conservation.org
Bedfordshire & Northamptonshire	Greg Herbert 3 Candale Close, Dunstable, Bedfordshire, LU6 3PE	01582 663784	
Bedfordshire & Northamptonshire	Data co-ordinator Keith Balmer 6 Salcombe Close, Bedford, Bedfordshire MK40 3BA	01234 355435	keith@balmer.co.uk
Cambridgeshire	Louise Bacon 236 Wimpole Road, Barton, Cambridge, CB23 7AE		recorder@cambs-essex-butterflies.org.uk
Cheshire & Peak District	Stu Burnet 17 Alderdale Road, Cheadle Hulme, Cheadle, Cheshire, SK8 5PP	0161 485 5107	stuburnet@ntlworld.com
Cornwall	Jim Barker An Arth, Alexandra Road, St Ives, Cornwall, TR26 1BX	01736 794134	jimfrances@talktalk.net
Cumbria	Vacant		
Devon	John Randall 112 Peters Park Lane, St Budeaux, Plymouth, Devon, PL5 1PT	01752 309857	jmrandall@blueyonder.co.uk
Dorset	Bill Shreeves Little Garth, 5 Butt's Mead, Shaftesbury, Dorset, SP7 8NS	01747 852587	w.shreeves@btinternet.com
East Midlands	Ken Orpe 34 Derwent Avenue, Allestree, Derby, DE22 2DQ	01332 730524	ken@malaga.plus.com
Essex	Robert Smith 165a Warley Hill, Great Warley, Brentwood, Essex, CM13 3AG		recorder@cambs-essex-butterflies.org.uk
Gloucestershire	Chris Wiltshire The Brambles, Stinchcombe Hill, Dursley, Gloucestershire, GL11 6AQ	01453 545509	chriswiltshire164@o2.co.uk
Hampshire & I.O.W.	Andy Barker 13 Ashdown Close, Chandlers Ford, Eastleigh, Hants, SO53 5QF	02380 270042	aj3barker@btinternet.com
Herts & Middlesex	Dr John Murray Field End, Marshalls Heath, Wheathampstead, Herts, AL4 8HS Andrew Wood 93 Bengeo Street, Hertford, SG14 3EZ	01582 833544 01992 503571	j.b.murray@open.ac.uk zoothorn@ntlworld.com
Kent	Ade Jupp		ade_jupp@hotmail.com

RECORDING AREAS	NAME & ADDRESS OF CO-ORDINATOR	TELEPHONE	EMAIL
Lancashire	Laura Sivell 22 Beaumont Place, Lancaster, LA1 2EY	01524 69248	laura.sivell@mypostoffice.co.uk
Lincolnshire	Robert Day Little Holme Road, Walpole Cross Keys, King's Lynn, Norfolk, PE34 4EW	01553 829077	rd2736@my.open.ac.uk
Norfolk	Vacant		
North East England (Durham & Northumberland)	Brian Denham 1 Swaledale Avenue, Darlington, DL3 9AJ	01325 263449	brian.denham@ntlworld.com
Somerset & Bristol	Marjorie Brunt Kea House, Chapel Lane, Butleigh, Glastonbury, Somerset BA6 8TB	01458 850919	Marjorie.brunt@onetel.com
Suffolk	Rob Parker 66 Cornfield Road, Bury St Edmunds, Suffolk, IP33 3BN	01284 705476	robparker@waitrose.com
Surrey	Richard Donovan 65 Stoughton Avenue, Cheam, Surrey SM3 8PH	0208 6441563	Richard.Donovan@Reichhold.com
Sussex	Peter Atkinson 55 Furze Road, Worthing, W. Sussex, BN13 3BH	01903 690943	patkinson55@tiscali.co.uk
Upper Thames (Berks, Bucks & Oxon)	Mike Wilkins 65, The Causeway, Steventon, Abingdon, Oxfordshire, OX13 6SE	01235 831300	mikeawilkins@googlemail.com
Warwickshire	Keith Warmington 30 New Street, Baddesley Ensor, Atherstone, Warwickshire, CV9 2DW	01827 715873	keith@warmies.co.uk
West Midlands	John Tilt 9 Meadow Close, Flyford Flavell, Worcs., WR7 4DE	01386 792458	John.Tilt2@btopenworld.com
Wiltshire	Geoff Hobson 30 Leigh Road, Westbury, Wiltshire, BA13 3QL	01373 823820	m5eay.geoff@btinternet.com
Yorkshire	Jean Murray 'High Up', Binns Lane, Holmfirth, West Yorkshire, HD9 3BJ	01484 685286	eeh_oop@yahoo.co.uk
WALES			
Ceredigion	Vacant		
Denbigh, Flintshire & Wrexham	Vacant		
Glamorgan	Vacant		
Gwynedd & Anglesey	Andrew Graham 'Trawscoed', Llanuwchllyn, Bala, Gwynedd, LL23 7TD	01678 540370	angrhm@globalnet.co.uk
Monmouthshire	Vacant		
Montgomeryshire	Vacant		
Pembrokeshire	Bob Haycock 1 Rushmoor Cottages, Martletwy, Narberth, SA67 8BB	01834 891667	rushmoor1@tiscali.co.uk
Powys & Brecon Beacons National Park	Julian Jones Radnorshire Wildlife Trust, Warwick House, High Street, Llandrindod Wells, Powys, LD1 6AG	01597 823298	julian@rwtwales.org

RECORDING AREAS	NAME & ADDRESS OF CO-ORDINATOR	TELEPHONE	EMAIL
SCOTLAND			
Renfrewshire	Neil Gregory 32 Oldhall Drive, Kilmacolm, Renfrewshire, PA13 4RF	01505 874 275	droitwich@btinternet.com
Ayrshire	Vacant		
Borders	Vacant		
Dumfries & Galloway	Andy Riches		Slioch69@aol.com
East Lothian	Nick Morgan East Lothian Council, Landscape & Countryside Division, Block C, Haddington, East Lothian, EH41 3HA	01620 827671	nmorgan@eastlothian.gov.uk
Fife	Duncan Davidson 140 Pitcorthie Drive, Dunfermline, KY11 8BJ	01383 730 446	duncan.davidson@calnexsol.com
Highlands	Hilary Quick Scottish Orienteering Association, National Orienteering Centre, Glenmore Lodge, Aviemore, PH22 1QU	01479 861374	hilary@scottish-orienteering.org
Lanarkshire	Louisa Maddison Countryside & Greenspace Service, Calderglen Country Park, East Kilbride, G75 0QZ	01355 236 644	Louisa.Maddison@southlanarkshire.gsx.gov.uk
Stirlingshire, Argyllshire & Bute	Andrew Masterman Flat 1/3, 214 Calder Street, Glasgow, G42 7PE	0141 4231336	andrewmasterman@hotmail.com

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Appendix I

Appendix 1: Trends in UK BAP Priority species

BAP priority species	No. sites where declining	No. sites where increasing	No. sites where stable	Total sites recorded at	Change in Collated Index 2010-11 (%)
Brown Hairstreak	3	4	10	83	-27
Dingy Skipper	39	28	140	583	26
Duke of Burgundy	28	5	24	141	65
Glanville Fritillary	0	0	1	13	129
Grayling	28	6	59	319	-38
Grizzled Skipper	30	21	104	437	96
Heath Fritillary	14	2	17	54	-5
High Brown Fritillary	16	5	40	126	0
Large Blue	1	4	7	29	-21
Large Heath	1	2	8	41	12
Lulworth Skipper	4	1	1	22	84
Marsh Fritillary	18	9	49	222	-67
Northern Brown Argus	9	1	19	70	21
Pearl-bordered Fritillary	29	6	44	225	103
Silver-studded Blue	5	3	20	106	4
Small Blue	13	16	54	282	26
Small Heath	113	23	295	1250	5
Small Pearl-bordered Fritillary	27	14	61	291	17
Swallowtail	0	1	0	11	41
Wall Brown	102	6	118	776	-20
White Admiral	20	17	83	333	-51
White-letter Hairstreak	8	5	19	246	-16
Wood White	8	1	12	84	-41

Appendix II

Vernacular & scientific names of butterfly species referred to in this report (vernacular names follow Emmet and Heath (1990) The Moths and Butterflies of Great Britain and Ireland Volume 7 Part 1, Harley Books, Colchester. The scientific names follow the Fauna Europaea website (version 2.2) www.faunaeir.org, accessed on 27-09-2010

Common name	Scientific name	Authority	Page no. for species account
Adonis Blue	*Polyommatus bellargus*	(Rottemburg, 1775)	25
Black Hairstreak	*Satyrium pruni*	(Linnaeus, 1758)	21
Brimstone	*Gonepteryx rhamni*	(Linnaeus, 1758)	16
Brown Argus	*Aricia agestis*	Denis & Schiffermuller, 1775)	23
Brown Hairstreak	*Thecla betulae*	(Linnaeus, 1758)	19
Chalk-hill Blue	*Polyommatus coridon*	(Poda, 1761)	24
Chequered Skipper	*Carterocephalus palaemon*	(Pallas, 1771)	11
Clouded Yellow	*Colias croceus*	(Fourcroy, 1785)	16
Comma	*Polygonia c-album*	(Linnaeus, 1758)	30
Common Blue	*Polyommatus icarus*	(Rottemburg, 1775)	24
Cryptic Wood White	*Leptidea juvernica*	(Williams, 1946)	16
Dark Green Fritillary	*Argynnis aglaja*	(Linnaeus, 1758)	32
Dingy Skipper	*Erynnis tages*	(Linnaeus, 1758)	14
Duke of Burgundy	*Hamearis lucina*	(Linnaeus, 1758)	26
Essex Skipper	*Thymelicus lineola*	(Ochsenheimer, 1808)	12
Gatekeeper	*Pyronia tithonus*	(Linnaeus, 1767)	38
Glanville Fritillary	*Melitaea cinxia*	(Linnaeus, 1758)	34
Grayling	*Hipparchia semele*	(Linnaeus, 1758)	37
Green Hairstreak	*Callophrys rubi*	(Linnaeus, 1758)	19
Green-veined White	*Pieris napi*	(Linnaeus, 1758)	18
Grizzled Skipper	*Pyrgus malvae*	(Linnaeus, 1758)	14
Heath Fritillary	*Melitaea athalia*	(Rottemburg, 1775)	34
High Brown Fritillary	*Argynnis adippe*	(Denis & Schiffermuller, 1775)	32
Holly Blue	*Celastrina argiolus*	(Linnaeus, 1758)	25
Large Blue	*Phengaris arion*	(Linnaeus, 1758)	26
Large Heath	*Coenonympha tullia*	(Muller, 1764)	39
Large Skipper	*Ochlodes sylvanus*	(Esper, 1777)	13
Large Tortoiseshell	*Nymphalis polychloros*	(Linnaeus, 1758)	30
Large White	*Pieris brassicae*	(Linnaeus, 1758)	17
Lulworth Skipper	*Thymelicus acteon*	(Rottemburg, 1775)	12
Marbled White	*Melanargia galathea*	(Linnaeus, 1758)	36
Marsh Fritillary	*Euphydryas aurinia*	(Rottemburg, 1775)	33
Meadow Brown	*Maniola jurtina*	(Linnaeus, 1758)	38
Mountain Ringlet	*Erebia epiphron*	(Knoch, 1783)	36
Northern Brown Argus	*Aricia artaxerxes*	(Fabricius, 1793)	23

Common name	Scientific name	Authority	Page no. for species account
Orange-tip	*Anthocharis cardamines*	(Linnaeus, 1758)	18
Painted Lady	*Vanessa cardui*	(Linnaeus, 1758)	29
Peacock	*Aglais io*	(Linnaeus, 1758)	30
Pearl-bordered Fritillary	*Boloria euphrosyne*	(Linnaeus, 1758)	31
Purple Emperor	*Apatura iris*	(Linnaeus, 1758)	27
Purple Hairstreak	*Favonius quercus*	(Linnaeus, 1758)	20
Red Admiral	*Vanessa atalanta*	(Linnaeus, 1758)	28
Ringlet	*Aphantopus hyperantus*	(Linnaeus, 1758)	39
Scotch Argus	*Erebia aethiops*	(Esper, 1777)	36
Silver-spotted Skipper	*Hesperia comma*	(Linnaeus, 1758)	13
Silver-studded Blue	*Plebejus argus*	(Linnaeus, 1758)	22
Silver-washed Fritillary	*Argynnis paphia*	(Linnaeus, 1758)	33
Small Blue	*Cupido minimus*	(Fuessly, 1775)	22
Small Copper	*Lycaena phlaeas*	(Linnaeus, 1758)	21
Small Heath	*Coenonympha pamphilus*	(Linnaeus, 1758)	38
Small Pearl-bordered Fritillary	*Boloria selene*	(Denis & Schiffermuller, 1775)	31
Small Skipper	*Thymelicus sylvestris*	(Poda, 1761)	11
Small Tortoiseshell	*Aglais urticae*	(Linnaeus, 1758)	29
Small White	*Pieris rapae*	(Linnaeus, 1758)	17
Speckled Wood	*Pararge aegeria*	(Linnaeus, 1758)	35
Swallowtail	*Papilio machaon*	(Linnaeus, 1758)	15
Wall Brown	*Lasiommata megera*	(Linnaeus, 1767)	35
White Admiral	*Limenitis camilla*	(Linnaeus, 1764)	27
White-letter Hairstreak	*Satyrium w-album*	(Knoch, 1782)	20
Wood White	*Leptidea sinapis*	(Linnaeus, 1758)	15

Acknowledgements

During the period covered by this report, the UKBMS project was co-funded by a multi-agency consortium led by the Department of the Environment, Food, and Rural Affairs and including the Countryside Council for Wales, Forestry Commission, Joint Nature Conservation Committee, Natural England, Northern Ireland Environment Agency, and Scottish Natural Heritage. The project is guided by a Steering Group which meets biannually and includes representatives from these organisations and from the volunteer recording community.

Although this funding support is essential to the existence and running of the UKBMS, without the contribution of an army of volunteers, it simply could not operate. We are indebted to all who co-ordinate and record butterfly transects throughout the United Kingdom, as well as to those who allow access to their land and in some cases actively promote butterfly monitoring thereon. The continued success of the UKBMS depends on a high level of volunteer support in order to provide the huge database on butterfly abundance throughout the UK. This data has immense value towards the preservation of our nation's butterflies, enabling us to monitor the state of vulnerable species and sites, and to gain a better understanding of butterfly ecology. We will continue to try and give you the support and feedback you need and deserve.

We would like to thank the photographers for allowing their superb images to be used in this report.

Finally we would like to thank the Joint Reprographic Services (JRS) Unit - part of the support services to the UK Research Councils - for designing and printing the report

Butterfly Conservation is the charity aimed at securing a lasting future for butterflies, moths and their habitats. It works in partnership with thousands of volunteers and a wide range of organisations in the UK and Europe to secure a healthy environment where we all can live.

The Centre for Ecology & Hydrology (CEH) is the UK's Centre of Excellence for integrated research in terrestrial and freshwater ecosystems and their interaction with the atmosphere. As part of the Natural Environment Research Council (NERC) CEH works in partnership with the research community, policymakers, industry and society, to deliver world-class solutions to the most complex environmental challenges facing humankind.

The Department for Environment Food and Rural Affairs is the UK government department responsible for policy and regulations on the environment, food and rural affairs. The overarching challenge for Defra is to secure a healthy environment in which we and future generations can prosper. As we build a low carbon, resource efficient economy, Defra helps people to adapt to changes, deals with environmental risks and makes the most of the opportunity we have to secure a sustainable society and a healthy environment.

The Joint Nature Conservation Committee (JNCC) is the statutory adviser to Government on UK and international nature conservation. Its work contributes to maintaining and enriching biological diversity, conserving geological features and sustaining natural systems. JNCC delivers the UK and international responsibilities of the four country nature conservation agencies - Council for Nature Conservation and the Countryside, the Countryside Council for Wales, Natural England and Scottish Natural Heritage.

Natural England is an independent public body whose purpose is to protect and improve England's natural environment, for its intrinsic value, the wellbeing and enjoyment of people and the economic prosperity that it brings.

Scottish Natural Heritage is the government body that looks after all of Scotland's nature and landscapes, across all of Scotland, for everyone.

The Countryside Council for Wales is the Government's statutory advisor on sustaining natural beauty, wildlife and the opportunity for outdoor enjoyment in Wales and its inshore waters. It champions the environment and landscapes of Wales and its coastal waters as sources of natural and cultural riches, as a foundation for economic and social activity, and as a place for leisure and learning opportunities.

The Northern Ireland Environment Agency takes the lead in advising on, and in implementing, the Government's environmental policy and strategy in Northern Ireland. It aims to protect and conserve Northern Ireland's natural heritage and built environment, control pollution, and promote the wider appreciation of the environment and best environmental practices.

The Forestry Commission is the government department for forestry in Great Britain. It works to improve people's lives through the many benefits provided by sustainably managed woods and forests, including timber production, public recreation, nature conservation, and rural and community development. It does this by supporting woodland managers with grants, tree felling licences, regulation and advice, and advising Ministers in the UK, Scottish and Welsh Assembly Governments on forestry policy. It manages more than 1 million hectares (2.5 million acres) of public forest land owned or leased by Ministers to provide the above benefits, and through its Forest Research agency, it conducts world-class scientific research and technical development relevant to forestry.

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