

# CONSERVATION NEWS

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Above: Regular transect walking is at the core of UK butterfly monitoring Above inset: Chalkhill Blue – a species well suited to the transect method

## Monitoring butterfly abundance – the way forward

Recording and monitoring underpin everything Butterfly Conservation does. Here the organisation's monitoring team, **Dr Tom Brereton**, **Dr Katie Cruickshanks** and **Ian Middlebrook**, tell how monitoring is being developed through a major new scheme focussed on commoner species

Two main butterfly monitoring schemes operate in the UK. Changes in the geographical distribution are monitored through the Butterflies for the New Millennium Project (BNM) co-ordinated by Butterfly Conservation, whilst butterfly abundance is monitored through the UK Butterfly Monitoring Scheme (UKBMS) jointly co-ordinated by Butterfly Conservation and the Centre for Ecology and Hydrology (CEH).

The principal method used to monitor changes in butterfly abundance is the butterfly transect. The method, now used worldwide, was developed by Dr Ernie Pollard

of CEH (then ITE) in the early 1970s. A transect is a walk around a particular area (often a favoured walk) during which all of the butterflies seen within a defined area are counted. The route remains the same each time and the transect is walked during fine weather every week from April until the end of September. Clearly, this requires commitment from recorders, although the workload can be shared by teams of recorders. Some transects are set up to focus on particular rare species. These are less time-consuming as only the flight period of the focus species is monitored. Weekly counts for each species

at each site are used to calculate annual abundance indices, which are combined with data from all other sites to compile national indices. The indices are modelled over time to detect long-term trends.

The butterfly transect method was developed for the Butterfly Monitoring Scheme (BMS), which was set up by CEH in 1976 to provide information on changes in the abundance of butterflies at selected monitored sites throughout the UK, with the number of sites increasing steadily to around 140 by 2004. The BMS was recognised nationally and internationally for its substantial contribution to monitoring ecology. The scheme greatly increased our understanding of the factors that determine the abundance of butterflies, adding to our knowledge of the

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**Above:** Counting butterflies is an enjoyable activity  
**Above right:** New recruits to monitoring are always welcome



## Making a difference

Since 2005, there have been major changes in UK butterfly monitoring:

- The BMS and Butterfly Conservation transect schemes have been combined into a unified UKBMS comprising over 1,500 sites, with more than 900 sites currently monitored each year.
- Reliable annual indices and population trends have been produced for up to 52 resident and regular migrant butterflies in the UK. The data has been used to help revise the UK BAP list of Priority species and the Red List of species threatened with extinction.
- Butterfly biodiversity indicators have been developed for England, Scotland and the United Kingdom, with a draft indicator having been developed for Wales.
- UKBMS has helped develop an indicator for grassland butterflies across Europe.
- UKBMS data has increasingly been used to assess the impacts of climate change on biodiversity – the UKBMS is a world leader in this vital topic.

roles that habitat management and climate play in changes to populations over time. However, coverage of rare species was inevitably low, and the BMS generated annual trends for only one UK BAP Priority Species.

### Momentum

Counting butterflies is enjoyable and the BMS transect methodology was taken up by many new recorders from the late 1970s. Following steady growth, the number of 'independent' transects increased rapidly during the 1990s. Coverage of rare species correspondingly increased. By 2004, over 500 additional transects were being recorded, with the data collated by Butterfly Conservation, principally to assess the impacts of agri-environment schemes on butterfly populations in England. 'Transect Walker' software was developed by Butterfly Conservation to enable recorders to enter and analyse their own data, and to facilitate rapid data transfer to Butterfly Conservation HQ for national analysis. These developments transformed the scale and context of butterfly monitoring in the UK, giving opportunity for improved assessments of trends for a wider range of species.

The 1992 Earth Summit generated many biodiversity initiatives. But how did one gauge progress on these? There was a need for biodiversity indicators. Butterflies were identified as strong candidates. They respond rapidly and sensitively to subtle habitat or climatic changes, showing what may be happening to other wildlife, especially insects. Most important, there was sound data collected through butterfly monitoring schemes.

In 2005, a consortium of government agencies led by Defra provided funding to substantially develop butterfly monitoring in the UK and to develop butterflies as Governmental Biodiversity Indicators through the UKBMS project.

Although extensive use is made of monitoring data at a national level, it is important to stress that the majority of recorders chiefly walk transects for more local purposes – either to inform site habitat management for butterflies and other wildlife or to contribute to county-wide analyses of butterfly status compiled by Butterfly Conservation Branch local co-ordinators. For site management, annual monitoring data is especially vital because it provides early warnings of species decline so that conservation action can be taken to prevent extinctions.

### Knowledge gap

Despite the massive growth in butterfly distribution recording and transect monitoring, we still lack knowledge of the short and long-term population trends of wider countryside butterflies. Current transects are location biased towards semi-natural and protected habitats. This knowledge gap is important because recent research indicates that many wider countryside species underwent substantial declines in local and regional abundance during the 20<sup>th</sup> century. These declines were largely undetected by current monitoring and mapping schemes. Intensive farmland and upland habitats are particularly under-represented in current butterfly monitoring.

Consequently, the UKBMS set about



**Above:** Katie Cruickshanks carrying out WCBS surveys in the Highlands **Above inset:** Green-veined White – The most widespread species across Scottish WCBS squares

developing a new scheme to more effectively monitor the changing abundance of these wider countryside butterfly species.

Between 2005 and 2008, a Wider Countryside Butterfly Survey (WCBS) method was developed and tested by Butterfly Conservation, CEH, the British Trust for Ornithology (BTO) and with the help of volunteer recorders and co-ordinators. The partnership with the BTO, which runs the highly successful Breeding Bird Survey (BBS), was crucial. The BBS started in 1994 and today 2,500 volunteers monitor birds on 3,000 random 1km squares across the UK. Early in the Wider Countryside Project the BBS was identified as a good model for the new butterfly survey. It is scientifically sound, well tested, yielding extremely valuable results and popular with recorders. Furthermore, it gave the potential for bird recorders to record butterflies on their squares. The method involves two visits in good butterfly weather over July and August to randomly selected 1km squares with optional extra visits from May to September.

On each visit, butterflies and other insects (i.e. day-flying moths and dragonflies) are counted along two parallel survey lines evenly placed through the square.

### Rolling out

The pilot scheme was popular with Butterfly Conservation and BTO volunteers. Last year, with three years of data already collected, it was decided to roll out the Wider Countryside Butterfly Survey (WCBS). Plans were made and a coverage target of 1,000-squares set. WCBS co-ordinators helped to match local recorders to squares in each Butterfly Conservation Branch and the BBS National Organiser co-ordinated BTO recorders.

Over 760 1km squares were surveyed by more than 600 recorders with Butterfly Conservation covering 53 per cent and BBS recorders covering 47 per cent of squares (Figure 1). Despite missing the 1,000-square target, this was still a fantastic achievement for all involved. Pleasingly, a number of Butterfly Conservation Branches exceeded

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their 20-square target including Somerset and Bristol, Dorset, Norfolk, Sussex and Suffolk.

### Sightings up

Over 1,500 visits were made to the squares over the summer with nearly 80 per cent of squares receiving two or more visits during the peak butterfly period of July and August. Recorders stacked up impressive totals of over 119,000 butterflies, 1,600 day-flying moths and 2,700 dragonflies. Forty-nine butterfly species were seen, with Meadow Brown, Large White, Small White,



**Above:** Figure 1. WCBS squares surveyed in 2009 by Butterfly Conservation recorders (Green) and BTO BBS recorders (Blue)

**Right:** Small Copper – present in more than a quarter of WCBS squares



Gatekeeper, Green-veined White, Painted Lady, Ringlet and Speckled Wood accounting for 84 per cent of all butterflies seen. The remaining 16 per cent was made up of the other 42 species. Several species not detected in the pilot studies were picked up, including Adonis Blue, Lutworth Skipper, Northern Brown Argus, Pale Clouded Yellow, Wood White and Small Blue.

The early analysis for two summer visits shows that, on average, recorders saw 11 species and 160 butterflies per square. This is a marked increase from the pilot years when around 100 butterflies were seen in the same period. The increase reflected better weather and the fact that last year was a good year for migrant species, especially the

**Below:** Large White was the commonest butterfly in the Wider Countryside in 2009



Painted Lady which was present in 82 per cent of squares and ranked 4<sup>th</sup> in total abundance compared to 2008 when it ranked 26<sup>th</sup>. The Large White moved up three places to claim the prize of most commonly seen species in 2009. Encouragingly the Small Copper, a species of intermediate range and abundance, was seen in more than a quarter of squares and moved five places up the table to become the 14<sup>th</sup> most commonly seen species. The most species rich square was in Suffolk with 21 species. The two busiest squares, with over 1,000 butterflies in just two summer visits, were in Northants and Hampshire. Dragonflies were recorded in 38 per cent of squares, with approximately 25 species detected. Day-flying moths were recorded in 30 per cent of squares with approximately 50 species recorded.

An additional component was added to last year's roll-out, thanks to funding from Joint Nature Conservation Committee. Recordors were invited to take part in an optional ten-minute Insect Flower Search, looking for 12 target species from three groups – bumble bees, hoverflies and beetles. Once again, recordors responded to this call for extra effort, with 30 per cent testing the method. The pilot Insect Flower Search was

carried out by a third of recordors on 279 squares. All 12 selected species were recorded, with the Common Carder Bumblebee the most widespread species, and the Marmalade Hoverfly the most abundant. These results are encouraging and show the willingness of our volunteers to find out more about wider biodiversity.

## How to get involved?

The UKBMS is a world-renowned monitoring scheme. Its importance increases with each passing year. Since 1976, more than 3,500 volunteers have contributed scientific butterfly counts. With the current ambitious work programme, continued help and support from volunteers is vital. To take part contact your local Butterfly Monitoring Co-ordinator about establishing a transect (see the UKBMS website for details [www.ukbms.org/how\\_to\\_get\\_involved.htm](http://www.ukbms.org/how_to_get_involved.htm)). To take part in the WCBS contact [survey@butterfly-conservation.org](mailto:survey@butterfly-conservation.org). Further information on the scheme can be found at [www.ukbms.org](http://www.ukbms.org)

## Thanks

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