Butterfly Conservation

the state of britain's butterflies 2007

Once a familiar sight in woodlands across Britain, the Pearl-bordered Fritillary symbolises the plight of many butterflies in modern Britain. Its population halved in size between 1995 and 2004

Photograph Jim Asher

Introduction

The **Swallowtail**, one of Britain's rarest butterflies, is benefiting from concerted conservation effort by Butterfly Conservation and other organisations
Robert Thompson

Butterflies are beautiful, emblematic creatures that enrich our quality of life. They fulfil a vital role as flagship species; engaging the public, local communities and the media in biodiversity conservation and sustainable development issues. Butterflies can also act as indicators in this time of rapid, perhaps unprecedented, environmental change.

Continued deterioration of wildlife habitats, pollution and climate change pose considerable challenges for biodiversity. Butterflies are sensitive indicators of how this country's rich natural heritage is responding to change and to policy initiatives such as agri-environment schemes.

This report summarises the first assessment of the state of Britain's butterflies in the twenty-first century, based on over 5 million records from over 10,000 observers. Thanks to the data sets collated by Butterfly Conservation and the Centre for Ecology and Hydrology, we have a unique insight into the changing fortunes of this wonderful group of animals.

The State of Britain's Butterflies

Reliable information

British butterflies are the best monitored insects in the world and, within Britain, information of similar quality exists for only one other group of wildlife: birds. Two different, but complementary, schemes exist to monitor butterflies: a national distribution recording scheme (Butterflies for the New Millennium) and a population monitoring scheme (UK Butterfly Monitoring Scheme). Both of these schemes have yielded important data sets through extremely cost-effective networks of skilled volunteer recorders and co-ordinators.

◆ Butterflies for the New Millennium (BNM) has compiled comprehensive national surveys for the periods 1970-82, 1995-99 and 2000-04. Changes to butterfly status have been determined by comparing species' distributions in these surveys, and the records themselves can be used to inform policy development, the planning system, site management and the designation of protected areas.

◆ The UK Butterfly Monitoring Scheme (UKBMS) has co-ordinated population monitoring at over 1000 sites, some since 1976. Over 10.5 million butterflies have been counted during 350,000km of transect walks. Short and long-term population trends can be calculated and used to monitor the effectiveness of policies including the UK Biodiversity Action Plan (BAP) and agri-environment schemes, as well as nature reserve management.

Both data sets have proved very important in ecological research, including quantifying and predicting species' responses to climate change.

High Brown Fritillary *Jim Asher*

Dramatic declines

Five years on from the previous report, this new assessment confirms that Britain's butterflies are in rapid decline. Since the 1970s, the Large Blue has become extinct in Britain (in 1979) and distribution data show that three-quarters (76%) of the 54 remaining resident species have declined. Six of these have lost >50% of their distribution. A further 15 have suffered distribution decreases of >30%, including formerly widespread butterflies such as the Dingy Skipper, Small Pearl-bordered Fritillary, Wall and Grayling. Population data show that 54% of monitored species are less abundant at transect sites compared to the 1970s. The Marsh Fritillary and Heath Fritillary have the greatest long-term population declines, and there are worrying 10-year trends for the High Brown Fritillary *above*, Silver-studded Blue and Duke of Burgundy.

Habitat specialist butterflies (those that inhabit flower-rich grasslands, woodland clearings, heaths, dunes and bogs) have fared the worst, with 93% of species in decline and an overall drop in abundance of 30%.
See chart on page 10

Silver-spotted Skipper *Jim Asher*

Conservation successes

A few of our most threatened species have started to recover, responding to concerted conservation effort co-ordinated by Butterfly Conservation. Most promising are the trends for the Adonis Blue and Silver-spotted Skipper *above*. The latter has increased from just 68 colonies in Britain in 1982 to over 250 colonies and its populations have grown by 1500%. The introduction of grazing to conserve the butterfly and other wildlife has played a significant part in this resurgence.

The Large Blue has been successfully reintroduced and 7000 individuals of this globally endangered species flew in Britain in 2004.

At a regional scale, conservation for the High Brown Fritillary in north-west England and the Heath Fritillary in Kent have produced significant successes. These positive outcomes demonstrate that it is possible to conserve even the most threatened butterflies, given sufficient knowledge, will and resources.

Peacock *Robert Thompson*

Moving north

There is also good news for some mobile, wider countryside butterflies that have been expanding their ranges northwards in recent decades. For example, the Essex Skipper's distribution has increased by 46% since the 1970s and the butterfly reached Wales for the first time in 2000. Other rapidly spreading species include the Comma, Brown Argus, Orange-tip, Peacock *above*, Speckled Wood and Ringlet. All these range expansions are in keeping with predicted positive responses to climate change.

Priorities for action

Resources for biodiversity conservation are always scarce and it is vital that they are used effectively by prioritising those species and habitats that are most threatened. Trends derived from distribution and population data enable threatened butterflies to be targeted through the UK Biodiversity Action Plan. Assessment of the new trends against UK BAP criteria has identified 24 butterflies that meet Priority Species status (compared to the 11 existing Priority butterflies) and three species that no longer qualify (see table overleaf). This assessment forms part of the current review of the UK BAP.

Summary of 2006 UK BAP Priority Review butterfly species and their qualification criteria

	Reasons for qualification	Distribution change (BNM)	Population change (UKBMS)	
		1970-82 vs 1995-2004*	Long term change**	10-year change 1995-2004
Species to remain Priority				
Chequered Skipper	Severe decline in range, no evidence of recovery	38% ↓	-	-
Silver-studded Blue	Severe decline in range and abundance	43% ↓	1% ↓	72% ↓
Northern Brown Argus	Localised species, no evidence of recovery, threat from climate change	18% ↑	10% ↓	30% ↓
Large Blue	Internationally threatened, extinct in UK and being re-introduced	100% ↓	-	-
Pearl-bordered Fritillary	Severe decline in range and abundance	61% ↓	66% ↓	51% ↓
High Brown Fritillary	Severe decline in range and abundance	79% ↓	13% ↓	85% ↓
Marsh Fritillary	Internationally threatened, severe decline in range and abundance	46% ↓	73% ↓	73% ↑
Heath Fritillary	Severe decline in abundance	25% ↓	73% ↓	46% ↓
Proposed additions as Priority Species				
Lulworth Skipper	Internationally threatened	15% ↓	13% ↓	79% ↑
Dingy Skipper	Severe decline in range	48% ↓	37% ↓	26% ↓
Grizzled Skipper	Severe decline in range	49% ↓	34% ↓	42% ↓
Wood White	Severe decline in range and abundance	65% ↓	64% ↓	10% ↑
Brown Hairstreak	Severe decline in range	43% ↓	-	-
White-letter Hairstreak	Severe decline in range and abundance	53% ↓	71% ↓	63% ↓
Small Blue	Severe decline in range	38% ↓	6% ↓	121% ↑
Duke of Burgundy	Severe decline in range and abundance	52% ↓	28% ↓	58% ↓
White Admiral	Severe decline in abundance	31% ↓	62% ↓	36% ↓
Small Pearl-bordered Fritillary	Severe decline in range and abundance	34% ↓	70% ↓	10% ↓
Glanville Fritillary	Extreme rarity and threat, especially from climate change	17% ↓	-	-
Wall	Severe decline in range and abundance	38% ↓	65% ↓	2% ↓
Mountain Ringlet	Extreme threat from climate change (evidence of decline at low altitudes)	12% ↓	-	-
Grayling	Severe decline in range and abundance	45% ↓	51% ↓	41% ↓
Small Heath	Severe decline in abundance	29% ↓	52% ↓	29% ↓
Large Heath	Severe decline in range	43% ↓	26% ↓	58% ↑
Proposed demotion to Species of Conservation Concern				
Silver-spotted Skipper	Large increase in abundance, some recovery of range	4% ↑	1524% ↑	2% ↑
Large Copper	Extinct in the UK	-	-	-
Adonis Blue	Increase in abundance	19% ↓	28% ↑	63% ↑

* Distribution decline underestimates population losses;
the threshold for 50% population decline is estimated to be 32% loss at the 10km square scale.

** Trends are for varying time periods.
All start in the late 1970s except for Marsh Fritillary 1983–2004, Heath Fritillary 1984–2004 and Lulworth Skipper 1992–2004.

Wall *Robert Thompson*

Wood White *Jim Asher*

Grizzled Skipper *Tom Brereton*

Policy relevance of butterflies

Butterflies and habitat loss

Biodiversity faces many threats, notably from conversion of semi-natural habitats to intensive land-uses, abandonment of centuries-old land management practices, and the insidious influences of pollution and climate change. British butterflies have been more adversely affected by such changes than either birds or flowering plants, and provide an early warning of declines in biodiversity as a whole.

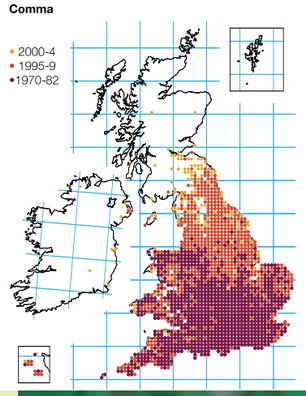
The destruction and deterioration of habitats remain primary causes of butterfly declines. The ongoing destruction of post-industrial 'brownfield' habitats (though redevelopment or landscaping) and upland bogs (through drainage) are major causes of the recent losses of Dingy Skipper *right above* and Large Heath colonies, respectively. In addition, decreasing traditional management of semi-natural habitats is of considerable concern. Reduced grazing and subsequent vegetation changes (e.g. scrub invasion) have been linked with the declines of the Adonis Blue, Large Blue and Marsh Fritillary. Characteristic woodland butterflies have also declined as traditional management (notably coppicing) has been abandoned (e.g. the Pearl-bordered Fritillary, High Brown Fritillary and Heath Fritillary). The UK Butterfly Monitoring Scheme data show that these declines can be reversed through well-targeted woodland management grants or agri-environment schemes.

Brownfield site *Maurice Hughes*

Dingy Skipper *Jim Asher*

Duke of Burgundy *Robert Thompson*

Two habitats currently pose particular problems. **Brownfield sites** *left* have become refuges for wildlife, but are under acute threat from house building and regeneration targets. On the other hand, **late-successional grassland** can be threatened by conservation management (e.g. scrub clearance and heavy grazing). Such management damages populations of threatened butterflies, such as the Duke of Burgundy *above* and Small Blue, which require areas of long vegetation or scrub. Recent research using UK Butterfly Monitoring Scheme data suggested that these butterflies have declined on Sites of Special Scientific Interest and that Government targets to achieve 'favourable status' may, ironically, be detrimental to some threatened species. Generic management to produce uniform vegetation is an anathema to many insects and butterflies can act as flagship species for this issue.



The Comma's distribution has moved 280km northwards since the 1970s. This butterfly is now breeding in Scotland for the first time since 1870.

Marsh Fritillary *Robert Thompson*

Butterflies, habitat fragmentation and landscape-scale conservation

Many butterflies occupy only small fragments of habitat in the modern landscape. While habitat quality is of utmost importance, the size and isolation of fragments also influence survival. Scientific studies suggest that specialist butterflies will not survive on individual fragments, but require networks of sites between which they can move.

This insight helps to guide conservation action. For example, most remaining population networks of the Marsh Fritillary *above* in Wales, the one remaining in Cumbria and several others in England appear not to be viable in the long-term, without the restoration of substantial amounts of additional habitat.

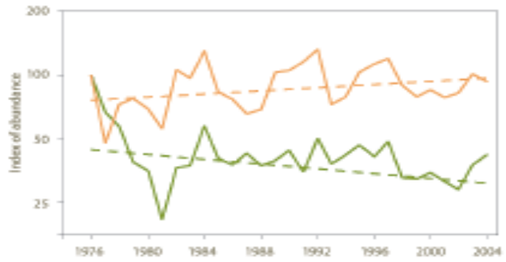
Landscape-scale conservation seeks to maintain or create habitat networks, ensuring the survival of threatened butterflies and maximising their ability to withstand future environmental change. This approach is now central to butterfly conservation strategies in Britain, and many projects are underway (e.g. for the Marsh Fritillary in the rush pastures of south-west England and Wales, for High Brown Fritillary on the Morecambe Bay Limestones and for Pearl-bordered Fritillary and Small Pearl-bordered Fritillary in the woodlands of Surrey and Sussex). Such projects link fragments together both physically (i.e. through habitat recreation) and by co-ordinating management across sites. These measures will also benefit other wildlife, as well as sustaining the local character and attractiveness of the countryside. Information from butterfly data enables effective targeting of conservation effort and resources.

Comma *Robert Thompson*

Butterflies and climate change

Climate change may bring opportunities for some species, but grave concerns have been raised about the overall impact on biodiversity. Butterflies are highly sensitive to climate: populations typically increase during warm, dry weather. In Britain, most butterflies reach a climatic limit to their range and many 'southern' butterflies have spread northward (and increased in numbers) in recent decades. In contrast, our few 'northern' butterflies have retreated to higher latitudes and altitudes. Ecological models show that these observed changes are not only consistent with those predicted from climate change, but are a response to it. These models have been used to predict future responses and warn of severe declines for 'northern' species.

Butterfly studies have also provided examples of the means by which species respond to climate change. For example, as a result of the warming climate, the Silver-spotted Skipper is no longer dependent upon the hottest, short-turf, south-facing habitats, but can breed in slightly longer turf and on cooler aspects. Thus climate change has contributed to the recovery of this UK BAP Priority Species, in conjunction with favourable conservation management. In contrast, climate change has been implicated in the loss of many Mountain Ringlet, Scotch Argus and Northern Brown Argus colonies in northern Britain over the past 20 years. The responses of British butterflies to past and future climate change are likely to be mirrored amongst our biodiversity as a whole.



Butterfly population data from the UK Butterfly Monitoring Scheme can be used to develop policy-relevant indicators. For example, this chart shows composite (i.e. multi-species) abundance indices of habitat specialist (green) and wider countryside (orange) butterflies in Britain. Dotted lines show long-term trends: a significant 30% decrease for specialists and a 27% increase for wider countryside species.

Butterflies as indicators

Insects make up the largest proportion of terrestrial wildlife in Britain (over half of all species), so it is crucial that the fate of insect groups is assessed in order to monitor overall biodiversity. Butterflies are recognised as valuable indicators, both for their rapid and sensitive responses to habitat or climatic changes and as representatives for a wide range of other wildlife. As insects, the responses of butterflies are more likely to reflect changes amongst other insect groups, and thus the majority of biodiversity, than established indicators.

The excellent baseline information that exists for British butterflies enables them to be used as indicators for monitoring the progress of sustainable development and biodiversity protection policies, including the Convention on Biological Diversity target to reduce of the rate of biodiversity loss by 2010. UK Butterfly Monitoring Scheme data are being used to create a range of policy-relevant indicators suitable for governmental use at UK and country levels. Most important would be a UK headline indicator to complement the current 'Quality of Life' indicator based on wild bird populations. A butterfly indicator would bring popular appeal, be representative of wider biodiversity and be better than existing indicators for monitoring some UK BAP habitat types. A similar butterfly headline indicator has been adopted for the England Biodiversity Strategy, and monitoring data are being used to develop European indicators under the auspices of Butterfly Conservation Europe (www.bc-europe.eu).

Butterfly distribution and population data enable precise, objective and cost-effective assessments of priorities for the UK BAP, and for the national, regional and local plans that stem from it. The same data also allow progress towards BAP targets to be measured. The population status of most UK BAP butterflies can now be reported annually from the UK Butterfly Monitoring Scheme.

Butterflies and agri-environment schemes

Britain remains a largely agricultural landscape, and many butterflies rely on traditional agricultural practices. Agri-environment schemes have been developed to maintain or reinstate appropriate management to benefit biodiversity and other heritage features. Monitoring data show that agri-environment schemes have failed to halt the general decline of butterflies on farmland in England: there had been a significant decline (30% over the last 10 years) in mean abundance of 40 butterfly species assessed. However, schemes have helped to slow and, in some cases, reverse the declines of eight target UK BAP Priority Species (including the Silver-spotted Skipper, Adonis Blue *far right* and High Brown Fritillary). Species benefiting most from schemes were those associated with short and medium turf conditions, while butterflies requiring more complex structure and fine-scale habitat heterogeneity (e.g. the Small Blue and Duke of Burgundy) have fared poorly.

England's new Environmental Stewardship Scheme offers greater potential benefits, in part through targeting a wider range of species and habitats and adopting greater management flexibility and also because of far wider take up. The landscape scale of operation offers hope of reversing the fragmentation of wildlife-rich habitats that has occurred across the farmland landscape. The UK Butterfly Monitoring Scheme offers cost-effective monitoring of the progress of Environmental Stewardship and equivalent agri-environment schemes in other UK countries, whilst butterfly distribution records could be of great benefit in targeting agreements.

Conclusions and recommendations

The UK Butterfly Monitoring Scheme and Butterflies for the New Millennium provide data of enormous importance for biodiversity conservation and sustainable development. Both sources of information are crucial for the effective targeting of limited resources and allow butterflies to be used as indicators of the effectiveness of Government policies and of the impacts on biodiversity of changes to the environment and climate.

1. Butterflies continue to decline: three quarters of our 54 resident species have declined since the 1970s and six species have been lost from more than half of their distribution. Five species have become extinct since recording began in 1800.
2. Almost all habitat specialist butterflies have decreased in distribution and over three quarters have declined in abundance at monitored sites. Overall abundance of habitat specialist butterflies (all species taken together) has decreased significantly (30% decrease 1976-2004).
3. Butterflies have fared worse than birds or plants. Butterfly and moth declines (see also *The State of Britain's Larger Moths* companion publication) indicate a British biodiversity crisis.
4. We strongly urge Government to implement fully the UK Biodiversity Action Plan and honour commitments to halt the loss of biodiversity by 2010.
5. We propose that 16 additional Priority Species are adopted in the current review of the UK Biodiversity Action Plan. Three butterflies should be removed either because they are extinct or because they have recovered substantially.
6. Butterflies are valuable indicators of the health of the countryside and also of major environmental issues such as climate change. The UK Butterfly Monitoring Scheme provides a unique and robust source of data to detect trends and assess policy outcomes.
7. We propose that butterflies be adopted as headline indicators of the state of our environment and become a key method of monitoring the impacts of climate change and Government land-use policies.

Adonis Blue *Jim Asher*

8. The future of butterflies is in our hands. Several threatened species are recovering thanks to conservation action by Butterfly Conservation and our partners. Moreover, there is evidence that agri-environment schemes have helped slow and in some cases reverse the decline of targeted species.
9. We urge the Government to enhance funding, uptake and monitoring of targeted agri-environment schemes.
10. We also urge the strategic restoration of habitats to reverse butterfly declines and allow species to respond to climate change. This can be achieved through landscape-scale conservation projects, entry-level agri-environment schemes, woodland grants and the protection of important brownfield sites.

Butterfly Conservation
Saving butterflies, moths and their habitats

Centre for Ecology & Hydrology

Acknowledgements

It would be impossible to assess the state of Britain's butterflies without the efforts of thousands of skilled and dedicated volunteer recorders. We are deeply indebted to them and to the organisations that have supported butterfly monitoring during the past five years, especially the Bernard Sunley Charitable Foundation, Esmée Fairbairn Foundation, Joint Nature Conservation Committee and the multi-agency consortium (led by Defra) that funds the UKBMS.

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Butterfly Conservation is the UK charity working towards a world where butterflies and moths can thrive for future generations to enjoy. Through conservation programmes on threatened species, management of nature reserves, survey and monitoring, education, training, raising awareness and carrying out research, Butterfly Conservation's work contributes not only to the conservation of biodiversity but also to the creation of a healthier world in which we all can live.

The State of Butterflies in Britain and Ireland

This book, published in 2006, provides an essential, up-to-date reference for the changing fortunes of all our regularly breeding species. In addition to all the essential facts and figures, this 120 page book is colourfully illustrated with over 70 photographs, more than 85 maps and numerous charts and tables. It is available for £12 (plus £2.50 p&p) from Pisces Publications (01635 550380 or www.naturebureau.co.uk/shop).

The State of Britain's Larger Moths

This companion volume contains an assessment of the first national population trends for moths, revealing a dramatic decline in many once-common species. This 34 page full colour publication is available from Butterfly Conservation for just £4 (including p&p).

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