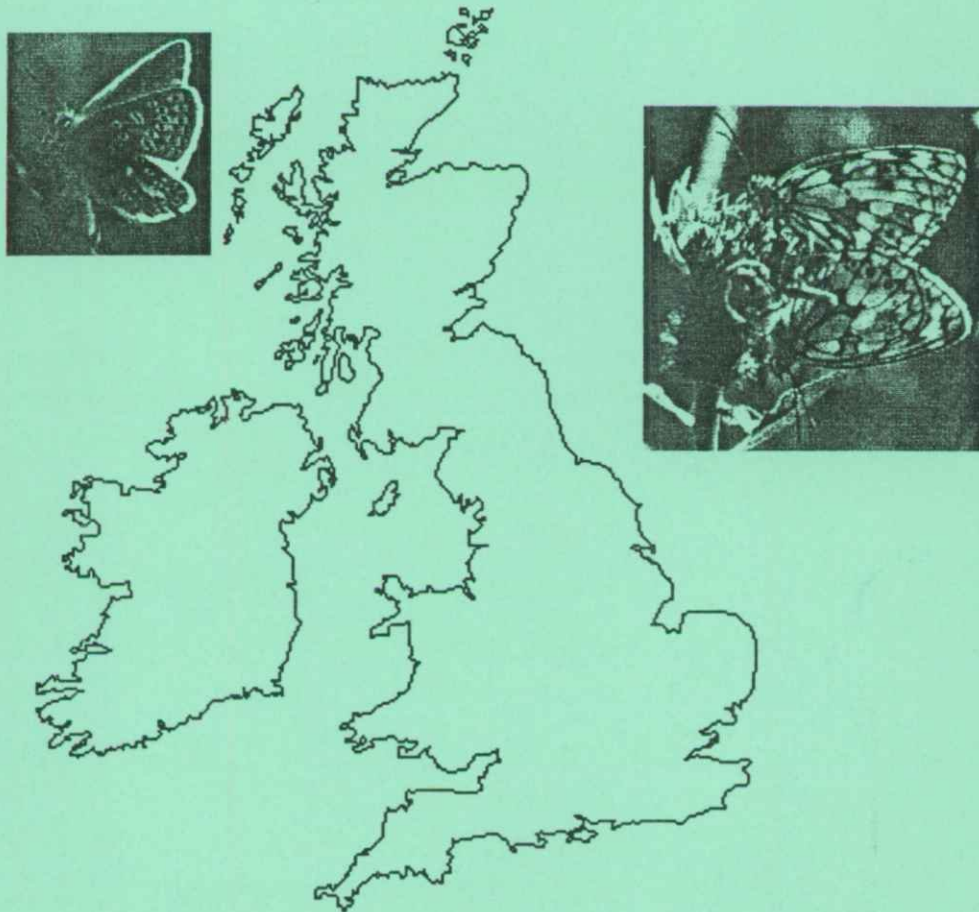


A PROGRAMME FOR THE COORDINATION OF BUTTERFLY RECORDING IN BRITAIN AND IRELAND

A report of an *ad hoc* working party
of the British Butterfly Conservation Society
and the Biological Records Centre



February 1992

Member of working

Party -

P. Harding (ARC)

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National Butterfly Recording Working Party

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EXECUTIVE SUMMARY

A Working Party formed by the Conservation Sub-Committee of Butterfly Conservation (BBCS), jointly with the Biological Records Centre (BRC) has been looking at future policy for butterfly recording, with the objective of recommending detailed guidelines for standardising the recording of data and national coordination.

A recent survey has revealed over 200 separate butterfly recording projects in the UK, ranging from national surveys to very local projects. Each has its own priorities, objectives and usually its own recording methods. As a result, it became clear that there is a lack of coordination in butterfly recording, with the risks of duplication of effort and difficulty in collating data more widely.

At the same time, there is a greater need than ever for a fast response to requests for information on key sites, for example, in connection with evidence for planning on or near sensitive areas. Also, with increasing concern over environmental issues, such as climatic effects of global warming, there is keen interest in monitoring the patterns of change, for example, the possible extension of range of particular species.

This growth in demand for data has been accompanied by rapid growth in the availability of information technology, bringing the capabilities of handling large quantities of data efficiently at a very local level and at affordable cost.

This report examines the issues of recording needs for the future and recommends strategies and standards for butterfly recording in Britain and Ireland. The main objectives are:

- a) to provide a focus for recording at a national level,
- b) to coordinate recording at a local or regional level from which national data can be drawn,
- c) to encourage and enable the interchange of data between BBCS branches, local recording groups and recording centres (such as at county museums).

Recommendations

The following is a summary of the recommendations made by the Working Party:

- 1) BBCS should take a leading role in the national coordination of butterfly recording, working jointly with BRC and in close cooperation with other recording bodies.
- 2) The national (BBCS/BRC) scheme in its present form should be superseded by a new recording initiative, based on regional recording schemes.
- 3) Established local recording schemes, including non-BBCS schemes, will be encouraged to collect and collate records to a minimum set of standards, to ensure that records are reliable and can provide useful information for conservation and distribution studies, and for environmental planning and research. Agreed standards are essential for the interchange of data nationally and between regional centres.
- 4) New local schemes will be set up in areas where no recording schemes currently exist. Where possible, the local BBCS branch will be encouraged to take up this role and will be provided with a 'tool-kit' to start a scheme working to at least the minimum standards.
- 5) Computerisation of records is a priority, using IBM-compatible PC systems as the preferred hardware, with software recommended and supported by a Data Management Group. New schemes will be encouraged to use one of a number of

computer programs already in use, rather than develop their own and thereby proliferate interchange problems. Where a local scheme already has well-developed software, it will be a clear objective to provide efficient data interchange wherever possible. It is a firm aim that data should be keyed in only once.

- 6) The concept of a 'Living Atlas' of Butterflies with an annually updated record database, should be seriously considered, although very significant demands would be placed on both local and national resources to maintain it.
- 7) A 'landmark' objective is to launch a national survey of butterfly distributions for a new Britain and Ireland Atlas to mark the end of the 20th Century. This would be based on records collected over the late years of the 1990s and would be run jointly by BBCS and BRC. This will aim to show, in more detail than before, the true current status of butterflies and the strength of local colonies, by using a range of symbols to indicate the numbers of individual species recorded, rather than simply show recorded presence.
- 8) Feedback to recorders is recognized as a crucial component of success in recording schemes and any new scheme should make provision for timely and efficient feedback on at least a season-to-season basis.

Minimum recording standards

A set of minimum data is required for each observation, including key information of the recording site. The level of detail has been kept reasonably simple - we want to encourage, not discourage recording. The current proposed minimum information is:

1. Name of recorder (preferably with address/phone number)
2. Year (plus day/month or period such as week)
3. Site/locality name and nearest town/village
4. Grid reference (minimum 1-km square (4-fig., e.g. SP6011), preferred 100m square (6-fig., e.g. SP605114))
5. Habitat type(s) present on the site, using a simple agreed classification of basic land use/vegetation types
6. County
7. Species and numbers of each species observed (coded using a standard 5-point scale)

New recording forms incorporating these standards have been devised; BBCS branches will be encouraged to use this new format from 1992 onwards, or to revise their existing recording forms to incorporate the minimum standards.

Implementation

It is recommended that a National Recording Steering Committee be formed jointly by BBCS and BRC as soon as possible to implement these recommendations. This committee should set up a Data Management Group with members bringing expertise in software and experience of computer-based recording. A framework for action and timetable to set up a new recording scheme are put forward. Financial implications and budgetary cost estimates to cover both setting up and running the new scheme are included.

1 INTRODUCTION

Within this report, the following abbreviations are used:

BBCS - British Butterfly Conservation Society Ltd., **BMS** - Butterfly Monitoring Scheme, **BRC** - Biological Records Centre, **BTO** - British Trust for Ornithology, **CCBR** - Coordinating Commission for Biological Recording, **ITE** - Institute of Terrestrial Ecology, **JCCBI** - Joint Committee for the Conservation of British Insects, **JNCC** - Joint Nature Conservation Committee, 'NCC' - the former Nature Conservancy Council and its successor bodies, **NERC** - Natural Environment Research Council, **RSPB** - Royal Society for the Protection of Birds, **RSNC** - Royal Society for Nature Conservation, **SSSI** - Site of Special Scientific Interest.

1.1 Background

Butterfly species and habitat recording has, in recent years, very much taken over from specimen collecting as an activity of serious and conservation-minded lepidopterists and other naturalists. This has been organised at different levels and for different purposes and now enjoys the attentions of a large number of keen volunteers as well as professionals working in the field.

A recent survey conducted by BRC (P.T.Harding and S.V.Green, unpublished) covers various aspects of butterfly recording and its history, objectives and requirements. The survey has revealed over 200 separate butterfly recording projects in the UK, ranging from national surveys to very local projects. Each has its own priorities, objectives and usually its own recording methods, and no one organisation has overall responsibility. At the same time, government funding for professional recording and coordination of this activity is being reduced. As a result, it became clear that there is a lack of coordination in butterfly recording, with the risks of duplication of effort and difficulty in collating data more widely.

There is however a valuable resource of data and recording effort that can provide important biological information if properly coordinated and data can become more accessible to interpretation.

The BRC operated a Butterfly Recording Scheme from 1968 to 1982, whereby records were sent in by over 2000 individual recorders for centralised recording, collation and interpretation at ITE Monks Wood. Since 1982, this scheme has been run by BBCS in collaboration with BRC. However the call on resources is such that at a time of dwindling funding, ITE is finding it difficult to maintain the present system, let alone push for expansion and a wider coordinating role. Many of the post-1982 data are still stored in card form and are therefore not readily accessible.

The Butterfly Monitoring Scheme (BMS) is also operated by ITE, with financial support from the Joint Nature Conservation Committee (JNCC). The BMS collates and analyses weekly transect records from over 90 sites. Results from BMS are regarded by ITE and JNCC to be of particular importance in monitoring the effects of environmental changes, such as in weather and site management. Many 'unofficial' butterfly transects are operated independently, based on BMS methods.

At an open meeting in 1989, these factors were discussed jointly by BRC and BBCS and it was felt that BBCS has an important potential role in organising and coordinating butterfly recording regionally, thereby saving BRC resources for the interpretation of national data where it is most required. As a result, a joint initiative was set up to examine the issues and future of butterfly recording.

1.2 The objectives of butterfly recording

It is clearly recognised that recording, if properly organized and adequately resourced, is not just 'square-filling', but has important and serious aims for biological research on species and their habitats, and makes a positive contribution to conservation strategies.

The main objectives of butterfly recording are:

- 1) to provide knowledge of the distribution and status of the butterfly fauna of Britain and Ireland,
- 2) to identify sites of importance to butterflies and their conservation,
- 3) to monitor changes in the well-being of butterflies at important sites and in the wider countryside,
- 4) to assess the factors causing change: habitat management, land-use changes and weather patterns or climatic change,
- 5) to provide a firm basis from which to advance conservation priorities and to give advice on planning and legislative matters.

The first objective provides data for national mapping, aimed at establishing the geographical distribution patterns of species, identifying the occurrence of distribution changes and the scale of local extinctions of threatened species. Distribution maps also form part of many books on butterflies.

At the same time, there is a greater need than ever for a fast response to requests for information on sites of conservation significance, for example, in connection with evidence for planning on or near sensitive areas. Also, with increasing topical concern over environmental issues, such as climatic effects of global warming, there is keen interest in monitoring the very broad patterns of change, for example, changes of range of particular common and threatened species.

This growth in demand for data has been accompanied by very rapid growth in the availability of information technology, bringing the capabilities of handling large quantities of data efficiently at a very local level and at affordable cost by involving volunteers.

1.3 The National Recording Working Party

The National Recording Working Party was formed in 1989 from members combining recording experience and representation from BBCS and BRC to examine the issues of recording needs for the future and to formulate strategies and standards for butterfly recording in Britain and Ireland, with the following main objectives:

- a) to provide a focus for recording at a national level,
- b) to coordinate recording at a local or regional level from which national data can be drawn,
- c) to encourage and enable the interchange of data between BBCS branches, recording groups and local recording centres (such as county museums).

This report completes the task assigned to the Working Party.

Working Party Composition

Jim Asher	BBCS, Chairman
Andy Barker	BBCS
Paul Harding	BRC
Neil Jones	BBCS
Guy Meredith	BBCS
Alan Stubbs	BBCS
Mike Wilkins	BBCS
Linda Williams	BBCS, Secretary

Acknowledgements

The Working Party acknowledges helpful discussions with several BBCS branches, and with Matthew Oates, Caroline Steel and Martin Warren. We are grateful to Roger Sutton for agreeing to continue collating national data on behalf of BBCS and BRC while this new initiative is being drawn up.

2 THE PRESENT SITUATION

2.1 Present use of records

At present, records are used for various purposes. The most obvious, perhaps, is to provide data for compiling butterfly distribution maps, at national and local (usually county) scales.

Systematic recording at particular sites is widely used to monitor the effects of habitat change, and especially to develop information on deterioration of habitat and/or the effectiveness (or otherwise) of management plans. This generally takes the form of transect recording carried out weekly throughout the flight season, following the methods of the Butterfly Monitoring Scheme.

2.2 Potential applications of records

As development increasingly places sensitive sites at risk, there is growing demand for accurate and up-to-date information on species present at particular sites, and on the strength of individual colonies. Much defence of sites, however, is based on, at best, a few *ad hoc* records, often seriously out of date.

For threatened species, where local extinctions may change national status, it is especially important that reliable, accurate and up-to-date data are available; there are many cases of evidence to planning enquiries being disregarded because data are of poor quality or too old. The most up-to-date national distribution maps lack sufficient information to judge the true status of key species; for example, local extinctions may be widespread and obvious at the 1km square level, but may not show up at the 10km level.

2.3 Present recording

2.3.1 Types and sources of recording data

The main sources of data at present are:

- 1) BBCS members operating within branches and national schemes,
- 2) Individuals submitting data direct to BBCS and BRC,
- 3) Professional field biologists, such as in 'NCC', other conservation bodies and academic institutions,
- 4) County recorders, usually associated with local natural history societies or with 5 or 6, below,
- 5) Local biological record centres, often based at provincial museums,
- 6) County and local wildlife trusts and urban wildlife groups - members, reserve managers and conservation officers,
- 7) Published literature and museum collections - useful sources of present and historic data (some of which have been collated by BRC and existing local records centres).

There are several types of recording scheme at present:

- 'National survey', operated by BRC/BBCS,
- County and local surveys, operated by local records centres, natural history societies, some BBCS branches and by individuals,
- Site surveys, generally by transect, based on particular routes through individual sites, operated, for example, by BBCS, 'NCC', RSPB, National Trust and county wildlife trusts,
- Garden surveys, run by BBCS,
- Site type, e.g. churchyard surveys, run by BBCS and county trusts,
- Individual species studies, e.g. by BBCS, NCC, JCCBI, ITE, and universities,
- Butterfly Monitoring Scheme (ITE/JNCC).

There are gaps in the knowledge of distribution, behaviour and habitat requirements reflected in limitations of data. The lack of coordination in butterfly recording makes it difficult to identify and to cover such gaps.

2.3.2 Scales of coverage

Most national distribution maps have been prepared on a 10km grid, whereas county/local distributions are generally on a 1km or 2km (tetrad) grid. The BBCS/BRC Butterfly Recording Scheme is based on 100m (6-figure, e.g. SU987885) grid references to individual sites or sub-sites. For practical conservation management purposes, many important sites are broken down into smaller sub-site units, so that recording can be related to details of management within the site.

2.3.3 Validation procedures

There is only a limited degree of validation of data presently carried out; great reliance is put on the experience and accuracy of individual recorders. It is generally accepted that even authoritative distribution maps published contain some dubious or spurious sightings. Such is the practical difficulty of obtaining enough data for many surveys, that there is great reluctance to filter or to be selective with presented data. Taxonomic validation is best carried out at the local level where local knowledge is often (but not invariably) strongest.

2.3.4 Data Management in current use

Much use is still made of index cards for data storage but these require large storage space and are very labour-intensive to use and interpret. Most archive material is available only in this form and computerisation presents formidable resourcing problems.

Some use is now being made of computer technology to store and manipulate data. A few BBCS branches have begun to put butterfly data onto computer files, generally on IBM- or BBC-based microcomputer systems. BRC uses the ORACLE database management system, but has access to the RECORDER package, sponsored by English Nature and RSNC. RECORDER is likely to become a principal data management standard for species/site records at local records centres and county wildlife trusts. However, many efforts are uncoordinated, and use is made of custom-written software and also of commercial database software, including Dbase, Lotus and Paradox systems.

3 RECOMMENDATIONS FOR FUTURE RECORDING

The principal recommendation of the Working Party is that a new coordinated initiative for butterfly recording be set up to cover Britain and Ireland, in which BBCS takes a leading role as the prime conservation society for butterfly species, jointly with BRC.

This new initiative should be based on a structure of regional units (as yet undefined), within which local recording is carried out to a recommended minimum set of standards (although there may be local requirements for additional data). Regional schemes would involve organization of local recording, collection and validation of data, using computers for data storage and analysis. Regional data can then be collated nationally, and data can be interchanged between regions (for example, to improve county boundary coverage) on computer media.

Where no existing local scheme is in operation in a particular region, the local BBCS branch should be encouraged to take on the rôle of collating and computerizing butterfly records in that region. Particularly where the local branch is small or the area of coverage is very large, much work will be required to get a scheme up to speed.

Where a local scheme is already in operation, especially one run by or in liaison with a local records centre, the local BBCS branch should seek to become closely involved with the existing scheme, even to act on behalf of the local centre (as in the existing relationship with BRC).

It is essential that any local recording project that is developed by BBCS should also involve other biological recording activities organized, for example, by local records centres and wildlife trusts. Ideally, where two or more such projects overlap, there should be a move to merge the projects. Where such a merger is either inappropriate or impractical, BBCS must ensure that there is no competition or rivalry with other, longer-running projects; the aim must be to enhance, and not to diminish, butterfly recording. It is hoped that the Co-ordinating Commission for Biological Recording will provide a framework for mutual exchange of data between independent projects covering the same taxa and area.

Data should be keyed in only once wherever possible; it is a labour-intensive process and must be streamlined using efficient software, to make the best use of meagre resources. Data validation must also be carried out locally, in particular, checking the input for keying errors.

Timely feedback to recorders is now recognized as vital, particularly in atlas campaigns, both to maintain incentive, and to target recording efforts more effectively to fill gaps in current knowledge. This can take the form of an annual statement at local level of the status of each butterfly species (BBCS Hampshire Branch has an excellent model), and/or 10km square printout sheets sent out annually to recorders showing lists of species recorded in each tetrad, as devised by BBCS Upper Thames Branch. Feedback of this kind becomes practical only with the adoption of computerized data.

A new National Butterfly Recording Steering Group should be formed to implement these recommendations and to manage the new initiative. This report completes the task assigned to the Working Party.

3.1 Recommended standards for regional site and species recording

It will be possible to fluently interchange and collate data from different sources, only if recording is carried out to a minimum set of standards. Recommendations for these are laid out in the following sub-sections.

3.1.1 Minimum data fields

The basic conservation unit for recording is the site. If meaningful interpretation and exchange of data is to be possible, a common set of minimum data is required for each individual observation, including key information of the recording site. At the same time, the level of detail has been kept reasonably simple - we want to encourage, not discourage recording. The recommended minimum information is:

1. Name of recorder (preferably with address/phone number for verification).
2. Year (plus day/month or period such as week). Records for different years should be clearly separated and identified. Recorders should be encouraged to make repeated visits (>4) to individual sites through the flight season. Date information is useful both for verification and to provide data to identify changes in seasonal occurrence from year to year.
3. Site or locality name and nearest town/village. The site should be a recognisable site as defined by conservation bodies, or a geographical feature named on an OS map or a local name where it is not an existing conservation site (including, for example, Forestry Commission sites). The nearest town/village assists with verification where local names may not be uniquely recognized.
4. Ordnance Survey National Grid Reference (minimum 1-km square (4-fig., e.g. SP6011), preferred 100m square, (6-fig., e.g. SP605114). Where the site overlaps more than one 1km square, it should be broken down into recognizable sub-sites or at least into separate 1km squares. Even when recording for tetrad mapping, the 1km or 100m square identity should be used in primary data collection. For threatened species, it is particularly important to have 100m references for the accurate location of colonies.
5. Habitat type(s) present on the site, using a simple agreed classification of basic land use/vegetation types, reduced to a short list of principal types for simplicity of use on recording forms. A recommended scheme of habitat types and codes, based largely on the CORINE project, in Appendix I, gives a more extended listing that can be used to code more detailed habitat data.
6. County - assumed to be contemporary political boundaries (or vice-county if clearly stated as such; the real site identity is established by the map reference). This is useful for both data validation and sorting.
7. Numbers of each species observed as maximum count (ideally scored for each visit) within the given year. It is recommended that for most purposes a standard 5-point scale be used, represented by standard codes as follows:

A: 1 B: 2-9 C: 10-29 D: 30-99 E: 100+

This approximately geometric scale has been devised to be (a) amenable to limited numeric analysis, (b) easily recalled and (c) easily applied in the field. This does not preclude some schemes recording actual numbers seen, where it is necessary, for example, in a BMS-style transect, but the implied accuracy may be misleading and there are pitfalls in placing too much statistical significance on the results. The scale can readily be extended to larger numbers, if required, by the addition of further codings, for example, E: 100-299, F: 300-999, G: 1000+.

3.1.2 Advised additional fields

Further information may give added value in interpreting data. Additional advised fields are:

1. Evidence of breeding status from observation of early stages, coded, for example, as O for ovum, L for larva and P for pupa, or observation of mating.
2. Time at start of visit,
3. Time spent at the site on the specified recording date(s) (units preferably in minutes),
4. Weather conditions, expressed simply as Poor/Moderate/Ideal, defined, in a simple form, in terms of sunshine, temperature and wind (e.g. Poor: cloudy, cool, windy; Ideal: sunny, warm, calm), or in terms of actual measured conditions,
5. Notes on significant changes in habitat, management or use,
6. Site protection status where definitely known (e.g. SSSI, nature reserve, ownership),
7. Absence of given species when searched for at an appropriate time of year under ideal weather conditions (particularly at sites where previously recorded).

3.1.3 Validation procedures

The recommendations on basic standards for recording make provision for some checking of the validity of the data being submitted. It is recommended that all data being recorded is validated at the local level. The given map reference should be cross-checked with the site or locality name and with the county name to ensure accuracy; in cases where species identification might be open to question, then the date of the record and to some extent, the habitat type, can be used to check the feasibility of correctness.

Care should be taken, however to check back with the recorder, in cases open to question, to assess the confidence with which the identification has been made. At the same time it is important to include unusual sightings, where doubts have been eliminated.

3.2 Data Management

It is recommended that a Data Management Team be set up within the National Butterfly Recording Steering Group to undertake the task of providing and maintaining facilities for the provision and/or approval of software for the recording, interchange and analysis of data and arrangements for data security, within the scope of the new scheme.

3.2.1 Recommended hardware and software standards

The widespread adoption by business, industry and education of the IBM-compatible PC hardware system and its resulting low cost make it an obvious candidate. Families of these computers exist with different levels of processor power, memory and disc storage capacity, starting at prices that make it realistic to envisage each BBCS branch owning a computer. The MS-DOS operating system is currently universal on these machines and allows for the painless interchange of programs and data between machines. A fixed disc drive is strongly recommended as the best approach for storing software and data files; floppy disc drives are a minimum requirement and are needed for initial program input and for data interchange and archiving.

It is recommended that, as far as possible, any new regional scheme uses the same software, customised as required to meet local needs, but storing data in a standard format using

standard codings; recommendation on codings are given in the following section. It is recognized that this will not always be possible and provision will have to be made for format translation.

Almost certainly, funding support will be required to help BBCS branches that do not already have suitable computers to purchase appropriate equipment, and early sponsorship should be sought centrally to raise the necessary funds (see Section 5).

It is envisaged that new BBCS branch schemes, where appropriate, could be up and running within 2-3 years, with a computer and one of a small number of software packages (preferably a centrally 'adopted' package optimized for the purpose) to meet all their local data recording and analysis needs.

Although it is likely that within the 1990s, BBCS could be handling large quantities of data on a national scale, clear working cooperation and data interchange with BRC and other bodies must be retained. BRC has access to a growing range of other environmental datasets and Geographical Information Systems, which will provide expertise and novel ways of using and interpreting butterfly data. An appropriate interface with the RECORDER package (see section 2.3.4) is likely to be needed to allow for easier exchange of data with some other recording organisations.

3.2.2 Standard coding systems

There is no single widely accepted coding system to cover butterfly recording. To a great extent, coding details are not crucial, as computer programs can be written to translate between formats with relative ease. There is, however, a recognized need for an efficient front-end system for keying in data within a minimum of operator effort, and that may require new software optimized for use in butterfly recording.

In any new or non-standard software used, the basic file structures of butterfly record files should be clearly documented and simply coded to minimise the work involved in translating between different formats. Although some of the data fields may be in simple text, it is recommended that simple forms of data compression/coding should be used to keep file sizes and therefore storage capacity requirements to an acceptable minimum.

A prototype data storage system, devised to meet the recommendations for standard data, is already under evaluation and could result in a standard coding system for general use by BBCS. Further work is required, however to investigate compatibility with existing systems, such as RECORDER, before any such system is put into widespread use.

Coding of species is recommended to make economical use of file storage space. The coding should be based on a standard national species list. It is recommended that the list should contain both the 'normal' British species known to breed regularly in UK, but should also make provision for erratic visitors/migrants. A recommended list, based on that used in *The Moths and Butterflies of Great Britain and Ireland, Vol.7*, is given in Appendix II. Any form of coding must be clearly and unambiguously documented.

Where BBCS branches already use other custom-written or commercial software database systems, then the Data Management Team will need to receive a detailed specification of the software and formats being used, so that appropriate translation programs can be developed.

3.2.3 Safeguarding data

Butterfly records will have to be protected against loss or corruption. All computerised records should be derived from source material in hard copy form, such as standard recording sheets. All the source hard copy should be retained by the regional centres and

adequately cross-referenced to computer files, so that disputed records can be checked and to protect against irretrievable loss of computer media. Efforts should be made by BBCS branches to find permanent archiving facilities (e.g. at a local records centre or museum) for source data.

Anyone creating a file of records to be kept under the scheme, either by keying them in directly, or by processing other files in some way (such as collating or reformatting), should make at least two back-up copies at regular intervals on floppy discs. These should be made read-only and one should be removed for keeping at a different address as soon as possible. A description of the file should be made; copies should be kept with each back-up disc. The description should give enough information for someone other than the originator of the file to determine whether the file contains new records, selected records from other files (and if so, which other files), all records from an older file plus new records, or whatever. The regulation and monitoring of such arrangements within BBCS will need to be administered, probably by the Data Management Team.

Computer viruses have to be taken seriously, although some simple steps give considerable protection against risk. No computer, that is used for games purposes should be used for collating or exchanging data, particularly if the games are from dubious sources. Serious consideration should be given to positive methods to detect and eliminate known type of virus; some commercial software exists to help in this respect - but beware of so-called virus protection or information from non-reputable sources, it may itself carry a concealed virus.

3.2.4 Using data from existing systems

Some BBCS branches already have computer databases up and running, and would be understandingly reluctant to change to a different system. It is expected that records from existing computer-based systems can be converted to any recommended format, if necessary leaving some fields unspecified if the information is not recorded at present. This also applies to existing manual recording systems. Amongst those BBCS members involved in managing this scheme there will be some with the necessary expertise and equipment to convert files from existing IBM-compatible systems to new record format(s); in some cases, they will also be able to transfer records from other types of computer (e.g. BBC microcomputer). Provision of facilities for such inter-computer transfer would be undertaken by the Data Management Team, only where necessary making use of an external professional service.

On a wider front, CCBR is examining data transfer mechanisms in biological recording. Also, JNCC and English Nature will be looking at RECORDER package transfer mechanisms in 1992. It is therefore very timely to examine these issues for butterfly record data formats and to seek take advantage of these other initiatives, where appropriate.

3.3 Standards for site monitoring

Recording at individual sites of conservation priority generally includes transect recording aimed at establishing quantitative data on species abundance as a means of monitoring habitat change and the effectiveness of management regimes.

In general, the basic systems used for transect recording already include the basic ingredients of the standards recommended in this report. The main emphasis here therefore is to ensure that transect data can be made readily available to regional centres in a form that can be stored and converted for use with a minimum of additional effort.

Transect recording should be encouraged where a local recorder has the motivation and ability to maintain recording over a good run of years. This is an area in which BBCS may have a uniquely important function.

Transect recording is different from distribution recording with a different purpose. It may not record all species present on a site (but should be encouraged to do so where practicable - although transect recording cannot be applied, for example, to tree canopy species) and the status along a transect may not be representative of the site as a whole. It is, however, a very good means of monitoring long-term changes. The resultant data provide useful contributions to distribution mapping and should be included in this scheme.

The ITE/JNCC Butterfly Monitoring Scheme is to be funded for a further 5 years in which the scheme is expected to increase the number, geographical coverage and ecological spread of sites covered. Modified transect techniques for use in 'the wider countryside' are to be examined in 1992. Further work is to be done on the analytical techniques used on BMS data which may lead to some rethinking and re-analysis of past data.

Although there is currently no means of handling all the data from all the sites being monitored and data are often not truly comparable with BMS data, some BBCS branches are starting to use computers to store and analyse transect data. It is important to ensure that data from all such transects can be brought into this wider recording initiative. A separate project may be required to coordinate transect data, but this is best tackled by extending the BMS scheme; BBCS may have an important role to play in this.

3.4 Garden recording and monitoring

For the majority of recorders, the garden is the place that can be most regularly observed, although, in conservation terms, garden recording is perhaps seen as the lowest priority. Encouragement of butterfly recording here is an important means of generating and maintaining enthusiasm. Hence it is important to build upon these opportunities and to direct recording efforts towards achieving useful information. Furthermore, gardens may offer the only readily accessible means of recording species in many heavily urban and intensive agricultural areas, which, inevitably, are becoming an increasingly dominant part of the landscape.

The present system of garden recording run by BBCS is very basic, and can be extended to include the minimum recording standards so as to increase motivation further, without becoming over-complicated.

The following are key ingredients:

- 1) Recording which species are seen in a garden and their breeding status
- 2) Noting the dates of occurrence of each species each year or, at least, the first and last dates.
- 3) Clarifying the utilisation of various types of garden flower, best coded within broad groups for computer storage
- 4) Monitoring the pattern of seasonal occurrence of species year by year

Most of these ingredients have been included within the Garden Butterfly Survey format deployed by BBCS in recent years. The last ingredient is a useful enhancement for those recorders who are interested in achieving rather more valuable data.

The basic recording effort assists with mapping coverage at local and national scales. The pattern of dates of occurrence gives a basis for analysing the effects of climatic factors and for noting the appearance of migratory species, leaving scope for analysis of geographic patterns. The utilisation of flowers may lead to a better understanding of the drawing power and value of gardens managed in given ways, in turn affecting the nature of local records.

The monitoring format recommended is an adaptation of the BTO garden bird survey. The maximum number of each species seen on any occasion during a week is recorded, a week running from Sunday to the following Saturday (so that absence on one weekend is less critical). This system has similarities with transect walks, but is not geared only to a single recording session under 'ideal' weather. The method offers a reasonable means of recording seasonal patterns, including multiple brood patterns and puts a numerical figure to migrants. Ideally, it should be supplemented by first dates of occurrence and sudden renewed appearance especially for multi-voltine species or where the movement pattern of migrant species may potentially be demonstrated from nationally collated data.

The processing of data is a matter to be addressed. Some recorders will be prepared to plot histograms of their own data and as the runs of data build up, it has to be anticipated that the ways and means to collate this data will emerge in due course. Similarly, the potential to track migration patterns should promote the incentive to analyse the data. The basic presence (or absence) data and general aspects of representation of species in gardens forms an ingredient of distribution data to be treated at both local and national recording scheme level.

The validation of garden survey data for further use requires careful consideration, particularly as there may be young children or inexperienced recorders involved. Reliance will have to be placed on the regional centres to develop and use their local experience to weed out questionable data. Some regulation of standards for scrutiny of data should be developed nationally.

Garden recording could be developed massively as part of a BBCS publicity drive - the potential is great - and may provide a good initial training ground to generate further resources for recording effort elsewhere in future years. However, the limitations of such recording must be recognized so that disproportionate allocation of scarce resources, to high profile but limited conservation value projects, is avoided. It is recommended, however, that a new national garden recording scheme should not be launched until the present BBCS national garden survey project is completed in 1995.

3.5 Collation of records

The geographical unit for collation should cover Great Britain, Northern Ireland, Republic of Ireland, Isle of Man and the Channel Islands, assuming that agreement to collaborate can be obtained with the relevant organizations and individuals, especially in the Republic of Ireland, where BBCS and BRC have no remit.

BBCS should seek to collaborate with BRC on a broader European perspective, drawing upon the existing contacts and experience of BRC. Similar national or regional recording projects exist in many countries, and there have been proposals for a European atlas project. Topics that would benefit particularly from an international approach are studies of migratory species and the protection of internationally threatened species such as Marsh Fritillary. In the case of the latter topic, the European Invertebrate Survey is already actively involved with the Council of Europe, advising on the Berne Convention.

For national mapping (as a representative summary of more localised regional data, based on a minimum standard of recording down to 1km square detail), the 10km square unit should be retained.

The concept of maintaining an annually updated database, both at local and at national level should be considered. Such a 'Living Atlas' would be very useful in allowing prompt treatment of requests for data, for example, in connection with submitting timely evidence in connection with planning issues. Although this would be useful, it implies a considerable degree of local and national commitment if it is to be properly maintained.

3.5.1 Britain

It is recommended that BBCS should work in cooperation with the resources available from BRC to collate and map national distribution data, derived from data collected and submitted regularly on computer media by the regional schemes. There are clear mutual benefits in sharing the task of handling a national database with BRC, not least BRC's access to other species and environmental datasets and statistical advice to underpin the analysis of butterfly data.

3.5.2 Ireland

Early steps are being made by BRC to make contact with appropriate organizations in the Republic of Ireland and in due course it should be possible to involve them in this scheme. BBCS already has a Northern Ireland branch and BRC has close ties with the biological recording networks in Northern Ireland. Data from Ireland would then be included with data from the rest of the British Isles to compile distribution maps.

3.5.3 Sample surveys

It is recognized that survey coverage is not likely to be equally thorough or uniform throughout Britain and Ireland; there are self-evident problems in achieving a detailed survey of the Scottish Highland area, for example. It is recommended that consideration be given to a sample survey technique, whereby either a randomly selected, or a uniformly distributed, array of 1km squares, for example, one 1km square per 10km square, be surveyed in detail across the country. This should be linked in to the ITE scheme which has been measuring land use on a sample basis. Such schemes have been used in other species groups, including surveys of badgers. Although obviously less complete than a full survey, the data that result may be of more rigorous statistical value.

3.6 Policies on the release of information

Ownership of the regional data should rest as far as possible with the regional schemes; although ownership of data provided by BBCS should remain with BBCS, the formal legal position on ownership is unclear and it must recognize that it cannot retain total control over all the data, since other recording bodies will have played a role in collating and processing data. Without some degree of friendly interchange of data with other conservation parties, the common goal is unlikely to succeed.

The new successor bodies to NCC will hold considerable data for the scarcer species, much of it sensitive and in confidence. At times, they will almost certainly have research projects on individual rare species, apart from the Invertebrate Site Register, which includes information given by entomologists who require respect and care over sensitive data.

Release of data to third parties raises issues that must be carefully reviewed. There are a number of environmental consultancies that will collect together, interpret and report data to developers for the purposes of supporting planning applications for development. Many BBCS members would be very reluctant to cooperate with any scheme that gave developers easy access to their data. However, it must also be remembered that it is usually the incompleteness of data that loses a planning argument to defend a sensitive site, and not their availability.

Another issue is access to data by collectors. Whilst there is much discussion about whether or not collecting really is a significant factor in endangering species, it is clear that feelings run strong. It would not serve any legitimate purpose if collectors could easily gain access to site records.

It is recommended that any regional and national centres handling collated data should be given agreed guidelines on policy for release of data, so that adequate controls and safeguards can be built in to protect valuable or sensitive data and prevent it falling into the wrong hands. Any such data passed on to third parties on the agreed basis would have to carry a clear confidentiality and ownership marking, so that recipients are in no doubt about the limits to their use of the data provided.

Where consultants employed by developers request data, clear guidelines for disclosure are required, particularly if development is in direct conflict with the wider aims of BBCS. In some extreme cases, it may be felt necessary to withhold some data. The collection of data has costs associated with it and is recognized now as having monetary value; data should not be casually given away free. Where a consultant is being paid to make an assessment, it is only reasonable that any body providing data, including BBCS, should be paid. This raises 'ethical' issues and clear policy decisions are required by BBCS, in consultation with other conservation bodies, to devise guidelines to meet these circumstances. If a site is an SSSI, 'NCC' should be consulted over data disclosure.

Wherever possible, information released to third parties should be 'filtered' so that the level of detail supplied is no greater than that required. Information on individual sensitive sites should not be released unless absolutely necessary, and only then with due consideration to the site owner's rights. Furthermore, release of interpreted data is to be preferred to raw data - and interpretation also adds value.

3.7 Effective use of distribution maps

Distribution maps can be used to summarize the spatial and/or temporal occurrence of species and, where sufficient data are available, to give an impression of the abundance of species.

Although there are examples of the use of maps in these ways for other taxonomic groups, few butterfly atlases have shown anything more than distribution in two or three 'date classes', using simple dot marking to indicate only recorded presence. Future national and regional atlases should aim to summarize data in more meaningful ways, of which the following are examples:

- a) More than one map per species to enable better interpretation of changes in range or abundance over a period of time, or to indicate varied status within a known range.
- b) Up to 4 symbols per species map to differentiate a sequence of date classes (it has been shown that the use of more than 4 symbols per map is visually difficult to interpret).
- c) The most recent date class should be as recent as possible, depending on the length of time for which a survey or data collection project has been operated. Because of increasingly rapid changes in the environment, a most recent date class of 10 years or less should be preferred.
- d) The status of species can be differentiated using up to 4 symbols, for example, to show breeding records or confirmed colonies as opposed to casual/erratic records or introductions.
- e) A measure of abundance could, with caution, be used in mapping. This could be based, for example, on the number of sites, colonies, 100m squares, 1km squares or tetrads recorded in the relevant mapping unit (e.g. number of colonies/1km square or number of tetrads/10km square), or direct use of recorded numbers seen in the relevant mapping unit. Appendix III shows an illustrative example of a scheme used by BBCS Hampshire Branch. In its simplest form, this type of approach can be used to provide a visual discrimination between true colonies and accidental records.

f) Consideration should be given to indicating that a species *has been actively looked for*, but not found. This would be particularly appropriate at the edge of the known range of a species or within lacunae (gaps) in known range. It would not be appropriate to indicate the 'recorded absence' of the Scotch Argus in Wales or southwest England, whereas it would in Caithness and Sutherland.

The Working Party has refrained from proposing a fixed set of symbols to be used for these proposed applications because of the great variety of graphics in use in biological recording and the recognition that the choice of appropriate symbols will depend on individual circumstances. It is more important to ensure that the symbols chosen provide an appropriate visual sequence through varying size, shape and shading to convey clearly the information intended.

3.8 A National Atlas Landmark Project

It is proposed that a major landmark project be launched that will give clear focus to this new scheme. The proposal is for the production of a new Atlas of Butterflies of Britain and Ireland to mark the status of butterflies at the end of the 20th Century, based on recording effort over the last three to five years of the 1990s, and incorporating the recommended standards for data and new mapping concepts. This will require that the recommendations of this report are in place and that regional schemes are all up and running by 1995 at the latest, and preferably earlier, to build up the required momentum and to identify important sites for what could be the most comprehensive and intensive survey of our butterfly species ever undertaken.

Sponsorship funds and a project management team will be required to run this project successfully. Widespread publicity and organized and detailed feedback to recorders during the recording period are likely to be further essential ingredients for success. BRC would expect to be actively involved with such a project.

3.9 Standardised recording forms

It is a strongly advised feature of this new scheme (and would make for greatest efficiency) that standardised forms should be used for recording, incorporating entry points for each of the minimum standard data items required, but customised to cover the requirements and environment of regional areas. An example of a Site Recording Form, which has been used on a prototype basis in 1991 and revised for use in 1992, is attached to the report. Clarity, simplicity of use and availability of simple instructions for use are of key importance in such forms but form design should allow also for efficient keying-in of data.

It is likely that no one form can be devised to meet the varied requirements of site-based recording, tetrad recording for mapping, garden surveys etc., but a model form or a series of model forms makes it easier to ensure that standards are kept. Furthermore, not all branches have facilities to generate their own recording forms. Expertise is already available through the present Working Party to customise standard forms for individual branch use. Limited trials with the 1991 prototype form have demonstrated the feasibility of doing so and 1992 forms have already been customized for several BBCS branches.

The use of forms specifically designed for computer scanning has been considered by the Working Party, but it is felt that there are real problems in making these work accurately; furthermore the cost of specialist scanning equipment and software is likely to be well beyond the finances of regional centres. We therefore recommend against their use at a regional level.

4 TIMETABLE AND FRAMEWORK FOR ACTION

Work needs to progress reasonably quickly if the scheme is to be come up to speed for a new major atlas project. Early approval by the BBCS National Executive Committee will enable the programme to start in the 1992 recording season. The following sections detail steps and ambitious, but achievable, target dates/timetables for subsequent actions.

4.1 Development of regional recording systems

Endorsement of recommendations by BBCS Conservation Sub-committee - Jan. 1992

BBCS National Executive approval - February 1992

Formation of Recording Steering Group to implement recommendations
- February 1992

Discussions with non-BBCS agencies - 1992

Consult with CCBR over relationship with local records centres, wildlife trusts, etc.

Structure and definition of regional units in place by end 1993

4.2 Introduction of standard recording by BBCS branches

To be implemented by Steering Group - provision and dissemination of standards, recording formats and software.

Target: 1992 recording season

4.3 Development of standard coding systems

To be tackled by Data Management Team with Branch consultation by mid 1992

4.4 Incorporation of information from other sources

BBCS, jointly with BRC, through Working Party - introduce from 1992 on

Examine need for, and potential to, complete gaps in geographical coverage

Target: completion by 1995

4.5 Mapping concepts for regional and national distribution mapping

Steering Group to examine concepts for mapping representation and consult jointly with BRC on recommendations - pilot schemes from 1993

Consideration of use of other environmental datasets and graphics - from 1993

National mapping concepts by 1995

4.6 Computer based systems in BBCS Branches

Sponsorship in place by end of 1992

Computers in place during 1993

4.7 Landmark Project Action Plan

Set up action plan for project - 1993

Specify date periods for recording - end 1993

4.8 Financial Plan for forward working

Financial requirements for Regional centres - April 1992

Five-year forward financial plan - end 1992

5 FINANCIAL IMPLICATIONS

Needless to say, there are significant costs and resource implications for any major initiative of this kind. Those costs likely to be incurred within BBCS are considered briefly in this section and simple outline budgetary estimates are attempted. There are further cost implications for BRC, which cannot be quantified here.

The extensive use of volunteer effort within regional schemes provides a valuable, enthusiastic and cost-efficient resource to record the occurrence of species on local sites, collate data and develop feedback routes to recorders. Although this can be done at low cost, postage, printing and communications inevitably have to be paid for. In an active local centre these costs alone may amount to £100-500 per year, depending on the number of recorders and level of feedback.

To provide minimum computer facilities to enter, store and collate primary data, requires at least one computer costing in the region of £1000-2000 per local scheme, where there is no existing access to suitable equipment. Based on 25-30 BBCS branches alone, this implies an investment in the region of £25-60k in 1991 money; if, say, half the BBCS branches already have suitable computers, then the investment level will be reduced in proportion.

To run a major national publicity campaign to attract recorders in poorly covered areas and to gain general public interest, and also to underpin applications for sponsorship, also requires a significant input of resources on a scale comparable with the recent Operation Butterfly campaign.

Costs will arise in organizing data transfer, format translation and collation. Some of these can be covered by volunteer effort within BBCS, but inevitably, part of the cost will fall on other voluntary and non-voluntary organizations. The use of professional staff or 'bought-in' services is expensive, and therefore should be reserved for high-value activities.

Costs of publication of local data to professional standards, in atlas form, for example, are also considerable. The economics of doing so are more complex, and depend crucially on estimated demand and therefore size of print runs, cover price and to what extent sponsorship can be attracted. No attempt will therefore be made here to estimate these costs. On the positive side, the publicity value of a good quality publication in consolidating the name of Butterfly Conservation has considerable value. There is no reason, however, why the publication of a national atlas should not be a profitable enterprise on its own, and could be of considerable direct financial benefit to Butterfly Conservation.

A considerable number of important butterfly sites are reserves or SSSIs where 'NCC' has a unique statutory role of benefit to BBCS aims. The whole issue of legislation, including protected species and licensing, will continue to be in their sphere. These bodies have limited resources and will clearly be seeking close relationships with BBCS and its data and expertise. If this initiative is serious in its objectives then it represents a genuine contribution towards conservation. As such, it should be entirely proper for BBCS to seek funding support from 'NCC' for their part in this new scheme.

BRC should build into forward plans a commitment of resources to working with BBCS and to the development of the database for the new atlas (and all the work that goes with it). This commitment also needs to be built into the contract between JNCC and NERC for BRC. If, in due course, a wider European aspect to this initiative can be established through BRC, then consideration should be given to seeking European Community funding.

APPENDIX I : Classification and coding of habitat types

Recording of site habitat presents a challenging compromise between a comprehensive description of the habitat types present and a simple-to-use scheme that does not discourage recorders. The scheme presented here is kept simple at the recording form level, but provides a hierarchical structure to allow for more detail to be coded into the database if it is supplied. Recorders should be encouraged to give more details on site habitats where possible.

A1 A simple habitat coding scheme

It is recommended that recording forms include a short tick-list of relevant principal habitat types, with adequate provision for recorders to supply more information, if they wish. Only those habitats found within a region should be listed on the regional form. The recommended classification of habitats is based on the CORINE biotopes project codings at a broad level. Where more information is supplied, this can be coded in using the more extended coding list suggested in section A2. A recommended short list of types with their codings is as follows:

- | | |
|----|---------------------------------------|
| 1 | Sea-shore/cliffs/salt marsh |
| 2 | Freshwater edges |
| 3 | Scrub/heath/native grasslands |
| 4 | Native woodland |
| 5 | Bogs/marshes |
| 6 | Rocky habitats |
| 81 | Improved/seeded grassland |
| 82 | Crops |
| 83 | Orchards/Plantations |
| 84 | Tree lines/hedges/small woods |
| 85 | Parks/gardens/churchyards |
| 86 | Urban/industrial areas |
| 87 | Fallow/waste land |
| 89 | Quarries/chalk/gravel pits |
| 90 | Road/rail verges/cuttings/embankments |

Where a given site has more than one of these habitat types present, then all the appropriate codes should be recorded, although a large complex site should preferably be broken down into appropriate sub-sites with distinct habitat types, if practical.

A2 Detailed habitat codes

Often recorders will supply supplementary information about site habitat. The following table lists more habitat types at a greater level of detail, following the CORINE codes. The CORINE biotopes project provides a comprehensive breakdown of habitat types, structured in a hierarchy with corresponding codes, according to the level of detail required. The more detailed level of types in the following list can be used for coding additional site information within a consistent structure, with the entries in italics giving the greatest level of detail. This is not a complete list of the CORINE types, but covers those habitat type/codings likely to be appropriate to butterfly recording in Britain and Ireland.

CODE	Habitat type
1	COASTAL AND SALT COMMUNITIES
14	Mud flats and sand flats
15	Salt marshes, salt meadows
16	Coastal sand dunes and sand beaches
17	Shingle beaches
18	Sea cliffs
	<i>181 Unvegetated cliff/rocky shore</i>
	<i>184 Coastal landslips/undercliffs</i>
19	Islets and rock stacks
1A	Machair
2	NON-MARINE WATERS
22	Standing water (fresh)
	<i>225 Pond/lake edge</i>
	<i>226 Banks of reservoir</i>
24	Running water
	<i>246 River edge/riverside path</i>
	<i>247 Canal edge/towpath</i>
3	SCRUB AND GRASSLANDS
31	Heath and scrub
	<i>311 Wet heaths</i>
	<i>312 Dry and humid heaths</i>
	<i>31A Gorse-dominated heaths</i>
	<i>31B Hawthorn scrub</i>
	<i>31C Blackthorn scrub</i>
	<i>31D Other scrub</i>
34	Dry calcareous grassland
	<i>341 Chalk grassland</i>
	<i>342 Limestone grassland</i>
35	Dry siliceous grasslands
	<i>358 Bracken-dominated acid grasslands</i>
36	Alpine and boreal grasslands
37	Humid grasslands & tall herb communities
38	Meadow
	<i>381 Grassland on neutral soil</i>
	<i>382 Lowland hay meadow</i>
	<i>383 Mountain hay meadow</i>
	<i>386 Wet meadow (grazed)</i>
	<i>387 Wet meadow (ungrazed)</i>

APPENDIX I - continued

4 WOODLAND

41 Broadleaved deciduous woodland

411 *Beech*

412 *Oak*

413 *Ash*

419 *Chestnut*

41B *Birch*

41D *Other woods*

42 Native coniferous woodland

43 Mixed woodland

44 Alluvial/wet forests (sallow/willow/alder)

Additional qualifiers:

<i>For: Coppice</i>	<i>add:</i>	<i>C after number</i>
<i>Glades/clearings</i>		<i>G</i>
<i>Ride system</i>		<i>R</i>
<i>Edge</i>		<i>E</i>
<i>Managed</i>		<i>M</i>
<i>Unmanaged</i>		<i>U</i>
<i>Heavily shaded</i>		<i>S</i>

5 BOGS AND MARSHES

51 Raised bogs

52 Blanket bogs

53 Water-fringe vegetation

54 Other bog/Calcareous fen

6 ROCKY HABITATS

61 Scree

62 Exposed bedrock, inland cliffs

8 AGRICULTURAL AND ARTIFICIAL LANDSCAPES

81 Fertilized/improved grassland

811 *Long turf fertilized/improved meadow*

812 *Medium turf fertilized/improved meadow*

813 *Short turf fertilized/improved meadow*

814 *Golf course*

815 *Sports field*

82 Crops

822 *Cereals*

823 *Brassicas*

824 *Lucerne*

825 *Root crops*

826 *Linseed*

827 *Other crops*

83 Orchards, plantations and commercial forestry

831 *Orchard*

832 *Plantations (including coniferous)*

Add: R for ride system

E for edge

B for major open/cleared blocks/compartments

APPENDIX I - continued

- 84 Tree lines, hedges, small woods and parkland
841 *Hedgerows*
842 *Tree lines*
- 85 Parks, gardens
851 *Urban park*
852 *Churchyard*
853 *Garden Centre/Botanical gardens*
854 *Zoo*
855 *Large garden*
856 *Small/medium garden*
Add: *V for village*
T for town/city
- 86 Urban and industrial areas
861 *Shopping precinct*
862 *Car park*
863 *Factory site/industrial estate*
- 87 Fallow, waste and disturbed land
871 *Rubbish tip/Dump*
872 *Wasteland (including old factory site)*
873 *Set-aside agricultural land*
- 89 Habitats associated with surface rock/mineral extraction
891 *Chalk pit/Limestone quarry*
892 *Slate quarry*
893 *Granite quarry*
894 *Sandstone/quartzite quarry*
895 *Open-cast coal mine*
896 *Other mines/quarries*
897 *Sand/gravel pits*
898 *Spoil heaps*
899 *Clay pits*
Add: *A for active*
D for disused
- 90 Habitats associated with roads, railways, airfields
901 *Roadside verge*
902 *Roundabout*
903 *Unmetalled road/track*
904 *Road/Rail embankment*
905 *Road/Rail cutting*
907 *Airfields*
Add: *A for active/used*
D for disused

APPENDIX II: Species list for recording

The following is the recommended list of butterflies relevant to recording in the islands of Britain and Ireland. The order and nomenclature is as used in *The Moths and Butterflies of Great Britain and Ireland*, Vol 7, Part I, published by Harley Books (1989).

NATIVE SPECIES AND COMMON IMMIGRANTS

Chequered Skipper	Duke of Burgundy Fritillary
Large Chequered Skipper (CI only)	
Small Skipper	White Admiral
Essex Skipper	Purple Emperor
Lulworth Skipper	Red Admiral
Silver-spotted Skipper	Painted Lady
Large Skipper	Small Tortoiseshell
Dingy Skipper	Large Tortoiseshell
Grizzled Skipper	Peacock
	Comma
Swallowtail	Small Pearl-bordered Fritillary
	Pearl-bordered Fritillary
Wood White	High Brown Fritillary
Clouded Yellow	Dark Green Fritillary
Brimstone	Silver-washed Fritillary
Large White	Marsh Fritillary
Small White	Glanville Fritillary
Green-veined White	Heath Fritillary
Orange-tip	
Green Hairstreak	Speckled Wood
Brown Hairstreak	Wall
Purple Hairstreak	Small Mountain Ringlet
White-letter Hairstreak	Scotch Argus
Black Hairstreak	Marbled White
	Grayling
Small Copper	Gatekeeper
Small Blue	Meadow Brown
Silver-studded Blue	Ringlet
Brown Argus	Small Heath
Northern Brown Argus	Large Heath
Common Blue	
Chalk Hill Blue	
Adonis Blue	
Holly Blue	










INFREQUENT IMMIGRANTS, INTRODUCTIONS AND ACCIDENTALS

Pale Clouded Yellow	Short-tailed Blue
Berger's Clouded Yellow	Mazarine Blue
Black-veined White	Large Blue
Bath White	Camberwell Beauty
Large Copper	Queen of Spain Fritillary
Long-tailed Blue	Monarch

APPENDIX III Example of mapping symbols to convey abundance

This appendix gives an example, for purely illustrative purposes, of symbol use to improve the depth of information that can be conveyed in species mapping.

To illustrate in more useful detail the number and/or strength of colonies within a mapping unit, it is useful to have graded symbols. A system devised by Hampshire Branch gives a visual representation of this, coupled with the average of the code values for the number of species seen over an agreed period of time, based on the recommended codes in section 3.1.1 (where A=1, B=2, C=3, D=4, E=5), as follows:

Average 'abundance' code		< 1.5	1.5-3.0	>3.0
No. of tetrads in 10km square	1-3			
	4-10			
	11-25			

It should be emphasized that this is simply an example; in any particular mapping project, a symbol set should be chosen to suit the nature of the data so as to convey the relevant information in as clearly visual a representation as possible.

BUTTERFLY SITE RECORDING FORM

BBCS Upper Thames Branch
1992 edition



NAME:

YEAR:

ADDRESS:
& Tel. No.

Date(s) of visit(s): *please list overleaf*

SITE INFORMATION: If possible, please add a sketch map of the site and area visited

Site name:	Grid ref:
Nearest town:	County:

HABITAT TYPES: Please tick box(es) that apply to the area visited and give any other details about habitat/land use:

Freshwater edges (lakes/rivers/canals)	2
Heath/ Scrub	31
Dry calcareous grassland/ Chalk down	34
Meadow (unimproved)	38
Broad-leaved deciduous woodland	41
Mixed woodland	43
Bog/ Calcareous fen	54
Fertilized/improved/reseeded grassland	81
Crops	82
Orchards/ Plantations/ Commercial forestry	83

Tree lines/ hedges	84
Parks/ Gardens/ Churchyards	85
Urban/ Industrial areas	86
Fallow/ Waste land	87
Quarries / Chalk pits / Gravel pits / Clay pits	89
Road/rail verges/cuttings etc (active)	90A
Road/railway tracks (disused)	90D
Other details	

SUMMARY OF SPECIES SEEN

Enter the date and length (approx. minutes) of each visit and indicate weather conditions and the number of each species seen overleaf. Give a summary below of the highest number of each species seen on any one visit over the year, in column X. Use the following codes: A: only 1 seen, B: 2-9, C: 10-29, D: 30-99, E: 100+. If any early stages (ova, larvae or pupae) or mating of a particular species are seen, use codes O, L, P or M overleaf and mark columns O, L, P or M, respectively, below.

	X	O	L	P	M
Small Skipper					
Essex Skipper					
Silver-spotted Skipper					
Large Skipper					
Dingy Skipper					
Grizzled Skipper					
Wood White					
Clouded Yellow					
Brimstone					
Large White					
Small White					
Green-veined White					
Orange-tip					
Green Hairstreak					
Brown Hairstreak					
Purple Hairstreak					
White-letter Hairstreak					
Black Hairstreak					
Small Copper					
Small Blue					
Silver-studded Blue					
Brown Argus					
Common Blue					
Chalk Hill Blue					
Adonis Blue					
Holly Blue					

	X	O	L	P	M
Duke of Burgundy					
White Admiral					
Purple Emperor					
Red Admiral					
Painted Lady					
Small Tortoiseshell					
Large Tortoiseshell					
Peacock					
Comma					
Small Pearl-bordered Fritillary					
Pearl-bordered Fritillary					
High Brown Fritillary					
Dark Green Fritillary					
Silver-washed Fritillary					
Marsh Fritillary					
Speckled Wood					
Wall					
Marbled White					
Grayling					
Gatekeeper					
Meadow Brown					
Ringlet					
Small Heath					
Other (specify):					

Please return completed forms to:

Jim Asher BBCSIUTB, 24 Fettiplace Road, Marcham, Abingdon, Oxfordshire, OX13 6PL

Notes on use of Butterfly Site Recording Form - 1992 Edition

Please use separate forms for different sites, or for different sub-sites within a large site. Please do not put data from more than one year on any one form. Records should be entered as follows:

Name/Address: Please write in the name, address and telephone no. of the recorder.

Year: Enter the year for which records have been made.

Site Information

Site name: Enter the name of the site, or a geographical feature as used on the OS map or a known local name. This could be a Nature reserve name, the name of a wood, or a well-defined feature, such as a green lane, or a hill name, for example. For a garden, it can help to give the postcode, and for a suburban location, the name of the district. If possible, please attach a sketch map of the site and area visited.

Nearest town: Give the name of the nearest town or village to assist with identifying sites with a very local name or a very common name (such as Home Farm). It also helps in correcting grid reference errors (which anyone can make!).

Grid ref: Enter the 6-figure OS Grid reference of the centre of the named site or sub-site (e.g. Oakley Wood (Bernwood) is SP615117), or at least a 4-figure reference to the 1km square (e.g. SP6111). If you have difficulty with Grid references, please attach a sketch or other indication of the location of the site to assist in its identification.

County: As data may be sent to county museums and will be collated nationally, it is very useful to identify the county to which these records relate.

Habitat types: Tick those boxes in the list that best describe the habitat(s) present on the site, within the area visited. Please add any additional information that you may have on the habitat, not covered by the categories listed.

Species seen: Enter details of each visit to the site on the back of the form, using one column per visit. Give the day and month of the visit at the top of the column, the approx. length of the visit (in minutes) and an indication of weather conditions (P for poor (cloudy/cool/windy), M for moderate, I for ideal (warm/sunny/calm). For each species seen, enter the number seen, coded **A** for 1 only, **B**: 2-9, **C**: 10-29, **D**: 30-99, **E**: 100+. If you are fortunate enough to see any eggs (ova), larvae or pupae, please enter the code **O**, **L**, or **P**, respectively. If you see mating, enter the code **M**.

To be likely to observe all species that may occur on any site, it is best to make at least 4 visits to the site through the season, i.e., April/May through to September, but even if you can manage only one visit, please record the data anyway.

At the end of the year, please give a summary on the front of the form of all species seen, entering the code (A-E) for the highest number seen on any one visit during the year, under column X, and O, L, P or M for any ova, larvae, pupae or mating seen, under columns *O*, *L*, *P*, or *M*, respectively.

Sightings of very unusual species, not listed, should be given under 'Other', but please add notes.

Comments: Please use the space at the foot of the back of the form to make any additional comments about the site (e.g. ownership/status, if known, or more information about unusual sightings). Please add further notes on a separate sheet of paper, if necessary.

