

DIPTERA: FLIES



'Blue Bottle' from Vilhelm Bergsøe, *Fra Mark og Skov*¹

Name of organisation :- **Dipterists Forum**

Website:- Under development.

Number of species:- ca. 7,000 in the British Isles. Eight national (i.e. GB & Ireland) recording schemes cover 1,476 species, and five study groups cover an additional 1,672 species.

Scottish Contact:- Malloch Society of Scotland.

Address:- David Horsfield, Secretary
131, Comiston Road, Edinburgh, EH10 6AQ

National contact:- Alan Stubbs, Secretary

Address:- 181 Broadway, Peterborough, PE1 4DS

Tel:- 01733 346648

The (National/International) Society was started in 1995.

Method:- The standard BRC recording cards can be used for all the schemes.

Coverage:- Varies greatly according to individual schemes. Main gaps are Islands, Kintyre and Caithness.

Data:- Records are maintained by the individual scheme organisers. Work is still on-going, consolidating list of Diptera species of conservation concern in Scotland.

Activities:- The Malloch Society consists of Scottish Dipterists working in tandem with the Dipterists Forum, which is responsible for all Diptera recording schemes. The Dipterists Forum runs residential field meetings twice a year, and occasional workshops are organised by the Forum as well as the British Entomological & Natural History Society (BENHS).

Publications:- The journal *Dipterists Digest*, is published twice a year, and the *Bulletin of the Dipterists Forum* also published twice a year. Both come with the annual subscription of £5. A 'Starter Pack' on recording flies to be published by BRC in late 1999.

Ease of identification:- Beginners are encouraged.

Recommended guides to ID:- Royal Entomological Society (RES) keys cover some groups of diptera, and Freshwater Biological Association (FBA) keys cover some groups. Other keys can be found in journals, including the *Dipterists Digest*, published by the Dipterists Forum. (see also individual schemes)



Name of scheme:- **Conopidae Recording Scheme and Lonchopteridae Study Group**

Number of species:- 24 Conopids, 7 Lonchopterids

No official Scottish Organiser.

National Recorder:- Mr David Clements

Address:- 7 Vista Rise, Rhadyr Cheyne, Llandaff, Cardiff, CF5 2SD

Tel/Fax:- 01222 307878

Conopid scheme has been in operation since about 1970.

Method:- One of the many Diptera recording schemes operated by BRC via Dipterists Forum. There is a standard recording card for Conopids (No 6482).

Coverage:- Moderately good generally, but poorer in Scotland.

Data:- 15,000 records. Computerisation of records is intended in the future, but awaits purchase of hardware/software, possibly in 1999.

Activities:- Workshops have been given in the recent past.

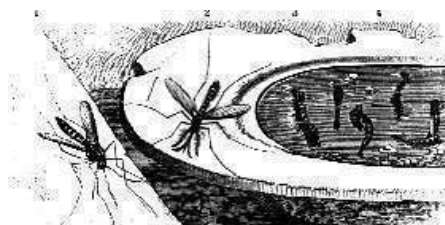
Publications:- No recent atlas is available, but modern maps for the genus *Leopoldius* (Conopidae) were published in 1990 in *Dipterists Digest* 7:34-38, and others are planned in the future. A newsletter is published irregularly as text becomes available through *Dipterists Forum* & *Bulletin*.

Ease of identification:- Not an easy group. Specialist identification is required for some members of these families.

Recommended guides to ID:-

¹ Bergsøe (1881) *Fra Mark og Skov: Billeder af Insekternes Liv*, Gyldendal, Copenhagen, Vol 1&2

- Clements, D K (1997), 'The enemy within: Conopid flies as parasitoids of bees and wasps in Britain' *British Wildlife*, 8: 310-315.
- Smith, K G V (1969), *Diptera: Lonchopidae*, Handbooks for the Identification of British Insects (HIBI)10 (2a) 19pp, Royal Entomological Society, London.
- Smith, K G V (1969), *Diptera: Conopidae*, HIBI 10 (3a) 9pp, Royal Entomological Society of London, supplemented by notes in the recording scheme newsletter (especially No.4 1991).
- Recent accounts for the rarer species are given in Falk (1991), *A Review of the Scarce and Threatened Flies of Great Britain*, Part 1, Research and Survey Series 39, NCC.



'Mosquitos' from Vilhelm Bergsøe, *Fra Mark og Skov*

Name of scheme: - Culicidae (Mosquito) Recording Scheme

Number of species:- 32

No official Scottish Organiser

National Recorder:- Prof. Keith R Snow

Address:- Department of Environmental Sciences, University of East London, Romford Road, London, E15 4LZ

Tel:- 0181 590 7000 - ext. 4554 **Email:**- k.r.snow@uel.ac.uk

Scheme has been in operation since 1980.

Method:- Submit either specimen or identification together with OS reference, locality, habitat, time and date of capture and name of collector/identifier to scheme organiser.

Coverage:- Group well recorded in S England, but few recorders in Scotland where many areas are under-recorded.

Data:- 1,800 records.

Activities:- Part of the Dipterists recording schemes.

Publications:- Snow, K R, Rees, A T & Bulbeck, S J (1998), *A Provisional Atlas of the Mosquitoes of Britain.*, University of East London Press. (£4 incl. p+p) from scheme organiser. *British Mosquito Newsletter* (renamed *British Mosquito Bulletin*) published from early 1980s to 1995/6. Now replaced by *European Mosquito Bulletin* - (three issues published) every 4-6 months. Available from the organiser at £5 (for first three issues) incl. p+p.

Ease of identification:- Potential involvement for schools at certain generic level of identification.

Recommended guides to ID:- Snow, K R (1990), *Mosquitoes*, Naturalist's Handbooks No 14. Richmond Publishing Co. Ltd. ISBN 0-85546-275-2

Name of Recording scheme:- Dixidae (Meniscus Midges) Recording Scheme

Number of species:- 15

No separate Scottish Organiser.

National Recorder:- Dr R Henry L Disney

Address:- University Museum of Zoology, Downing Street, Cambridge CB2 3EJ

Tel:- 01223 336654 **Fax:**- 01223 3335576 **Email:**- rhld2@zoo.cam.ac.uk

Scheme has been in operation since about 1975.

Method:- A standard record form available from BRC.

Coverage:- Patchy in Scotland, although some species are confined to Northern Britain.

Data:- ca. 1000, some published, many in notebooks, which are available for examination in the Museum. BRC holds 1400 computerised records (68% to 1km accuracy; 19% post 1980).

Activities:- The organiser has a large collection of specimens and slides. In 1992 a species new to Britain, *Dixella graeca*, was identified. Since the death of Kathleen Goldie-Smith the scheme has been somewhat in abeyance and the present organiser would be pleased to initiate a new organiser if one can be found.

Publications:- Goldie-Smith, K (1990), *Dipterists Digest* 3:8-26 gives distribution maps. A newsletter was originally produced but is now in abeyance. Disney, R H L (1975), *A Key to British*

Dixidae, Scientific Publications. Freshwater Biology Association 31:1-78. (with has a number of distribution maps). A revised key, without maps, but with the addition of Thaumaleidae (trickle midges) is due out in 1999.

Ease of identification:- A distinctive group of aquatic larvae, six species in running water and nine in still waters (including slightly brackish waters). Adults resemble small craneflies.

Recommended guide to ID:-

- Disney, R H L (1975), *A Key to British Dixidae* (see above).

Name of Scheme:- **Drosophilidae (Fruit Flies) Recording Scheme**

National Recorder:- Dr B Pitkin

Address:- Department of Entomology, Natural History Museum, Cromwell Road, London SW7 5BD
No further information received on this scheme.

Name of scheme:- **The Empidoidea & Dolichopodidae Study Group**

Number of species:- 660+

Scottish Contact:- Dr G E Rotheray - for information regarding Dipterists Forum and Malloch Society (for details see the start of this section).

Address:- Royal Museum of Scotland, Edinburgh

Tel:- 0131 225 7534 Fax:- 0131 220 4819

National Recorder:- Mr Roy Crossley

Address:- 1 The Cloisters, Wilberfoss, York YO41 5RF

Tel:- 01759 388809

Started in 1986 but has lately lost some momentum. However, an attempt is to be made in 1999 to revive interest.

Method:- Field recording cards are available from the organiser.

Coverage:- Reasonably good nationally, but patchy, including Scotland.

Data:- In hand-written format (organiser's personal records only). 600 records are held electronically at BRC.

Activities:- An informal association producing a newsletter about twice a year. Anyone interested should contact the Malloch Society and/or the Dipterists Forum.

Publications:- Newsletter published irregularly, last in 1996 with another planned for 1999.

Ease of identification:- Difficult - not recommended for inexperienced beginners.

Recommended guide to ID:-

- Collin, J E (1961), *British Flies, 6: Empididae*, Cambridge, Cambridge University Press (o/p)
- Assis Fonseca, ECM (1978), *Diptera Orthorrhapha Brachycera* □ Handbooks for the Identification of British Insects (HIBI) London, Royal Entomological Society (recently reprinted).

Name of scheme:- **Larger Brachycera (Horseflies, Robberflies, Soldierflies and others)**

Number of species:- ca. 160 in eleven families

No official Scottish Organiser.

National Recorder:- Dr C M Drake

Address:- 22 Park Road, Deeping St James, Lincolnshire, PE6 8ND

Tel:- 01778 455264 Fax:- 01733 568834 Email:- martin.drake@english-nature.org.uk

Scheme has been in operation since 1976.

Method:- There is a BRC recording card RA34, Gen7, or use direct export from *Recorder*.

Coverage:- Moderately good, but poor in Scotland. Few resident recorders send in records, and most records from Scotland are from visiting English and Welsh dipterists.

Data:- 35,000 records held on *Recorder*; 20,900 of these also computerised at BRC, Monks Wood (57% to 1km accuracy; 41% post 1980).

Activities:- Dipterists Forum organises an annual training course (2 days) at Preston Montford Field Centre (Shropshire) in March.

Publications:- Drake, C M (1991), *A Provisional Atlas of Larger Brachycera (Diptera) of Britain and Ireland*. BRC ISBN 1-870393-14-7, including 80 species recorded in Scotland, some of which are confined to this country. The *Bulletin of the Dipterists Forum* carries the Larger Brachycera Recording Scheme Newsletter (about once a year).

Ease of identification:- Most large and attractive and relatively straight-forward, although some difficult genera. A forthcoming book (see below) should make things far easier.

Recommended guides to ID:- Oldroyd, H (1969), *Diptera Brachycera*, Handbook to the Identification of British Insects Vol 9 (4), available from Royal Entomological Society.

Rozkošný, R (1973), *The Stratiomyoidea (Diptera of Fennoscandia and Denmark)*. Fauna Entomologica Scandinavica Vol 1 (ISBN 87-87491-00-1).

A major forthcoming book is Stubbs, A & Drake, M, (with colour photographs by David Wilson) *British Soldierflies and their Allies*, The British Entomological and Natural History Society, to be published in summer 1999. Test keys for this book have been circulated with the Dipterists Bulletin for several years.



Horses bolting from horseflies' from Vilhelm Bergsøe, *Fra Mark og Skov*

Name of scheme:- **Mycetophilidae and allies (Fungus Gnats)**

Number of species:- 533; ca 410 known from Scotland

No official Scottish Organiser

National Recorder:- Mr Peter Chandler

Address:- 43 Eastfield Road, Burnham, Slough, Berkshire SL1 7EL

Tel 01628 664111

Scheme been in operation since 1986.

Method:- The scheme encompasses five families formerly included in the *Mycetophilidae*, i.e. *Bolitophilidae*, *Diadocidiidae*, *Ditomyiidae*, *Keroplastidae* and *Mycetophilidae*. The BRC recording card lists species under these five families.

Coverage:- The national coverage is good in some areas, and Scotland is covered fairly well. The organiser has also determined material in most of the major museum collections including those at Edinburgh and Glasgow.

Data:- An estimated 60,000 records, with more than 10,000 records for Scotland. Data are stored as hard copy on BRC cards and are site based.

Activities:- The organiser is happy to examine any material.

Publications:- Reports are published in the *Dipterists Bulletin*.

Ease of Identification:- Difficult

Recommended guide to ID:-

- Hutson, AM, Ackland, DM & Kidd, LN (1980), *A Handbook to Smaller Families and Subfamilies*, published by the Royal Entomological Society, covers 2/5 of the group.
- Scientific papers and manuscripts on particular genera, especially *British Journal of Entomology and Natural History*, the *Entomologist's monthly magazine*, *Entomologist's Record* and *Systematic Entomology*.

Name of Scheme:- **Sciomyzidae (Snail-killing Flies) Mapping Scheme**

Number of species:- 70

National Recorder:- Dr Ian F G McLean

Address:- 190 Miller Way, Brampton, Huntingdon, Cambs., PE18 8TZ

A scheme was started in 1970.

Data:- 6000 records are computerised at BRC for the publication of Ball & McLean (1986), *Preliminary Atlas of the Sciomyzidae of Great Britain*, ITE.

No further information received on this scheme.

Name of scheme:- **Sepsidae Recording Scheme**

Number of species:- 23

No official Scottish Contact.

National Recorder:- Mr Adrian C Pont,

Address:- 38 Gatehampton Rd., Goring-on-Thames, Reading RG8 0EP

Scheme has been in operation since 1977 but is current suspended.

Method:- There a BRC standard recording card.

Coverage:- A specialised ongoing recording scheme for which more records are needed from Scotland in particular.

Data:- BRC holds 6000 records in computerised format, 33% to 1km accuracy; 14% post 1980.

Publications:- Pont, A (1986) *Provisional Atlas of the Sepsidae (Diptera) of the British Isles*, ITE, ISBN 1-870393-00-7.

Recommended guides to ID:- Pont, A C (1979), *Diptera: Sepsidae*, Handbooks to the Identification of British Insects Vol 10 (5c).

Name of scheme: - **Syrphidae (Hoverfly) Recording Scheme**

Number of species:- 266 + 4 thought to be new but not yet published.

Scottish Contact:- Dr Graham Rotheray (but see also below),

Address:- National Museum of Scotland, Chambers Street, Edinburgh EH1 1JF

National Organiser: - Dr S G Ball,

Address:- 255 Eastfield Road, Peterborough, PE1 4BH

Tel:- 01733 567996 (evenings)

Scheme has been in operation since 1976.

Method:- A BRC recording card RA33 is available from Monks Wood - but names on it are now rather out of date. The organisers prefer written records in the form of list of species for each site visit. Data on disk is much appreciated. *Recorder* export format is the preferred option, but most formats can be handled - please contact Stuart Ball if you have machine-readable data to submit.

Coverage:- At least one record from 82% of 10km squares.

Data:- 335,377 records on computer file.

Activities:- Dipterists Forum runs an annual training course at Preston Montford Field Studies Centre, in March, covering various groups of Diptera. Preston Montford also has a hoverfly identification course in May 1999. Contact the Dipterist Forum.

Publications:- Ball & Falk, *A Provisional Atlas of British Hoverflies (Diptera Syrphidae)* is to be published by BRC in 1999. Ball, S & Morris, R (1983) *Preliminary Atlas of the Hoverflies (Diptera: Syrphidae) of the British Isles*, BRC [o/p?]. The national scheme publishes the *Hoverfly Newsletter*. This comes with membership of the Dipterists Forum.

Ease of identification:- Gilbert, F S (1986), *Hoverflies*, Naturalists' Guide No 5, Richmond Publishing Co. is a good starting guide, but only covers selected species. An average garden or school ground will hold 30-40 mostly common species which could be identified with some help/training. Stubbs, AE (1991), *A Method for Monitoring Garden Hoverflies*, Dipterists Digest No 10:26-39 might be a useful project for schools.

Recommended guides to ID -

- Stubbs, A E & Falk, S J (1983), *British Hoverflies*, The British Entomological & Natural History Society ISBN 0-9502891-4-0 (pbk); 0-9502891-3-2 (hbk).
- Stubbs, A E & Falk, S J (1996), *British Hoverflies* - second supplement, BENHS.
- Rotheray, G (1993), *Colour Guide to Hoverfly Larvae*, Dipterists Digest No 9.



Name of scheme:- **Scottish Hoverfly Recording Scheme**

Number of species:- 220

Scottish Organiser:- Mr. Kenneth R. Watt

Address:- Kob-Web Record Centre, 64 Hilton Drive, Aberdeen, AB24 4NP

Tel:- 01224 272856 (Daytime) 01224 483065 (Evening) Email:- Hoverfly@aol.com

Scheme has been in operation since 1977.

Method:- There a BRC recording card.

Coverage:- Good. ca 80% of 10km squares covered in Scotland. The west coast and Western Isles are poorly recorded.

Data:- 35,000 records in Scotland (held in electronic format on *Famulus* db).

Activities:- The Malloch Society of Scotland, Secretary, David Horsfield, 131, Comiston Road, Edinburgh, EH10 6AQ.

Publications:- The organiser has produced an unpublished provisional atlas of the hoverflies of Scotland, with 800 pages giving the status and distribution of over 200 species and covering 70% of the 10km squares. An atlas is in preparation for the national scheme (see above), and a separate (additional) atlas for the Scottish scheme.

Ease of identification:- As previous entry.

Recommended guides to ID- As previous entry.

Name of scheme: - **British Tephritidae (Tephrid flies) Recording Scheme**

Number of species:- 70

No official Scottish Organiser

National Organiser: - Mr Laurence Clemons

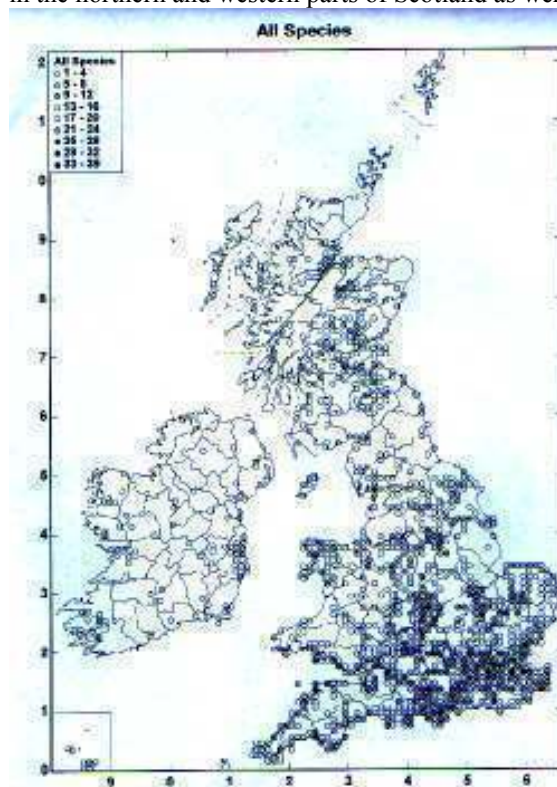
Address:- 14 St John's Avenue, Sittingbourne, Kent, ME10 4NE

Tel:- 01227 766263

Scheme has been in operation since 1983.

Method:- There is no BRC recording card, and records should be submitted in paper format with collector's name, date, site name, grid reference and any other useful information.

Coverage:- Poor and very patchy in Scotland, where records are absent from many areas, especially in the northern and western parts of Scotland as well as the islands.



Data:- 9,900 records kept on *Recorder*.

Activities:- Training days have been arranged at the request of various organisations.

Publications:- Clemons, L (1997) *A Provisional Atlas of the Tephritidae (Diptera) of Britain and Ireland*, Dipterist Forum, ISBN 1358-5029. Only a limited number of copies produced and available from the Dipterist Forum. Also a newsletter, *British Tephritidae*, published occasionally. Contact Dipterist Forum Membership Secretary, Liz Howe, Ger-Y-Parc, Tynyngongl, Benllech, Ynys Mon, Gwynedd, LL74 8NS.

Ease of identification:- The RES handbook (see below) contains wing maps enabling many species to be identified pictorially, and there is potential opportunities for school involvement for rearing from galls.

Recommended guides to ID:-

- White, I M (1988), *Tephritid Flies*. Handbooks for the Identification of British Insects 10 (5a), ISBN 0-901546-68-2 (£12). Best obtained from the Royal Entomological Society, 41 Queen's Gate, London SW7 5HR
- A computerised key is being prepared.

Name of Scheme:- **Tipuloidea and Ptychopteridae (Craneflies) Recording Scheme**

Number of species:- ca. 350

No official Scottish Organiser.

National Recorder:- Mr. Alan E Stubbs

Address:- 181 Broadway, Peterborough, PE1 4DS

Scheme has been in operation since 1973.

Method:- A BRC standard recording card is available from Monks Wood.

Coverage:- Moderately good, including Scotland. Main gaps are Caithness, Orkney, Hebrides (only Rum & Skye recently recorded), Arran (old data only) and Kintyre.

Data:- 250,000. BRC holds 1,900 records in electronic format (98% to 1km accuracy; 45% post 1980).

Activities:- The Dipterists Forum runs residential field meetings (twice a year) and occasional workshops are organised both by the Forum and the British Entomological & Natural History Society (BENHS).

Publications:- Stubbs, A E (1991), *Atlas of Short-Palped Craneflies*, ITE (has ecological notes and bibliography). Stubbs, A E (1992), *Atlas of Long-Palped Craneflies (Diptera: Tipulinae) of Britain and Ireland*, ITE, ISBN 1-870393-16-3 (£ 5.00) and Stubbs, A E (1993) *Atlas of Ptychopterid Craneflies (Diptera: Ptychopteridae) of Britain and Ireland*, ITE, ISBN 1-870393-19-8, available from Monks Wood. The scheme organiser is currently working on a complete reference book on British craneflies. A 'Cranefly Recording Scheme Newsletter', news items and test keys are included in the *Bulletin of the Dipterists Forum*.

Ease of identification:- Beginners are encouraged. To get involved, contact the Malloch Society (see entry for Dipterists Forum above or Appendix C 'Useful Addresses').

Recommended guides to ID:-

- Coe, R L, Freeman, P & Mattingley, P F (1950) *Diptera: Nematocera (part)*, Handbooks to the Identification of British Insects (HIBI) 9 (2) (o/p).
- Stubbs, A E, *Cranefly recording scheme test keys*, Dipterists Forum.
- Stubbs, A E (1993), Ptychopteridae Key in the atlas (see above).

Name of scheme:- **Ulidiidae, Platystomatidae and Pallopteridae (Picture-winged flies)**

Recording Scheme

Number of species:- 20 Ulidiidae; 2 Platystomatidae; 13 Pallopteridae

No Official Scottish Organiser.

National Recorder:- Mr David Clements

Address:- 7 Vista Rise, Llandaff, Cardiff, CF5 2SD

Tel/Fax:- 01222 307878

Scheme has been in operation since 1997.

Method:- Recording cards from BRC (standard Gen. 13). One of many Diptera recording schemes operated by BRC via Dipterists Forum.

Coverage:- Generally poor, as this is a new scheme for families not extensively studied in the past.

Data:- ca 2,000 records, computerisation is intended in the future.

Activities:- Identification workshops given recently.

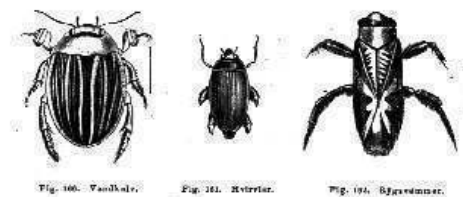
Publications:- Newsletter via Dipterists Forum; approximately annually.

Ease of identification:- Not easy families to identify; some species require dissection and critical determination.

Recommended guides to ID:-

- Clements, D K (1990), [Provisional Keys to the Otitidae [=Ulidiidae] and Platystomatidae of the British Isles] *Dipterists Digest* 6:32-41.
- Clements, D K & Merz, B (1998), [Key to the genus *Herina* (Diptera: Ulidiidae) in Britain] *Dipterists Digest* (NS) 5:55-67.
- Stubbs, A E (1994), [Draft Key to British Pallopteridae] circulated with Newsletter No 1 (1997).
- Rotheray, G E & MacGowan, I (1999) [*Palloptera anderssoni* sp. N from Scotland and Finland (Diptera: Pallopteridae)] *British Journal of Entomology and Natural History* 11:175-179.

HEMIPTERA - BUGS



Water bugs from Vilhelm Bergsøe, *Fra Mark og Skov*

Name of Scheme:- Aquatic Heteroptera Recording Scheme (Aquatic Bugs)

Number of Species:- British Isles 63, Scotland 46.

National Organiser for Scotland, England and Wales :- Mr Thomas Huxley

Address:- The Old Manse, Pitcairngreen, Perth PH1 3LR

Tel:- 01738-583397 **Fax:-** 01738-582113 **Email:-** t.huxley@btinternet.com

National Organiser for Ireland :- Brian Nelson, Ulster Museum, Botanic Gardens, Belfast BT9 5AB

Tel:- 01232-383000 **Fax:-** 01232-383003

Email:- brian.nelson.um@nics.gov.uk

Scheme has been in operation since about 1986.

Method:- Obtain records by field work and send to National organisers. Recording cards obtained from BRC, Monks Wood.

Data:- Total number of records in Britain at February 1999: 11,484, with at least one record in 1,137 10km squares. Records entered using *Recorder* software and maps produced using DMap.

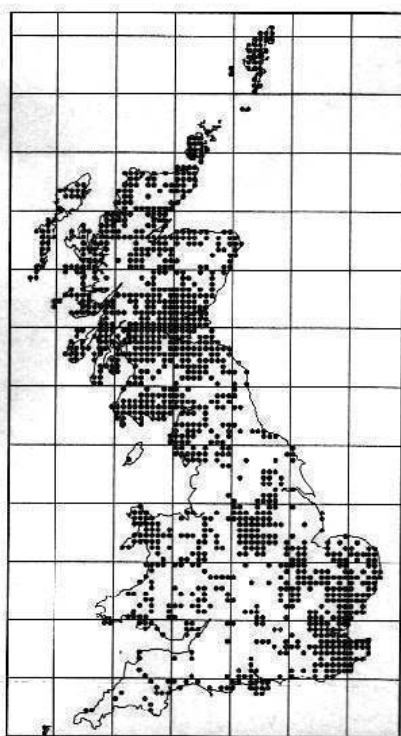
Coverage:- By now reasonably good for Scotland; main gaps: upland areas away from roads. Patchy for England and Wales, e.g. good in Suffolk and Kent, poor in south west.

Publications:- There is a Heteroptera study group which produces an annual newsletter (Editor: Peter Kirby, 21 Grafton Avenue, Netherton, Peterborough, Cambs., PE3 9PD). This includes a brief update on the aquatic bug scheme. A few copies of longer annual reports are produced privately by Mr Huxley and lodged in appropriate libraries. A preliminary report on distribution in Scotland, with maps, is available in Huxley, T. (1997) *The Distribution of Aquatic Bugs (Hemiptera-Heteroptera) in Scotland*, Scottish Natural Heritage Review No. 81. There is also a paper by the same author in *Freshwater Forum* (1998) 11:2-15. Eventually, it is intended to produce an atlas for the British Isles, jointly with Brian Nelson.

Ease of identification:- Very easy for families; some species need experienced help. Scheme not suitable for schools or general public. Although common species may be found by pond dipping, careful recording requires good aquatic collecting equipment, sometimes access to potentially dangerous places (e.g. edge of bogs to reach open water) and ability to maintain dead specimens in good condition for identification.

Recommended guides to ID:-

- Savage, A A (1989), *Adults of the British aquatic Hemiptera-Heteroptera: a Key with ecological notes*. Freshwater Biological Association, Scientific Publication No 50, 173 pp. (ISBN 0 900386 48 7).
- Southwood, T R E & Leston, D (1959), *Land and Water Bugs of the British Isles*, Warne, London. 436 pp. is also useful but now long out of print.



Map of all aquatic bug records at 30 November 1998. Symbols at 10-km centres, diam. 8-km. Black symbols - pre-1970 records. 12988 records in RECORDER. 1238 symbols shown on map.

Name of scheme:- **Terrestrial bugs Recording Scheme (Hemiptera - Heteroptera) (True Bugs, e.g. Shield Bugs, Plant Bugs, etc.)**

Number of species:- about 550

Scottish Organiser :- Stephen Moran

Address:- Inverness Museum & Art Gallery, Castle Wynd, Inverness, IV2 3EQ

Tel:- 01463 237114 Fax:- 01463 225293

National Organiser :- Dr B S Nau

Address:- 15 Park Hill, Toddington, Dunstable, Beds, LU5 6AW

Tel/Fax:- 01525 872174 Email:- Nau.BS@BTInternet.com

Scheme has been in operation since 1983.

Method:- There is a BRC recording card, RA 57, available from Monks Wood: a card should be completed for each site. Completed cards can be sent to Steven Moran, who will forward them to the National Organiser after making a copy for local use.

Coverage:- Modern records are sparse and patchy, especially in Scotland - most are from visiting Heteropterists. Records are particularly needed **away** from popular areas such as Speyside/Deeside.

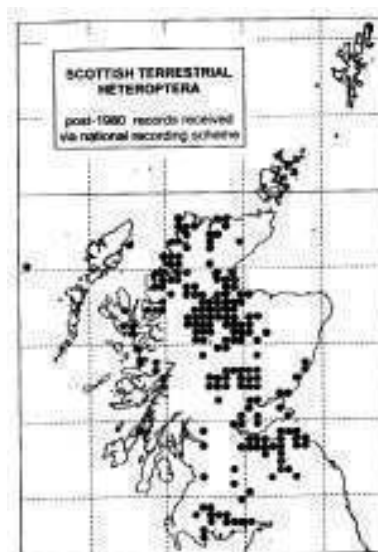
Data:- Several thousand cards are held. Lack of resources at BRC has prevented computerisation.

Activities:- Courses are run at Kindrogan, usually annually, and other courses may be arranged by the Scottish Organiser if there is sufficient demand.

Publications:- A Heteropterist's newsletter is produced, usually annually, containing short articles relating to bugs and notes on recent literature, etc. Editor is Dr P Kirby, 21 Grafton Ave., Peterborough, PE3 9PD, and it is currently distributed free to Heteropterists.

Ease of identification:- Details of new British species of true bugs, distribution, splitting of existing species, or changes of nature are listed in the newsletter (see above)

Recommended guide to ID:- Southwood & Leston (1959), *Land and Water Bugs of the British Isles*, Wame, is the best starting point, but is now out of date, hard to get and expensive (£50-£100). A replacement is several years away, but *Faune de France* monographs (in French) are useful, containing keys which include virtually all British species. A dealer in entomological books and equipment who stocks these is Lydie Rigout, 1 Hillside Ave., Canterbury, Kent, CT2 8ET.



Name of scheme:- **Auchenorrhyncha Recording Scheme (Leafhoppers and related groups: Hemiptera: Homoptera)**

Number of species:- 375 in Britain

No official Scottish Organiser.

National Organiser:- Dr Alan J.A. Stewart

Address:- School of Biological Sciences, University of Sussex, Falmer, Brighton, East Sussex BN1 9QG

Tel:- 01273 606755 (ext. 2819) Fax:- 01273 678433 E-mail:- a.j.a.stewart@sussex.ac.uk

Scheme has been in operation since 1979.

Method:- One of several schemes co-ordinated by BRC at Monks Wood, it covers all species of leafhopper, planthopper, froghopper, treehopper and cicada that occur in Britain. No atlases have yet been produced for this group although this is a long term objective.

Coverage:- Fairly good, but most of Scotland is very poorly covered for this group, so Scottish records and recorders would be warmly welcomed. Especially upland species (several of which are Scottish specialities), from west coast, north, north-east, islands, Shetland, Orkney, Inner & Outer Hebrides, southern upland.

Data:- ca. 50,000 records, probably less than half of which are computerised.

Activities:- Free identification service offered to anyone sending records from Scottish sites. No atlases have yet been produced for this group although this is a long term objective.

Publications:- An annual newsletter is produced, free to participants, with a limited number of maps. Review of rare and endangered species published by JNCC in 1992. A volume is planned in the 'Naturalists Handbooks' series, published by Richmond Press.

Ease of identification:- Some species are easy, but others more difficult. At present there is no suitable text for beginners. However, a fact sheet, giving a general introduction to the group, field collection techniques, references to identification keys, etc., is available from the scheme organiser.

Recommended guide to ID:- All currently in print, but normally available only from specialist entomological book suppliers.

- Handbooks for the Identification of the British Insects (HIBI): LE QUESNE, W J (1960), *Hemiptera: Fulgoromorpha*, HIBI 2(3); (1965), *Hemiptera Cicadomorpha (excl. Deltocephalinae & Typhlocybinae)*, HIBI 2(a); (1969), *Hemiptera Cicadomorpha Deltocephalinae*, HIBI 2(b); LE QUESNE, W J & PAYNE, K R (1980), *Cicadellidae (Typhlocybinae) with a check list of the British Auchenorrhyncha (Hemiptera, Homoptera)*, HIBI 2(c), all Royal Entomological Society, London.
- Faune de France Series: Homopteres Auchenorrhynches (1936), Vol 31(Typhlocybidae) and (1952) Vol 57 (Jassidae), Paris: Paul Lechevalier et Fils; Homopteres Cicadellidae (1989) Vol 73, Paris, Institute National de la Recherche Agronomique.
- Fauna Entomologica Scandinavica series 7(1-3): OSSIANNILSSON, F (1978-1983), *The Auchenorrhyncha (Homoptera) of Fennoscandia and Denmark*, Part 1 Introduction, 'infraorder Fulgoromorpha'; Part 2. 'The Families Cicadidae, Cercopidae, Membracidae and Cicadellidae (excl. Deltocephalinae)'; Part 3. 'The Family Cicadellidae: Deltocephalinae', Catalogue, Literature and Index, all Scandinavian Science Press, Klampenborg.
- Photographic guide: REMANE, R & WACHMANN, E (1993), *Zikaden: kennenlernen, beobachten*. Weltbild, Augsburg.

HYMENOPTERA: BEES, WASPS & ANTS



Name of scheme:- Bees, Wasps & Ants Recording Society (BWARS)

Website:- <http://www.insect-world.com/bwars.html>

Number of species:- Probably about 600. A new checklist is being prepared.

Scottish Organiser: Dr. A Murdo Macdonald,

Address:- Tigh nam Beithe, Strathpeffer, Ross & Cromarty IV14 9ET

e-mail murdo_macdonald@hotmail.com

Enquiries Secretary:- Mr Robin Edwards,

Address:- 5 St Edwards Close, East Grinstead, West Sussex RH19 1JP

Tel:- 01342 325 387

Membership Secretary & Treasurer :- Mr George Else

Address:- Northcroft, St Peter's Road, Hayling Island, Portsmouth, Hants PO11 0RX

The original scheme was set up with assistance from the BRC in 1978. In 1995 the recording scheme was changed to a formally constituted society which retains the same acronym.

Method:- Records are sent in to species co-ordinators on BRC recording cards, on computer discs, or by email. They are retained as computer files. The society deals with the social and solitary aculeate hymenoptera: Chrysidoidea, Vespoidea (including Formicidae, Pompilidae, Vespidae) and the apoidea (including Sphecidae, Apidae)

Coverage:- All groups covered by the society are under-recorded in Scotland

Data:- Several hundreds of thousands of records.



Activities:- BWARS organises regular spring field and autumn indoor meetings. Autumn meetings are currently held at Hill End Residential and Field Studies Centre, Farmoor, nr Oxford. A 'Starter Pack' is sent to all new participants in the scheme,

Publications:- Edwards, R (1996), *BWARS Starter Pack*, NERC, ISBN 1-870393-26-0 (second edition) with sections on conservation, collection and preservation, identification of the different groups, recording, encouraging bees in the garden & photographing them, dealers in entomological supplies and an extensive bibliography. A Newsletter is produced twice a year, containing information and notes on aculeates. Lists of 'target species' are given, and later, maps of these species are printed in advance of the published maps. Edwards, R (1997 and 1998), *Provisional Atlas of the Aculeate Hymenoptera of Britain and Ireland*, part 1 & 2, BRC, ITE.

Ease of identification:- There is an identification service to help beginners get started. Please send a large (A4) s.a.e. with all enquiries. Participants in Scotland are particularly welcome.

Recommended guides to ID:- An extensive bibliography is given in the Starter Pack above. A few are listed here:

- Willmer, P (1985), *Bees, Ants and Wasps: A Key to Genera of the British Aculeates*, AIDGAP Field Studies Council.
- Prys-Jones, O E & Corbet, S A (1991), *Bumblebees*, Naturalists Handbooks No 6 (second edition), Richmond Publishing.
- Yeo, P F & Corbet, S A (1995), *Solitary Wasps*, (second edition) Naturalists Handbooks No 3, Richmond Publishing.
- Day, M C (1988), *Spider Wasps: Hymenoptera: Pompilidae*, Royal Entomological Society (RES) Handbook for the Identification of British Insects Vol 6 (4).
- Edwards, R (1980), *Social Wasps*, East Grinstead: Rentokil Ltd, contains a key to this group.

Name of scheme:- Postal Survey of the Distribution of Wood Ants in Scotland

Number of species:- 4

Scottish Organiser:- Dr D S Phillips

Address:- Invertebrate Ecologist, Scottish Natural Heritage, 2 Anderson Place, Edinburgh EH6 5NP

Tel:- 0131 446 2421 **Fax:-** 0131 446 2405

Email:- David.Phillips@rasdsnh.demon.co.uk

Scheme has been in operation since 1995.

Background:- There are 2 species of red and black *Formica* that build large mounds in woods in Scotland. 1) the Scottish wood ant *Formica aquilonia* - a nationally (GB) scarce ant that is found only in the Highlands of Scotland. 2) the hairy wood ant *Formica lugubris* - which is more widespread in GB but is a local species. Both species are listed in the IUNC (1996) Red Data Book as globally 'near threatened'. Both species are also therefore priority species under the UK Biodiversity Action Plan. Two similar species are the robber ant *Formica sanguinea* and the narrow-headed wood ant *Formica exsecta*. These are both rare species in Scotland and *F. exsecta* is a UKBAP priority species. Records of all four species are welcome. The data will be used in implementing the UK plans for *F. aquilonia* and *F. lugubris*.

Method:- Separation of *F. aquilonia* and *F. lugubris* in the field is difficult, even for the specialist. The method for this survey is therefore for specimens to be sent to a central point where they can be identified. For each nest we need details of the recorder, the date, the nest site and a 6-figure Grid reference. About 6 worker ants should be taken from each nest. Old workers may be more worn so 6 workers are needed to overcome this variation. The ants should be sent dry (otherwise they go mouldy) in a post-proof pot.

Coverage:- Records have been received from most parts of the Highlands but the ants are almost certainly under-recorded in W Scotland and N Scotland.

Data:- Records are held on paper, on *Recorder*, and on spreadsheets. So far, just over 100 records of *Formica aquilonia* have been passed to BWARS for the UK Atlas under preparation. There is a similar number of records of *F. lugubris*.

Publications:- All contributors will receive a summary of the findings of the survey.

Recommended guides to ID:-

- Skinner, G J & Allen, G W (1996), *Ants*, Richmond Publishing Co. Ltd, ISBN 0-86646-305-8

Wood Ant (BRISC survey sheet)



Name of scheme:- **Sawfly (Symphyta) Study Group**

Number of species:- 500

National Organiser :- Dr D A Sheppard

Address:- English Nature, Northminster House, Peterborough PE1 1UA

Tel:- (work) 01733 455263 (home) 01778 570573 Fax:- 01733 568834

Scheme has been in operation since ca. 1984.

Method:- An updated checklist and notes on the British genera is available from the organiser.

Coverage:- Nationally it is poor and very poor for Scotland.

Data:- 10,000 records, which are kept in paper format.

Activities:- Occasional workshops are arranged (contact organiser for details).

Publications:- A newsletter is produced irregularly, which is free on request.

Ease of identification:- A fairly difficult group, though there is an AIDGAP key to the genera.

Recommended guide to ID:-

- Wright, A (1990), *British Sawflies (Hymenoptera: Symphyta): A Key to adults of the genera occurring in Britain.*, AIDGAP Field Studies Council No 203, ISBN 1 85153 203 X..
- Benson, R (1951-1958), *Royal Entomological Society Handbooks* (3 Vols) (o/p).
- Quinlan, J & Gauld, I D (1981), *Symphyta (except Tenthredinoidea) Hymenoptera*, Royal Entomological Society Handbooks 6(2a), (new edition).



Sawfly at different stages, larva, pupa and adult

From Bergsøe, Vilhelm, (1881) *Fra Mark og Skov: Billeder af Insekternes Liv*, Gyldendal, Copenhagen, Vol 1&2

LEPIDOPTERA: BUTTERFLIES & MOTHS



Antler moth and larva from Vilhelm Bergsøe, *Fra Mark of Skov*¹

Name of scheme: - **Butterflies for the New Millennium**

Website:- <http://www.nmw.ac.uk/ite/butterfly/> Butterfly Recording scheme
<http://www.butterflyconservation.org.uk> Butterfly Conservation Society

Number of species:- 60

Scottish Organiser:- Mr Richard Sutcliffe

Address:- Art Gallery & Museum, Kelvingrove, Glasgow, G3 8AG

Tel:- 0141 287 2660 **Email:-** richard.sutcliffe@cls.glasgow.gov.uk

East Scotland:- Mr Chris Stamp, 11 Whitefauld Road, Dundee, DD2 1RH

Tel:- 01382 669 288 **Email:-** chrisstamp@enclave4.freereserve.co.uk

Fife Mrs Anne-Marie Smout, Chesterhill, Shore Road, Anstruther, Fife KY10 3DZ, **Tel:-** 01333 310 330 **Email:-** AMSmout@aol.co,

Lothian Mr Bob Saville, Lothian Wildlife Information Room 19, Leith Walk Business Centre, 130 Leith Walk, EH6 5DT, **Tel/fax:-** 0131 554 6360

Perth & Kinross Mr Mark Simmons, Perth Museum & Art Gallery, 78 George Street, Perth PH1 5LB **Tel:-** 01738 632488 **Email:-** museum@pkc.gov.uk (Mark Simmons)

Highland (& Islands) Mr David Barbour, 125a High Street, Aberlour, Banffshire, AB38 9PB **Tel:-** 01340 871 850

SW Scotland Mr Richard Sutcliffe (address as above)

Renfrewshire Ms Shona Allan, Renfrewshire BRC, Paisley Museum & Art Gallery, High Street, Paisley, PA1 2BA **Tel:-** 0141 889 3151

National Organiser :- Mr Richard Fox

Address:- Butterfly Conservation, PO Box 444, Wareham, Dorset BH20 5YA

Tel:- 01929 400209 **Fax:-** 01929 400210

Email:- rfox@butterfly-conservation.org

Scottish Conservation Officer:- Dr Paul Kirkland,

Address:- Butterfly Conservation, PO Box 12477, Edinburgh EH1 2YE

Tel/Fax:- 0131 226 3385

email:- scotch_argus@cix.compulink.co.uk

The scheme is a joint initiative between Butterfly Conservation and BRC Monks Wood and has been in operation since 1995.

Method:- Local branches of Butterfly Conservation often run field trips & training in identification skills. There are three branches in Scotland. There are a standard recording forms, and the recording scheme will continue beyond the publication of a new atlas in the year 2000. An information pack is available from the national organiser, which provides advice on recording, grid references, etc.

Coverage:- Good in S England, becoming patchy in N & W of Britain. A few areas in Scotland, e.g. Ayrshire, are generally well recorded. However, all species are under-recorded in large areas, such as Borders, Highland, Western Isles and Aberdeenshire. Under-recorded species include grayling on the west coast, scotch argus, northern brown argus, pearl-bordered fritillary, small pearl-bordered fritillary, dark green fritillary and mountain ringlet.

Data:- 900,000 records have been computerised at start of 1999. Ca. 250,000 records received per annum.

Activities:- A network of regional co-ordinators have been established, listed above. They can also be found on the website. There are three branches in Scotland:

East of Scotland:- Richard Buckland, 7 Leslie Place, Edinburgh, EH4 1NG

Tel:- 0131 332 0615

Glasgow & SW Scotland Richard Sutcliffe, Art Gallery & Museum, Kelvingrove, Glasgow, (covers Central and SW) G3 8AG **Tel:-** 0141 287 2660

Highlands & Islands:- Jimmy McKellar, 24 Scorguie Gardens, Inverness IV3 6SS,



¹ Bergsøe (1881) *Fra Mark og Skov: Billeder af Insekternes Liv*, Gyldendal, Copenhagen, Vol 1&2

Tel:- 01463 241185

Publications: - Two newsletters a year are published (contact Richard Fox). A set of provisional maps was produced in 1998 and another will be available early in 1999. These are free, but have a restricted distribution. A full new atlas of butterflies in the British Isles will be published in 2000 (ca. £30)

Ease of identification: - Most species are easy. The field guide below is an excellent starting point.

Recommended guides to ID:-

- Thomas, J A (1986 & reprints), *Hamlyn Guide to Butterflies of the British Isles*.
- AIDGAP *Guide to Butterflies of Britain*, Field Studies Council.



Six-spot Burnet Moth (Fife Nature)

Name of scheme:- **National Recording Network for Rarer British Macro-Moths**

Website:- <http://www.butterflyconservation.org.uk>

Number of species:- ca. 300, ca. 75 of which occur in Scotland.

Scottish Contact:- Mr Paul Kirkland

Address:- Butterfly Conservation (Scotland), P O Box 12477, Edinburgh, EH1 2YE

Tel/Fax:- 0131 226 3385

Email:- scotch_argus@cix.co.uk

For a list of Scottish Vice-county Recorders, please contact Paul Kirkland.

National Organiser:- Butterfly Conservation (The British Butterfly Conservation Society)

Address:- UK Conservation Office, P O Box 444, Wareham, Dorset, BH20 2YA

Tel:- 01929 400209 Fax:- 01929 400210

Email:- ukconsoff@butterfly-conservation.org

UK Advisor:- Dr Paul Waring

Address:- as above

Scheme has been in operation since 1991.

Method:- Records are accepted in any form, as long as they have all the necessary details (location, grid reference, data, numbers, observer. Data are collated from network of county recorders, Butterfly Conservation branches, and other groups and individuals throughout the UK.

Coverage:- Generally good, but poor in Scotland, with particular gaps in the Highlands.

Data:- For the UK 80,000, for Scotland ca 1000. Records are kept on *Recorder*.

Activities:- Occasional field meetings, often in conjunction with others such as County recorders, local moth groups the British Entomological & Natural History Society (BENHS).

Publications:- The scheme produces a newsletter annually in April with directory of recorders. An atlas is in press at JNCC. A full feature on the scheme published by Paul Waring in *Atropos* (1999) 6:19-26. Regular updates are also published in the moth reports in the journal *British Wildlife*.

Recommended guides to ID:-

- Skinner, B (1998), *The colour identification guide to moths of the British Isles* (new edition), Viking, ISBN 0-670-87978-9.
- Porter, J (1997), *The colour identification guide to caterpillars of the British Isles*, Viking, ISBN 0-670-87509-0.

Name of scheme:- **Macro Moths**

Number of species:- 910

A recording scheme was in operation 1968 - 1982

There is no current recording scheme for these as such, and observers are encouraged to send all records to their Local Records Centres or county recorders (see above).,

Data:- BRC holds 378,500 computerised records of macro moths, mostly pre 1980s.

Publications: Maps published in various volumes of Heath & Emmet, *Moths and Butterflies of Great Britain and Ireland*

Name of scheme:- **Incurvarioidea (Micro-moths)**

Number of species:- 33 British; 25 of which Scottish

National Recorder:- Dr Keith Bland

Address:- 35 Charterhall Road, Edinburgh EH9 3HS

Tel:- 0131 667 7013

Scheme has been in operation since 1982.

Data:- ca 3000 cards.

Method:- No special recording card. Records to be on 5x3 filing cards or paper cut to that size. Species name at top left, grid reference at top right, location and date (and any other snippets) below. Records in other forms also accepted.

Coverage:- The whole of the British Isles, including Eire and Channel Islands. European records also welcome. Poorest coverage in Ireland.

Activities:- There are no formal activities. Persons interested in contributing, please contact the National Recorder.

Publications:- Bland, K P (1986), *Preliminary Atlas of the Lepidoptera: Incurvarioidea of the British Isles*, BRC.

Ease of identification:- A difficult group.

Recommended guides to ID:-

- Heath, J (1976), *The Moths and Butterflies of Great Britain and Ireland*, Vol.1 Curwen Press, London, ISBN 0632-03316

Name of Recording scheme: - **Pyralid and Plume Moth Recording Scheme**

Number of species:- 400

National Organiser:- Mr A M (Tony) Davis

Address:- The Rangers House, Cricket Hill Lane, Yateley, Hampshire, GU46 6BB

Tel:- 01252 874346 Email:- pyralid.scheme@virgin.net (TonyDavis)

Scheme has been in operation since 1994.

Method:- There are BRC recording cards, but their use is not mandatory.

Coverage:- Poor to moderate generally. Very poor in Scotland, especially southern uplands, central, Western Isles and Orkney.

Data:- 50,000 records kept on *Recorder*.

Activities:- Recording scheme field meetings. The British Entomological and Natural History Society also organise helpful field meetings.

Publications:- A newsletter is published, usually twice a year (free). No provisional atlas published as yet, but provisional maps are available on request from scheme's organiser.

Ease of identification:- Not too difficult. Especially the publication by Goater (see below) is helpful for beginners.

Recommended guides to ID:-

- Goater, Barry (1986), *British Pyralid Moths: A Guide to their Identification*. Harley books ISBN 0-946589-08-9.
- Slamka, Frantisek, *Die Zynslerartigen (pyraloidea) Mitteleuropas*, ISBN 80-967540-2-5
For plumes:
- Gielis, Lees (1995), *Microlepidopter of Europe Vol 1: Pterophoridae*, Apollo Books ISBN 87-88757-360-6.
- Identification guide to British plume moth to be published by the British Entomological and Natural History Society in late 1999



Eggar Moth, (Vilhelm Bergs, Fra Mark of Skov)

Name of scheme:- **Rothamsted Moth Survey**

Number of species:- 650 species recorded

National Organiser:- Mr Adrian Riley

Database manager:- Mr Ian Woiwod

Address:- Institute of Arable Crops Research, Department of entomology, Rothamsted Experimental station, Harpenden AL5 2JQ

Tel:- 01582 763133

Scheme has been in operation since 1960.

Description:- Rothamsted Experimental Station have in operation a number of standard-pattern low-power (tungsten light bulb, not mercury vapour) moth traps scattered throughout the country. These are run by research institutions and private individuals who operate the trap all night every night throughout the year. The catches of moths are identified, counted and recorded on special forms. available from the organiser. The standard trap gives quantitative data which is used for a wide range of ecological studies. Other insects coming to the light, such as lacewings, are also identified. A large amount of information on distribution, taxonomy and emergence dates from the survey gives rise to a number of other studies based on the recorders' material, supplemented with information from the Station's own suction traps which are also scattered throughout the country.

Coverage:- There are 350 sites in the British Isles; and 21 sites in Scotland. The scheme is always looking for more participants and sites.

Data:- 3,500,000 records of moths have been collected in 20 years, totalling 1,800 site years, with records computerised.

Publications:- An annual newsletter is circulated to all participants.

Aphids:- A separate database on the abundance of aphids is organised by Dr Richard Harrington. An *Aphid Bulletin* with Information about emergence of aphids is circulated to alert crop growers.



Flightless Greenflies (Vilhelm Bergsøe, Fra Mark of Skov)

Name of scheme:- **Environmental Change Network (ECN)**

Website: www.enc.ac.uk

National Organiser:- This scheme is operated from Rothamsted

Address:- Institute of Arable Crops Research, Department of entomology, Rothamsted Experimental station, Harpenden AL5 2JQ

Tel:- 01582 763133

Scheme has been in operation since 1992.

Description:- The ECN is sponsored by a number of organisations, including Scottish Natural Heritage, and is the UK's long-term environmental monitoring programme. It is designed to collect, store, analyse and interpret long-term data based on a set of key physical, chemical and biological variables. Through a network of sites within the UK it seeks to obtain comparable long-term datasets. By analysing these data it seeks to identify natural and man-induced environmental changes, to improve understanding of such causes, to distinguish short-term fluctuations from long-term trends, and to predict future changes.

Coverage:- There are 12 terrestrial sites (3 in Scotland) and 42 freshwater sites (15 in Scotland).

Information about these sites can be obtained from their website.

Data:- Licensed access to ECN raw data may be provided at the discretion of ECN sponsoring organisations

MOLLUSCS: SNAILS AND SLUGS



Door snail (Fife Nature)

Name of scheme:- **Non-marine Mollusc Mapping Scheme (Snails and Slugs)**

Number of species:- ca. 200 in the British Isles, ca. 140 occurring in Scotland

Scottish Contact:- Dr Adrian Summer

Address:- 7 Smileyknowes Court, North Berwick, E Lothian, EH39 4RG

Tel:- 01620 894640

National Organiser:- Dr M P Kerney

Address:- Mollusca Section, The Natural History Museum, Cromwell Road London, SW7 5BD

Tel:- 0171 938 8914

Scheme has been in operation since 1961.

Method:- Tetrad mapping schemes are in progress, although not so far in Scotland. A Conchological Society/BRC recording card is available.

Coverage:- Now adequate to good of the whole of the British Isles.

Data:- ca. 250,000 records, kept both manually on cards and electronically processed (>144,200 held electronically at BRC).

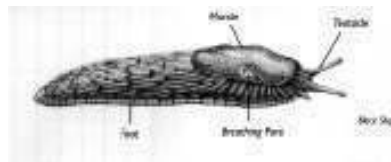
Activities:- The Conchological Society of Great Britain and Ireland holds six indoor meetings a year (between October and May), usually at the Natural History Museum. Field meetings, workshops and other events are held throughout the year at various locations. Hon. Secretary Ms J Reynolds, 21c Loraine Road, Holloway, London N& 6EZ

Publications:- Members receive *The Journal of Conchology* (usually two numbers a year) and *The Conchologists' Newsletter* (quarterly). Kerney, M, (1999) *Atlas of the Land and Freshwater Molluscs of Britain and Ireland*, Harley Books, ISBN 0-946589-48-8 (£25), representing the culmination of nearly forty years' work by members of the Conchological Society, with text, illustrations and bibliography.

Ease of identification:- A hand-lens or microscope is needed for some species. The field guide below offers an excellent way into the group.

Recommended guides to ID:-

- Kerney, M P & Cameron, R A D (1979 reprinted 1987, 1994), *A Field Guide to the Land Snails Of Britain and North-West Europe*. London: HarperCollins, ISBN 0-00-219676 X..



Black slug (Fife Nature)

Name of scheme:- **Marine Molluscs**

Website:- In preparation.

Number of species:- around 1,500

For Scottish Contacts:- Contact the national recorder

National Recorder:- Mrs Janice Light

Address:- 88 Peperharow Road, Godalming, Guildford, Surrey, GU7 2PN

Tel:- 01483 417782 Email:- jan@aquamar.demon.co.uk

Scheme has been in operation since 1920s.

Method:- The scheme has a field standard recording card. All records must have locality with grid reference, preferably latitude/longitude, although the national grid will be accepted, and date. Abundance and habitat information desirable. The scheme also conducts its own focused field work; literature and published reports are searched for data; marine labs contracted.

Coverage:- Scotland is well worked.

Data:- Several hundred of thousands records. 80,000 computerised, using 'Recordit' link with DMap. The scheme operates independently from BRC.

Activities:- The scheme organises field meetings, ID workshops and indoor meetings.

Publications:- Smith, S & Mackay, D (197?), *Distribution Atlas of Marine Molluscs on the East coast of Scotland*, NCC (?). A distribution atlas for the west of Scotland is in preparation. Seaward, D R (ed) (1982), *Sea area Atlas of the Marine Mollusc of Britain and Ireland*, NCC, Shrewsbury. Seaward, D R (1990), *Distribution of the Marine Molluscs of NW Europe*, NCC, Peterborough. In addition there are UK regional distribution atlases.

Ease of identification:- The larger, more conspicuous species are fairly straight forward, and there are good Identification guides (see below).

Recommended guides to ID:-

- Graham, A (1988), *Molluscs: Prosobranch and Pyramidellid Gastropods: Keys and Notes for Identification of the Species*, Synopsis of the British Fauna Vol 2 (new edition).
- Tebble, N (1966), *British Bivalve Seashells*, BN(NH) (o/p).
- Poppe, G T & Goto, Y (1991), *European Seashells*, Vols 1 -2, Verlag, Christa Hemmen.

Name of scheme:- **Freshwater Pearl Mussel Site List**

Number of species:- 1

Scottish Contact:- Dr Martin Gaywood

Address:- Scottish Natural Heritage, 2 Anderson Place, Edinburgh EH6 5NP

Tel:- 0131 447 4784 Fax:- 0131 446 2405 Email:- martin.gaywood@rasd.demon.co.uk

Scheme has been in operation since 1998.

Method:- A national survey was undertaken between 1996-97. Information on the status of the freshwater pearl mussel is held by SNH. Due to the continued threat from illegal pearl fishing, the information is confidential. However, requests for information will be considered on a case by case basis.

Coverage:- National - approximately 150 rivers have been surveyed.

Data:- Functioning populations of peal mussel recorded from ca. 50 rivers.

Publications:- Cosgrove, P et al. (in prep), *Status of the Freshwater Pearl Mussel in Scotland*.

Recommended guides to ID:-

- Ellis, A E (1978), *British Freshwater Bivalve Mollusca*, Synopses of the British fauna (new series) no 11, Linnean Society of London.



A flat millipede (AMS)

MYRIAPODS: MILLIPEDES & CENTIPEDES

Name of scheme:- **Centipede Recording Scheme (Chilopoda)**

Number of species:- 50 - 25 in Scotland

No official Scottish organiser

National Organiser:- A D Barber

Address - Rathgar, Exeter Road, Ivybridge, Devon PL21 0BD

Tel - 01752 305362

Scheme has been in operation since 1973.

Method:- BRC cards with a habitat section are in use, alternatively lists of records with date, location, NGR, verifier name and as much habitat information as possible. Alternatively, specimens, preserved in 70% alcohol may be sent for identification or confirmation. There are several established collectors in Scotland but contact in the first instance should be with the national scheme organiser. Instruction card and guidance on identification is available.

Coverage:- Patchy. Scotland is moderately well recorded in some areas, but smaller species especially are under-recorded, and records are welcome from all areas including those from urban and sub-urban sites. Under recorded areas include Highlands, Western Isles, Caithness and Sutherland.

Data:- There are well in excess of 20,000 British records kept manually and with 16,000 electronically processed at BRC (84% to 1km; 34% post 1980). Approximately half of the British species are known from Scotland; the only British record of *Geophilus proximus* is from Shetland and that for *Lithobius lucifugus* from a kirkyard in Edinburgh. Information (including existing records from specific areas) on request and as available from the organiser.

Activities:- There is an annual field meeting jointly between the British Myriapod Group and the British Isopod Group at different locations in Britain each year immediately after Easter to which anyone interested is most welcome. Further meetings may be arranged.

Publications:- Barber, A D & Keay, A N (1988), *Provisional Atlas of the Centipedes of the British Isles*, NERC ISBN 1-870393-08-2. Twice yearly free Myriapod newsletter and annual *Bulletin of the British Myriapod Group* ISSN 0267-2154, (£4) obtainable from A D Barber (as above).

Ease of identification:- A few species may present some difficulty, especially if immature or damaged, but the organisers are willing to identify specimens (including those collected in site surveys) or confirm identifications. A Field Studies Council key is in preparation and free keys to species are also available from the organiser. There is potential for school involvement in mapping out the occurrence of even common species and collections of specimens (accompanied with data) may be sent for identification to the organisers.

Recommended guides to ID:-

- Eason, E H (1964), *Centipedes of the British Isles*, Warne (o/p) is excellent, although there have been a few additions and name changes.

- Wheater, C P & Read, H J (1997), *Animals under Logs and Stones*, Naturalists Handbook 22, Richmond Publishing is at a more basic level

Name of scheme:- **Millipede Recording Scheme (Diplopoda)**

Number of species:- 55+, only about 30 of these recorded in Scotland

There is no official Scottish Organiser, but the organiser will act as an identification point for recorders new to the group and put them in touch with someone near to them if possible.

National Organiser:- Paul Lee

Address:- 155 Corton Road, Lowestoft, Suffolk, NR32 4PR

Tel:- 01502 530430 (daytime) 01502 565381 (evenings) Fax:- as daytime phone Email:- paull@btinternet.com

Scheme has been in operation since 1971.

Method:- There a BRC recording card (RA59). The scheme as part of the National Recording Scheme of the British Myriapod Group.

Coverage:- Large areas are still to be covered in Scotland.

Data:- Estimated 40-50,000 records in various formats. About 18,000 records were computerised by BRC for the 1988 Myriapod atlas ((of these 89% to 1km; 38% post 1980) and further records have been amassed since then on record cards or electronically by individual recorders.

Activities:- An annual meeting the British Myriapod Group is held as a field weekend to 'fill in the squares' at a poorly covered area somewhere in Britain. Occasional workshops around the country are also announced in the BMG Newsletter.

Publications:- News items and articles appear in the British Myriapod Group newsletter published twice a year. British Myriapod Group (1988), Preliminary atlas of the Millipedes of the British Isles □ BRC Monks Wood (limited distribution). A new atlas of millipede distribution will hopefully be prepared soon.

Ease of identification:- Some common species are easily identified in the field, but several species groups require microscopic examination and some require dissection. Naturalists Handbook 22 *Animals Under Logs and Stones* has an introductory key to the easier species and makes clear which groups are more difficult to identify, referring the reader to Blower (see below)

Recommended guides to ID:-

- Blower, J N (1986), *Millipedes*, Synopses of the British Fauna (new series) 35
ISBN 085546-301-5

NEUROPTERA, MECOPTERA AND MEGALOPTERA: LACEWINGS AND ALLIED ORDERS

Name of scheme:- **Lacewings and allies Recording Scheme**

Website: <http://entowww.tamu.edu/research/neuropterida/neuroweb.html>

Number of species:- 74 species (encompassing Neuroptera, Megaloptera, Raphidioptera & Mecoptera - also known as lacewings, alder flies, wax flies, sponge flies, snake flies & scorpion flies).

Scottish Organiser:- Stephen Moran

Address:- Inverness Museum & Art Gallery, Castle Wynd, Inverness

Tel:- 01463 237114 Fax:- 01463 225293

National Organiser:- Colin W Plant

Address:- 14 West Road, Bishops Stortford, Hertfordshire CM23 3QP

Tel/Fax:- 01279 507697 Email:- Colinwplant@compuserve.com

Scheme has been in operation since 1988.

Method:- Revised recording cards (RA 68) are available free in any quantity from BRC at Monks Wood. In general, records are preferred on these cards. Large volumes of records from computerised databases can be handled electronically, but it is essential to contact the national organiser before sending with details of database systems and number of records.

Coverage:- Fairly good, but many species under-recorded and some probably unrecorded in Scotland.

Data:- ca. 200,000 records, 11,800 of which (65% to 1km accuracy; 50 % post 1980) have been computerised at BRC, constituting all data up to publication of the provisional atlas (see below), with duplicates on the national organiser's PC as a DMap distribution file only. Post atlas records are currently stored on cards, waiting electronic processing later in 1999.

Activities:- The scheme organiser runs workshops on a minimal-fee basis if asked. There are several active recorders in Scotland and the scheme also works closely with the Rothamsted Insect Survey (see this) retaining lacewing material from the survey's static light traps in Scotland and elsewhere. Written and illustrative contributions are welcomed for the newsletter (see below); in particular, accounts of Scottish holiday collecting.

Publications:- Plant, C W (1994), *Provisional Atlas: Lacewings and Allied Insects (Neuroptera, Megaloptera, Raphidioptera and Mecoptera) of Britain and Ireland*, BRC, ISBN 1-870393-18-X (£6.50). A newsletter is produced twice a year - free from the national organiser. It is also available on the webpage above.

Ease of identification:- Most species are relatively easy, though a few are tricky and some require genitalic examination. The AIDGAP key treats all species except for *Symphorobius klapaleki* added to GB list after publication - and the segregates of the *Chrysoperla carnea* group for which see the newsletter. The national organiser is keen to name or verify specimens - by arrangement or unsolicited - as long as return postage is enclosed with parcels. The newsletter contains regularly updates the published identification keys and gives hints on finding lacewings and their allies, results of new fieldwork, bibliographies, etc.

Recommended guides to ID:-

- Plant, C W, *Key to Adult British Lacewings*, AIDGAP Field Studies Council.

ODONATA - DRAGONFLIES & DAMSELFLIES

Name of scheme:- **Dragonfly Recording Network**

Website:- <http://www.hanslope.demon.ci.uk/bols> is the British Dragonfly Society's website

Number of species:- ca. 40 (21 recorded breeding in Scotland)

Regional Recorder Scotland:- Mrs Elizabeth M Smith

Address:- 33 Hunter Terrace, Loanhead, Midlothian, EH20 9SJ

Tel: 0131 440 0888 (evenings)

National Organiser:- British Dragonfly Society

Address:- Hon. Sec. Dr W H Wain, □The Haywain□ Hollywater Road, Bordon, Hants., GU35 0AD.

An Odonata recording scheme has been in operation since the 1960s.

Method:- All records should be submitted to the regional recorder on RA70 cards accompanied by a SAE for acknowledgment, information and/or queries. Recording cards are available direct from BRC at Monk's Wood.

Coverage:- Moderately good, but patchy. New breeding records are requested especially for the bog species *Aeshna caerulea*, *Somatochlora arctica*, *Leucorrhinia dubia* as well as for all the other rare/local species.

Data:- 109,100 records (82% to 1km accuracy; 67% post 1980) electronically processed at BRC, Monk's Wood for the atlas (see below), and since 1997 by the British Dragonfly Society.

Activities:- Informal instruction is given at field meetings of the BDS, to which all recorders are welcome. Membership of the BDS is currently £ 5.50 per annum, due 1st April. (for contact see above).

Publications:- Merritt, R, Moore, N W & Eversham, B C (1996), *Atlas of the Dragonflies of Britain and Ireland*, HMSO, ISBN 0-11-701561-X. A newsletter and *Journal of the British Dragonfly Society* is free to members with two issues a year.

Recommended guides to ID:-

- Hammond, Cyril O (1983), *The Dragonflies of Great Britain and Ireland*, Harley.
- Brooks, S (ed.) & Lewington, R (illus.) (1997), *Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland*, British Wildlife Publishing, ISBN -09531-399-05.

Name of scheme:- **Migrant Dragonfly Project**

Website: <http://powell.colgate.edu/wde/dragonfly.htm>

Scottish Contact:- Mrs E Smith, 33 Hunter Terrace, Loanhead, Midlothian, EH20 9SJ (see also above)

National Organiser:- Mr Adrian James Parr

Address:- 10 Orchard Way, Barrow, But St Edmunds, Suffolk, IP29 5BX

Tel:- 01603 255162 (work hours) Email:- adruab.parr@bbsrc.ac.uk



Scheme has been in operation since spring 1995.

Method:- Recording cards available from the national organiser or BRC, Monk's Wood.

Coverage:- This is moderately good, but density of records is very low in Central Scotland and the Borders. Several species are expanding their range in Britain and recorders in Scotland need to be alert to this. Also, day-to-day recording is scarce in many remoter regions.

Data:- 500 recent and 300 historical records, kept both electronically and manually.

Activities:- This project is part of the national Odonata scheme, run by the British Dragonfly Society. The Society also has an extensive programme of field trips including several in Scotland (see also above).

Publications:- Yearly progress is summarised in the *Journal of the British Dragonfly Society* published twice a year (free to members) and in the journal *Atropos*, published three times a year (at £5 per issue, available from the editor, 36 Tinker Lane, Meltham, Huddersfield, W Yorkshire HD7 3EX.).

Ease of identification:- There is potential for school and general public involvement.

Recommended guide to ID:-

- Brooks, S (ed.) & Lewington, R (illus.) (1997), *Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland*, British Wildlife Publishing, ISBN -09531-399-05.

ORTHOPTERA & ALLIED ORDERS: GRASSHOPPERS, CRICKETS & ALLIED ORDERS



Name of scheme:- **Orthoptera Recording Scheme (Grasshoppers and Crickets, including Earwigs, Cockroaches etc.)**

Number of species:- 29 species

No official Scottish contact.

National Recorder:- Mr J Widgery,

Address:- 21 Field View Road, Potters Bar, Hertfordshire, EN6 2NA

Tel:- 01707 642708

Scheme has been in operation since 1967.

Method:- BRC standard recording cards RA4/B and GEN 13 obtainable direct from BRC.

Coverage:- Much remains to be discovered about habitat and distribution of all Orthoptera as well as the common and lesser earwigs in Scotland: also, any breeding colonies of house crickets or 'domestic' cockroach species.

Data:- Many thousands records are held by the national recorder and BRC. They are kept manually by the how national recorder before eventually being put on the BRC computer (37,300 computerised at the last count, 58% to 1km accuracy; 49% post 1980)..

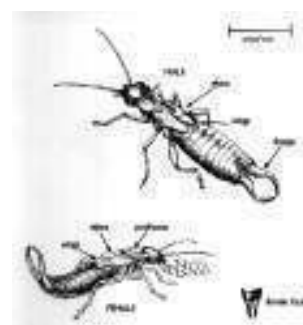
Activities:- There are no workshops or field meetings at present.

Publications:- Haes, ECM & Harding, PT (1997), *Atlas of Grasshoppers, Crickets and Allied Insects in Britain and Ireland*, HMSO, ISBN 0-11-702117-2. A newsletter, edited by the national recorder, is published annually via BRC, Monk's Wood.

Ease of identification:- The small number of species means that the group is comparatively easy to learn or study and it is therefore ideal for young naturalists and newcomers to entomology. Beginners can get involved, with the assistance of one or more of the publications listed below.

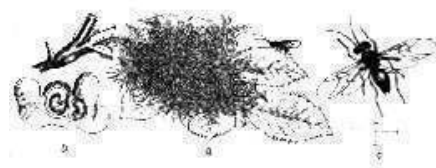
Recommended guides to ID:-

- Marshall, J A & Haes, E C M (1988), *Grasshoppers and Allied Insects of Great Britain and Ireland*, Harley Books, ISBN 0-946589-13-5 (hbk) also in pbk.
- Bellman, H (1985), *A Field Guide to the Grasshoppers and Crickets of Britain and Europe*, Collins ISBN 0-00-219852-5.
- Brown, V K (1983), *Grasshoppers*, Naturalists' Handbooks 2, Richmond Publishing Co. This latter publication is aimed at sixth-forms and others as an introduction into entomology, and is limited to the common species.



Earwigs (Fife Nature)

PLANT GALLS



Rose Gall from Vilhelm Bergs-e, *Fra Mark og Skov*

Name of scheme:- **British Plant Gall Society Records**

Number of species:- 1700+ British gall-causing species

Scottish Organiser:- Mr P Entwistle

Address:- Rhiva, Spinningdale by Ardgay, Sutherland, IV24 3AE

National Organiser:- Dr. C K Leach, Hon. Secretary of British Plant Gall (BPGS) Society,

Address:- c/o Department of Biological Sciences, De Montfort University, Scraftoft, Leicester, LE7 9SU

Tel:- 0116 2577 713 Fax:- 0116 2577 775 Email:- bioted@dmu.ac.uk

Scheme has been in operation since 1990.

Method:- A guide to oak leaf galls and record cards are available from BPGS, also a provisional key to plant galls.

Coverage:- Patchy generally, and very patchy in Scotland, where mainly reliant on a handful of recorders.

Data:- ca. 100,000 records, currently being held manually but it is anticipated having them in electronic format by the end of 1999.

Activities:- BPGS organises field meetings, workshops and lectures, and a Gall Gathering Weekend - held in early/mid September. Details from the organiser.

Publications:- The journal *Cecidology* is published twice a year, cost of which is included in subscription to BPGS (currently £ 7.50). A newsletter is occasionally circulated free to members.

Ease of identification:- Provisional keys of Plant Galls available from BPGS.

Recommended guides to ID:-

- Redfern, M & Askew, RR (1992), *Plant Galls*, Naturalists' Handbook No 17, Richmond Publishing Co. ISBN 0-85546-286-8.

OTHER INVERTS

SIPHONAPTERA: FLEAS



Flea (Vilhelm Bergs-e, *Fra Mark og Skov*)

Name of scheme:- **Fleas Mapping Scheme (Siphonaptera)**

Number of species:- 62 Species and subspecies

No official Scottish contact.

National Recorder:- Mr R S George

Address:- 54 Richmond Park Avenue, Bournemouth BH8 9DR

Tel:- 01202 515238 Fax:- 01202 510303

Started 47 years ago.

Method: A leaflet is available on techniques for flea collecting, but there is no BRC recording card.

Coverage:- The least well recorded counties are Bute and Arran (10 species), Caithness (11), Dumbarton (10) Kinross (11), Kirkcudbright (7), Peebles (10), and Roxburgh (11). Flea lists from any local area would be a great help.

Data:- Records are kept on cards and are passed on to BRC for production of a 10km distribution map for each species and sub-species. BRC holds 2000 records in electronic format, 47% to 1km square accuracy; 7% post 1980.

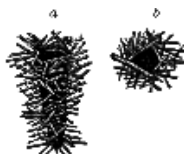
Activities:- There are no groups of recorders as such, but records are needed of fleas from birds and mammals and from their nests. Specimens of fleas from both cats and dogs and nest material with fleas is wanted by the organiser. Particularly wanted are house martin and sand martin nest material from the west of Scotland, but also fleas from the badger, from small mammal nests and the nests of shag. The organiser will report on the contents if they are sent in flea-tight containers.

Publications:- George, R S (1974), *Provisional Atlas of the Insects of the British Isles: Part 4, Siphonaptera, Fleas*, BRC, ITE.

Ease of identification:- A slide preparation and microscope are required for identification of fleas and is work for a specialist. A sheet with 'Notes on collecting fleas' is available from the organiser

Recommended guide to ID:-

- Smit, F G A M (1957), Handbook for the Identification of British Insects, Vol 1 (16) 1-94, (200 figs) (o/p).



Caddisfly larval case from Vilhelm Bergsøe, *Fra Mark og Skov*

TRICHOPTERA: CADDISFLIES

Name of scheme:- **Caddis Fly Recording Scheme (Trichoptera)**

Number of species:- 199

There is no official Scottish Organiser.

National Organiser - Dr I D Wallace, Liverpool Museum, William Brown Street, Liverpool L3 8EN

Address - Liverpool Museum, William Brown Street, Liverpool L3 8EN

Tel:- 0151 478 4236 Fax:- 0151 478 4390

Scheme has been in operation since 1975.

Method: A standard recording card is available from BRC.

Coverage:- Poor generally, including Scotland.

Data:- 5000 records in total - some of which have been electronically processed.

Activities:- Contact the organiser to get involved.

Publications:- Wallace, I D (1991), □ *A review of the Trichoptera of Great Britain* □ *Research and Survey in Nature Conservation* No 32, NCC ISBN 0-86139-693-6, includes summaries of distribution for Caddis in Britain, and information on collection and recording. Marshal, J E (ed.) (1978) □ *Caddisflies* □ *Provisional Atlas of the insects of the British Isles* 8(1), NERC, ISBN 0-904282-18-X.

Ease of identification:- There is limited scope for those unfamiliar with entomological identification keys.

Recommended guides to ID:-

- Edington, J M & Hildrew, A G (1995), *A revised key to the Caseless Caddis Larvae of the British Isles: with notes on their ecology*, FBA Scientific Publication No 53, Freshwater Biological Association ISBN 0-900386-55-X.
- Wallace, I D, Wallace, B & Philipson, G N (1990), *A Key to the case-bearing Caddis larvae of Britain and Ireland*, FBA Scientific Publication No 51, Freshwater Biological Association, ISBN 0900386-49-5. Both keys available from FBR. (See useful addresses in Appendix C) Series editor J M Elliott, ISSN 0367-1887.

FLATWORMS

Name of scheme: - **Freshwater Tricladida (flatworms)**

Website: - [soon to be announced]

Number of species:- 13

Scottish Contact:- Mrs Jean Elliott

Address:- 3 West Park, Strathpeffer, Highland IV14 9BT

National Organiser: - Dr L S Bellamy

Address:- 6, Dean Road, Newnham on Severn, Glos., GL14 1AB

Tel:- 01452 426649 (daytime) Email:- soon

Scheme has been in operation since 1977.

Method:- A standard recording card RA38 is used and available from Monks Wood.

Coverage:- Sparse, with some clustering. Only about 10 records from Scotland - (Loch Lomond, Loch Ness and west coast). None at from east and north (except some unidentifiable specimens from Caithness LRC).

Data:- Several hundred records, kept manually on cards (by Vice-County). 1,400 records are held in computerised format at Monks Wood.

Activities:- No organised meetings. Contact the organiser for how to get involved.

Publications:- Some (very) provisional maps have been produced by BRC, Monks Wood.

Ease of identification:- Most species are easy with practice, though some need examination of reproductive organs under the microscope. The FBA publication listed below is a short and fairly basic work for identification purposes.

Recommended guides to ID:-

- Reynoldson, TB (1978), *A Key to the British Species of Freshwater Triclad*, Freshwater Biological Association publication no 23, 32pp, FBA, Ambleside.
- Ball, IR & Reynoldson, TB (1981), *British Planarians*, Synopses of the British Fauna no 19, Linnean Society of London, CUP.

Name of scheme:- **Terrestrial planarians or flatworms (Platyhelminthes)**

Number of species:- 11 in UK (several hundred world-wide)

Scottish Organiser :- Dr Brian Boag

Address:- Scottish Crop Research Institute, Invergowrie, Dundee, DD2 5DA

Tel:- 01382 562731 Fax:- 01382 562426 Email:- bboag@scri.sari.ac.uk

National Organiser :- Dr Hugh D Jones

Address:- School of Biological Sciences, The University of Manchester, 3.239 Stopford Building, Oxford Road, Manchester, M13 9PT

Tel/Fax:- 0161 275 3885 Email:- hugh.jones@man.ac.uk

Scheme has been in operation since 1975.

Method:- There is no specific recording card.

Coverage:- Quite good - more records are needed from less popular areas.

Data:- 300 records for the national survey are kept on computer. The New Zealand Flatworm survey have resulted in 1000+ records and the Scottish scheme organiser is currently exploring ways of getting the records computerised. (ca 200 records are held by BRC, 100% down to 100m accuracy; 60% post-1980).

Activities:- A special survey relating to the distribution of the New Zealand Flatworm was initiated in 1991 in Scotland by BRISC, the Scottish Crop Research Institute, Scottish Museums and SOAFD to investigate the incidence of the New Zealand flatworm in private gardens, horticultural centers and agricultural land. However, all native flatworms are very poorly recorded.

Publications:- Jones, H D & Boag, B (1986), □The distribution of New Zealand and Australian flatworms in the British Isles - The Scottish Survey and Magalab worms□ *Journal of Natural History*, London, Vol 30:955-975. Boag, B et al. (1994), □Distribution and prevalence of the predatory planarian *Artioposthia triangulata* (Dendy) Tricladida: Terricola in Scotland□. *Annals of Applied Biology* 124:165-171. Boag, F, Jonnes, H D & Neilson, R (1997), □The spread of the New Zealand flatworm (*Artioposthia triangulata*) within Great Britain□ *European Journal of Soil Science* (1997) 33: 53-56.

Ease of identification:- There is a great potential for involvement by schools. Also, alien flatworms from Australia and New Zealand are easily recognised.

Recommended guide to ID:-

- Jones, H D (1998), □The African and European land planarian faunas, with an identification guide for field workers in Europe□ *Pedobiologia* Vol 42: 477-489.
- Ball, I R & Reynoldson, T B (1981), *British Planarians* ISBN 0-521 23875-7 (hbk) 0-521-28272-1 (pbk); Synopses of the British Fauna (new Series) No 19, Linnean Society of London and Estuarine & British Water Sciences Association.

Name of scheme:- **Nematode survey**

Number of species:- 12+

National Organiser :- Dr Brian Boag

Address:- Scottish Crop Research Institute, Invergowrie, Dundee, DD2 5DA

Tel:- 01382 562731 Fax:- 01382 562426 Email:- bboag@scri.sari.ac.uk

The scheme started in 1970 covering the distribution of the plant parasitic nematode Longidoridae and has been extended to include entomophilic and predatory nematodes. This was extended in 1991 to include marine nematodes.

Method:- There is no standard recording card, and records should be sent with as much information as possible. Data would be welcomed on internal parasites in mammals such as rabbits, hares, hedgehogs and roe deer, for a possible future survey.

Coverage:- Poor. More information is needed on all nematode species from all areas of Scotland.

Data:- ca. 900 records. Some are kept in electronic format at SCRI, others manually on cards.

Activities:- In the case of animal parasites, specimens would be welcome if properly preserved in alcohol or formalin. There may be a nematode "master class" in a year or so financed by the NERC thematic programme.

Publications:- Boag, B & Neilson, R (1996), *Nematologica* 42:96-108. Boag, B et al. (1992), *Nematologica* 38:502-513. The initial nematode survey produced Heath, J, Brown, D J F & Boag, B (1977), *A provisional atlas of the Nematodes of the British Isles*, of practical and economic use to farmers.

Ease of identification:- A very difficult group. There is no key in English, but see below.

Recommended guides to ID:-

- Bongers, T (1987), *De Nematoden van Nederland*, ISBN 90-5011-015-0 covers most British species.
- Southey, J S (1987), *Plant Nematology*, HMSO, ISBN 0-11-240907-5

Name of scheme:- **Bryozoa**

This project is no longer active, although assistance with identification can be obtained from:

Peter J Hayward, School of Biological Sciences, University of Wales, Singleton Park, Swansea SA2 8PP see also

- Hayward, P J & Ryland J F (1995), *Handbook of the Marine Fauna of North West . Europe* . Oxford University Press.

Name of scheme:- **Freshwater Oligochaetes**

Number of species:- 170

Scheme in operation 1979 - 1996.

Data:- All records passed to BRC: 600 record cards (90% to 1 km; 40% post 1980).

No atlas produced to date. No further information available.

PLANTS & FUNGI

ALGAE

Name of scheme:- **Stonewort Mapping Scheme (Charophytes)**

Number of species:- 33

Scottish Organiser :- Botanical Society of the British Isles Vice-county recorders (see below))

National Organiser :- Mr Nicholas F Stewart

Address:- Cholwell, Posbury, Crediton, Devon EX17 3QE

Tel - 01363 773779 Email:- nstewart@eurobell.co.uk

Scheme has been in operation since ca. 1975.

Method:- Records should include a minimum of habitat, site, grid reference, date, recorder, location of any voucher or source reference (if appropriate). The organiser is happy to check specimens (pressed preferred but alternatively pickled in alcohol). There is a BRC recording card.

Coverage:- Moderate, though fairly even, although some areas, e.g. Western Isles and Shetland warrant more thorough survey.

Data:- ca.9,000 - held electronically at BRC Monk's Wood (61% to 1km accuracy; 28% post 1980).

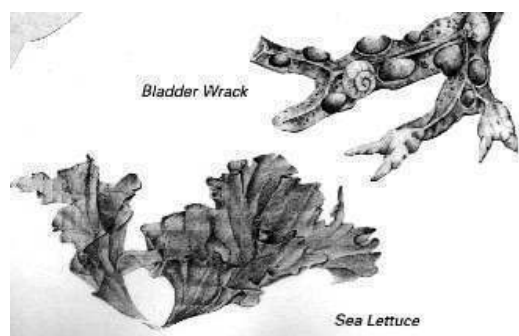
Activities:- There have been field courses led by the organiser at Kindrogan in 1997 and 1998. Other field courses are led by the organiser, R V Lansdown and others for the Field Studies Council/Scottish Field Studies Council, and some are privately organised. Being algae, stoneworts are also within the remit of the British Phycological Society.

Publications:- Maps of all species are in either of the two publications listed under 'recommended guides to ID' below. Scottish Loch Survey of SNH are working on producing revised Scottish maps. Moore, J A & Greene, D M (1983), *Provisional Atlas and Catalogue of British Museum (Natural History) Specimens of the Characeae*, ITE, Monk's Wood.

Ease of identification:- Traditionally regarded by botanists as a difficult group, but most species can be identified in field with hand-lens. The field key in RDB (see below) is best start, used with illustrations and descriptions in BSBI handbook, though there have been some changes between the two. Because stoneworts grow under water makes it difficult for schools to become involved.

Recommended guides to ID:-

- Moore, J A (1986), *Charophytes* BSBI Handbook No5.
- Stewart, N F & Church, J (1992), *Red Data Books for Britain and Ireland, Stoneworts*, JNCC (available from Natural History Book Service) contains field key.



Seaweeds (Fife Nature survey)

Name of scheme:- **Marine Algal Mapping Scheme (Seaweeds)**

Website:- <http://www.qub.ac.uk/bb/jbpage/bps/home/bps.htm>

Number of species:- ca.700. About 120 species can be found on any unpolluted shore and at least as many again occur below low-tide mark.

Scottish contact:- Dr Martin Wilkinson

Address:- Department of Biological Sciences, Heriot-Watt University, Riccarton, Edinburgh

National Organiser:- Dr F Gavin Hardy

Address:- Department of Marine Sciences and Coastal Management, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU

Tel:- 0191 222 5282 (daytime) 0191 213 2638 Email:- f.g.hardy@ncl.ac.uk

Scheme has been in operation since 1970.

Method:- A guide leaflet is available to would-be recorders along with a BRC field card. All records are vetted through a system of referees. It is intended to re-launch the scheme with new, updated, record cards for all data collected after 1.1.2000.

Coverage:- Fairly good including Scotland, although NW Scotland & Outer Hebrides poorly represented. Greatest gaps are 'difficult' species - small filamentous spp., coralline crusts. Some 30 recorders are active in Scotland.

Data:- 69,500 electronically processed at BRC.

Activities:- Help from amateurs is most welcome, especially from skin divers who could cover the lesser known deeper water species. The scheme is associated with the British Phycological Society, who run occasional seaweed identification courses.

Publications:- Norton, T A (ed.) (1985), *Provisional Atlas of the Marine Algae of the British Isles*, ITE, ISBN 0-904282 53 8. Definitive atlas in production (records accepted till 31 December 1999).

Ease of identification:- Many common or large seaweeds are easily identifiable. Collins or Hamlyn Field Guides to the Seashore may be used. There is scope for schools to get involved by choosing particular groups of the 'easier' species in areas local to school.

Recommended guides to ID:-

- The series *Seaweeds of the British Isles*, HMSO/British Museum/Natural History by various authors is in progress: Vols 1 (Parts 1, 2A, 2B, 3A), Vol 2, Vol 3 (Part 1), Vol 4, published to date.
- Newton, L (1931), *Seaweeds of the British Isles*, Natural History Museum (o/p).
- Hiscock, S, (1986), *Field Key to Red Seaweeds*, AIDGAP, Field Studies Council.
- Hiscock, S (1984), *Field Key to Brown Seaweeds*, AIDGAP, Field Studies Council.

Name of scheme:- **Marine and Freshwater Diatom Survey**

Website:- <http://www.rbge.org.uk/>

Number of species:- ca. 10,000

Scottish Organisers:- Dr David Mann or Mr Stephen J M Droop

Address:- Royal Botanic Garden, Inverleith Row, Edinburgh, EH3 5LR

Tel:- 0131 248 2875/2910 Fax:- 0131 248 2901

Email:- d.mann@rbge.org.uk s.droop@rbge.org.uk

Scheme has been in operation since 1991.

Method:- Information about collection and preservation of material is available from the above.

Coverage:- Marine: quite good already of W and SE Scotland, but very little from NW, N and NE Scotland. Freshwater: quite good of lowland lochs; less good from highland lochs, rivers in general.

Data:- ca. 2500 recent samples, about 1500 of which have been prepared as permanent slides; major collections of historical material from 19th century. Documentation in notebooks.

Activities:- Diatoms are important indicator species of physical and chemical conditions in marine and fresh waters. As part of projects to write floras covering the marine and freshwater diatoms of the British Isles, samples of planktonic and benthic diatoms are being collected from around Scotland, basic ecological information gathered, and distributions mapped. There is an annual meeting of British diatomists, usually at a field centre during autumn, when around 60 researchers and other interested individuals get together for a weekend to discuss their own and each other's work. Details from the scheme organisers.

Publications:- Contact the scheme organisers for a list of their diatom papers and other publications. See also the RBGE website. Papers about diatoms appear in several phycological and microscopical journals, and the journal *Diatom Research* is devoted entirely to this group. There is an email list-server called DIATOM-L that distributes questions/answers/comments about diatoms from around the world; details from the scheme organisers.

Ease of identification:- Most amateurs interested in diatoms have come via an interest in microscopy and microscopes, since diatoms are mostly too small to see with the naked eye. They are not easy to identify, but represent a rewarding challenge for someone with a great deal of patience and a keen eye for detail. They can be viewed alive, but to see the fine detail in the ornamentation of the silica cell wall, they must be cleaned (usually involving strong oxidising acids) and mounted in a high refractive index mountant to make permanent slides.

Recommended guides to ID:-

- Cox, E J (1996), *Identification of Freshwater Diatoms from Live Material*, Chapman & Hall, London, 158pp, ISBN 0-412-49380-2 (hbk).
- Hartley, B (1996), *Atlas of British Diatoms*, BioPress Ltd, The Orchard, Clanage Road, Bristol BS3 2JX, 601pp, ISBN 0-948737-45-X.

Name of Scheme:- **Marine Dinoflagellates**

Dodge, J D (1981) *Provisional Atlas of the Marine Dinoflagellates of the British Isles*, ITE.

No further information available on this project.

FUNGI

Name of Scheme:- **Myxomycetes (Slime Moulds)**

Number of species:- 246

No official Scottish Organiser.

National Organiser:- Dr Bruce Ing

Address:- Chester College, Cheyney Road, Chester, Cheshire

Scheme has been in operation since 1957.

Method:- Although not truly fungi, myxomycetes are now covered by the British Mycological Society's mapping scheme.

Data:- 25,000 records held by BRC in electronic format.

Publications:- Ing, B, (1982) *Provisional Atlas of the Myxomycetes of the British Isles*, ITE. Additionally a review of Scottish myxomycetes by Dr Bruce Ing has been published in SNH Review No 38.

Ease of identification:- A difficult group. The publication below is the first book this century to cover these fungi comprehensively, with identification keys.

Recommended guides to ID:-

- Due out in April 1999 is Ing, B, *The Myxomycetes of Britain and Ireland: An Identification Handbook*, Richmond (hbk £35) covering life history, structure, ecology and distribution, how to find and collect material, storage, etc.

Name of scheme:- **Macromycete Mapping Scheme (Larger Fungi)**

Number of species:- ca.3,000

National Contact:- Prof. Roy Watling

Address:- Caledonian Mycological Enterprises, Crelah, 26 Blinkbonny Ave. Edinburgh EH4 3HU or Royal Botanic Garden, Inverleith Row, Edinburgh EH3 5LR

Tel:- 0131 467 3747

Email:- caledonianmyc@compuserve.com

Scheme has been in operation since 1960.

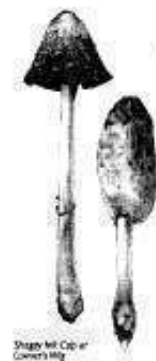
Method:- Several schemes organised by the British Mycological Society are at present operating in Scotland. Records may be submitted in manual or electronic format (see separate entry for database details), supported by dried material in the case of rare species.

Coverage:- Generally poor but getting better. Particularly SW Scotland is poorly covered. Especially the less attractive, deceptive and bizarre taxa, jelly fungi and resupinates are under-recorded.

Data:- ca. 10,000 records, kept manually and electronically. Scheme operates independently of BRC.

Activities:- The Scottish Fungus Groups are keen to receive records and welcome new members. They can be contacted through Dr Adrian Newton, Kingsmuir Hall, Bonnington Road, Peebles EH45 9HE and Mrs Liz Holden, The Stables, Mar Lodge, Braemar, Aberdeenshire. Participation in the autumn fungus forays, run by Natural History Societies and other centres including Royal Botanic Garden, Edinburgh, will illustrate not only the problems but the possibilities open to the amateur. If sufficient demand, the organiser will put on a practical training course.

Publications:- Watling, R & Whalley, A J S (1977), *Provisional Maps of Xylariaceous Fungi*, BRC.



Fungi (Fife Nature Survey)

Ease of identification:- The absence of any comprehensive book for identification of fungi has always been a drawback, but some headway can be made with the several popular books, and parts of the British Fungus Flora now available from the Royal Botanic Garden, Edinburgh. British Mycological Society has also published *Guide for the Beginner* (£2.50), *Guide to Identification with a Microscope* (£3.00) and *Guide to Recording*. (£3.00). These can be obtained from the SE Scotland Fungus Group (see below).

Recommended guides to ID:-

- Henderson, Orton & Watling (eds.) (1969-1998), *British Fungus Flora: Agarics and Boleti*, Vols 1-8, Royal Botanic Garden, Edinburgh.
- Ryvardeen & Gilbertson, *Polyporaceae of N Europe*, and Eriksson & Ryvardeen (eds.) *The Corticiaceae of N Europe*, Vols 1-8, Fungi Flora, Royal Botanic Garden, Edinburgh.
- Breitenbach & Kranzlin, *Fungi of Switzerland*, Vols 1-4 (with coloured illustrations), Edition Mykologia, Lucerne. Available from Richmond Publishing Co. as are the following:
- Bas, Kuyper, Noordeloos & Vellinga (eds.) *Flora Agaricina Neerlandica*, Vols 1-3, A A Balkema, Rotterdam.
- Pegler, Spooner & Young (1993), *British Truffles*, Royal Botanic Garden, Kew.
- Pegler, Spooner & Laessle (1995), *British Puffballs, Earthstars & Stinkhorns*, RBGK.
- Pegler, Roberts & Spooner (1997), *British Cantharella and Tooth Fungi*, RBGK.

Name of scheme:- **Database for Macromycete Mapping Scheme (Larger Fungi)**

Website:- <http://helios.bto.ed.ac.uk/ierm/research/sucre/fgses1.htm>

Number of species:- About 4,000

Scottish Contact:- Dr Adrian Newton

Address:- IERM, University of Edinburgh, Kings Buildings, Mayfield Rd, Edinburgh EH9 3JU

Tel:- 0131 650 5419 Fax:- 0131 662 0478 Email:- anewton@ed.ac.uk

Scheme has been in operation since 1995.

Method:- This project manages a database for records generated under the Macromycete Recording Scheme (see separate entry) under the auspices of the Botanical Society of Scotland, and in collaboration with the British Mycological Society and Local Fungus Groups. Records should be submitted according to the BMS standard format. Records requiring verification and deposition of voucher specimens should contact Prof. Roy Watling (National contact; Caledonian Mycological Enterprises, Crellah, 26 Blinkbonny Ave. Edinburgh EH4 3HU). Enquiries regarding the data held electronically and possibilities for data exchange may be directed to Dr Adrian Newton (address above). Currently we are attempting to collate available records and are very interested in exchanging information.

Coverage:- The focus is purely Scotland. A collaborative link is made with the national BMS database and local Biological Record Centres, to enable data to be exchanged.

Data:- Data are kept in a computer database (written in Access v.2). About 25,000 records currently held.

Activities:- There are field meetings held with the Botanical Society of Scotland and in conjunction with local fungus groups in SE Scotland and Grampian areas.

Publications:- The results are disseminated through the newsletters of the Botanical Society of Scotland and local fungus groups.

Ease of identification:- The vast majority of taxa are critical. Specialist monographs are required for accurate determinations of most taxa (see previous entry)

Recommended guides to ID:- See previous entry

LICHENS

Name of scheme: **Lichen Mapping Scheme**

Website: - <http://www.argonet.co.uk/users/jmgray/>

Number of species:- 1880+ species (including lichenicolous fungi)

Scottish Organiser:- Dr B J Coppins

Address:- Royal Botanic Garden, Inverleith Row, Edinburgh EH3 5LR

Tel:- 0131 467 3747 Fax:- 0131 248 2901 Email:- b.coppins@rbge.org.uk

National Organiser - Prof. M R D Seaward

Address:- Dept. of Environmental Science, University of Bradford, Bradford BD7 1DP
Tel:- 01274 234212 Fax:- 01274 234231 Email:- m.r.d.seaward@bradford.ac.uk
Scheme has been in operation since 1963.

Method:- Special mapping cards (general & for specific habitats available free of charge to BLS members and bona fide researchers, agencies, etc. who will be contributing to the scheme.

Coverage:- Good. More than 96% of 10km grid square covered and more than 93% in Scotland. Some remote areas, mainly islands, are under-recorded.

Data:- 344,000 records - 121,000 in Scotland. All existing data are electronically processed. Scheme operates independently of BRC.

Activities:- British Lichen Society runs workshops on identification.

Publications:- Seaward, M R D & Hitch, C J B (eds.) (1982), *Provisional Atlas of the Lichens of the British Isles* Vol.1 NERC. Seaward, M R D (ed.), (1984-85), *Provisional Atlas of the Lichens of the British Isles* Vol 2, parts 1 and 2, University of Bradford. Seaward, M R D (1995, 1996 and 1998), *Lichen Atlas of the British Isles* Fascicles 1, 2 and 3, London, British Lichen Society. (4th in preparation). Purvis, O W, Coppins, B.J & James, P W (1994), *Checklist of lichens of Great Britain and Ireland*. London, British Lichen Society.

Ease of identification:- Dobson, F (1992), *Lichen, an Illustrated Guide to British & Irish Species*. 3rd edition. Richmond Publishing, Slough (4th edition in preparation) makes a good starting point.

Recommended guides to ID:-

- Purvis, O W et al. (1992), *The Lichen Flora of Great Britain and Ireland*, The Natural History Museum/ British Lichen Society, London.

MOSESSES & LIVERWORTS: BRYOPHYTES

Name of scheme:- **Bryophyte Mapping Scheme (Mosses and Liverworts)**

Website:- <http://www.rbge.org.uk/bbs>

Number of species:- Mosses 748 species, Liverworts 296 species

Scottish Organiser :- Mr Gordon Rothero

Address:- Stronlonag, Glenmarran, Dunoon, PA23 8RA

Tel:- 01369 706281 email:- gprothero@aol.com

National Organiser:- Mr R D Porley

Address:- English Nature, Foxhole House, Crookham Common, Newbury, Berkshire RG15 8EL
Scheme has been in operation since 1960.

Method:- The scheme is managed by the Recording Secretary of the British Bryological Society who issues and receives mapping cards. The basic 10km scheme continues, but with an emphasis on local floras.

Coverage:- Poor in comparison with vascular plants. Ruderal species are generally poorly recorded, and particular gaps are E Grampians and most of NE Highland.

Data:- 795,000 computerised records at BRC (15% to 1km accuracy; 25% post-1980). All data manipulations, production of maps and enquiries from scientists are handled by BRC, Monks Wood.

Activities:- The Scottish Field Studies Centre runs 2-3 courses a year at Kindrogan Field Centre. The BBS runs a field meeting in Scotland every 3 years.

Publications:- The *BBS Bulletin*, distributed free to members, contains periodic information on the recording scheme. A 30-year scheme by the British Bryological Society (BBS) to map the bryophyte flora of Britain and Ireland within 10km squares of the National Grid came to fruition with Hill, Preston and Smith (1991, 1992, 1993), *Atlas of the Bryophytes of Britain and Ireland*, Harley Books Vols. 1-3 (hbk £26.50 - £34.00 each). The volumes also contain articles on the history of bryophyte recording in the British Isles (Vol 1), the relationships of the British bryophyte flora to floras elsewhere (vol.2) and a statistical analysis of relationships of the liverworts with climatic and other environmental factors (Vol 3). It is hoped that updates of the maps will be published from time to time.

Ease of identification:- A difficult group. Correct identification is of concern and the use of a microscope is essential for many individual species.

Recommended guides to ID:-

- Smith, A G E (1978), *The Moss Flora of Britain & Ireland*, Cambridge University Press (pbk £37.50).
- Smith, A G E (1990), *The Liverworts of Britain and Ireland*, Cambridge University Press (pbk £24.50). These volumes are indispensable for serious students, the keys are good and worth persevering with.
- Hill, M O, Hodgetts, N G & Payne, A G (1992), *Sphagnum: a Field Guide*, JNCC (£3.90), is an excellent little guide using characters that can be seen with a hand lens.
- Watson, E V (1981, 3rd edition) *British Mosses and Liverworts*, Cambridge University Press, (pbk at £37.00) gives a useful selection of the commoner species but has suffered from successive revisions, making the keys cumbersome.

VASCULAR PLANTS - FLOWERING PLANTS & FERNS



Orchids (Fife Nature Surveys)

Name of scheme:- Ferns and allies

Website:- http://www.nhm.ac.uk/hosted_sites/bps/beta

Number of species:- 64 Ferns, 17 Horsetails, 7 Clubmosses, 3 Quillworts (2 in Scotland and 1 other British species) - all numbers except quillworts include hybrids

Scottish Contacts:- Dr Heather McHaffie

Address:- 180 Granton Road, Edinburgh, EH5 1AH

Tel:- 0131 552 5026

National Contact:- Mr Rob Cooke, BPS Conservation officer and Recorder

Address:- 16 Conduit Road, Stamford, Lincs., PE9 1QQ

Tel/Fax:- 01780 766 704

Email:- rob.cooke@english-nature.org.uk

Scheme has been in operation since 1970s.

Method:- 3 standard cards are in use: 1) BRC card, which includes all vascular plants, including pteridophytes; 2) Area cards for individual species, which also requests information concerning habitats and other environmental data; 3) British Pteridological Society cards, which list all pteridophyte species and request habitat and other environmental data. Cards 1 & 2 to be returned to BRC, Monks Wood; card 3 returned to BPS Records officer or Botanical Society of the British Isles.

Coverage:- Intermediate in Scotland. Most areas probably covered at some time in the past, but new records desired from all areas. Recent work has shown that there are probably many new records to be found of new taxa and distribution.

Data:- Numerous, and numerous new additions over the last 25 years. All cards eventually sent to BRC at Monks Wood where they are electronically processed.

Activities:- BPS membership is scattered in Scotland. BPS programme of meetings frequently includes field trips in Scotland. Membership secretary is Mr M S Porter, British Pteridological Society, c/o Botany Department, The Natural History Museum, Cromwell Road, South Kensington, London, SW7 5BD.

Publications:- Jermy, A C et al. (1978) *Atlas of Ferns of the British Isles*, BSBI & BPS, London, ISBN 0-901158-01-1. A new atlas is to be produced in 2000 as part of a new British Atlas and a new Pteridophyte Flora in 2001. Distribution found in various country floras. The BPS also publishes the following journals: annually *The Bulletin*, which includes accounts of meetings of the Society, with extensive reports of pteridophyte sightings; and *The Pteridologist*, with scientific papers, and twice yearly *The Fern Gazette*, which contains occasional articles relevant

to the British pteridophyte flora. Ease of identification:- Of intermediate difficulty generally, with some critical taxa. No formal way for schools to become involved: for the general public, the best way in is to join the British

Pteridological Society and by attending their meetings/outings. A good starting point is Merriweather, J & Nill, M (1995), *The Fern Guide; a Field Guide to the Ferns, Clubmosses, Quillworts and Horsetails of the British Isles*, 2nd edition, Natural History Museum, London ISBN 0-565-01172-3.

Recommended guides to ID:-

- For beginners: Jermy, C & Camus, J (1991), *The Illustrated Field Guide to Ferns and Allied Plants of the British Isles*, HMSO, ISBN 0-11-310009-4.
- Intermediate: Hutchinson, g & Thomas, B A (1996), *Welsh Ferns*, 7th edition, National Museums & Galleries of Wales, Cardiff, ISBN 0-7200-0435-7.
- Advanced: Page, C N (1997), *The Ferns of Britain and Ireland*, 2nd edition, Cambridge University Press, ISBN 0-521-58658-5.



Name of Organisation:- **Botanical Society of the British Isles (BSBI)**

Web site:- <http://members.aol.com/bsbihgs>

Number of species:- ca.5,500

Secretary of the Scotland Committee:- Miss L. Farrell

Address:- SNH, 1 Kilmory Industrial Estate, Kilmory, Lochgilphead, Argyll, PA31 9RR

Tel: 01546 603611 Fax:- 01546 602298

Scottish Recorders:- The list of vice-county recorders is subject to continual change, but the current list (Jan 1999) is as follows:

- | | |
|------------------------|--|
| VC72 Dumfriesshire:- | Dr C. Miles, Braeside, Lockerbie DG11 2LL |
| VC74 Wigtownshire:- | Dr A.J. Silverside, Dept. of Biological Sciences, University of Paisley, Paisley, Renfrew PA1 2BE |
| VC75 Ayrshire:- | Mr A McG. Stirling, 17 Austen Road, Glasgow G13 1SJ |
| VC76 Renfrewshire:- | Mr K J. Watson, c/o Glasgow Museum & Arts Galleries, Kelvingrove, Glasgow G3 8AG |
| VC77 Lanarkshire:- | Dr P. MacPherson, 15 Lubnaig Road, Newlands, Glasgow G43 2RY |
| VC78 Peeblesshire:- | Mr D J McCosh, Baconsthorpe Old Rectory, Holt, Norfolk NR25 6LU |
| VC79 Selkirkshire | Dr R W M Corner, Hawthorn Hill, 36 Wordsworth Street, Penrith, & VC80 Roxburghshire:- Cumbria CA11 7QZ |
| VC81 Berwickshire:- | Mr M E Braithwaite, 19 Buccleuch Street, Hawick, Roxburghshire TD9 0HL |
| VC82 East Lothian:- | Miss E H Jackson, 41f Promenade, Musselburgh, Midlothian EH21 6JU |
| VC83 Midlothian:- | Mr D McKean, Royal Botanic Gardens, Edinburgh EH3 5LR |
| VC84 West Lothian:- | Miss J Muscott, 69 Warrender Park Road, Edinburgh EH9 1ES |
| VC85 Fife & Kinross:- | Mr G H. Ballantyne, 'Branksome', 193 Nicol Street, Kirkcaldy, Fife KY1 1PF |
| VC86 Stirlingshire:- | Mrs E.W. Stewart, 33 Woodlands Street, Milngavie, Glasgow G62 8NS |
| VC87 West Perthshire:- | Mr N W Taylor, Glenfender Cottage, by Amulree, Dunkeld, Perthshire PH8 0BY |
| VC88 Mid Perthshire:- | Dr R E Thomas, Orchil House, Braco, Dunblane, Perthshire FK15 9LF |
| VC89 East Perthshire:- | Dr R A H Smith, Holburn, Dalcrue Road, Pitcairngreen, Perthshire PH1 3LU |
| VC90 Angus:- | Mrs B G Hogarth, 14 Greystane Road, Invergowrie, Dundee DD2 5JQ |
| VC91 Kincardineshire | Dr D Welch, East Fernbank, Woodside Road, Banchory, & VC93 North Aberdeen:- Kincardineshire, AB3 3XL |

- VC92 South Aberdeen:- Mrs K M Fallowfield, Ben A'an, Kindrochit Drive, Braemar, Aberdeenshire AB35 5YT
- VC94 Banffshire:- Mr J.R. Edelsten, 12 Durn Avenue, Portsoy, Banff AB4 2QJ
- VC96 Easterness & Nairn:-Mrs M Barron, The Granary, Ness Side, Dores Road, Inverness IV1 2DH
- VC97 Westerness:- Mr I Strachan, Seilach, Inverroy, Roy Bridge, Inverness-shire PH31 4AQ
- VC98 Main Argyll:- Mr B.H., Thompson, Glenlussa, Ford, Lochgilphead, Argyll PA31 8RM
- VC99 Dunbartonshire:- Miss A Rutherford, Moniaive, 19 South King Street, Helensburgh, Dunbartonshire G84 7PU
- VC100 Clyde Islands:- Mr A Church, Youth Hostel, Lochranza, Isle of Arran KA27 8HL
- VC101 Kintyre:- Mr & Mrs B D Batty, Kirnau Farm, Kilmichael Glen, Lochgilphead, Argyll PA31 8QL
- VC102 South Ebudes:- Dr R L Gulliver, Carraig Mhor, Imeravale, Port Ellen, Islay PA42 7AL
- VC103 Mid Ebudes:- Miss L. Farrell, c/o SNH, Kilmory Estate, Lochgilphead, Argyll PA31 8RQ
- VC104 North Ebudes:- Mrs C W Murray, Prabost, Skeabost Bridge, Portree, Isle of Skye IV51 9PF
- VC105 Wester Ross:- Prof D M Henderson, Larachan, 54 Lonemore, Gairloch, Ross IV21 2BD
- VC106 Easter Ross:- Mr P C H Wortham, 2 Croyard Drive, Beauly, Inverness-shire IV4 7EE
- VC107 East Sutherland:- Mrs M E Murray, Morven, Davoch, Rogart, Sutherland IV28 3XD
- VC108 West Sutherland:- Mrs P A Evans, Calltuinn, Nedd Drumbeg, Lairg, Sutherland IV27 4NN
- VC109 Caithness:- Mr N Butler, Seaside Cottage, Thurso East, Caithness KW14 8HN
- VC110 Outer Hebrides:- Dr R.J. Pankhurst, 23 Royal Crescent, Edinburgh EH3 6QA
- VC111 Orkney:- Miss E R Bullard, Toftwood, Kirkwall, Orkney KW15 1SB
- VC112 Shetland:- Mr W Scott, New Easterhoull, Castle Street, Scalloway, Shetland ZE1 0TP

National Secretary:- Mr. R G Ellis, Hon. Gen. Secretary

Address:- 41 Marlborough Road, Roath, Cardiff, CF2 5BH

Tel/Fax:- 01222 496042

Email:- bsbihgs@aol.com

National Co-ordinator:- Sarah Wild and Alex Lockton

Address:- 66 North Street, Shrewsbury, Shropshire SY1 23L

Tel:- 01743 343789 Email:- s.j.whild@bham.ac.uk

The society was started in 1836 and the recording scheme has been in operation since 1954.

Method:- Recording cards are available from BRC. Join the BSBI to become involved at £18 p.a. for an ordinary member. Other subscriptions are available for families, concessions and overseas members.

Coverage:- Extensive. It includes all vascular plants (flowering plants, ferns, horsetails, clubmosses and quillworts) and stoneworts.

Data:- The Society holds many records (at the last count about 12 million), mostly through a system of vice-county recorders (see list above). Only 43% are processed in electronic format. The BSBI Database at Leicester University maintains up-to-date information on nomenclature, taxonomy and published references to the British vascular flora. Enquiries should be directed to Professor Clive Stace ([HYPERLINK mailto:cas7@leicester.ac.uk](mailto:cas7@leicester.ac.uk) or cas7@leicester.ac.uk).

Activities:- A project to re-survey all Britain for an new Atlas 2000 has been under way since 1987.

Publications:- Perring, F & Walters, M (1962) *The Atlas of the British Flora*, BSBI. A British newsletter is published three times a year, and a year book containing details of the field meeting programme, conferences, and addresses of officers and members is produced in January. There

are also local newsletters in many areas, including one for Scotland. The main academic publication is the journal *Watsonia*, published in several volumes annually. A publications list is available from BSBI Books, Green Acre, Wood Lane, Oundle, Peterborough, PE8 5TP.

The BSBI Handbooks series include:

<i>Sedges of the British Isles</i>	£12
<i>Umbellifers of the British Isles</i>	£10
<i>Willows and Poplars of Great Britain and Ireland</i>	£12
<i>Charophytes of Great Britain and Ireland</i>	£9
<i>Crucifers of Great Britain and Ireland</i>	£13
<i>Roses of Great Britain and Ireland</i>	£12
<i>Pondweeds of Great Britain and Ireland</i>	£17.50
<i>Dandelions of Great Britain and Ireland</i>	£17.50

Ease of identification:- Many species are identifiable with the aid of good reference books and there is plenty of scope for everyone to get involved.

There are many recommended identification guides :- The standard reference work essential for all serious botanists

- Stace, C A (1997), *New Flora of the British Isles*, (2nd edition.), Cambridge University Press, ISBN 0-521-58935-5.



Name of scheme:- **Atlas 2000**

Website:- <http://members.aol.com/bsbihgs>

Number of species:- 4129, i.e. all those in Stace (1997) - (see below)

Scottish Organiser :- Dr Chris Sydes

Address:- SNH, 2 Anderson Place, Edinburgh EH6 5NP

Tel:- 0131 447 4784 Fax:- 0131 446 2405 Email:- ibb@rasdsn.demon.co.uk (Chris)

National Organiser :- Trevor Dines

Address:- Rhyd y Fwch, Bethel, Caernarfon, Gwynedd, LL55 3PS

Tel:- 01248 670789 Email:- TrevorDines@compuserve.com

Scheme has been in operation since January 1996

Method:- Standard recording cards are available from BRC. For remote upland areas 1970+ records will be accepted as most up-to-date.

Coverage:- Generally very good, including Scotland. Particular areas which are under recorded are VC106 (E Ross), VC107 (E Sutherland), VC97 (Westernness), VC102 (S Ebudes).

Data:- 3,500,000 records are held in electronic format at the BRC database, Monks Wood.

Activities:- Courses leading to NVQ³ National Vegetation Identification Qualifications are run by University of Birmingham. Courses are also run at Kindrogan Field Studies Centre in Perthshire.

Publications:- A 2 volume coloured atlas planned, giving maps and captions of taxa in the project. Price as yet unknown. Previous atlas is Perring, F & Walters, M (1962), *The Atlas of the British flora*, three reprints, latest in 1990, BSBI. *BSBI News* is published three times a year which includes Atlas 2000 reports. This comes with membership of the BSBI (see the entry above).

Ease of identification:- The scheme has produced a series of booklets outlining the project and a *Beginners Guide to Recording*, available from BSBI.

Recommended guides to ID:-

- Stace, C A (1997), *New Flora of the British Isles*, (2nd edition), Cambridge University Press, ISBN 0-521-58935-5.
- Rich, T & Jermy (eds.) (1998), *Plant Crib*, BSBI, ISBN 0-90115828-3.
- BSBI handbooks on sedges, roses, pondweeds, willows, etc. (see BSBI entry).



Section 5.

LOCAL BIODIVERSITY ACTION PLAN (LBAP) PROJECTS IN SCOTLAND

'If a strategy for biodiversity is to be fully effective, it must be shared and owned by everyone in Scotland. We all have a part to play whether it is in our daily work perhaps as managers of land or other resources, as consumers sensitive to environmental issues when exercising our choice, or even in our leisure time where pursuits as diverse as gardening or walking can all affect biodiversity'

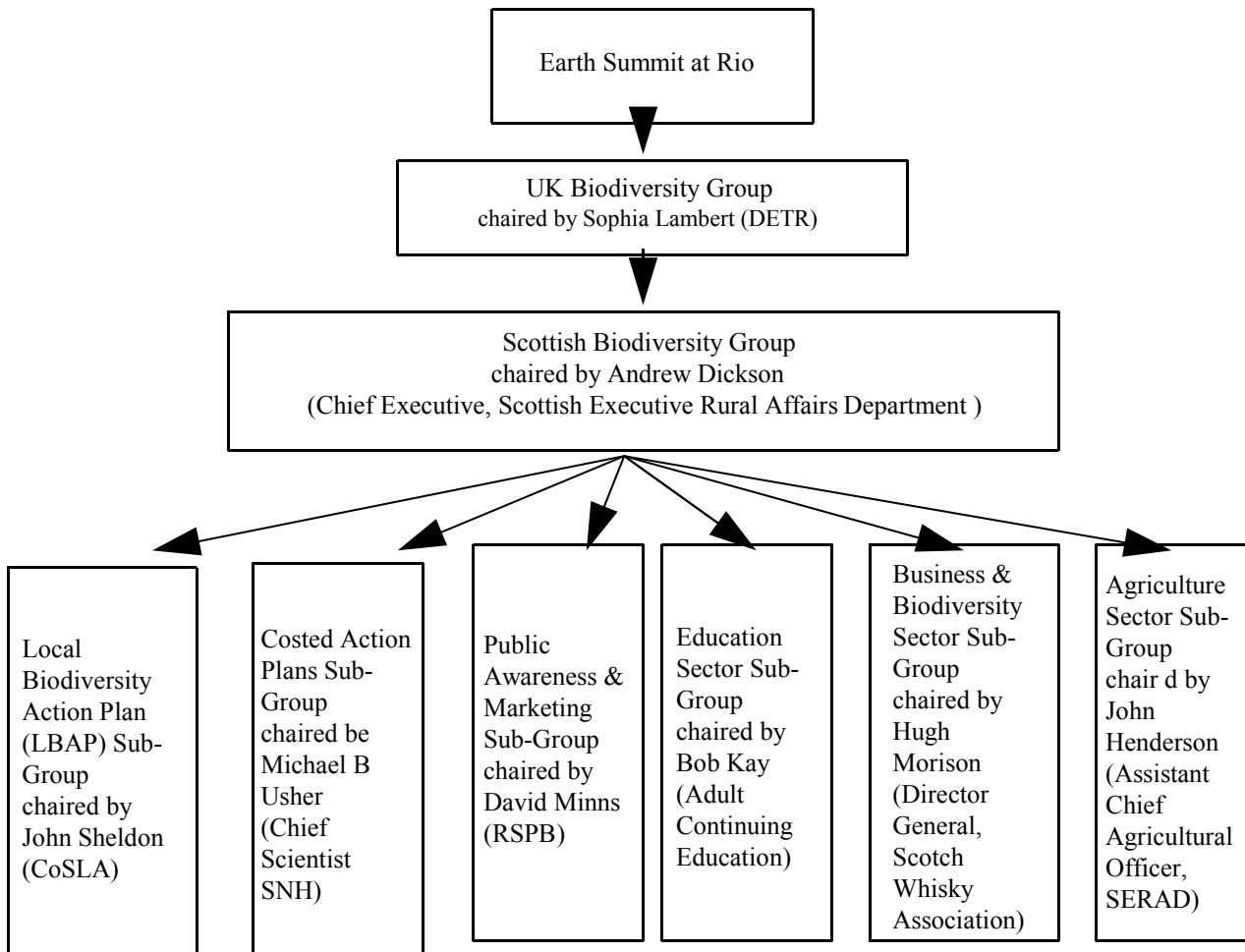
Lord Sewel (Biodiversity in Scotland: the Way Forward)¹

Scottish Biodiversity Group

A Scottish Biodiversity Group was formed in 1996 and is chaired by the Scottish Executive (what was the Scottish Office up till Devolution). What originally started out as three sub-groups have now expanded into six, namely Local Biodiversity Action Plan Sub-Group, Public Awareness & Marketing Sub-Group, Costed Action Plan Sub-Group, Education Sector Sub-Group, Business & Biodiversity Sector Group and the Agriculture Sector Group. For more detail and any future changes see the **Scottish Executive website** at <http://www.scotland.gov.uk>



Fig. 6 The Scottish Biodiversity Group



¹ Anon. (1997), *Biodiversity in Scotland, The Way Forward*, The Stationery Office on behalf of Scottish Biodiversity Group ISBN 0 7480 6600 4

Aims of the LBAP Sub-group include²:

- helping to form local partnerships as a focus for expressing local priorities and concerns
- identifying and sharing good practice
- bringing national expertise to bear on local problems
- reflecting local priorities back into national policy planning processes
- encouraging people to take action for the biodiversity in their own local area
- ensuring that national targets for species and habitats are taken into account at a local level

Since 1996, the LBAP sub-group has worked with four pilot areas in Orkney, North-east Scotland, Argyll & Bute, and South Lanarkshire to develop appropriate and effective local action plans. A Local BAP Manual was subsequently produced in 1997, updated and reissued in January 1999³, and a Toolkit⁴, which makes the case for the importance of biodiversity, and contains useful material to help promote biodiversity generally. All publications are available from the

Scottish Biodiversity Group Secretariat,
Scottish Executive Rural Affairs Department (SERAD),
Area 1-H/J Victoria Quay,
Edinburgh EH6 6QQ.

Scottish LBAP Initiatives (as by July 1999)

This section gives a brief statement of the current position in each active LBAP area and relevant contact points, listed in alphabetical order. It also gives details of all the species and habitats currently selected as LBAP species by the growing number of LBAP groups across Scotland. Each LBAP group chooses species to suit its own local interests and circumstances. There will obviously be change in time as more species/habitats are brought into the scheme. Future updates will be communicated through BRISC publications and, increasingly, on the web. Scottish Natural Heritage is being asked to take on this monitoring role. The Joint Nature Conservation Committee (JNCC) already have an LBAP section on their website:- <http://www.jncc.gov.org.uk>

Biodiversity News published quarterly by the Department of the Environment, Transport and the Regions (DETR) is also a good source of information. It is free from the

UK Biodiversity Secretariat,
Room 902D,
Tollgate House,
Bristol BS2 9DJ,
Telephone orders 0171 873 9090 or Fax orders 01671 873 8200

Each species and habitat chosen for an LBAP will require the development of effective recording and monitoring processes to ensure successful monitoring of conservation activity. It is hoped that publication of this list will encourage communication between LBAP areas so that good practice in recording can be exchanged. Contact names and phone numbers which were available at the time of going to press have been included with each LBAP account.

The information here is based periodic reports produced by the biodiversity project officer. It should, however, be kept in mind that things are likely to change rapidly and further up-to-date information should be sought direct from the project officer:

Vicky Abernethy,
Biodiversity Project Officer,
c/o RSPB, Dunedin House,
25 Ravelston Terrace,
Edinburgh. EH4 3TP
Tel:- 0131 311 6500,
Fax:- 031 311 6569.

² Anon. (1997), *Biodiversity in Scotland, The Way Forward*, Scottish Biodiversity Group, p12

³ Anon. (1997, updated 1999), *Local Biodiversity Action Plans: a Manual & Guidance Notes*, Scottish Biodiversity Group, Scottish Office/ CoSLA

⁴ Anon. (1997), *Biodiversity for All: a Toolkit* (on diskette), Scottish Biodiversity Group

Argyll and Bute Biodiversity Partnership

Sandy Taylor. Argyll & Bute Council. Tel:- 01546 604132

- Steering group set up following workshop in September 1998.
- Four subgroups established to progress - Marine, Freshwater, Land-use, Public awareness.
- Biodiversity statement summarising species/ habitat priorities planned for Spring 1999.

Ayrshire

Ken Gibb. South Ayrshire Council. Tel:- 01292 616288

- Subgroups formed for Upland, Blanket bog, Farmland, grassland, Urban, Wetland, Woodland, Audit, Publicity.
- Audit group working with Ayrshire BRC on GIS system for habitat/species information.
- Lists of priorities expected May 1999.
- Draft action plans scheduled for September 1999.

Borders

Kathleen Fraser. Borders Council. Tel:- 01835 824000

- Steering group first met in December 1998
- Habitat subgroups established to audit habitat resource and plan action.
- The Local Biological Records Centre and LBAP project officer are collaborating on Species Audit.
- LBAP process is integrated with LA21 programme.

Cairngorms

Peter Cosgrove. Cairngorms Partnership. Tel:- 01479 873535

- Audit published; plus summaries of meetings held Summer 1999.
- Biodiversity Officer post established.

Clackmannanshire

Neil Deasley. Clackmannanshire Council. Tel:- 01259 452193

- Audit being commissioned for area.
- Steering group expected to focus on habitats and landuse topics to integrate with development plan process.

Dumfries and Galloway

Alison Barnes. Dumfries & Galloway Council. Tel:- 01387 260000

- Action Plan (Habitats) published, consultation stage completed. 20 habitats included.
- Farmland Action Plan distributed to 200 farms through FWAG, NFUS and SAC.
- Other Habitat Action Plans now being developed into work plans
- Species plans (for 23 species) completed

East Dunbartonshire

Chris Wood-Gee, Kelvin Valley Countryside Project. Tel:- 0141 771 4399

- First Steering Group meeting held

East Lothian

Maree Johnstone East Lothian Council. Tel:- 01620 827427

- Core group is proceeding with Audit

Edinburgh City

David Jamieson. City of Edinburgh Council. Tel:- 0131 200 2000

- 115 species and habitats selected; 60 have plans drafted, 6 are finalised and some are being implemented.

Falkirk

David Gorman. Falkirk Council. Tel:- 01324 504712

- Steering Group formed

Fife

Catherine Lloyd Tel:- 01738 850566

- First Action plan published autumn 1997
- Group has new project officer.
- Plans for working groups on habitats
- Work in progress on 20 species plans
- River systems likely to be first habitat for action implementation.

Glasgow

Jim Coyle. Glasgow City Council. Tel:- 0141 287 5782

- LBAP consultation paper published
- 3 species and 2 habitats selected and lead partners identified.

Highlands

Andy Dorin. Highland Council. Tel:- 01463702831

- Exploratory meeting held November 1998.
- Given the problems of size of area group are considering approach; maybe a single "whole area" audit and a pilot area for initial action plan.

Mid Lothian

Jennie Fausset. Mid Lothian Council. Tel:- 0131 2713473

- Steering group first meeting in Feb. 1999.
- Biological Records Centre assisting in audit process.

North Lanarkshire

Brian Thompson. North Lanarkshire Council. Tel:- 01236 780636

- Audit underway, preliminary publication expected in April 1999.
- three habitats selected- Lowland Bogs, Rivers and Streams, Native woodlands
- Species selected; Lowland waders, Bean Goose.

North-east Scotland (Aberdeen City, Aberdeenshire & Moray)

Debbie Burroughs. Aberdeenshire Council. Tel:- 01224 664717

- First tranche of action plans out for consultation in autumn 1998.
- Project established to evaluate the Audit and suggest priorities for the group.
- Project established to draw up workplan for first ten plans.
- Subgroup working on a "generic" urban action plan
- North-east Scotland LBAP document available from Stuart McPherson, Aberdeen City Council Planning Dept.
- Project officer recruited autumn 1999.

Orkney

Rachel Bain. Orkney Islands Council. Tel:- 01856 875977

- Project Officer post established November 1999.
- LBAP plans will be produced for each island or parish.
- First one has been produced for Sanday

Renfrewshire, East Renfrewshire, Inverclyde.

Jennifer Gough. Renfrewshire Council. Tel:- 0141 842 5270

- Joint plan
- Biodiversity Audit (for Renfrewshire) being co-ordinated by Renfrewshire Biological Information Centre.

Shetland

Austin Taylor. Shetland Islands Council

- Steering group established.

- Biodiversity Audit in progress.

South Lanarkshire

Kenny Boag. South Lanarkshire Council. Tel:- 01698 454726

- Audit draft out for consultation; planned publication in Spring 1999
- Lanarkshire Biological recording service being relaunched.
- Feasibility study carried out Jan./Feb. 1999.
- Lowland waders, Water vole, Native woodlands, Raised bogs and mires selected for BAPs.
- Wildlife and Biodiversity leaflet being distributed.

Stirling

Tim Edwards. Stirling Council. tel. 01786 442750

- First steering group meeting held in October 1999
- Biodiversity audit underway, facilitated by 3 year appointment of project officer to CARSE LBRC.

Tayside (Perth, Kinross, Angus, Dundee)

John Milne. Perth & Kinross Council. tel. 01738 476400

- Tayside Biodiversity Audit due March 1999.
- Landfill tax application to fund 3 year post and fund various monitoring projects.
- Approved as NBN phase 2 pilot area (existing BRCs linking to NBN).
- Development Plan underway for LBRC.
- next stage is to identify priorities based on Audit.

West Lothian

John Sheldon. West Lothian Council. 01506 775222

- First LBAP published in autumn 1997
- First scheme was "Birds, Banks, Boundaries 98" encouraging farmers to apply for grants to improve habitat- hedges, trees, stream-side management. Good response.
- Next scheme will focus on a Rivers and Stream HAP which is being drafted by SEPA.
- Public awareness group is focusing on gardens and smallholdings

Fig. 7 on the following two pages shows the priority species and habitats selected for the different LBAPs

Summary of Local Biodiversity Action Plan progress in Scotland

03/02/2015

AREA	Steering group	Audit	Public consultation on priorities	Seminar	Designated Project Officer	Species Action Plans	Habitat Action Plans	Other Action Plans	Lead partners identified	Implementati on projects underway	Annual review of plan	Objectives achieved	Contact
ARGYLL & BUTE	Yes	Yes		Sep-97									Sandy Taylor A&BC 01546 604132
AYRSHIRE (N, S & E Ayrshire)	Yes	Draft		Jun-98									Ken Gibb, SAC, 01292 616288
BORDERS	Yes	in progress			part time								Kathleen Fraser, BC, 01835 824000
CAIRNGORMS	Yes	Yes	Yes		full time					Yes			Peter Cosgrove, CP 01479 873535
CLACKMANNANSHIRE	Yes	in progress											Neil Deasley, CC, 01259 452193
DUMFRIES & GALLOWAY	Yes	Yes	Yes		part time		21 draft published			Yes			Alison Barnes D&GC 01387 260000
<i>DUNBARTONSHIRE</i>													
EAST DUNBARTONSHIRE	Yes												Chris Wood-Gee KVCP, 0141 771 4399
EAST LOTHIAN	Yes	in progress											Maree Johnstone, ELC, 01620 827427
EDINBURGH	Yes	in progress			part time	23 draft	8 draft		Yes	Yes			David Jamieson CEC 0131 200 2000
FALKIRK	Yes												Dave Gorman, FC, 01324 504712
FIFE	Yes	Yes			part time	3 draft	7 published outlines						Catherine Lloyd 01738 850566
GLASGOW	Yes	Draft	Yes	Mar-99						Yes			Jim Coyle GCC 0141 287 5782
<i>HIGHLAND</i>													Andy Dorin, HC, 01463 702831
MID LOTHIAN	Yes												Jennie Fausset MLC 0131 271 3473
NORTH LANARKSHIRE	Yes	in progress											Brian Thompson, NLC 01236 780636
NORTH-EAST SCOTLAND (Aberdeen City, Aberdeenshire, Moray)	Yes	Yes		Feb-97		3 draft	2 draft	2 urban 3 area	Yes				Debbie Burroughs AC 01224 664717 Geoffrey Tudor ACC 01224 522248 Gary Templeton MC 01343 543451
ORKNEY	Yes	Draft	Yes		part time	4 draft	3 draft	1 area					Rachel Bain OIC 01856 875977
RENFREWSHIRE, EAST RENFREWSHIRE, (INVERCLYDE)	Yes	in progress											Jennifer Gough RC 0141 842 5270
SHETLAND	Yes	in progress											Austin Taylor, SIC
SOUTH LANARKSHIRE	Yes	Draft		May-97		2 draft	2 draft		Yes	Yes			Malcolm Muir, SLC 01698 455715
STIRLING	Yes	in progress											Tim Edwards, SC, 01786 442750
TAYSIDE (Perth and Kinross, Angus, Dundee City)	Yes	Yes											John Milne, P&K 01738 476400 Stuart Roberts AC 01307 461460 Alison Anderson DC 01382 434000
<i>WESTERN ISLES</i>													
WEST LOTHIAN	Yes	Yes	Yes	Dec-97			9 outline 1 draft plan		Yes	Yes			John Sheldon WLC 01506 775278

contact Vicky Abernethy, LBAP Project Officer, RSPB, Dunedin House, 25 Ravelston Terrace, Edinburgh, EH4 3TP

Summary of local species and habitat action plans in development

		UK action plan	Action Plans	Argyll & Bute	Ayrshire	Borders	Clackmannanshire	Cairngorms	Dumfries & Galloway	Edinburgh	Fife	Glasgow	N. Lanarkshire	N.E Scotland	Orkney	S. Lanarkshire	West Lothian
Key	p = published d = draft p* = published outline s = selected for plan writing																
^ = contains additional habitat or species types to the UK BAP																	
HABITATS	Key	*	Cereal field margins & boundary habitats			s	s							d			
		*	Coastal floodplain and grazing marsh						d				d				
			Estuaries						d								
			Lowland woodpasture and parkland			s			d								
			Maritime cliff and slope			s			d								
			Merse (saltmarsh)				s		d								
			Mesotrophic lochs						d								
		*	Native Pine Woodlands					s									
		*	Purple Moorgrass and Rush pasture						d								
		*	Raised Bogs (^and mires)			s^	s^		d	d^			d^	d		d	
			Sand Dunes and shingle beaches			s			d								
		*	Seagrass beds						d								
	Broad		Acid Grassland			s	s		d								
			Canals							s							
			Fens, carr, marsh, swamp and reedbeds			s	s		d			s					
			Inlets and enclosed bays			s			d								
			Montane			s	s	s	d								
			Native woodlands			s			d				s		d		
			Planted coniferous woodland				s		d								
			Rivers and streams				s		d	d			d				d
			Shingle						d								
			Unimproved/semi-improved grassland			s	s										
			unimproved neutral grassland				s										
			Improved grassland				s										
			Calcareous grassland			s	s										
			Lowland heath				s										
			Upland heath				s										
			Urban			s	s		d	d	s						
	Other		Coastal and marine								s						d
			Farmland						d	d	s						d
			Flatfish nursery and herring spawning grounds												d		
			Forestry							s							
			Gardens												d		d
			Grassland						s		s						d
			Heather moorland			s				s	s						d
			Intertidal (^and marine)						d	d^							
			Boulders and rocks above high tide			s											
			Open coast			s											
			Open sea water column			s											
			Offshore sea bed			s											
			Lochs, ponds, rivers and burns			s					s						
			Oil shale bings														d
			Peatlands														d
			Rockfaces							s							
			Still water bodies			s	s			s							
			Wet grassland					s									
			Wetlands (^and rivers)								s						d^
			Wildlife corridors							d							d
			Woodland							d	s	s				d	d
			Broadleaved woodland				s										
			Wood and scrub pasture			s				d	s						
AREA			Moray Coast														d
			Moray Moorlands														d

Summary of local species and habitat action plans in development

		UK action plan	Action Plans	Argyll & Bute	Ayrshire	Borders	Clackmannanshire	Cairngorms	Dumfries & Galloway	Edinburgh	Fife	Glasgow	N. Lanarkshire	N.E Scotland	Orkney	S. Lanarkshire	West Lothian
Key			p = published d = draft p* = published outline s = selected for plan writing														
COMMUNITY			Quarrywood											d			
			Kincorth Hill											d			
			Powys/Bedford											d			
SPECIES	priority		Aspen Hoverfly											d			
			Black grouse					s	d	s							
		*	Corn bunting					s									
		*	Corncrake												d		
		*	Freshwater pearl mussel							s				s			
		*	Great crested newt					s	d				s				
		*	Natterjack toad					s									
		*	Nightjar					s									
			Northern brown argus					s									
		*	Otter					s	d				d				
		*	Pearl bordered fritillary					s	d				s	s			
		*	Pillwort					s	d	s							
		*	Pipistrelle Bat						d	s							
		*	Red Squirrel					s		s				s			
		*	Reed bunting						s		s						
		*	Scottish crossbill											s			
		*	Slender green feather moss (<i>Drepanocladus vernicosus</i>)					s									
		*	Twin flower											s			
		*	Vendace						s								
			Water beetle (<i>Bidessus minutissimus</i>)						s								
		*	Water vole						s	d		s	d				d
	conservation concern			Alpine Sow Thistle													
			Barn Owl						d								
			Barnacle goose					s									
			Chough					s									
			Daubentons Bat						d	s			d				
			Golden eagle					s									
			Lapwing						d								
			Lowland waders									d			d		
			Redshank											d			
			Ring ouzel					s									
			River lamprey						d								
			Sand martin						d								
			Small pearl bordered fritillary						d		s						
			Sticky catchfly					s	d	s							
			Twite					s									
other			Aspen												d		
			Azure hawk dragonfly					s									
			Bats						d			s					
			Bluebell						d			s					
			Sieve-toothed moss (<i>Coscinodon cribrosus</i>)						d								
			Forester moth					s									
			Heath snail (<i>Helicella itala</i>)							s							
			Hieroglyphic ladybird						d								
			Holy grass					s									
			Large red damselfly						d								
			Perennial flax					s									

Summary of local species and habitat action plans in development

	UK action plan		Argyll & Bute	Ayrshire	Borders	Clackmannanshire	Cairngorms	Dumfries & Galloway	Edinburgh	Fife	Glasgow	N. Lanarkshire	N.E Scotland	Orkney	S. Lanarkshire	West Lothian
Key	p = published d = draft p* = published outline s = selected for plan writing															
		Channelled crystalwort (<i>Riccia canaliculata</i>)							d							
		Rock Whitebeam							d							
		Megalanic bog moss (<i>Sphagnum magellanicum</i>)							d							
		Swift							d							
		Terns							s							
		Tree snail (<i>Balea perversa</i>)								s						
		Trout (^sea trout and salmon)										s^		d		
		Wych Elm											d			

NFU and FWAG contacts on Local Biodiversity Action Plans

AREA	Council contact	NFU contact	FWAG contact
ARGYLL & BUTE	Craig Stevenson A&BC 01436 658905	Catriona Bell, Tiree	Helen Bibby
AYRSHIRE	Dave Wilson, SWT 01555 666868	Mr H Murdoch/Christine McNab	Phil Davies
CAIRNGORMS	Janet Adamson, CP 01479 873535	Stuart Black	
DUMFRIES & GALLOWAY	Alison Barnes D&GC 01387 260000	Jim Milby	Sue Agnew
EAST LOTHIAN	David Evans, ELC, 01620 827365		
EDINBURGH	David Jamieson CEC 0131 200 2000	Robert Allan	Tony Seymour
FIFE	Allan Brown FC 01592 416498	James Wilson, Fife and Kinross	Sarah Warrener
GLASGOW	Jim Coyle GCC 0141 287 5782		
NORTH LANARKSHIRE	Brian Thompson, NLC 01236 780636	Willie Leiper	Willie Leiper
NORTH-EAST SCOTLAND	Linda Mathieson AC 01224 664717, Geoffrey Tudor ACC 01224 522248, Gary Templeton MC 01343 543451		Nicky Penfold
ORKNEY	Piers Blaxter OIC 01856 873535	Victor Muir	
PERTH & KINROSS/ANGUS	John Milne, P&K 01738 476400 Stuart Roberts AC 01307 461460	Brian Henderson	Christine Hall
SOUTH LANARKSHIRE	Kenny Boag, SLC 01698 454726	Willie Leiper	
WEST LOTHIAN	John Sheldon, WLC, 01506 775222	Robert Warnock	

APPENDICES

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133-146	Appendix A	priority species and species action plans (SAPs)
147-148	Appendix B	priority habitats, and habitat action plans (UK HAPs)
149-153	Appendix C	useful addresses (National societies, national organisations, SWT survey teams, Scottish Ranger Services, specialist bookshops, software suppliers.
154-157	Appendix D	useful additions to the library shelf
158-161	Appendix E	bibliography relating to biological recording
162	Appendix F	legislative framework for information handling
163-165	Appendix G	how to give a grid reference & Watsonian Vice Counties

APPENDIX A

Priority species occurring in Scotland

The species on in the table below which will all have individual species action plans (SAPs) prepared, i.e. all species occurring in Scotland which are listed on the 'short' & 'middle' list from *Biodiversity: the UK Steering Group Report* Vol 2 combined:

* = 'short' list

** = 'middle' list

MAMMALS

Balaena glacialis northern -black right whale
 ***Balaenoptera acutorostrata* - minke whale
Balaenoptera borealis - sei whale
Balaenoptera musculus (Sibbaldus musculus)- blue whale
Balaenoptera physalus - fin whale
Grampus griseus - Risso's dolphin
 ***Hyperoodon ampullatus* - northern bottlenosed whale
Megaptera novaeangliae - humpback whale
Mesoplodon europaeus - Gervais' beaked whale
Mesoplodon mirus - True's beaked whale
Monodon monoceros - narwhal
Orcinus orca - killer whale
Physeter catodon (*P. macrocephalus*) - sperm whale
Stenella coeruleoalba - striped dolphin
Tursiops truncatus - bottlenose dolphin
 (Three grouped cetacean plans: toothed whales, baleen whales, and dolphins)

**Arvicola terrestris* - water vole
 **Lepus europaeus* - brown hare
 **Lutra lutra* - European otter
 **Phocoena phocoena* - harbour porpoise
 **Pipistrellus pipistrellus* - pipistrelle bat
 **Sciurus vulgaris* - red squirrel

BIRDS

***Caprimulgus europaeus* - nightjar
 ***Carduelis cannabina* - linnet
 ***Emberiza schoeniclus* - reed bunting
 ***Jynx torquilla* - wryneck
 ***Melanitta nigra* - common scoter
 ***Miliaria calandra* - corn bunting
 ***Muscicapa striata* - spotted flycatcher
 ***Passer montanus* - tree sparrow
 ***Phalaropus lobatus* - red-necked phalarope
 ***Pyrhula pyrrhula* - bullfinch
 ***Sterna dougallii* - roseate tern
 ***Streptopelia turtur* - turtle dove
 ***Tetrao tetrix* - black grouse
 **Alauda arvensis* - skylark
 **Crex crex* - corncrake
 **Loxia scotica* - Scottish crossbill
 **Perdix perdix* - grey partridge
 **Tetrao urogallus* - capercaillie
 **Turdus philomelos* - song thrush

AMPHIBIANS

**Bufo calamita* natterjack toad
 **Triturus cristatus* great crested newt

REPTILES

Caretta caretta- loggerhead turtle
Chelonia mydas - green turtle
 ***Dermochelys coriacea* - leatherback turtle
Lepidochelys kempii - Kemp's ridley turtle
 **Lacerta agilis* - sand lizard

FISH

Acipenser sturio - sturgeon
 ***Cetorhinus maximus* - basking shark
 **Alosa alosa* - allis shad
 **Alosa fallax* - twaite shad
Coregonus albula - vendace
 ANNELIDS
 **Hirudo medicinalis* - medicinal leech
 ANTS
 ***Formica aquilonia* - a wood ant
Formica lugubris - a wood ant
 **Formica exsecta* - narrow-headed wood ant
 BEES
 ***Bombus distinguendus* - great yellow bumble bee
 ***Colletes floralis* - northern colletes
 ***Osmia inermis* - a mason bee
 ***Osmia uncinata* - a mason bee
 ***Osmia parietina* - a mason bee

WASPS

***Chrysura hirsuta* - a ruby-tailed wasp

BETTERLES

Apion ryei
Bembidion testaceum - a ground beetle
Bidessus minutissimus - a water beetle
Ceutorhynchus insularis - a weevil
 ***Cicindela hybrida* - a tiger beetle
 ***Cryptocephalus primarius* - a leaf beetle
Cryptocephalus decemmaculatus - leaf beetle
 ***Cryptocephalus sexpunctatus* - leaf beetle
 ***Donacia aquatica* - a reed beetle
Dromius quadrisignatus - a ground beetle
 ***Dyschirius angustus* - a ground beetle
 ***Hydroporus rufifrons* - a water beetle
 ***Melanapion minimum* - a weevil2

Meotica anglica

Perileptus areolatus - a ground beetle
 ***Procas granulicollis* - a weevil
 ***Rhynchaenus testaceus* - a jumping weevil2
Thinobius newberyi - a rove beetle

BUTTERFLIES

***Aricia artaxerxes* - northern brown argus
 ***Carterocephalus palaemon* - chequered skipper
 **Boloria euphrosyne* - pearl bordered fritillary butterfly
 **Eurodryas aurinia* - marsh fritillary butterfly

CRUSTACEANS

***Triops cancriformis* - tadpole shrimp2
 **Austropotamobius pallipes* - freshwater crayfish

FLIES

***Blera fallax* - a hoverfly
 ***Hammerschmidtia ferruginea* - a hoverfly
 ***Lipsothrix nervosa* - a crane fly
 ***Lipsothrix ecucullata* - a crane fly
 ***Lipsothrix errans* - a crane fly
 ***Rhabdomastix hilaris* - a crane fly
Thereva lunulata - a stiletto fly

***Tipula serrulifera* - a cranefly

MAYFLY

Heptagenia longicauda - a mayfly

MOLLUSCS

***Atrina fragilis* - fan mussel

***Modiolus modiolus* - horse mussel

***Ostrea edulis* - native oyster

***Thyasira gouldi* - northern hatchet-shell

**Margaritifera margaritifera* - freshwater pearl mussel

**Vertigo angustior* - narrow-mouth whorl snail

**Vertigo genesii* - round-mouth whorl snail

**Vertigo geyeri* - Geyer's whorl snail

MOTHS

***Epione parallelaria* - dark bordered beauty

***Hemaris tityus* - narrow-bordered bee hawk

Noctua orbona - lunar yellow underwing

***Paradiarsia sobrina* - cousin german

Rheumaptera hasta - argent and sable

***Semiothisa carbonaria* - netted mountain

Trichopteryx polycommata - barred toothed stripe

***Xestia rhomboidea* - square-spotted clay

Xylena exsoleta - sword grass

***Zygaena viciae argyllensis* - New Forest burnet moth

***Zygaena loti ssp scotica* - slender Scotch burnet

SEA ANEMONE GROUP

***Amphianthus dohrnii* - sea fan anemone

***Funiculina quadrangularis* - tall sea pen

SEA SLUG

***Tenellia adpersa* - lagoonal sea slug

SPIDERS

***Clubiona subsultans* - spider

STONEFLY

Brachyptera putata - a stonefly

SEA SQUIRT/SEA FIR

***Styela gelatinosa* - a sea squirt

FUNGI

Boletopsis leucomelaena - a bracket fungus

***Hygrocybe spadicea* - waxcap

***Hygrocybe calyptraeformis* - waxcap

***Threatened Hydnelloid* - fungi (15 species)³

***Hypocreopsis rhododendri* - an ascomycete

***Microglossum olivaceum* - an ascomycete

**Tulostoma niveum*

LICHENS

***Alectoria ochroleuca* - a lichen

***Arthothelium dictyosporum* - a lichen

***Arthothelium macounii* (reagens) - a lichen

***Bacidia incompta* - a lichen

***Bellemeria alpina*

***Caloplaca nivalis*¹

***Catapyrenium psoromoides* - tree catapyrenium

Catillaria aphan (*Lecidea aphan*) - a lichen

***Cladonia botrytes* - a lichen¹

***Cladonia peziziformis* a lichen

Gyalideopsis scotica - a lichen

Halecania rhypodiza - a lichen

Hypogymnia intestiniformis - a lichen

***Opegrapha fumosa* - a lichen

Opegrapha paraxanthoides - a lichen

***Peltigera lepidophora* - ear-lobed dog-lichen

***Pertusaria bryontha* - alpine moss pertusaria¹

***Thelenella modesta* - a lichen

**Caloplaca luteoalba*

**Collema dichotomum*

**Gyalecta ulmi*

**Pseudocyphellaria norvegica*

**Schistmatoma graphidiodes*

LIVERWORTS

***Acrobolbus wilsonii* - a liverwort

***Adelanthus lindenbergianus* - Lindenberg's leafy liverwort

***Herbertus borealis* - a liverwort

**Jamesoniella undulifolia* - marsh earwort

**Lejeunea mandonii*

**Petalophyllum ralfsii* - petalwort

MOSS

***Andreaea frigida* - a moss

***Bartramia stricta rigid* - apple moss

***Bryoerythrophyllum caledonicum* - a moss

Bryum calophyllum - a moss

***Bryum neodamense* - a moss

Bryum turbinatum - a moss

Bryum uliginosum - a moss

***Bryum warneum* - a moss

Campylopus setifolius - a moss

***Didymodon mamillosus* - a moss

***Ditrichum plumbicola* - a moss

***Orthodontium gracile* - a moss

Orthotrichum gymnostomum - a moss

***Orthotrichum obtusifolium* - blunt-leaved bristle-moss

Pictus scoticus - a moss

Plagiothecium piliferum - hair silk moss

***Pohlia scotica* - a moss

***Sphagnum balticum* - Baltic bog-moss

Sphagnum skyense - a bog moss

**Buxbaumia viridis* - green shield moss

**Drepanocladus vernicosus* - slender feather-moss

STONEWORTS

***Chara baltica baltic* - stonewort

***Chara canescens* - bearded stonewort

***Chara curta* - lesser bearded stonewort

***Lamprothamnium papulosum* - foxtail stonewort

***Nitella gracilis* - slender stonewort

***Tolypella nidifica* - bird's nest stonewort

**Chara muscosa*

VASCULAR PLANTS

***Artemisia norvegica* - arctic sandwort

***Calamagrostis scotica* - Scottish small-reed

***Carex muricata ssp. muricata* - prickly sedge⁴

***Centaurea cyanus* - cornflower

Cerastium nigrescens - Shetland mouse-ear

***Cochlearia micacea* - mountain scurvy-grass

***Cochlearia scotica* - Scottish scurvy-grass

***Epipactis youngiana* Young's helleborine

***Euphrasia campbelliae* - an endemic euphrasia

***Euphrasia eurycarpa* - an endemic euphrasia

***Euphrasia heslop-harrisonii* - an endemic euphrasia

***Euphrasia rhumica* - an endemic euphrasia

***Euphrasia rotundifolia* - an endemic euphrasia

***Fumaria purpurea* - purple ramping-fumitory

***Gentianella uliginosa* - dune gentian

***Hieracium Sect. Alpestris* (Shetland spp only) hawkweeds

***Juniperus communis* - juniper

***Limonium recurvum ssp humile* - an endemic sea lavender

***Linnaea borealis* - twinflower

***Luronium natans* - floating water-plantain

***Lycopodiella inundata* - marsh clubmoss
**Melampyrum sylvaticum* - small cow-wheat
**Najas flexilis* - slender naiad
**Pilularia globulifera* - pillwort
**Potamogeton compressus* - grass-wrack pondweed
**Potamogeton rutilus* - Shetland pondweed
**Salix lanata* - woolly willow
**Saxifraga hirculus* - marsh saxifrage

**Scandix pecten-veneris* - shepherd's needle
**Silene gallica* - small-flowered catchfly
**Sium latifolium* - greater water parsnip
**Spiranthes romanzoffiana* - Irish lady's tresses
**Trichomanes speciosum* - Killarney fern
**Woodsia ilvensis* - oblong woodsia



The tables on the following pages show species of conservation concern in Scotland, the international and national background to why they have been included, and also offer a rough indication of where in Scotland they occur. They have been supplied by Scottish Natural Heritage species branch, and are based on work up till 1995. Please note, however, that work continues to take place revising and updating these lists as more knowledge becomes available, and the tables here do not include changes since 1995.

Explanatory notes to the tables: Only groups which have published RDB (red data book) status are included (which means in effect that several invertebrate groups with thousands of species) are excluded.

Column 1 - Taxon - species are grouped in the order of the UK BAP priorities ¹.

Column 2 - BAP rank - coding stands for 1 - globally threatened, 2 - threatened endemic; 3 - international/UK schedules; 4 - threatened RDB species; 5 - other species on the Steering Group report's list²

Column 3 - DoE list - Steering Group report priorities - (1=short; 2=middle; 3=long list)

Column 4 - Source - species have been included because they are listed by

- WCMC (World conservation Monitoring Centre) = globally threatened species
- HSD (Habitats Directive)
- BD (Birds Directive)
- WCA (Wildlife and Countryside Act)
- RDB (published Red Data Books)
- DoE (on the Steering Group report's short and middle lists, but not listed by the others)

Column 5 - RDB status (Red Data Book status): Ex = extinct; E = endangered; V = vulnerable; R = rare; I = indeterminate; K = insufficiently known; SC = scarce - For birds the categories are 1 = IUNC globally threatened; 2 = Rare and declining British breeding birds; 3 = Rapidly declining but common British breeding birds; 4 = Moderately declining, historically declining but common, internationally important, 'threatened in Europe'

Columns 6-7 indicate nos of **10km squares** in Scotland and for the UK as a whole. For birds, data are based on the *New Atlas of Breeding Birds*.³

Column 8 - Where - gives a rough indication in what part of Scotland the species occur.

Column 9-10 - International - relates species' status to the appendices of the **Bern, Bonn** Conventions and Annexes of the EC Habitats Directive (**HDs**).

Column 11-12 - UK protection - shows inclusion on the relevant schedules of **WCA** (the 1981 Wildlife & Countryside Act as amended up till 1995) and **Reg'ns** (the 1994 Conservation Regulations: Natural Habitats, etc.)

¹ Anon. (1994), *Biodiversity the UK Action Plan* (CM2428). HMSO, London

² Anon. (1995), *Biodiversity: the UK Steering Group Report*. HMSO, London

³ Gibbons, D W, Reid, J B & Chapman, R A (1993), *The New Atlas of Breeding Birds in Britain & Ireland: 1988-1991*. T & AD Poyser

List of animal species ranked in Biodiversity Action Plan priority order													
Taxon	BAP rank	DoE list	Source	RDB status	10km sq. Scot.	GB	where in Scotland:	International Bern	BDir	HSD	Bonn	WCA	UK protection Reg'ns
Globally threatened species													
Mammals													
<i>Lutra lutra</i> European otter	1	1	WCMC		939	1775	All	II		Ila,IVa		5	2
<i>Balaena (Eubalaena) glacialis</i> northern/black right whale	1	2	WCMC				-	II		IVa	I	5	2
<i>Balaenoptera acutorostrata</i> minke whale	1	2	WCMC				-	III		IVa		5	2
<i>Balaenoptera borealis</i> sei whale	1	2	WCMC				-	III		IVa		5	2
<i>Balaenoptera physalus</i> fin whale	1	2	WCMC				-	III		IVa		5	2
<i>Delphinapterus leucas</i> white whale	1	3	HSD				-	III		IVa	II	5	2
<i>Delphinus delphis</i> common dolphin	1	3	HSD				-	II		IVa	II	5	2
<i>Globicephala melas</i> long-finned pilot whale	1	3	HSD				-	II		IVa	II	5	2
<i>Grampus griseus</i> Risso's dolphin	1	3	HSD				-	II		IVa	II	5	2
<i>Hyperoodon ampullatus</i> northern bottlenosed whale	1	2	WCMC				-	III		IVa	II	5	2
<i>Megaptera novaeangliae</i> humpback whale	1	2	HSD				-	II		IVa	I	5	2
<i>Lagenorhynchus acutus</i> atlantic white-sided dolphin	1	3	HSD				-	II		IVa	II	5	2
<i>Lagenorhynchus albirostris</i> white-beaked dolphin	1	3	HSD				-	II		IVa	II	5	2
<i>Monodon monoceros</i> narwhal	1	3	HSD				-	III		IVa	II	5	2
<i>Mesoplodon bidens</i> Sowerby's beaked whale	1	3	HSD				-	II		IVa		5	2
<i>Mesoplodon minus</i> True's beaked whale	1	3	HSD				-	II		IVa		5	2
<i>Orcinus orca</i> killer whale	1	3	HSD				-	II		IVa	II	5	2
<i>Phocoena phocoena</i> harbour porpoise	1	1	WCMC				-	II		Ila,IVa	II	5	2
<i>Physeter catodon (macrocephalus)</i> sperm whale	1	2	WCMC				-	III		IVa		5	2
<i>Pseudorca crassidens</i> false killer whale	1	3	HSD				-	II		IVa		5	2
<i>Stenella coeruleoalba</i> striped dolphin	1	3	HSD				-	II		IVa		5	2
<i>Tursiops truncatus</i> bottlenose dolphin	1	3	HSD				-	II		Ila,IVa	II	5	2
<i>Ziphius cavirostris</i> Cuvier's beaked whale	1	3	HSD				-	II		IVa		5	2
Birds													
<i>Acrocephalus paludicola</i> aquatic warbler	1	1	WCMC	1			migrant		I				
<i>Crex crex</i> corncrake	1	1	WCMC	1	97	105	NW,NE,SW	II	I			1	
<i>Loxia scotica</i> Scottish crossbill	1	1	WCMC	1	59	59	NE,NW	II	I			1	
Err:508													
<i>Caretta caretta</i> loggerhead turtle	1	2	WCMC				NW,NE,SW	II		Ila,IVa	I,II	5	2
<i>Chelonia mydas</i> green turtle	1	2	WCMC				NE	II		IVa	I,II	5	2
<i>Dermochelys coriacea</i> leathery turtle	1	2	WCMC				All	II		IVa	I,II	5	2
<i>Lepidochelys kempii</i> Kemp's ridley turtle	1	2	WCMC				SW,NW	II		IVa	I,II	5	2
Fish													
<i>Acipenser sturio</i> sturgeon	1	2	WCMC				(All)	III		Ila,IVa		5	2
Annelids													
<i>Hirudo medicinalis</i> medicinal leech	1	1	WCMC	R	2	22	SW	III		Va		5	
Crustaceans													
<i>Austromatobius pallipes</i> freshwater crayfish	1	1	WCMC		1	443	NW (introd)			Ila, Va		5*	
Insects													
<i>Formica aquilonia</i> Scottish wood ant	1	3	WCMC	Sc	49	49	All						
<i>Formica lugubris</i> hairy wood ant	1	-	WCMC	local	26	64	All						

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International			UK protection		
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Carterocephalus palaemon</i> chequered skipper butterfly	1	2	WCMC	Sc	23	30	SW, NW					5*	
Molluscs													
<i>Vertigo angustior</i>	1	1	WCMC	E	1	4	SW			Ila			
<i>Vertigo geyeri</i>	1	1	WCMC	E	3	11	SE			Ila			
<i>Vertigo genesii</i>	1	1	WCMC	E	3	4	SE			Ila			
<i>Balea perversa</i>	1	-	WCMC		85	302	All						
<i>Margaritifera margaritifera</i> freshwater pearl mussel	1	1	WCMC	Sc	113	151	All	III		Ila, Va		5*	
Threatened Endemic Species													
Insects													
<i>Apion ryei</i>	2	-	RDB	Sc			NE,NW						
<i>Procas granulicollis</i>	2	2	RDB	I	1	5	SW						
<i>Thinobius newberyi</i>	2	2	RDB	I	1	5	(NE)						
<i>Meotica anglica</i>	2	3	RDB	Sc			SW, SE						
<i>Brachyptera putata</i>	2	-	RDB	Sc			All						
International Schedules													
Mammals													
<i>Halichoerus grypus</i> grey seal	3	3	HSD		257	411	All	III		II		Seals Act	3
<i>Phoca vitulina</i> common seal	3	3	HSD		228	285	All	III		Ila		Seals Act	3
<i>Myotis daubentonii</i> Daubenton's bat	3	3	HSD		72	250	All	II		IVa	II	5	2
<i>Myotis mystacinus</i> whiskered bat	3	3	HSD		5	108	SE, SW	II		IVa	II	5	2
<i>Myotis nattereri</i> natterer's bat	3	3	HSD		56	286	All	II		IVa	II	5	2
<i>Nyctalus leisleri</i> Leisler's bat	3	3	HSD		2	35	SW	II		IVa	II	5	2
<i>Nyctalus noctula</i> noctule	3	3	HSD		3	141	SW	II		IVa	II	5	2
<i>Pipistrellus pipistrellus</i> pipistrelle bat	3	1	HSD		310	1296	All	III		IVa	II	5	2
<i>Plecotus auritus</i> brown long-eared bat	3	3	HSD		50	366	All	II		IVa	II	5	2
<i>Felis sylvestris</i> wildcat	3	3	HSD		318	318	All	II		IVa		5	2
Birds													
<i>Alcedo athys</i> kingfisher	3	3	BD	4	73	743	All	II	I		II	1	
<i>Anser albifrons</i> white-fronted goose	3	3	BD	4			SW,NW	III	I		II		
<i>Aquila chrysaetos</i> golden eagle	3	3	BD	4	215	216	All	II	I		II	1	
<i>Asio flammeus</i> short-eared owl	3	3	BD	4	255	381	All	II	I				
<i>Botaurus stellaris</i> bittern	3	1	BD	2	0	9	migrant	II	I		II	1	
<i>Branta leucopsis</i> barnacle goose	3	3	BD	4			SW,NE,NW	II	I		II		
<i>Caprimulgus europaeus</i> nightjar	3	2	BD	2	10	190	SW,NE	II	I				
<i>Charadrius morinellus</i> dotterel	3	3	BD	4	46	48	All	II	I		II	1	
<i>Chlidonias niger</i> black tern	3	3	BD				migrant	II	I			1	
<i>Circus aeruginosus</i> marsh harrier	3	3	BD	2	2	36	SE	II	I		II	1	
<i>Circus cyaneus</i> hen harrier	3	3	BD	2	254	286	All	II	I		II	1	
<i>Cygnus columbianus bewickii</i> Bewick's swan	3	3	BD	4			SW	II	I		II	1	
<i>Cygnus cygnus</i> whooper swan	3	3	BD	4	1	1	All	II	I		II	1	
<i>Falco columbarius</i> merlin	3	3	BD	2	255	386	All	II	I		II	1	
<i>Falco peregrinus</i> peregrine	3	3	BD	4	c450	720	All	II	I		II	1	
<i>Gavia arctica</i> black-thoated diver	3	3	BD	4	112	112	All	II	I		II	1	
<i>Gavia immer</i> great northern diver	3	3	BD	4			migrant	II	I		II	1	
<i>Gavia stellata</i> red-throated diver	3	3	BD	4	246	246	All	II	I		II	1	
<i>Haliaeetus albicilla</i> white-tailed eagle	3	3	BD	2	9	9	NW,SW	II	I		I,II	1	

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International			UK protection		
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Hydrobates pelagicus</i> storm petrel	3	3	BD	4	40	48	NW,NE,SW	II	I				
<i>Lanius collurio</i> red-backed shrike	3	2	BD	2	0	2	SE,NE	II	I			1	
<i>Larus melanocephalus</i> mediterranean gull	3	3	BD	4	0	6	migrant	II	I			1	
<i>Milvus milvus</i> red kite	3	3	WCMC	2	5	50	NW	II	I		II	1	
<i>Nyctea scandiaca</i> snowy owl	3	3	BD				NE,NW	II	I			1	
<i>Oceanodroma leucorhoa</i> Leach's petrel	3	3	BD	4	10	10	NW,NE	II	I			1	
<i>Pandion haliaetus</i> osprey	3	3	BD	2	38	38	All	II	I		II	1	
<i>Pernis apivorus</i> honey buzzard	3	3	RASD	4	1	10	NE	II	I		II	1	
<i>Phalacrocorax carbo</i> cormorant	3	3	BD		86	174	All	III	I				
<i>Phalaropus lobatus</i> red-necked phalarope	3	2	BD	2	5	5	NW, NE	II	I		II	1	
<i>Philomachus pugnax</i> ruff	3	3	BD	4	0	10	migrant	III	I		II	1	
<i>Pluvialis apricaria</i> golden plover	3	3	BD	4	c500	630	All	III	I		II		
<i>Podiceps auritus</i> slavonian grebe	3	3	BD	4	17	17	NW,NE	II	I		II	1	
<i>Porzana porzana</i> spotted crane	3	3	BD	4	9	11	SW,NW,NE	II	I		II	1	
<i>Pyrhocorax pyrrhocorax</i> chough	3	3	BD	2	15	64	SW	II	I			1	
<i>Sterna albifrons</i> little tern	3	3	BD	4	45	110	All	II	I		II	1	
<i>Sterna dougallii</i> roseate tern	3	2	BD	2	4	19	SE	II	I		II	1	
<i>Sterna hirundo</i> common tern	3	3	BD		244	426	All	II	I		II		
<i>Sterna paradisaea</i> arctic tern	3	3	BD		285	303	All	II	I		II		
<i>Sterna sandvicensis</i> sandwich tern	3	3	BD	4	6	43	SE,NE,NW	II	I		II		
<i>Tetrao urogallus</i> capercaillie	3	1	BD	2	33	33	All	III	I				
<i>Tringa glareola</i> wood sandpiper	3	3	BD	4	4	4	NW,NE	II	I		II	1	
<i>Tringa ochropus</i> green sandpiper								II	I		II	1	
<i>Troglodytes troglodytes</i> wren (Fair Isle race)	3	3	BD		1	1	NE	II	I				
Amphibians													
<i>Bufo calamita</i> natterjack toad	3	1	HSD		3	25	SW	II		IVa		5	2
<i>Triturus cristatus</i> great crested newt	3	1	HSD		33	778	All	II		IIa,IVa		5	2
Reptiles													
<i>Lacerta agilis</i> sand lizard	3	1	HSD		1	31	SW (introd.)	II		IVa		5	2
Fish													
<i>Alosa alosa</i> allis shad	3	1	HSD				SW	III		IIa,Va		5*	3
<i>Alosa fallax</i> twaithe shad	3	1	HSD				SW	III		IIa,Va			3
<i>Cottus gobio</i> bullhead	3	3	HSD				SE,SW			IIa			
<i>Lampetra fluviatilis</i> river lamprey	3	3	HSD				SE,SW,NE	III		IIa,Va			3
<i>Lampetra planeri</i> brook lamprey	3	3	HSD				All	III		IIa			
<i>Petromyzon marinus</i> sea lamprey	3	3	HSD				All	III		IIa			
<i>Salmo salar</i> atlantic salmon	3	3	HSD				All			IIa,Va			3
Insects													
<i>Eurodryas aurinia</i> Marsh Fritillary butterfly	3	1	HSD	Sc	28	184	SW, NW	II		IIa		5*	
UK Schedules													
Mammals													
<i>Martes martes</i> pine marten	3	3	WCA		179	209	All	III		Va		5	3
<i>Odobenus rosmarus</i> walrus	3	-	WCA					II				5	3
<i>Sciurus vulgaris</i> red squirrel	3	1	WCA		187	641	All	III				5	
Birds													

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International				UK protection	
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Accipiter gentilis</i> goshawk	3	3	WCA	4	16	91	All	II			II	1	
<i>Anas acuta</i> pintail	3	3	WCA	4	9	17	All	III			II	1*	
<i>Anas querquedula</i> garganey	3	3	WCA	4	5	39	migrant	III			II	1	
<i>Aythya marila</i> scaup	3	3	WCA	4	2	2	NW	III			I,II	1	
<i>Bucephala clangula</i> goldeneye	3	3	WCA	4	12	13	NE,NW	III			II	1*	
<i>Calcarius lapponicus</i> lapland bunting	3	3	WCA					II				1	
<i>Calidris maritima</i> purple sandpiper	3	3	WCA	4	2	2	NE	II			II	1	
<i>Calidris temminckii</i> Temminck's stint	3	3	WCA	4	1	1	NW	II			II	1	
<i>Carpodacus erythrinus</i> scarlet rosefinch	3	3	WCA	4	1	2	NW	II				1	
<i>Clangula hyemalis</i> long-tailed duck	3	3	WCA				migrant	III			II	1	
<i>Coturnix coturnix</i> quail	3	3	WCA	2	51	233	All	III			II	1	
<i>Eremophila alpestris</i> shore lark	3	3	WCA		1	1	NW	II				1	
<i>Falco subbuteo</i> hobby	3	3	WCA		0	230	migrant	II			II	1	
<i>Fringilla montifringilla</i> brambling	3	3	WCA		2	2	NW,NE	III				1	
<i>Jynx torquilla</i> wryneck	3	2	WCA	2	1	1	NE	II				1	
<i>Larus minutus</i> little gull	3	3	WCA	4				II				1	
<i>Limosa limosa</i> black-tailed godwit	3	3	WCA	2	2	12	NE	III			II	1	
<i>Loxia curvirostra</i> common crossbill	3	3	WCA		242	406	All	II				1	
<i>Loxia pytyopsittacus</i> parrot crossbill	3	3	WCA	4	1	2	NE	II				1	
<i>Melanitta fusca</i> velvet scoter	3	3	WCA	4				III			II	1	
<i>Melanitta nigra</i> common scoter	3	2	WCA	4	16	16	SE,NW,SW	III			II	1	
<i>Numenius phaeopus</i> whimbrel	3	3	WCA	4	36	36	NE,NW	III			II	1	
<i>Parus cristatus</i> crested tit	3	3	WCA	4	31	31	NW,NE	II				1	
<i>Phoenicurus ochruros</i> black redstart	3	3	WCA	4	0	57		II				1	
<i>Plectrophenax nivalis</i> snow bunting	3	3	WCA	4	15	15	All	II				1	
<i>Podiceps nigricollis</i> black-necked grebe	3	3	WCA	4	4	11	SE	II				1	
<i>Tringa nebularia</i> greenshank	3	3	WCA	4	149	149	All	III			II	1	
<i>Turdus iliacus</i> redwing	3	3	WCA	4	45	46	NW,NE,SE	III				1	
<i>Turdus pilaris</i> fieldfare	3	3	WCA	4	10	18	NW,NE,SE	III				1	
<i>Tyto alba</i> barn owl	3	3	WCA	4	140	748	All	III				1	
Amphibians													
<i>Bufo bufo</i> common toad	3	3	WCA		294	1337	All	III				5*	
<i>Rana temporaria</i> common frog	3	3	WCA		465	1680	All	III				5*	
<i>Triturus helveticus</i> palmate newt	3	3	WCA		166	647	All	III				5*	
<i>Triturus vulgaris</i> smooth newt	3	3	WCA		73	823	All	III				5*	
Reptiles													
<i>Anguis fragilis</i> slow-worm	3	3	WCA		138	644	All	III				5*	
<i>Vipera berus</i> adder	3	3	WCA		161	589	All	III				5*	
Fish													
<i>Coregonus albula</i> vendace	3	1	WCA		0	3	(SW)	III		Va		5	3
<i>Coregonus lavaretus</i> powan	3	3	WCA				SW	III		Va		5	3
Crustaceans													
<i>Triops cancrivorus</i> tadpole shrimp	3	3	WCA	E	0	1	(SW)					5	
Insects													
<i>Boloria euphrosyne</i> pearl bordered fritillary butterfly	3	1	WCA	Sc	77	330	All					5*	

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International				UK protection	
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Coenonympha tullia</i> large heath butterfly	3	3	WCA		238	302	All					5*	
<i>Erebia epiphron</i> mountain ringlet butterfly	3	3	WCA	Sc	24	29	All					5*	
<i>Aricia artaxerxes</i> northern brown argus butterfly	3	3	WCA	Sc	47	70	All					5*	
<i>Cupido minimus</i> small blue butterfly	3	3	WCA		19	194	SE,NE,SW					5*	
<i>Zygaena viciae argyllensis</i> New Forest burnet moth	3	2	WCA	E	1	1						5	
Molluscs													
<i>Thyasira gouldi</i>	3	2	WCA				NE,NW					5	
<i>Tenellia adspersa</i>	3	3	WCA	K			(SE)					5	
Endangered & vulnerable RDB species													
Mammals													
<i>Lepus europaeus</i> brown hare	5	1	DoE		268	1143	All						
<i>Sorex araneus</i> common shrew	5	1	DoE		196	830	All						
<i>Arvicola terrestris</i> water vole	5 (3)	1	DoE		75	727	All						
Birds													
<i>Alauda arvensis</i> skylark	3	1	BD	3	c800	2571	All					II	
<i>Carduelis cannabina</i> linnet	3	2	BD	3	c400	2002	All	II					
<i>Emberiza schoeniclus</i> reed bunting	3	2	BD	3	c400	1846	All	II					
<i>Miliaria calandra</i> corn bunting	5	2	DoE	2	87	686	All						
<i>Muscicapa striata</i> spotted flycatcher	3	2	BD	3	c500	2097	All	II				II	
<i>Passer montanus</i> tree sparrow	5	2	DoE	3	c150	1040	All						
<i>Perdix perdix</i> grey partridge	5	1	DoE	3	c300	1278	All						
<i>Streptopelia turtur</i> turtle dove	3	2	BD	2	1	700	SE						
<i>Tetrao tetrix</i> black grouse	5	3	DoE	2	208	278	All						
<i>Turdus philomelos</i> song thrush	3	1	BD	3	c750	2491	All						
Invertebrates													
Araneae (spiders)													
<i>Centromerus levitarsis</i>	4	-	JNCC	V			SE						
<i>Clubiona subsultans</i>	4	3	JNCC	V			SE,NE						
<i>Dictyna major</i>	4	-	JNCC	V			SE,NW						
<i>Diplocephalus</i>	4	3	JNCC	V			SE,NE						
<i>Haplodrassus soerenseni</i>	4	3	JNCC	V			SE,NE						
<i>Lepthyphantes antroniensis</i>	4	3	JNCC	E			NE						
<i>Pelecopsis elongata</i>	4	3	JNCC	V			SE,NE						
<i>Rhaebothorax paetulus</i>	4	-	JNCC	V			SE,NE						
<i>Robertus scoticus</i>	4	3	JNCC	E			SE						
Coleoptera (Beetles)													
<i>Abdera affinis</i>	4	-	JNCC	E			SE (NW)						
<i>Agonum quadripunctatum</i>	4	3	JNCC	E	0	1	NW						
<i>Ampedus tristis</i>	4	-	JNCC	V	2	2	SE, NE, SW						
<i>Aphodius quadrimaculatus</i>	4	-	JNCC	E			(SE)						
<i>Bidessus minutissimus</i>	4	2	JNCC	V	1	7	SW						
<i>Cassida denticollis</i>	4	-	JNCC	E			SW						
<i>Ceutorhynchus insularis</i>	4	2	JNCC	E			NW						
<i>Chrysanthia nigricornis</i>	4	-	JNCC	E			NE						
<i>Chrysolina crassicornis</i>	4	-	JNCC	V			SW,NW,NE						
<i>Cicindela hybrida</i>	4	2	JNCC	V	0	3	SE						
<i>Cryptocephalus coryli</i>	4	-	JNCC	E			(NE)						
<i>Cryptocephalus decemmaculatus</i>	4	-	JNCC	V			SE,NE						
<i>Cryptocephalus primarius</i>	4	-	JNCC	E			SE						
<i>Dorytomus affinis</i>	4	-	JNCC	V			NE						
<i>Dromius quadrisignatus</i>	4	2	JNCC	E	0	2	SE						
<i>Dyschirius obscurus</i>	4	-	JNCC	V	0	8	old						
<i>Euheptaulacus sus</i>	4	-	JNCC	E			SE						

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International			UK protection		
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Eutheia linearis</i>	4	-	JNCC	E			SW,SE						
<i>Hydroporus rufifrons</i>	4	2	JNCC	V	9	21	SW						
<i>Lamia textor</i>	4	-	JNCC	E			(SE)						
<i>Negastrius pulchellus</i>	4	3	JNCC	V	2	2	SW,NE,NW						
<i>Negastrius sabulicola</i>	4	-	JNCC	V	0	2	(SW)						
<i>Ochthebius lenensis</i>	4	-	JNCC	V	6	6	NW						
<i>Ostoma ferrugineum</i>	4	-	JNCC	E			NE						
<i>Otiorhynchus auropunctatus</i>	4	-	JNCC	E			NW						
<i>Otiorhynchus ligustici</i>	4	-	JNCC	V			SE						
<i>Psylliodes attenuata</i>	4	-	JNCC	E			(SE)						
<i>Psylliodes hyoscyami</i>	4	-	JNCC	E			SE						
<i>Rhynchaenus testaceus</i>	4	-	JNCC	V			old						
<i>Thanatophilus dispar</i>	4	-	JNCC	E	2	2	SE, NW						
Diptera (flies)													
<i>Alloia czernyi</i>	4	-	JNCC	V			SE,NW						
<i>Anatella pseudogibba</i>	4	-	JNCC	E			NE						
<i>Antichaeta brevipennis</i>	4	-	JNCC	V			NE						
<i>Arctocnopa melampodia</i>	4	-	JNCC	V			NE						
<i>Argyra auricollis</i>	4	-	JNCC	V			SW,SE						
<i>Blera fellax</i>	4	3	JNCC	E	2	2	NE						
<i>Boletina digitata</i>	4	-	JNCC	V			SE,NE						
<i>Bolitophila bimaculata</i>	4	-	JNCC	V			NE						
<i>Bolitophila fumida</i>	4	-	JNCC	E			NE						
<i>Borboropsis puberula</i>	4	-	JNCC	E			NE						
<i>Brevicornu fennicum</i>	4	-	JNCC	V			NE,NW						
<i>Callomyia elegans</i>	4	-	JNCC	V			SW						
<i>Chamaesyrphus caledonicus</i>	4	-	JNCC	E	2	2	NE						
<i>Cheilosia sahlbergi</i>	4	-	JNCC	V	6	6	SE,NE,NW						
<i>Cheilosia sp.B</i>	4	-	JNCC	E	1	1	NE						
<i>Chrysops sepulcralis</i>	4	3	JNCC	E	1	3	SW						
<i>Cordyla insons</i>	4	-	JNCC	V			NE						
<i>Diadocidia valida</i>	4	-	JNCC	V			NE,NW						
<i>Didea alneti</i>	4	-	JNCC	E	1	4	SE,NE,(NW)						
<i>Dolichopus caligatus</i>	4	-	JNCC	V			SE,NE,NW						
<i>Dolichopus maculipennis</i>	4	-	JNCC	V			SE,NW						
<i>Dolichopus signifer</i>	4	-	JNCC	E			SE						
<i>Doros profuges</i>	4	-	JNCC	V	1	18	SW						
<i>Dynatosoma cochleare</i>	4	-	JNCC	V			NE						
<i>Ectrepesthoneura colyeri</i>	4	-	JNCC	V			SE						
<i>Ectrepesthoneura pubescens</i>	4	-	JNCC	E			NE						
<i>Erioptera scotica</i>	4	-	JNCC	E			(NW)						
<i>Ernoneura argus</i>	4	-	JNCC	V			SE,NE						
<i>Estheria bohemani</i>	4	-	JNCC	E			NW						
<i>Eudicrana nigriceps</i>	4	-	JNCC	E			NE						
<i>Eudorylas terminalis</i>	4	-	JNCC	V			SW,SE,NE						
<i>Gonomyia connexa</i>	4	-	JNCC	V			SW,NE						
<i>Hammerschmidtia ferruginea</i>	4	3	JNCC	E	10	10	NE,NW						
<i>Heleodromia irwini</i>	4	-	JNCC	E			NE						
<i>Helina intermedia</i>	4	-	JNCC	V			NW						
<i>Helophilus groenlandicus</i>	4	-	JNCC	V			NW						
<i>Hemimacqartia paradoxa</i>	4	-	JNCC	E			NE						
<i>Hercostomus sahlbergi</i>	4	-	JNCC	E			NE						
<i>Hilara hirta</i>	4	-	JNCC	V			NE						
<i>Hilara submaura</i>	4	-	JNCC	E			NE						
<i>Homalocephala albitarsis</i>	4	-	JNCC	E			NW						
<i>Hybomitra micans</i>	4	-	JNCC	V	0	5	old						
<i>Hydrophorus rufibarbis</i>	4	-	JNCC	V			SE,NE,NW						
<i>Hypoderma bovis</i>	4	-	JNCC	V			(SE,NE,NW)						
<i>Hypoderma lineatum</i>	4	-	JNCC	V			(NE,NW)						
<i>Leptopeza borealis</i>	4	-	JNCC	V			SE						
<i>Limonia aperta</i>	4	-	JNCC	E			NE, NW						
<i>Limonia magnicauda</i>	4	-	JNCC	V			SW,SE						

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International			UK protection		
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Limonia omissinervis</i>	4	-	JNCC	V			SW,SE,NW						
<i>Limonia stylifera</i>	4	-	JNCC	V			SE,NW						
<i>Macrocera zetterstedti</i>	4	-	JNCC	E			SE,NE,NW						
<i>Medetera borealis</i>	4	-	JNCC	V			NE						
<i>Mycetophila caudata</i>	4	-	JNCC	V			SE,NE,NW						
<i>Mycetophila lapponica</i>	4	-	JNCC	V			SE,NW						
<i>Mycetophila mohilevensis</i>	4	-	JNCC	V			SE,NW						
<i>Mycetophila morosa</i>	4	-	JNCC	V			NE,NW						
<i>Mycetophila schnabli</i>	4	-	JNCC	E			NE,NW						
<i>Mycetophila scotica</i>	4	-	JNCC	V			NE,NW						
<i>Mycetophila strigatoides</i>	4	-	JNCC	V			SW,SE						
<i>Mycetophila v-nigrum</i>	4	-	JNCC	V			SW,NE						
<i>Mycomya clavigera</i>	4	-	JNCC	V			SE						
<i>Mycomya permixta</i>	4	-	JNCC	E			SE						
<i>Mycomya rosalba</i>	4	-	JNCC	E			NE,NW						
<i>Mycomya shermani</i>	4	-	JNCC	V			SE,NE						
<i>Mydaea obscurella</i>	4	-	JNCC	V			SE,NE						
<i>Nephrotoma aculeata</i>	4	-	JNCC	V			NE						
<i>Oedalea oriunda</i>	4	-	JNCC	E			NE						
<i>Oldenbergiella brumalis</i>	4	-	JNCC	E			NE						
<i>Ormosia aciculata</i>	4	-	JNCC	V			SW,NE						
<i>Parasyrphus nigratarsis</i>	4	3	JNCC	E	4	15	SE,NE,NW						
<i>Parhelophilus consimilis</i>	4	-	JNCC	V	9	35	SW						
<i>Phaonia amabilis</i>	4	-	JNCC	V			SW						
<i>Phebellia nigripalpis</i>	4	-	JNCC	V			SW						
<i>Platypalpus carteri</i>	4	-	JNCC	V			SW						
<i>Platyparea discoidea</i>	4	-	JNCC	V			(SW)						
<i>Poecilobothrus ducalis</i>	4	-	JNCC	V			SE						
<i>Prionocera pubescens</i>	4	-	JNCC	V	1	3	SW,SE,NE						
<i>Rhabdomastix inclinata</i>	4	-	JNCC	V			NE						
<i>Rhamphomyia albidiventris</i>	4	-	JNCC	E			NW						
<i>Rhamphomyia ignobilis</i>	4	-	JNCC	E			NE						
<i>Rhamphomyia vesiculosa</i>	4	-	JNCC	E			NE						
<i>Rhaphium pencillatum</i>	4	-	JNCC	V			SE						
<i>Rymosia britteni</i>	4	-	JNCC	V			SE,NE						
<i>Scatella callosicosta</i>	4	-	JNCC	V			NE						
<i>Scathophaga tinctinervis</i>	4	-	JNCC	V			SE						
<i>Sciophila plurisetosa</i>	4	-	JNCC	V			SW,NE,NW						
<i>Sciophila varia</i>	4	-	JNCC	E			NE						
<i>Spilogona alpica</i>	4	3	JNCC	V			SE,NW						
<i>Sphaerophoria loewi</i>	4	-	JNCC	V	2	6	NE,NW						
<i>Stratiomys chamaeleon</i>	4	-	JNCC	E	0	4	NW						
<i>Suillia oxyphora</i>	4	-	JNCC	V			NE,NW						
<i>Syntenna stylata</i>	4	-	JNCC	E			NE						
<i>Tachydromia acklandi</i>	4	-	JNCC	V			NE						
<i>Tachypeza heeri</i>	4	-	JNCC	V			SE,NE						
<i>Thricops separ</i>	4	-	JNCC	V			SE,NE						
<i>Thrypticus cuneatus</i>	4	-	JNCC	E			NE						
<i>Tipula bistilata</i>	4	-	JNCC	V	2	2	NE						
<i>Tipula laetabilis (dilatata)</i>	4	-	JNCC	V	4	4	SE,NE						
<i>Tipula serrulifera</i>	4	2	JNCC	E	0	1	SE						
<i>Wiedemannia impudica</i>	4	-	JNCC	E			NE						
<i>Xylophagus junki</i>	4	-	JNCC	E			(NE)						
Ephemeroptera (Mayflies)													
<i>Heptagenia longicauda</i>	4	-	JNCC	E			NE						
Hymenoptera (Bees, wasps, ants & sawflies)													
<i>Formica exsecta</i>	4	1	JNCC	E	5	14	NE,NW						
<i>Mellinus crabroneus</i>	4	-	JNCC	E			(SW)						
<i>Osmia inermis</i>	4	3	JNCC	V			SE,NE						
<i>Osmia uncinata</i>	4	-	JNCC	V			NE,NW						
<i>Dolerus coracinus</i>	4	-	JNCC	E			NE						
<i>Dolerus harwoodi</i>	4	-	JNCC	E			NE						

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International			UK protection		
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Nematus monticola</i>	4	-	JNCC	E			SE						
<i>Pachynematus arcticus</i>	4	-	JNCC	E			NW						
<i>Phyllocolpa acutiserra</i>	4	-	JNCC	E			SE						
<i>Pristiphora retusa</i>	4	-	JNCC	E			NE,NW						
<i>Strongylogaster contigua</i>	4	-	JNCC	E			SW,SE						
<i>Trichiosoma vitellinae</i>	4	-	JNCC	E									
<i>Xyela longula</i>	4	-	JNCC	E			NE						
Lepidoptera (Butterflies and moths)													
<i>Acleris abietana</i>	4	-	JNCC	V			SW,SE,NE						
<i>Aethes rutilana</i>	4	-	JNCC	V			NW						
<i>Aphelia unitana</i>	4	-	JNCC	V			SE						
<i>Apotomis infida</i>	4	-	JNCC	E			SE						
<i>Callisto coffeella</i>	4	-	JNCC	E			SE, NE						
<i>Cataplecta farreni</i>	4	-	JNCC	E			NE						
<i>Chorelitis diana</i>	4	-	JNCC	E			NW						
<i>Eana argentana</i>	4	-	JNCC	E			SE						
<i>Elachista orstadii</i>	4	-	JNCC	E			SE						
<i>Eriogaster lanestris</i> small eggar moth	4	3	JNCC	V	1	46	(SE)						
<i>Exaeretia ciniflonella</i>	4	-	JNCC	E			NW						
<i>Gypsonoma nitidulana</i>	4	-	JNCC	E			NE						
<i>Levipalpis hepatoriella</i>	4	-	JNCC	E			SW,NE						
<i>Nemapogon picarella</i>	4	-	JNCC	E			SE, NE						
<i>Pammene luedersiana</i>	4	-	JNCC	E			SE,NE						
<i>Panccalia latreillella</i>	4	-	JNCC	V			SE,NE,NW						
<i>Paraleucoptera sinuella</i>	4	-	JNCC	E			NE						
<i>Parornix alpicola</i>	4	-	JNCC	E			NW						
<i>Parornix leucostola</i>	4	-	JNCC	E			NW						
<i>Periclepsis cinctana</i>	4	-	JNCC	E			SW						
<i>Pselnophorus heterodactyla</i>	4	-	JNCC	E			SE						
<i>Pyrausta sanguinalis</i>	4	-	JNCC	E			SW						
<i>Rhigognostis incarnatella</i>	4	-	JNCC	E			SE,NE						
<i>Scrobipalpa clintoni</i>	4	-	JNCC	V			SW,NW						
<i>Xystophora pulveratella</i>	4	-	JNCC	E			SE						
Molluscs													
<i>Lymnaea glabra</i>	4	3	JNCC	V	2	33	(SE,SW)						
<i>Truncatellina cylindrica</i>	4	3	JNCC	V	0	2	(SE)						
<i>Vertigo arctica (modesta)</i>	4	-	JNCC	E	1	1	SE/NW						
Odonata (Dragonflies)													
<i>Coenagrion hastulatum</i> northern damselfly	4	-	JNCC	V	7	7	SE,NE						
Trichoptera (Caddis Flies)													
<i>Hagenella clathrata</i>	4	-	JNCC	E			NE						
<i>Nemotaulius punctatolineatus</i>	4	-	JNCC	V			NE,NW						
<i>Ylodes reuteri</i>	4	-	JNCC	V			NE						
Other lists													
Mammals													
<i>Lepus europaeus</i> brown hare	5	1	DoE		268	1143	All						
<i>Sorex araneus</i> common shrew	5	1	DoE		196	830	All						
<i>Arvicola terrestris</i> water vole	5 (3)	1	DoE		75	727	All						
Birds													
<i>Alauda arvensis</i> skylark	3	1	BD	3	c800	2571	All				II		
<i>Carduelis cannabina</i> linnet	3	2	BD	3	c400	2002	All	II					
<i>Emberiza schoeniclus</i> reed bunting	3	2	BD	3	c400	1846	All	II					
<i>Miliaria calandra</i> corn bunting	5	2	DoE	2	87	686	All						
<i>Muscicapa striata</i> spotted flycatcher	3	2	BD	3	c500	2097	All	II			II		
<i>Passer montanus</i> tree sparrow	5	2	DoE	3	c150	1040	All						
<i>Perdix perdix</i> grey partridge	5	1	DoE	3	c300	1278	All						

Taxon	BAP	DoE	Source	RDB	10km sq.		where in	International				UK protection	
	rank	list		status	Scot.	GB	Scotland:	Bern	BDir	HSD	Bonn	WCA	Reg'ns
<i>Streptopelia turtur</i> turtle dove	3	2	BD	2	1	700	SE						
<i>Tetrao tetrix</i> black grouse	5	3	DoE	2	208	278	All						
<i>Turdus philomelos</i> song thrush	3	1	BD	3	c750	2491	All						
Insects													
Coleoptera (beetles)													
<i>Bembidion testaceum</i>	5	2	DoE	Sc	0	5	SW						
<i>Dyschirius angustatus</i>	4/5	2	DoE	R	0	2	(NE)						
<i>Perileptus areolatus</i>	5	2	DoE	Sc	0	6	(SW)						
Diptera (flies)													
<i>Lipsothrix nervosa</i>	4/5	2	DoE				SW						
<i>Metasyrphus lapponicus</i>	5	2	DoE	Sc	0	2	(All)						
<i>Rhabdomastix hilaris</i>	4/5	2	DoE	R			SE,NE,NW						
Hymenoptera (Bees, wasps, ants & sawflies)													
<i>Bombus distinguendus</i>	5	2	DoE	Sc	11	19	NE,NW						
<i>Bombus sylvarum</i>	5	1	DoE	Sc	0	54	SW						
Lepidoptera (butterflies and moths)													
<i>Dyscia fagaria</i> grey scalloped bar moth	5	2	DoE		57	135	All						
<i>Epione parallelaria</i> dark bordered beauty moth	4/5	2	DoE	R	1	7	NE						
<i>Hemaris tityus</i> narrow bordered bee hawk moth	5	2	DoE	Sc	19	42	SW,NE,NW, (SE)						
<i>Noctua orbona</i> lunar yellow underwing moth	5	2	DoE	Sc	13	129	All						
<i>Paradiarsia sobrina</i> cousin german moth	4/5	2	DoE	R	20	21	SE,NE,NW						
<i>Polia bombycina</i> pale shining brown moth	5	2	DoE		0	60	(SE,SW)						
<i>Rheumaptera hasta</i> argent and sable moth	5	2	DoE	Sc	34	111	All						
<i>Semiothisa carbonaria</i> netted mountain moth	4/5	2	DoE	R	8	9	SE,NE, NW						
<i>Trichopteryx polycommata</i> barred toothed stripe moth	5	2	DoE	Sc	5	42	SW,SE,NW						
<i>Xestia alpicola alpina</i> northern dart moth	5 (2)	2	DoE	Sc	11	16	SE,NE,NW						
<i>Xestia rhomboidea</i> square spotted clay moth	5	2	DoE	Sc	7	95	All						
<i>Xylena exsoleta</i> sward grass moth	5	2	DoE	Sc	29	100	All						
<i>Zygaena exulans subochracea</i> scotch burnet moth	4/5(2)	3	DoE	R	3	3	NE						

Plants											
Taxon	BAP	DoE	Source	RDB	10km sq.		Where in Scotland	International		UK protection	
	rank	list		status	Scot.	GB	SW;NW;NE;SE	Bern	H&SD	WCA	Reg'ns
Globally threatened species											
Fungus											
<i>Tulostoma niveum</i>	1	1	WCMC	V	1	1	NW				
Lichens											
<i>Collema dichotomum</i>	1	1	WCMC		9	17	SE (SW)			Sch 8	
<i>Schistmatoma graphidioides</i>	1	1	WCMC			10	NE, SE				
Bryophytes											
<i>Lejeunea mandonii</i>	1	1	WCMC		3	6	NW				
Vascular plants											
<i>Artemisia norvegica</i>	1	1	WCMC	R	4	4	NW				
<i>Epipactis youngiana</i>	1	1	WCMC		3	4	SE, SW			Sch 8	
<i>Euphrasia campbelliae</i>	1	1	WCMC	R	6	6	NW				
<i>Euphrasia eurycarpa</i>	1	1	WCMC	R	1	1	NW				
<i>Euphrasia heslop-harrisonii</i>	1	1	WCMC	R	3	3	NE, NW, SW				
<i>Euphrasia rhumica</i>	1	1	WCMC	R	1	1	NW				
<i>Euphrasia rotundifolia</i>	1	1	WCMC	R	11	11	NW				
<i>Trichomanes speciosum</i>	1	1	WCMC	E	4	12	SW	I	II, IV	Sch 8	
Threatened endemic species											
Lichen											
<i>Halecania rhypodiza</i>	2	2	DoE		2	2	SE				
Bryophytes											
<i>Bryoerythrophyllum caledonicum</i>	2	2	JNCC		12	12	SE, SW				
<i>Bryum dixonii</i>	2	3	JNCC		15	15	NE, NW, SE				
<i>Pictus scoticus</i>	2	2	JNCC		1	1	SE				
<i>Pohlia scotica</i>	2	2	JNCC		8	8	NW, SW				
<i>Sphagnum skyense</i>	2	2	JNCC		1	1	NW				
<i>Tortella limosella</i>	2		JNCC	Ex	0	0	(NW)				
Algae											
<i>Chara muscosa</i>	2	1	JNCC	indet	0	0	NW, NE				
Vascular plants											
<i>Athyrium flexile</i>	2	1	JNCC		8	8	SE, NE, NW				
<i>Calamagrostis scotica</i>	2	2	JNCC		4	4	NW				
<i>Cerastium nigrescens</i>	2	2	JNCC		2	2	NE				
<i>Cochlearia micacea</i>	2	1	JNCC		13	14	SE, SW				
<i>Sagina boydii (extinct)</i>	2	3	JNCC	Ex	0	0	(NE)				
<i>Senecio cambrensis</i>	2	3	JNCC		2	10	SE				
<i>Sorbus arranensis</i>	2		RDB	R	1	1	SW				
<i>Sorbus pseudofennica</i>	2		RDB	R	1	1	SW				
<i>Taraxacum clovense</i>	2		RDB	R	2	2	SW				
UK / international schedules											
International											
Bryophytes											
<i>Buxbaumia viridis</i>	3	1	HSD		1	1	NW	I	II	Sch 8	
<i>Drepanocladus vernicosus</i>	3	1	HSD		15?	70?	All	I	II	Sch 8	
<i>Petallophyllum ralfsii</i>	3	1	HSD		1	10	NW	I	II	Sch 8	
Vascular plants											
<i>Najas flexilis</i>	3	1	HSD		18	19	NW, SE, SW	I	II, IV	Sch 8	Sch 4
<i>Saxifraga hirculus</i>	3	1	HSD		4	11	NE, (NW), SE	I	II, IV	Sch 8	Sch 4
National											
Lichens											
<i>Bryoria furcellata</i>	3	3	WCA		4	4	NW, NE			Sch 8	
<i>Caloplaca luteoalba</i>	3	1	WCA		?	112	All?			Sch 8	
<i>Caloplaca nivalis</i>	3	3	WCA		1	1	SE			Sch 8	
<i>Catapyrenium psoromoides</i>	3	2	WCA		1	1	SE			Sch 8	

Plants											
Taxon	BAP	DoE	Source	RDB	10km sq.		Where in Scotland	International		UK protection	
	rank	list		status	Scot.	GB	SW;NW;NE;SE	Bern	H&SD	WCA	Reg'ns
<i>Cladonia stricta</i>	3	3	WCA		3	3	NE			Sch 8	
<i>Gyalecta ulmi</i>	3	1	WCA		6	7	SE			Sch 8	
<i>Nephroma arcticum</i>	3	3	WCA		1	1	NW			Sch 8	
<i>Pannaria ignobilis</i>	3	3	WCA		14	14	NW, SE			Sch 8	
<i>Parmenteria chilensis</i>	3	3	WCA		1	1	NW			Sch 8	
<i>Peltigera lepidophera</i>	3	2	WCA		1	1	SE			Sch 8	
<i>Pertusaria bryontha</i>	3	2	WCA		1	1	NE			Sch 8	
<i>Pseudocyphellaria lacerata</i>	3	3	WCA		3	4	SW			Sch 8	
<i>Psora rubiformis</i>	3	3	WCA		2	2	SE			Sch 8	
Bryophytes											
<i>Adelanthus lindenbergianus</i>	3	3	WCA	V	1	1	SW			Sch 8	
<i>Bartramia stricta</i>	3	3	WCA	V	1	4	SE			Sch 8	
<i>Bryum schleicheri</i>	3	3	WCA	E	1	1	SE			Sch 8	
<i>Cyclodictyon laetevirens</i>	3	3	WCA	V	2	3	SW			Sch 8	
<i>Geocalyx graveolens</i>	3	3	WCA	V	6	6	NW			Sch 8	
<i>Grimmia unicolor</i>	3	3	WCA	V	1	1	SE			Sch 8	
<i>Gymnomitrium apiculatum</i>	3	3	WCA	V	3	3	NW, NE			Sch 8	
<i>Hypnum vaucheri</i>	3	3	WCA	V	2	2	SE			Sch 8	
<i>Jamesoniella undulifolia</i>	3	1	WCA	E	1	5	SW			Sch 8	
<i>Mielichhoferia mielichoferia</i>	3	3	WCA	V	2	4	NE, (SW)			Sch 8	
<i>Orthotricum obtusifolium</i>	3	3	WCA	E	2	3	NE			Sch 8	
<i>Plagiothecium piliferum</i>	3	3	WCA	V	2	2	SE			Sch 8	
<i>Saelania glaucescens</i>	3	3	WCA	V	1	1	SE			Sch 8	
<i>Scorpidium turgescens</i>	3	3	WCA	V	1	1	SE			Sch 8	
<i>Sphagnum balticum</i>	3	3	WCA	V	1	7	(SW) NE			Sch 8	
Algae											
<i>Chara canescens</i>	3	2	WCA	E	2	2	NE			Sch 8	
<i>Lamprothamnium papulosum</i>	3	2	WCA	V			NW			Sch 8	
Vascular plants											
<i>Arabis alpina</i>	3	3	WCA	R	1	1	NW			Sch 8	
<i>Arenaria norvegica</i>	3	3	WCA	R	11	11	NE, NW, SW			Sch 8	
<i>Cicerbita alpina</i>	3	3	WCA	R	4	4	NE, SE			Sch 8	
<i>Crassula aquatica</i>	3	3	WCA	V	1	1	NW			Sch 8	
<i>Cystopteris dickleana</i>	3	3	WCA	E	1	1	NE			Sch 8	
<i>Dactylorhiza lapponica</i>	3	3	WCA		9	9	NW, SW			Sch 8	
<i>Diapensia lapponica</i>	3	3	WCA	V	1	1	NW			Sch 8	
<i>Erigeron borealis</i>	3	3	WCA	R	6	6	SE			Sch 8	
<i>Gentiana nivalis</i>	3	3	WCA	V	4	4	SE			Sch 8	
<i>Gentianella uliginosa</i>	3	3	WCA	O	2	8	SW			Sch 8	
<i>Hieracium attentuatifolium</i>	3	2	WCA		1	1	NE			Sch 8	
<i>Hieracium northroense</i>	3	2	WCA		1	1	NE			Sch 8	
<i>Hieracium zetlandicum</i>	3	2	WCA		1	1	NE			Sch 8	
<i>Homogyne alpina</i>	3	3	WCA	V	1	1	SE			Sch 8	
<i>Luronium natans</i>	3	1	WCA		3	45	SE	I	II, IV	Sch 8	Sch 4
<i>Lychnis alpina</i>	3	3	WCA	V	1	2	SE			Sch 8	
<i>Ononis reclinata</i>	3	3	WCA	V	1	7	SW			Sch 8	
<i>Phyllodoce caerulea</i>	3	3	WCA	V	3	3	SE			Sch 8	
<i>Polygonatum verticillatum</i>	3	3	WCA	E	7	7	SE			Sch 8	
<i>Potentilla rupestris</i>	3	3	WCA	V	2	5	NW			Sch 8	
<i>Rhinanthus serotinus</i>	3	3	WCA	E	2	9	SE			Sch 8	
<i>Saxifraga cespitosa</i>	3	3	WCA	R	12	13	NE, NW, SE			Sch 8	
<i>Saxifraga cernua</i>	3	3	WCA	V	3	3	NW, SE			Sch 8	
<i>Woodsia alpina</i>	3	3	WCA	R	14	15	NW, SW, SE			Sch 8	
<i>Woodsia ilvensis</i>	3	2	WCA	V	3	5	NE, SW, SE			Sch 8	
Endangered & vulnerable RDB species											
Fungi											

Plants											
Taxon	BAP	DoE	Source	RDB	10km sq.		Where in Scotland	International		UK protection	
	rank	list		status	Scot.	GB	SW;NW;NE;SE	Bern	H&SD	WCA	Reg'ns
<i>Boletopsis leucomeleana</i>	4	2	RDB	V			NE				
<i>Squamanita schreieri</i>	4	2	RDB	E			NE				
Lichen											
<i>Arthothelium macounii</i>	4	2	DoE		6	6	SW, NW				
<i>Bacidia incompta</i>	4	2	DoE			142					
<i>Cladonia botrytes</i>	4	2	DoE		12	12	SE, NE				
<i>Cladonia peziziformis</i>	4	2	DoE		2	5	SW				
<i>Hypogymnia intestiformis</i>	4	2	DoE		1	1	NE				
<i>Lecanora achariana</i>	4	3	RDB		1	2	NW				
<i>Thelenella modesta</i>	4	2	DoE		1	1	NE				
Algae											
<i>Chara baltica</i>	4	2	RDB	V	1	4	NE				
<i>Nitella gracilis</i>	4	2	RDB	V	1	4	SE				
Bryophytes											
<i>Andraea frigida</i>	4	2	DoE		3	4	NE				
<i>Bryum calophyllum</i>	4	2	DoE		5	11	NE, NW, SE				
<i>Bryum neodamense</i>	4	2	DoE		1	3	NW				
<i>Bryum turbinatum</i>	4	2	DoE		0	0	(NW)				
<i>Bryum uliginosum</i>	4	2	DoE		1	1	SE				
<i>Bryum warneum</i>	4	2	DoE		5	16	NE, NW, SE				
<i>Herbertus borealis</i>	4	2	DoE		2	2	NW				
Vascular plants											
<i>Agrostemma githago</i>	4		RDB	E	6	many	All				
<i>Carex buxbaumia</i>	4		RDB	V	6	6	NW				
<i>Juncus nodulosus</i>	4		RDB	V	3	3	NW				
<i>Moneses uniflora</i>	4	3	RDB	V	13	13	NE, NW				
<i>Scheuchzeria palustris</i>	4	3	RDB	V	4	4	NW, SE, SW				
<i>Schoenus ferrugineus</i>	4		RDB	V	2	2	SE				
Other species											
Lichens											
<i>Arthothelium dictyosporum</i>	5	2	DoE								
<i>Catillaria aphanis</i>	5	2	DoE								
<i>Cladonia fragilissima</i>	5	2	DoE								
<i>Gyalideopsis scotica</i>	5	2	DoE								
<i>Lecanactis hemisphaerica</i>	5	2	DoE								
<i>Lempholemma intricatum</i>	5	2	DoE								
<i>Melaspilea interjecta</i>	5	2	DoE			2					
<i>Opegrapha fumosa</i>	5	2	DoE								
<i>Opegrapha paraxanthoides</i>	5	2	DoE								
<i>Pseudocyphellaria norvegica</i>	5	1	WCA		1	21	NW, SW				
Bryophytes											
<i>Acrobolbus wilsonii</i>	5	2	DoE		17	17	NW, SW				
<i>Barbula mamillata</i>	5	2	DoE		1	1	SE				
<i>Campylopus setifolius</i>	5	2	DoE		43	62	NW, SW				
<i>Ditrichum plumbicola</i>	5	2	DoE		2	12	SW				
<i>Gymnostomum insigne</i>	5	3	RDB		14	14	NE, SE, SW				
<i>Marsupella stableri</i>	5	2	DoE		27	33	NE, NW, SW				
<i>Orthodontium gracile</i>	5	2	DoE		1	9	SE				
<i>Orthotrichum gymnostomum</i>	5	2	DoE		1	1	NE				
<i>Weissia rostellata</i>	5	2	DoE		1	17	SE				
Algae											
<i>Chara curta</i>	5	2	RDB	I	6	12	SW, NW, NE				
<i>Chara rudis</i>	5		RDB	R	8	10	SE, NE				
<i>Tolypella nidifica</i>	5	2	RDB	I	1?	1	NE				
Vascular plants											
<i>Arabis glabra</i>	5	2	Sc	Sc	0	31	(SE)				

Plants											
Taxon	BAP	DoE	Source	RDB	10km sq.		Where in Scotland	International		UK protection	
	rank	list		status	Scot.	GB	SW;NW;NE;SE	Bern	H&SD	WCA	Reg'ns
<i>Alchemilla glaucescens</i>	5		RDB	R	2	13	NW				
<i>Astragalus alpinus</i>	5		RDB	R	4	4	SE, NE				
<i>Atriplex longipes</i>	5		RDB	R	5	27	SE, SW				
<i>Bartsia alpina</i>	5		RDB	R	10	15	SW, SE				
<i>Carex atrofusca</i>	5		RDB	R	5	5	SE, NE				
<i>Carex chordorrhiza</i>	5	3	RDB	R	4	4	NW, NE				
<i>Carex lachenalii</i>	5		RDB	R	6	6	All				
<i>Carex microglochin</i>	5		RDB	R	1	1	SE				
<i>Carex norvegica</i>	5		RDB	R	5	5	SE, NE				
<i>Carex rariflora</i>	5		RDB	R	15	15	SE, NE				
<i>Carex recta</i>	5	3	RDB	R	4	4	NW				
<i>Cochlearia scotica</i>	5	3	DoE		many	many	All?				
<i>Elatine hydropiper</i>	5		RDB	R	7	19	SW, SE				
<i>Eleocharis austriaca</i>	5		RDB	R	1	11	SE				
<i>Eriocaulon aquaticum</i>	5		RDB	R	9	9	SW, NW				
<i>Fumaria purpurea</i>	5	2	Sc	Sc	13	43	All				
<i>Gnaphalium norvegicum</i>	5		RDB	R	12	13	NE, NW				
<i>Hieracium, sect. alpestris</i>	5	2	DoE				Shetland				
<i>Hierochloa odorata</i>	5		RDB	R	13	13	NW, SW, SE				
<i>Kobresia simpliciuscula</i>	5		RDB	R	13	15	SE				
<i>Koenigia islandica</i>	5		RDB	R	7	7	SW				
<i>Linnæa borealis</i>	5	2	Sc	Sc	32	38	NE, NW, SE				
<i>Lychnis viscaria</i>	5	3	RDB	R	12	14	SE, SW				
<i>Lycopodiella inundata</i>	5	2	Sc	Sc	20	64	NE, NW, SW				
<i>Minuartia rubella</i>	5		RDB	R	5	5	NW, SE				
<i>Myosotis alpestris</i>	5	3	RDB	R	4	8	SE				
<i>Oxytropis campestris</i>	5		RDB	R	4	4	SE, SW				
<i>Oxytropis halleri</i>	5	3	RDB	R	9	9	NW, SW, SE				
<i>Pilularia globulifera</i>	5	3	Sc	Sc	22	90	All				
<i>Poa flexuosa</i>	5		RDB	R	11	11	NE, NW, SE				
<i>Potamogeton compressus</i>	5	2	Sc	Sc	1	32	NE				
<i>Potamogeton epihydrus</i>	5		RDB	R	2	6	NW				
<i>Potamogeton rutilis</i>	5	1	RDB	R	10	10	NW, NE				
<i>Rumex aquaticus</i>	5		RDB	R	3	3	SW				
<i>Sagina nivalis</i>	5		RDB	R	4	4	SE				
<i>Sagina x normaniana</i>	5		RDB	R	16	16	All				
<i>Salix lanata</i>	5	2	RDB	R	14	14	SE, NE, NW				
<i>Saxifraga rivularis</i>	5		RDB	R	18	18	All				
<i>Scandix pecten-veneris</i>	5	2	Sc	Sc	0	131	(All)				
<i>Silene gallica</i>	5	2	Sc	Sc	0	57	(SE)				
<i>Spiranthes romanoffiana</i>	5		RDB	R	17	18	SW, NW				
<i>Taraxacum cymbifolium</i>	5		RDB	R	1	1	SE				
<i>Taraxacum ziphoideum</i>	5		RDB	R	3	3	NE				
<i>Veronica fruticans</i>	5		RDB	R	20	20	SE, SW, NE				

APPENDIX B

PRIORITY HABITATS

The following priority habitats were identified in *Biodiversity: the UK Steering Group's report*, Vol 2, each with a statement as to current status, current factors affecting the habitat, current action and conservation direction. Costed action plans were also worked out for those outlined in 'bold'

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. broad-leaved and yew woodland, 2. planted coniferous woodland, 3. native pine woodland, 4. lowland wood pastures and parkland, 5. boundary features, (ancient and/or species rich hedgerows) 6. cereal field margins, 7. improved grassland, 8. unimproved neutral grasslands, 9. acid grasslands, 10. calcareous grassland, 11. lowland heathland, 12. grazing marsh, (coastal and floodplain grazing marsh) 13. fen, carr, marsh, swamp and reedbed, 14. lowland raised bog, 15. standing open water, 16. rivers and streams, (chalk rivers) 17. canals, | <ol style="list-style-type: none"> 18. montane, 19. upland heathland, 20. blanket bog, 21. maritime cliff and slope, 22. shingle above high tide mark, 23. boulders and rock above the high tide, 24. coastal strandline, 25. machair, 26. saltmarsh, 27. sand dune, 28. estuaries, 29. saline lagoons, 30. islands and archipelagos, 31. inlets and enclosed bays, 32. open coast, 33. open sea water column, 34. shelf break, 35. offshore seabed, 36. limestone pavements, 37. urban |
|--|---|

The following categories have now got action plans and are at the stage of implementation ¹

HABITATS	LEAD DEPARTMENT/AGENCY	CONTACT NAME and TEL. NO
Fens	English Nature	Brian Johnson 01823 283211
Mesotrophic Lakes	Scottish Environment Protection Agency (SEPA)	Ian Fozzard 0131 449 7296
Chalk Rivers	Environment Agency	Robin Crawshaw 01903 820692
Reedbeds	English Nature	Andy Brown 01733 455269
Grazing Marsh	English Nature	Chris Newbold 01733 455224
Cereal Field Margins	Ministry of Agriculture, Fisheries and Food	Ann Tarran 0171 238 6448
Upland Oakwood	Forestry Commission	Gordon Patterson 0131 334 6464
Limestone Pavements	Countryside Agency	Richard Lloyd 1242 521381
Lowland Heathland	English Nature	Jayn Manley 01733 455050
Purple Moorgrass	Countryside Council for Wales	Dr David Stevens 01248 385665 Tim Blackstock -1248 385687-

¹ Biodiversity Fact Sheet 3, supplied by the Biodiversity Secretariat, Tel:- 01179 878974

Ancient and Species Rich Hedgerows	Ministry of Agriculture, Fisheries and Food	Peter Boyling 0171 238 5685
Saline lagoons	English Nature	Paul Gilliland 01733 455236
Seagrass beds	Environment and Heritage Service (DOE(NI))	Richard Weyl 01232 546589
Native Pinewoods	Forestry Commission	Alister Jones 0131 334 0303
Aquifer-fed naturally fluctuating water bodies	Environment Agency	Mrs Pat Sones 01480 414581
Eutrophic standing waters	Environment Agency	Mr Simon Leaf 01491 828545
Lowland meadows	Countryside Council for Wales	Dr David Stevens 01248 385665
Upland hay meadows	Ministry of Agriculture, Fisheries and Food	To be advised
Lowland dry acid grassland	English Nature	Mr Richard Jefferson 01733 455247
Lowland calcareous grassland	English Nature	Mr Richard Jefferson 01733 455247
Lowland wood pasture and parkland	English Nature	Ms Rachel Thomas 01733 455039
Wet woodland	Forestry Commission	Ruth Jenkins 01970 625866
Upland mixed ashwoods	Forestry Commission	Gordon Patterson 0131 334 6464
Lowland beech and yew woodland	Forestry Commission	Keith Wilson 01223 314546

The following Maritime Priority Habitats will have plans published during summer 1999 ²

BROAD HABITAT TYPES

Supralittoral rock

Supralittoral sediment

Littoral rock

Littoral sediment

Inshore sublittoral rock

Offshore shelf rock

Offshore shelf sediment

Continental shelf slope

Oceanic seas

Note: Littoral chalk and sublittoral chalk are combined in one Habitat Action Plan (Littoral and Sublittoral Chalk)

PRIORITY HABITATS

Maritime cliff and slopes (vegetated cliffs and lichen dominated cliffs)

Coastal sand dunes

Machair

Coastal vegetated shingle

Sabellaria alveolata reefs

Seagrass beds (*Zostera marina*)

Saltmarsh

Mudflats

Sheltered muddy gravels

Sublittoral chalk

Sabellaria spinulosa reefs

Tidal Rapids

Modiolus modiolus beds

Sands and gravel

Lophelia pertusa reefs

²List supplied by the Biodiversity Secretariat

APPENDIX C

USEFUL ADDRESSES

- i. National Societies, Institutions and Organisations**
- ii. Specialist book sellers and publishers:**
- iii. Scottish Wildlife Trust's Survey teams**
- iv. List of Country Parks and Ranger Services**
- v. Some software packages for biological recording and how to obtain them**

i. NATIONAL SOCIETIES, INSTITUTIONS AND ORGANISATIONS

- Balfour-Browne Club, 3 Eglinton Terrace, Ayr KY7 1JJ; Tel:- 01292 260064 Fax:- 01292 525333
- The Bat Conservation Trust, 15 Cloisters House, 8 Battersea Park Road, London SW8 4BG, Tel:- 0171 627 2629, Fax:- 0171 627 2628. email: enquiries@bats.org.uk
- Biodiversity Secretariat, Department of the Environment, Transport and the Regions, Floor 902d, Tollgate House, Houlton Street, Bristol, BS2 9DJ, Tel:- 0117 987 8974 Fax:- 0117 987 8182
- Biological Records Centre, Institute of Terrestrial Ecology, Monks Wood, Abbots Ripton, Huntingdon, Cambs., PE17 2LS ; Tel:- 01487 772405 or 773381 Fax:- 01487 773467
- Botanical Society of the British Isles, Hon. Gen. Secretary Mr. R G Ellis, 41 Marlborough Road, Roath, Cardiff, CF2 5BH; Tel/Fax:- 01222 496042 email:- bsbihgs@aol.com
- BSBI Books, Green Acre, Wood Lane, Oundle, Peterborough, PE8 5TP.
- Botanical Society of Scotland, General Secretary Mr R Galt, 8 Riselaw Terrace, Edinburgh EH10 6HW
- British Arachnological Society, Secretary Dr Helen Read, c/o Corporation of London, Burnham Beeches Office, Hawthorn Land, Farnham Common, Slough SL2 3TE.
- Bees, Wasps and Ants Recording Scheme (BWARS), Secretary Mr A S Davidson, 5 Hearsey Gardens, Blackwater, Camberley, Surrey, GU17 0EP
- British Bryological Society, Secretary Mr M A Walton, Ivy House, Wheelock Street, Middleswich, Cheshire CW10 9AB
- British Butterfly Conservation Society:- UK Conservation Office, PO Box 444, Wareham, Dorset, BH20 2YA; Tel:- 01929 400209, Fax:- 01929 400210, email:- ukconsoff@butterfly-conservation.org
- British Butterfly Conservation:- Butterfly Conservation Scotland:- Dr Paul Kirkland, PO Box 12477, Edinburgh, EH1 2YE; Tel/Fax:- 0131 226 3385 email: scotch-argus@cix.co.uk
- British Conchological Society of Great Britain and Ireland, Hon. Secretary Ms J Reynolds, 21c Loraine Road, Holloway, London N& 6EZ
- British Deer Society, HQ Burgate Manor, Fordingbridge, Hants, SP6 1EF
- British Dragonfly Society (BDS), Hon. Sec. Dr W H Wain, 'The Haywain', Hollywater Road, Bordon, Hants., GU35 0AD -
- British Entomological & Natural History Society (BENHS) c/o Pelham Clinton Building, Dinton Pastures Country Park, Davis St., Hurst, Reading, Berks. RG10 0TH website www.benhs.org.uk
- British Herpetological Society, c/o The Zoological Society of London, Regent's Park, London NW1 4RY
- British Lichen Society, c/o Dept of Botany, the Natural History Museum, Cromwell Road, London SW7 5BD]
- British Mammal Society, 15 Cloisters House, 8 Battersea Park Road, London, SW8 4BG Tel: 0171 498 4358 Fax:- 0171 622 8722 email:- enquiries@mammal.org.uk
- British Museum (see The Natural History Museum)
- British Mycological Society, P.O Box 30, Stourbridge, W. Midlands DY9 9PZ
- British Myriapod Group, Mr A D Barber, Rathgar, Exeter Road, Ivybridge, Devon, PL21 0BD
- British Plant Gall Society, Hon. Secretary Dr. C K Leach, Department of Biological Sciences, De Montfort University, Scraptoft, Leicester, LE7 9SU
- British Phycological Society (aimed mainly for professionals) Hon. Secretary Dr R Geider, Laboratory Sitaldel, Plymouth, PL1 2PB

- British Pteridological Society, Hon. Gen. Secretary, Miss J M Id, 42 Crown Woods Way, Eltham, London, SE9 2NN, Hon. Tel/Fax:- 0181 850 3218 Membership secretary Mr M S Porter, 5 West Avenue, Wigton, Cumbria CA7 9LG Tel:- 016973 43086
- British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU; Tel 01842 750050, Fax:- 01842 750030 email:- enquiries@bto.org
- Coleopterist Journal, available from Mr P J Hodge, 8 Harvard Road, Ringmer, Lewes, East Sussex, BN8 5HJ. . Subscription currently £7 pa (individuals), £10 (organisations).
- Dipterists Forum, Membership Secretary Liz Howe, Ger-y-Parc, Marianglas, Tynyngogl, Benllech, Gwynedd, LL74 8NS. The Bulletin comes out twice yearly (February and August), and carries newsletters of several Dipterist recording schemes. Editor is Darwyn Sumner, 122 Links Road, Anstey, Charnwood, Leicester LE7 7BX
- English Nature, Northminster House, Peterborough, Cambridgeshire PE1 1UA, Tel 01733 455 000 fax 01733 68834
- Estuarine Conservation Sciences Association (ECSA) - formerly Estuarine & Brackish Water Sciences Association. Department of Biological Sciences, Napier University, 10 Colinton Road Edinburgh EH10 5DT
- Field Studies Council, Preston Montford, Shrewsbury, Shropshire SY4 1HW Tel:- 01743 850 370
- Freshwater Biological Association (FBA), The Ferry House, Far Sawrey, Ambleside, Cumbria LA22 0LP Tel:- 015394 42468
- Froglife, Triton House, Bramfield, Halesworth, Suffolk, IP19 9AE; Tel:- 01986 784518
- Herpetological Groups in Britain and Ireland (HGBI) , Scottish Contact Mr Frank Bowles, 37 Albany Terrace, Dundee DD3 6HS Tel 01382 224362
- Heteroptera study group which produces an annual newsletter (Editor: Peter Kirby, 21 Grafton Avenue, Netherton, Peterborough, Cambs., PE3 9PD)
- John Muir Trust, 12 Wellington Place, Edinburgh EH6 7EQ. Tel:- 0131 554 0114
- Joint Nature Conservation Committee, Monkstone House, City Road, Peterborough PE1, Tel:- 01733 562626 Fax:- 01733 555948
- Kindrogan Field Centre, Enochdhu, Blairgowrie, Perthshire, PH10 7PG; Tel:- 01250 881286 Fax:- 01250 881433 email:- Kindrogan@btinternet.com
- Linnean Society of London,
- Malloch Society of Scotland, Secretary, David Horsfield, 131, Comiston Road, Edinburgh, EH10 6AQ or Dr G Rotheray, National Museum of Scotland, Chambers Street, Edinburgh EH1, Tel:- 0131 225 7534, Fax:- 0131 220 4819
- Marine Conservation Society, 9 Gloucester Road, Ross-on-Wye, HR9 5BU; Tel:- 01989 566017 Fax:- 01989 567815
- Marine Stranding, Bob Reid,/Tony Patterson co-ordinators, SAC Veterinary Services, Drummondhill, Stratherrick Road, Inverness IV2 4JZ; Tel:- 01463 243030 (24 hours, for all strandings)
- Macaulay Land Use Research Institute, Craigiebuckler, Aberdeen, AB9 2QJ, Tel:- 01224 318611 Fax 01224 311556
- National Museums of Scotland: Royal Museum of Scotland, Chambers Street, Edinburgh EH1 Tel 0131 225 7534 Fax 0131 220 4819
- Natural History Museum, Cromwell Road, London SW7 5BD Tel:- 0171 938 9386.
- Preston Montford Field Centre (Shropshire) see Field Studies Council
- Royal Botanic Garden, Edinburgh (RBGE), 20a Inverleith Row, Edinburgh, EH3 5LR; Tel:- 0131 552 7171 Fax 0131 248 2901
- Royal Botanic Garden, Kew (RBGK), London, Tel:- 0181 332 5000
- Royal Commission on the Ancient & Historic Monuments of Scotland, 18 Bernard Terrace, Edinburgh; Tel:- 0131 662 1456 Fax:- 0131 662 1477/7211
- Royal Entomological Society, 41 Queen's Gate, London SW7 5HR 0171 584 8361
- Royal Society for the Protection of Birds (Scotland), RSPB Scottish Headquarters, Dunedin House, 25 Ravelston Terrace, Edinburgh EH4 3TP; Tel:-0131 311 6500
- Scottish Biodiversity Group. Biodiversity Secretariat, John Ramsay, SERAD, Area 1-H/J, Victorian Quay, Edinburgh EH6 6QQ; Tel:- 0131 244 6519 Fax:- 0131 244 4071
- Scottish Conservation Project Trust, Balallan House, 24 Allan Park, Stirling FK8 7QG Tel 01786 479697

- Scottish Environment Protection Agency, Castle Business park, Stirling, FK9 4TR, Tel 01786 457700 Fax:- 01786 446885
- Scottish Fungus Group, Dr Adrian Newton, Kingsmuir Hall, Bonnington Road, Peebles EH45 9HE or Mrs Liz Holden, The Stables, Mar Lodge, Braemar, Aberdeenshire.
- Scottish Natural Heritage, Advisory Services, 2/5 Anderson Place, Edinburgh EH6 5NP, Tel: 0131 447 4784 Fax:- 0131 446 2405 SNH Web site:- <http://www.snh.org.uk> lists all the Area Offices
- Scottish Ornithologists Club, 21 Regent Terrace, Edinburgh EH7 5BT, Tel:- 0131 556 6042
- Scottish Wildlife Trust, HQ, Cramond House, Kirk Cramond, Cramond Glebe Road, Edinburgh EH4 6NS, Tel:- 0131 312 7765 Fax:- 0131 312 8705 (for SWT Survey Teams see below)
- Sea Watch Foundation, Dr.Peter G H Evans, Director, 11 Jersey Road, Oxford, OX4 4RT, Tel/Fax:- 01865 717276 email:- peter.evans@zoology.ox.ac.uk
- Wildlife & Wetlands Trust, Slimbridge, Gloucestershire, Glos. Tel:-01453 890333 Fax:-01453 890827
- Wildlife Trusts, UK National Office, The Kiln, Waterside, Mather Road, Newark, Nottinghamshire NG24 1WT Tel:- 01636 677711, Fax:- 01636 670001

ii. SOME SPECIALIST BOOK SELLERS AND PUBLISHERS

- AIDGAP Books, Taunton, England (Field Studies Council's publications) no tel. listed
- British Wildlife Publishing, Lower Barn, Rooks Farm, Rotherwick, Hook, Hants RG27 9BG.
- E W Classey Ltd, Oxford House, Marlborough Street, Faringdon, Oxfordshire SN7 7JP Tel:- 01367 244700 Fax 01367 244800 Email:- bugbooks@classey.demon.co.uk
- Foyles Book Shop, London Tel:- 0171 437 5660
- Lydie Rigout, 1 Hillside Ave., Canterbury, Kent, CT2 8ET - Dealer in entomological books and equipment.
- Natural History Book Service Ltd., 2-3 Wills Road, Totnes, Devon TQ9 5XN. Tel 01803 865913 Fax:- 01803 865913 email:- orders@nhbs.co.uk Web site:- <http://www.nhbs.com>
- Natural History Museum Bookshop, Cromwell Road, London, SW7 5BD, Tel:- 0171 938 9386.
- Pemberley Books (Ian Johnson) PO Box 334, Hayes, Middlesex UB4 OXX tel/fax 0181 561 5494 email ij@rembooks.demon.co.uk dealer in new and used books on entomology
- Pendleside Books (E Sutcliffe), 359 Wheatley Lane Road, Fence, Burnley BB12 9QA tel -1282 615617 - new and used books on entomology and mycology
- Richmond Publishing, Co. Ltd., PO Box 963, Slough SL2 3RS Tel:- 01753 643104
- Subbuteo Natural History Books Ltd, Pistyll Farm, Nercwys, Nr Mold, Flintshire, North Wales Tel 01352 756551 Fax 01352 756004, email sales@subbooks.demon.co.uk Website <http://www.subbooks.demon.co.uk>

iii SCOTTISH WILDLIFE TRUST'S SURVEY TEAMS

- Aberdeen Survey Team (Lisa Rigby), Doig Scott Building Top Floor, Scottish Agricultural College, Craibstone Estate, Bucksburn, Aberdeen AB21 9TQ, Tel. 01224 711 035
- Ayrshire Survey Team (John Blane), 2 Callander Road, Heathfield, Ayr KA8 9AF, Tel. 01292 610 529
- Clyde Valley Survey Team (David Lang), Unit 1, Enterprise Workshops, Dalziel Street, Motherwell, ML1 1PJ, Tel. 01698 264 146
- Clyde Valley Survey Team (David Knox), Unit 9, Enterprise Workshops, Dalziel Street, Motherwell, ML1 1PJ, Tel. 01698 264 146
- Dunbartonshire Survey Team (Chris Balling), Unit 14, Simpson Court, 11 South Avenue, Clydebank, Business Park, Clydebank G81 1UY, Tel. 0141 952 9090 N.B. As Of 1 April 1999 Relocating To 71 Houldsworth St., Glasgow G3 8EH. Tel. No. Not Yet Confirmed.
- Dundee Survey Team (Ken Laing), 42 Blinshall Street, Dundee DD1 5DF Tel. 01382 205 558
- Edinburgh Survey Team (Dave Garner), Custom House, 11 West Harbour Road, Edinburgh EH5 1PH Tel. 0131 551 4589 N.B. As Of 26 March 1999 Relocating To Room 22, Leith Walk Business Centre, Edinburgh EH6 5DT. Tel. No. Not Yet Confirmed.
- Edinburgh Survey Team (Bruce Lumsden), Custom House, 11 West Harbour Road, Edinburgh EH5 1PH, Tel. 0131 551 4589 N.B. As Of 26 March 1999 Relocating To Room 9, Leith Walk Business Centre, Edinburgh EH6 5DT. Tel. No. Not Yet Confirmed.

- Fife Survey Team (Tom McDonald), Units 9 & 10, 25 Dunnikier Road, Kirkcaldy, Fife KY1 2RU
Tel. 01592 206 481
- Inverness Survey Team (Paul Gallagher), Unit 4a, 4 Carsegate Road North, Inverness IV3 8DU,
Tel. 01463 714 746
- Perth Survey Team (Angus Blair), Scottish Agricultural Colleges, Cleeve Gardens, Oakbank
Road, Perth PH1 1HF, Tel. 01738 636 611
- Tweed Valley Survey Team (Carol Jones), 115/117 High Street, Galashiels TD1 1RZ,
Tel. 01896 755 516

iv. LIST OF COUNTRY PARKS AND RANGER SERVICES

1. Aden Country Park, Aberdeenshire Council, Mintlaw, Aberdeenshire AB42 8FQ
2. Almondell & Calderwood Country Park Visitor Centre, Broxburn, West Lothian EH52 5PE
3. Badenoch & Strathspey Ranger Service, Aultlarie Farm, Newtonmore, Invernessshire, PH20 1AY
4. Balloch Castle Country Park, North Lodge, Balloch, Dunbartonshire G83 8LX
5. Balmedie Country Park, Aberdeenshire Council, Balmedie, Aberdeen, AB23 8XG
6. Beecraigs Country Park, West Lothian Council, Whitebaults, Linlithgow, West Lothian EH49
6PL
7. Ben Lawers, NTS Visitor Centre, Killin, Perthshire, FK21
8. Calderglen Country Park, South Lanarkshire Council, Visitor Centre, Strathaven Road, East
Kilbride
9. Cambo Country Park, Kingsbarn, St Andrews, Fife KY16 8QD
10. Camperdown Country Park Ranger Service, Dundee DD2 4TF
11. City Of Edinburgh Council Ranger Service, Hermitage Of Braid, 69a Braid Road, Edinburgh,
EH10
12. Clan Donald Ranger Service Clan Donald L. Trust Visitor Centre, Armadale Castle, Ardsvar,
Isle of Skye IV45 8RS
13. Crathes Castle, S Banchory, Kincardineshire AB31 3QJ
14. Crombie Country Park, Angus Council, Monikie, Broughty Ferry, Angus DD5 3QL
15. Dean Castle Country Park, East Ayrshire Ranger Service, Dean Road, Kilmarnock, Ayrshire
KA1
16. Dumfries & Galloway Council, Env. & Infrastructure (E) Senior Ranger, English Street,
Dumfries DG1 2DD
17. Dundee City Council Ranger Service, Clatto Country Park, Dalmahoy Drive, Dundee DD1
18. Drumpellier Country Park, North Lanarkshire Council, Townhead Road, Coatbridge ML5 1RX
19. East Lothian Council Ranger Service, Dept. of Education & Community Services, Court Street,
Haddington, East Lothian
20. Eglinton Country Park Ranger Service, North Ayrshire Council, Irvine, Ayrshire KA12 8TA
21. Falls of Clyde Ranger Service, SWT, The Dye Works, New Lanark Lanarkshire ML11
22. Fife Ranger Service East, Silverburn House, Largo Road by Leven KY8 5PU
23. Fife Ranger Service, Lomond Hills, Pitcairn Centre, Coul, Glenrothes, Fife KY7 6NX
24. Fife Ranger Service, Lochore Meadows Country Park, Crosshill, Ballingry, Fife KY5 8BA
25. Finlaystone Estate Ranger Service, Langbank Renfrewshire
26. Forfar Loch Ranger, Angus Council, Lochside Leisure Centre Forfar, Angus DD5
27. Forth & Clyde Canal, British Waterways, Canal House, Applecross Street, Glasgow G4 9NP
28. Glenmore Forest Park Visitor Centre, Forest Enterprise, Glenmore Aviemore PH22 1QU
29. Glen Nevis Ranger Service, Highland Council, Glen Nevis Visitor Centre, Fort William, PH3 3
6PF
30. Glen Tanar Trust Ranger Service, Braeloine Interpretive Visitor Centre, Aboyne, Aberdeenshire
AB34
31. Glencoe & Dalness Ranger Service, NTS, Glencoe Visitor Centre, Ballachulish, Argyll PA39
3HX
32. Gleniffer Braes Country Park, Renfrewshire, The Glen, Glenfield Road, Paisley, Renfrewshire
33. Hoddum & Kinmount Estates Ranger, Estate Office, Hoddum, Lockerbie, Dumfriesshire DG11
1BE
34. Haddo Country Park Ranger Service, Aberdeenshire Council, Tarves, Ellon, Aberdeenshire AB4
0ER
35. Haughton House Country Park Ranger, Aberdeenshire Council Alford, Aberdeenshire AB3 8NA
36. Hopetoun House Ranger Service, Hopetoun House, South Queensferry, West Lothian

37. Jupiter Urban Wildlife Centre, SWT, c/o Zeneca, Earls Road, Grangemouth FK3 8XG
38. Kelburn Ranger Service, Kelburn Country Centre, Kelburn, Fairlie, Ayrshire
39. Linn Park Ranger, Glasgow City Council Ranger Service, Mansion House, Linn Park, Clarkston Road, Glasgow G44 5TA
40. Lochwinnoch Nature Centre, RSPB Warden, Largs Road, Lochwinnoch PA12 4JF
41. Monikie Country Park Ranger Service, Angus Council, Ranger Station Monikie, Broughty Ferry, Angus DD5 3Q
42. Montrose Basin Ranger, SWT Wildlife Centre, Rossie Braes, Montrose Angus
43. Moray Estates Ranger Service, Estates Office, Forres, Morayshire IV36 0ET
44. Muiravonside Country Park, Falkirk Ranger Service, Whitecross Linlithgow, West Lothian EH49 6LN
45. Northern Officer SWT, Easter Brae, Springfield, Kilbockie, Ross-Shire IV7 8JU
46. Pentland Hills Regional Park Ranger Service, Boghall Farm, Biggar Road, Edinburgh EH10 7DX
47. Perth & Kinross Council Ranger Service, Leisure & Cultural Services, Old Council Chambers, High Street, Perth PH1 5JU
49. Polkemmet Country Park Ranger Service, West Lothian Council Ranger Service, Whitburn, West Lothian EH47 0AD
50. Pollok Country Park, Glasgow City Council Ranger Service, 2060 Pollokshields Road, Glasgow G43 1AT
51. Rothiemurchus Estate Ranger Service, Visitor Centre, Rothiemurchus, Aviemore, Inverness-Shire
52. St Abbs Head, NTS /SWT Ranger Naturalist, Rangers Cottage, Northfield, St Abbs, Eyemouth, Berwickshire
53. Stirling Council Ranger Service, Environmental Services Dept Viewforth, Stirling FK8 2ET
54. Townhill Country Park Ranger Service, Townhill, Dunfermline, Fife KY12 0HT
55. Urban Wildlife Officer, SWT, 211, 18 High Street, Paisley PA1 2BS
56. Vane Farm Nature Centre, RSPB Warden, Loch Leven, Kinross, KY13 7LX
57. Vogrie Country Park Ranger Service, Midlothian Council, Gorebridge Midlothian EH22 4NU
58. West Lothian Council Ranger Service, Bloom Farm, Livingston Village, Livingston, West Lothian EH54 7AF
59. Western Officer, SWT, 25 Bloomgate, Lanark ML11 9ET

SOME SOFTWARE FOR BIOLOGICAL RECORDING AND HOW TO OBTAIN THEM

- '*BioBase*' recording software developed for the Look Out for Mammals project, and comes with DMap and the software to connect the two. Costs £140 from the Mammal Society (see above)
- '*Darter*' 8.0 is a version of *BioBase* using *MS Access* and is developed for the Dragonfly Society. It is available from Mr David Winsland, 2 Stourfield Road, Bournemouth BH5 2AR to BDS members at a discount price of £60 + £2 p&p.
- *DMap* developed and marketed privately by Dr Alan Morton, Blackthorn Cottage, Chawridge Lane, Winkfield, Windsor, Berkshire SL4 4QR costing £80. Maps by latitudes/longitudes or national grid.
- '*Levana*' - designed for Butterfly Conservation solely to record butterflies. Limited mapping facilities included. Available at £50 from Jim Asher
- '*Recorder 2000*' No indication of price as yet. Will include a mapping programme. Is time-tabled to become available late 1999-early 2000 from JNCC, address as below.
- '*Recorder 3.3*' £170, includes the mapping programme Plot5. Available from Eva Leck, JNCC, Monkstone House, City Road, Peterborough PE1 1JY direct line 01733 866 866.
- '*Recordit*' 8.0 - developed for the Conchological Society. There is a marine (uses latitude/longitude) and a land version (uses national grid). It costs £40, and interlinks direct with DMap (not included). Available from Mr Mike D Weideli, 35 Bartlemy Road, Newbury, Berks, RG14 6LD

Ivarious linking programmes with *Recorder 3.3*. Enquiries to Thurner Automation (Mike Thurner) Winton, Lower Ham Road, Elstead, Surrey, GU8 6HQ, Tel: 01252 702563 Mobile: 0777 5628102

APPENDIX D

Suggestions for the library shelf

The following list is intended to fill a few gaps necessarily left in the coverage of biological recording from Section 4. In particular, this list covers titles relating to the recording and monitoring of habitats, but some general reference books and other titles of benefit and interest to the general naturalist have also been included. No coverage of management techniques have been attempted.

Anyone looking for identification guides on particular species or groups should consult Section 4, under the appropriate recording scheme.

JOURNALS

- *British Wildlife*, an independent bi-monthly magazine covering all aspects of British natural history and conservation. Individual subscription is £18.95, libraries etc. £21.95. Back copies at £3.50 each. Contact Subscription Dept, British Wildlife Publishing, Lower Barn, Rooks Farm, Rotherwick, Hook, Hants RG27 9BG. A must for anyone interested in wildlife.

There are also a great number of journals and magazines published by individual schemes and these are listed in Section 4.

BOOKS & REPORTS

1. BIODIVERSITY

- Department of the Environment, *Biodiversity, The UK Steering Group's Report*, Vol 1: 'Meeting the Rio challenge', (pbk £26), Vol 2: 'Action Plans', (pbk£30), 326pp. HMSO. This has now become the bible for Local Biodiversity Action Plan partnerships and other people working towards protecting and enhancing biodiversity.
- UK Biodiversity Group, Tranch 2 Action Plans - (Free from the UK Biodiversity Secretariat, Room 902D, Tollgate House, Bristol BS2 9DJ, Tel:- 01179 878974)
 - Vol.1 *Vertebrates and Vascular Plants*
 - Vol. 2 *Terrestrial and Freshwater Habitats*
 - Vol. 3 *Plants and Fungi*
 - Vol. 4 *Invertebrates*
 - Vols 5-6 expected 1999
- *Biodiversity News*, a quarterly newsletter, also free from the UK Biodiversity Secretariat
- Ward, S D (1999), Local Biodiversity Action Plans: - Technical information on Species: I. Cryptogamic Plants and Fungi, SNH Review Series No 70. £5
- McKinnell & Sydes, C, Local Biodiversity Action Plans - Technical Information on Species: II. Vascular Plants. SNH Review Series No 125. £5

2. HABITAT SURVEYING

- *Handbook for Phase 1 Habitat Survey: a Technique for Environmental Audit*, JNCC (pbk 12.00), 78pp. Part 1 'Operational guide lines'; part 2 'Field Manual'. Maps, tables. The standard basic survey manual for phase 1. A must for anyone involved in surveying and auditing habitats and useful for others to understand how it is done
- Rodwell, J S (ed.) *British Plant Communities*, CUP
 - Vol 1 (1991) *Woodland and Scrub* (pbk £27.95)
 - Vol 2 (1992) *Mires and Heaths* (pbk £29.95)
 - Vol 3 ((1992) *Grassland and Montane Communities* (pbk £29.95)
 - Vol 4 (1995) *Aquatic Communities, Swamps and Tall Herbs* (pbk £24.95)
 - Vol 5 (1999) *Maritime and Weed Communities* (hbk £75.00)

All the above also available in hardback at a price between £95-£65 depending on the volume. Essential for professionals as well as amateur botanists, these volumes provide a

systematic and fully comprehensive account of the vegetation types of Great Britain (not Northern Ireland).

3. LAND COVER

- Mackey, EC, Shrewry, MC & Tudor, GJ (1998), *Land Cover Change: Scotland from the 1940s to the 1980s*, Edinburgh, The Stationary Office, (hbk £80). This important and very readable publication provides statistically robust, quantitative data on land change in Scotland based on three series of aerial photography (1940s; 1970s and 1980s). It lays a solid foundation for all future land cover monitoring.
- Anon. (1993), *The Land Cover of Scotland 1988: Executive Summary*, Aberdeen, Macaulay Land Use Research Institute

4. COASTS AND SEAS

A 'Coastal Directory Series' in 17 volumes, produced and published by JNCC, has recently completed the coverage of Scotland. The volumes on Scotland are (1) Shetland, (2) Orkney, (3) North-east Scotland: Cape Wrath to St Cyrus, (4) South-east Scotland: Montrose to Eyemouth, (13) Colwyn Bay to Stranraer, (14) South-west Scotland: Ballantrae to Mull, (15&16) Wester Isles and west Highland. Each volume covers the geology and physical environment, terrestrial coastal habitats, marine and estuarine environments, important species, archaeology and human history, coastal protected sites, land use, infrastructure, coastal defence, human activities (including fisheries, dredging, waste disposal, and leisure & tourism), coastal management. All volumes are in hard-back A4 size with b/w illustrations, maps etc., costing around £80 each.

5. MONITORING

- Sutherland (ed) (1996), *Ecological census Technique*, CUP, (pbk £17.95), 336pp. b/w illustration. This publication contains much practical information on the main techniques of monitoring plants and animals in the field.
- Scottish Natural Heritage (in prep.), *A Species and Habitats Monitoring Handbook*, Vols 1-3. This handbook of monitoring methods is due for publication in the year 2000.

Two useful series from SNH

'SNH Reviews' and 'Research Survey and Monitoring Reports' are published by Scottish Natural Heritage, generally costing less than £10 each, and the full lists can be obtained from SNH, Battleby, Redgorton, Perth PH1 3EW. LRCs may want to look at the many titles which have relevance to their own areas, but listed here are a few titles of universal interest:

1. Research Survey and Monitoring series:

- Peterken, G F, Baldock, D & Hampson, A (1995) *A Forest Habitat Network for Scotland*, Research Survey and Monitoring series No 44 (£7.50)
- Cox, R, Parr, T W & Wyatt, B K (1995) *Look-up Tables for comparing key Land Cover Classifications*. Research Survey and Monitoring series No 45 (£7.50)
- Carey, P D, Hill, M O & Fuller, R J (1996) *Biodiversity Hotspots in Scotland*, Research Survey and Monitoring series No 77 (£6.00)
- Lindsay, r A & Immirzi, C P ((1996) *An Inventory of lowland Raised Bogs in Great Britain* , Research Survey and Monitoring series No 78 (£5.00)
- Kierner, M, Carey, P D, Palmer, S & Roy, D B (1998), *The Biological Zones and Biodiversity of the Coastal Waters of Scotland* , Research Survey and Monitoring series No 103 (£10.00)
- An Inventory of Blanket Bogs series - with volumes for different areas
- A Sand Dune Vegetation Survey of Scotland series - usually 3 volumes for each area - (cost varies between £15 - £30 per set)

2. Review Series

- Environmental Resources Management (1995), *Environmental Audit and Assessment: concept, measures, practices and initiatives* , Review Series No 46 (£6.00)
- Allan, R L, Dickinson, G, Dickson, J H, etc. (1996) *The Natural Heritage Interest of Bings (waste tips) in Scotland: Inventory and Review* , Review Series No 48 (£6.00)

- Davidson, D M (1996) *A Review of the total number of Marine Species that occur in Scottish Coastal Waters* Review Series No 63 (£5.00)
- Focus on Firths series: volumes so far on Moray and Forth (@ ca. £6.00)
- Landscape assessment series (ranging in price from £22.00 to £35.00 per volume).

6. DICTIONARIES

Latin names of groups and species are often bewildering to the non-expert, and it may be difficult to place a group within the greater scheme of things. These dictionaries provide invaluable assistance:

- Lincoln, RJ, Boxhall, GA & Clark, P, *A Dictionary of Ecology, Evolution and Systematics*, second edition, Cambridge University Press (pbk £17.95), 361pp. A comprehensive and wide-ranging dictionary, explaining all those difficult terms. Has more than 11,000 entries.
- Barnes, RSK (ed.) (1984), *A Synoptic Classification of Living Organisms*, Blackwells (o/p?)
- Allaby, M (1998) *The Concise Oxford Dictionary of Ecology*, second edition, OUP (pbk£7.99) 415pp
- Hale & Margham (eds) (1995) *Collins Dictionary of Biology*, second edition, HarperCollins (pbk £9.99) 656pp, figures.

7. SOME ADDITIONAL TITLES FOR SPECIES IDENTIFICATION

Birds

- Harris, A Tucker, L and Vinicomb, K (1989), *The Macmillan Field guide to Bird Identification*, Macmillan, (hbk 14.95) 226pp, with colour illustrations. An identification book with a difference. Not intending to cover all species it concentrates on the difficult plumages in common and rarer birds which can cause confusion in the field. Excellent artwork.
- Thom, V (1986), *Birds in Scotland*. Poyser, (hbk £25.00). Species accounts of all species occurring in Scotland and providing an update on Baxter and Rintoul's classic work in 2 volumes *The Birds of Scotland* (1953).

Fish

- Miller, P & Loates, MJ (1997), *Collins Pocket Guide: Fish of Britain and Europe*, HarperCollins. (pbk £12.99), 288pp. 2000 colour illustrations. Covers fresh water as well as marine species in Europe, 753 species in total.
- Vas (1991) *A Field Guide to the Sharks of British Coastal Waters*, AIDGAP Guide, FSC, (pbk £5) 36pp, line drawings

Invertebrates

Some inexpensive series, such as 'The Naturalists' Handbooks' series from Richmond Publishing Co. are aimed at project work at school or university and make excellent introductions for beginners. There are currently 25 titles. A full list of the series is available from the publishers. Some cross boundaries between groups. The AIDGAP series, published by the Field Studies Council, fills similar gaps, and the British Museum (Natural History) produces a number of introductory books on a variety of subjects (list of publications from the BM's Book Shop (see 'Useful Addresses' Appendix C). A useful bibliography of the various groups of insects can be found in the journal *British Wildlife* Vol 10(3) 156-163.

General introductions to insects

- Chinery, M (1986, 1997), *Collins Guide to the Insects of Britain and Western Europe*, HarperCollins (pbk £12.99) 320pp. Over 2000 species illustrated in colour. Although only the commonest species are illustrated, this book provides an excellent way into the complex world of insects. An illustrated key helps beginners to differentiate between the various groups, and the moth section is particularly useful, as it illustrates the insects in their natural rest position as they would be observed in the wild.
- Chinery, M (1993), *Field Guide to the Insects of Britain and Northern Europe*, 3rd edition. HarperCollins (hbk £16.99). 448pp. The standard work which is commonly viewed as the best introduction for the layman. 778 coloured illustrations and 1000 in black/white
- Redfern, *Insects and Thistles*, Naturalists' Handbook series No 4, Richmond Publishing Co. (hbk £16.00 or pbk £8.95). Like the rest of the series, it is an excellent introduction to the study of invertebrates.

General introduction to other inverts

- Hayward, PJ & Ryland JF (eds) (1995), *Handbook of the Marine Fauna of NW Europe*. Oxford University Press, (pbk £29.50), 880pp, 1996 reprint with corrections. Covers the commonest 1500 species from all major marine groups, with 2000 illustrations (b/w)
- Anon (1991) *Ladybirds and Lobsters, Scorpions and Centipedes: Introducing the Arthropods*, British Museum Natural History (£5.00).108pp. Many colour photos
- Sims, RW & Gerard, BM, (1985) *Earthworms*, Synopsis of the British Fauna (new series) Vol 31, Brill (£10.65) 171pp. Line drawings.
- Ellis, AE (1978), *British Freshwater Bivalve Mollusca*, Synopses of the British Fauna (new series) No 11, Linnean Society of London (o/p?).

Vascular Plants

Some titles, currently in print, for general introduction to the groups:

- Blamey, M (1997), *Wild Flowers by Colour*, Dorling Kindersley (hbk £19.99) covers 1500 species occurring in Britain and Ireland and about 400 from Europe, arranged by colour with life-size illustrations (unless stated otherwise), English names and months of flowering.
- Fitter, Fitter & Blamey (1996), *Collins Pocket Guide: Wild flowers of Britain and Northern Europe*, 5th edition, HarperCollins (pbk £12.99). Illustrates in colour 1450 species of wild flowers, trees and shrubs, with easy to use keys.
- Fitter, R, Fitter, A & Farrer, A (1984), *Collins Guide to Grasses Sedges Rushes and Ferns of Britain and Northern Europe*, HarperCollins, (pbk £12.99). Describes 590 species (420 illustrated) with some distribution maps.

Wild flower keys and Excursion Floras

- Clapham, Tutin & Warburg (1985), *Excursion Flora of the British Isles*, Cambridge University Press, 500pp. A very popular work, first produced in 1959, with two new editions in 1969 and 1981, and further corrections in 1985.
- Rich, TC G & Jermy, A C (1998), *Plant Crib 1998*, Botanical Society of the British Isles (pbk £20.50), 391pp. Designed to help with the recording and identification of plants for Atlas 2000, aiming to augment Stace (see below) and the various BSBI handbooks (see the BSBI entry in Section 4 of this guide) with additional keys, identification hints, drawings and comments.
- Rose, F (1991), *The Wild Flower Key: British Isles - North West Europe*, Warne (pbk 12.99), 480pp. - A reprint of this very popular work, which describes ca. 1400 species with 1050 illustrated in colour. Useful keys include plants not in flower.

Orchids

- Allen & Wood (1993), *Wild Orchids of Scotland*, Royal Botanic Garden, Edinburgh (hbk £24.95). All 28 species of orchids found in Scotland described in details with exquisite colour photographs and distribution maps. Also keys to identification.

Trees

- Mitchell, A (1988), *A Field Guide to the Trees of Britain and Northern Europe*, second edition. HarperCollins (hbk £16.99), 420pp, 40 colour plates and many line drawings. The standard reference work.
- Mitchell, A (illustrations by D More) (1997), *The complete Guide to Trees of Britain and Northern Europe*, second edition (pbk £8.95). A basic reference work with illustrations and maps.

8. BOOKLETS AIMED AT THE NON-EXPERT

SNH produce a number of informative, beautifully illustrated, inexpensive booklets which provide useful introductions to a variety of subjects, including biodiversity, different types of habitats, different groups of species, wildlife and the law, etc. A publications catalogue is available from Battleby, Redgorton, Perth PH1 3EW, Tel: 01738 627921 Fax 01738 827411

Email pubs@redgore.demon.co.uk

APPENDIX E

DEVELOPMENTS IN BIOLOGICAL RECORDING A BIBLIOGRAPHY

This bibliography is a selection of references which relate to the development of biological recording and its purposes. It is intended mostly as an incentive for people interested in the historical development of biological recording to read something of what has been said and written over the last couple of decades.

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APPENDIX F

The Legislative Framework for Handling Information

UK Legislation and policy

Environmental Information Regulations 1992	Implements in the UK the EC Directive on Freedom of Access to Information on the Environment (90/313/EC).
Copyright (Computer Programs) Regulations 1992	Provides protection for computer software
Copyright, Designs and Patents Act 1988	Provides protection for all published and unpublished works, including database compilations
Data Protection Act 1984	Provides legislative control on the personal information which can be held in computer files and the uses to which those data may be put.
Supply of Goods and Services Act 1982	Regulates contracts to supply goods and services.
Sale of Goods Act 1979	If goods are supplied, the provider is bound to ensure their fitness for the purpose intended.
Public Register and Records (Scotland) Act 1948	Governs the storage and archiving of information held by public bodies.
Code of Practice on Access to Government Information	Gives the public a right of access to information about “the policies, actions and decisions of Government departments, agencies and public bodies”.
Tradable Information Initiative	DTI initiative to create an information market. Potential conflicts with freedom of access to environmental information.
Government.direct (Green paper Cm 3438)	Prospectus for the electronic delivery of Government services.
Your Right to Know (White paper Cm 3818)	Proposals for the creation of a Freedom of Information Act.

International Legislation

EC Directive on Freedom of Access to Information on the Environment (90/313/EC).	Gives the public a right of access to environmental information.
EC Directive on European harmonisation of copyright protection(93/C 27/09)	Harmonises the period of copyright protection to 70 years. UK legislation to implement the Directive is expected.
EC Directive on data protection (95/46/EC)	Harmonises data protection across Europe, and extends data protection principles to paper files. UK legislation to implement the Directive is expected by October 1998.
EC Amended proposal for the Legal Protection of Databases (93/C 308/01)	EU proposal to provide legal protection to the compilers of databases against unfair extraction (which is not protected under EC copyright law). UK legislation to implement the Directive is expected.

Reproduced from James Williams paper to BRISC Workshop for LRCs managers (Perth, June 1998)

APPENDIX G

GIVING A GRID REFERENCE

This can only be done by referring to the National grid as marked on Ordnance survey maps. The most commonly used OS maps are the Landranger series (red) of 1:50,000 and the Pathfinder series (green) 1:25,000. Both are available for sale in all good bookshops, tourist shops, etc. The national grid is marked as vertical and horizontal lines across these maps and the relevant grid numbers given along the edge of each map, while the 100km square is printed as large blue letters in the corners of the map and also on a drawing as part of the legend in the Landranger series, or on the cover of the map as in the Pathfinder series.

There are three elements of a grid reference:

1. The relevant 100km square, given as two letters e.g. NO or as two numbers, in this case 37 (see the map below for how to translate letters into numbers and visa versa).
2. The 'eastings' (i.e. the grid line numbers marked at the top and bottom of the map)
3. The 'northings' (i.e. the grid line numbered marked along the sides left and right on the maps).

Giving a grid reference is simply to state the point where the eastings cross the northings.

It is important to remember **always to give the eastings first, then the northings.**

Grid references relate to the area or square determined by the given grid lines and can be at the accuracy of

100km	2 letters such as NO
10km	2 letters and 2 figures such as NO41
1km	2 letters and 4 figures such as NO4016
100m	2 letters and 6 figures such as NO401168
10m	2 letters and 8 figures such as NO40181685

Some schemes ask for 'tetrads' or 'quadrates', which is less exact than 1km squares but better than 10km squares. The basic unit is then a 10km squares, which has first to be determined as above, but the next division is then slightly different from that shown above.

For 'Tetrads' each 10km square is divided into 25 2 x 2km squares, and each of these 25 divisions is given a letter (to distinguish them from 1km squares) starting at the bottom left-hand corner, going up and to the right as follows:

E	J	P	U	Z
D	I	N	T	Y
C	H	M	S	X
B	G	L	R	W
A	F	K	Q	V

the tetrad A is written as NO41A

It may be necessary to mark the map, using a highlighter pen, to avoid confusion when recording by tetrads

'Quadrates' are used less frequently: they are arrived at by dividing each 10km square into 4 x 5km squares thus:

NW	NE
SW	SE

written as NO41 SW, NO41 NW, etc.

Watsonian Vice County numbers and corresponding Vice Counties

ENGLAND & WALES

1. West Cornwall (with Scilly)	26. West Suffolk	51. Flintshire
2. East Cornwall	27. East Norfolk	52. Anglesey
3. South Devon	28. West Norfolk	53. South Lincolnshire
4. North Devon	29. Cambridgeshire	54. North Lincolnshire
5. South Somerset	30. Bedfordshire	55. Leicestershire (with Rutland)
6. North Somerset	31. Huntingdonshire	56. Nottinghamshire
7. North Wiltshire	32. Northamptonshire	57. Derbyshire
8. South Wiltshire	33. East Gloucestershire	58. Cheshire
9. Dorset	34. West Gloucestershire	59. South Lancashire
10. Isle of Wight	35. Monmouthshire	60. West Lancashire
11. South Hampshire	36. Herefordshire	61. South-east Yorkshire
12. North Hampshire	37. Worcestershire	62. North-east Yorkshire
13. West Sussex	38. Warwickshire	63. South-west Yorkshire
14. East Sussex	39. Staffordshire	64. Mid-west Yorkshire
15. East Kent	40. Shropshire (Salop)	65. North-west Yorkshire
16. West Kent	41. Glamorgan	66. Durham
17. Surrey	42. Breconshire	67. South Northumberland
18. South Essex	43. Radnorshire	68. North Northumberland (Cheviot)
19. North Essex	44. Carmarthenshire	69. Westmorland with North Lancashire
20. Hertfordshire	45. Pembrokeshire	70. Cumberland
21. Middlesex	46. Cardiganshire	71. Isle of Man
22. Berkshire	47. Montgomeryshire	113. Channel Isles
23. Oxfordshire	48. Merionethshire	
24. Buckinghamshire	49. Caernavonshire	
25. East Suffolk	50. Denbyshire	

SCOTLAND

72. Dumfriesshire	87. West Perthshire (with Clackmannan)	100. Clyde Isles
73. Kirkcudbrightshire	88. Mid Perthshire	101. Kintyre
74. Wigtownshire	89. East Perthshire	102. South Ebudes
75. Ayrshire	90. Angus (Forfar)	103. Mid Ebudes
76. Renfrewshire	91. Kincardineshire	104. North Ebudes
77. Lanarkshire	92. South Aberdeenshire	105. West Ross
78. Peebleshire	93. North Aberdeenshire	106. East Ross
79. Selkirkshire	94. Banffshire	107. East Sutherland
80. Roxburghshire	95. Moray (Elgin)	108. West Sutherland
81. Berwickshire	96. East Inverness-shire (with Nairn)	109. Caithness
82. East Lothian (Haddington)	97. West Inverness-shire	110. Outer Hebrides
83. Midlothian (Edinburgh)	98. Argyll Main	111. Orkney Islands
84. West Lothian (Linlithgow)	99. Dunbartonshire	112. Shetland Islands (Zetland)
85. Fifeshire (with Kinross)		
86. Stirlingshire		

IRELAND

H.1. South Kerry	H.15. South-east Galway	H.29. Leitrim
H.2. North Kerry	H.16. West Galway	H.30. Cavan
H.3. West Cork	H.17. North-east Galway	H.31. Louth
H.4. Mid Cork	H.18. Offaly (King's County)	H.32. Monaghan
H.5. East Cork	H.19. Kildare	H.33. Fermanagh
H.6. Waterford	H.20. Wicklow	H.34. East Donegal
H.7. South Tipperary	H.21. Dublin	H.35. West Donegal
H.8. Limerick	H.22. Meath	H.36. Tyrone
H.9. Clare	H.23. West Meath	H.37. Armagh
H.10. North Tipperary	H.24. Longford	H.38. Down
H.11. Kilkenny	H.25. Roscommon	H.39. Antrim
H.12. Wexford	H.26. East Mayo	H.40. Londonderry
H.13. Carlow	H.27. West Mayo	
H.14. Leix (Queen's County)	H.28. Sligo	

Other Grid refs

Alderney 90/48

Guernsey 90/15

Herm 90/25

Jersey 90/442

Sark 90/35

Scilly Islands 00/90

St Kilda 09/20

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