



Species Action Plan

THE CHEQUERED SKIPPER
Carterocephalus palaemon

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The Action Plan was prepared in consultation with the following organisations with the intention that they will participate in the actions outlined: English Nature, Scottish Natural Heritage, Aberdeen University, Forestry Authority, Forest Enterprise, Tillhill Economic Forestry, Scottish Wildlife Trust, Scottish Office Agriculture, Environment and Forestry Department.

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Butterfly Conservation (the British Butterfly Conservation Society) has an overriding objective to ensure a future for butterflies, moths and their habitats. In order to achieve this objective its aims are to:

- raise public awareness of the plight of our butterflies and moths and encourage public involvement in conservation.
- halt the decline of butterflies and moths and maintain or improve the present status of threatened species.
- improve the extent and suitability of key lepidoptera habitats and the environmental quality of the countryside as a whole for all lepidoptera species.
- work with and advise other conservation groups, local bodies and agencies on techniques of land management which favour butterflies and moths and related wildlife.
- acquire and manage habitats for butterflies and moths.
- encourage the research (both at amateur and professional levels) on butterflies and moths.
- support and encourage butterfly and moth conservation world-wide.

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Summary

- The Chequered Skipper *Carterocephalus palaemon* is a Red Data Book species in the UK and is threatened in Europe where it is classified as vulnerable. It is listed as a globally threatened species by the IUCN. It is protected in the UK by the Wildlife and Countryside Act with respect to trade only.
- The British population is now restricted to about 50 sites in a small area of western Scotland, although its status here requires further clarification. In England, it was formerly fairly common in the East Midlands, but became extinct in the 1970s. A re-introduction to England was conducted by Butterfly Conservation in 1995.
- In Scotland, the major threats to the species are overgrazing of larval habitats and/or dense scrub development and shading of adult habitats in the absence of light grazing, or other management. Unsympathetic forestry developments and other woodland improvement schemes are potentially threatening. In England, opportunities for re-establishing viable colonies are limited by lack of traditional open woodland habitats in its former sites.
- The major objectives of the plan are to ensure existing sites are maintained; to increase the number of sites protected; and improve biological knowledge, particularly of population trends and status. In England, a major objective is to restore a self-sustaining population by the year 2000 and to re-establish six populations by 2005 if suitable habitat can be restored.
- The objectives of the plan will be achieved by further surveys of the status of the species; maintaining beneficial management on key sites; encouraging sympathetic management at sites associated with commercial activities such as forestry plantations; establishing further monitoring of population trends at key sites; and increasing the number of sites that are protected. Research will be supported, particularly concerning the responses of populations to management. In England, the objectives will be achieved by continuing the re-establishment programme with appropriate monitoring.
- The Action Plan and the conservation of this butterfly will be publicised. Funds will be sought to ensure all proposed actions are implemented.
- The Action Plan covers the next ten years, will be monitored annually and reviewed in the year 2000 or such earlier time as the situation demands.

Part 1 Overview

1.1 PRIORITY STATEMENT

In the UK, the Chequered Skipper *C. palaemon* has declined substantially in the last 40 years and is now confined to a small area of western Scotland where it is known from about 50 sites (Ravenscroft 1994a). Its conservation requirements have been thoroughly investigated but knowledge of its status and population trends is moderate and many sites are unprotected. The butterfly was formerly widespread in the east midlands of England but became extinct in 1976. An attempt to re-introduce it to England was made in 1995 (Warren 1995). It is a Red Data Book species in Britain (Category 4, (Shirt 1987)), and is classified as a vulnerable species in Europe due to its widespread decline (Heath 1981a). It is nearly extinct in Holland and is one of three butterflies included on the European Red List of globally threatened animals and plants (IUCN 1991). Because of the international threat to the Chequered Skipper, **high** priority should be afforded to conservation action within the UK.

1.2 BROAD OBJECTIVES

1. Maintain current range in Scotland, focusing on key centres of distribution.
2. Increase knowledge of the butterfly's status and population trends.
3. In England, continue re-introduction programme on existing site and re-establish five further colonies by 2005 if suitable sites can be found.

1.3 LEGAL STATUS

The Chequered Skipper is listed on Schedule 5 of the 1981 Wildlife and Countryside Act for sale only. The English populations were retrospectively afforded full legal protection until 1989.

1.4

Status and Level of Biological Knowledge

Population	-size	Known from 30 10km squares in an area of western Scotland. About 50 known sites in 1993 although many are very small and may be satellites of nearby larger populations. About ten core populations thought to exist.
	-trend, numbers	Data only available from three current sites, but underlying trend apparently stable. Good historical data on decline in England.
	-trend, range	Stable.
Knowledge of	-status	Range well defined, knowledge of distribution within this moderate.
	-trends	Poor. No long-term monitoring data available.
	-conservation	Good knowledge of suitable requirements, management and methods for creating habitat in Scotland. Comparatively poor knowledge of its requirements in England.

Part 2 Biological Assessment

2.1 INTRODUCTION

The Chequered Skipper *Carterocephalus palaemon* is a boreal species that occurs across Europe, Asia and north America (Collier & Emmet 1990). It is declining in several European countries and is included on European Red Lists (Heath 1981a). It is endangered in some countries outside Europe (*e.g.* Japan) and is listed as globally threatened species (IUCN 1991). Thirty years ago, it was fairly common in the English east midlands in damp woods and fens, but it died out here in 1976, probably through neglect of its habitat (Heath, Pollard & Thomas 1984). The known history of the species in Scotland, where it is primarily a woodland edge and scrub butterfly, is short, not having been documented here until 1942 (Mackworth-Præd 1942). There are no recognised subspecies, but genetic research into the relatedness of the various populations is ongoing (Pullin pers. comm.). Its decline in England and uncertain status in Scotland led to full protection under the Wildlife and Countryside Act 1981 in England, but it was removed from the fully protected list in 1989. It is currently listed on schedule 5 with respect to trade only and is Red Data Book Category 4 (out of danger), although listed as nationally scarce (Shirt 1987).

2.2 ECOLOGY

Most of our knowledge of the Chequered Skipper has been obtained on habitats in Scotland and forms the basis of this account. In Scotland, it is associated with areas of lightly grazed or ungrazed grassland, scrub and marsh around open broad-leaved woodland, usually oak or birch, on steep or gentle slopes, on wet but well-aerated soils (Ravenscroft 1994b). The general landscape is species-poor and dominated by the foodplant, Purple Moor-grass *Molinia caerulea*, Heather *Calluna vulgaris* and other plants characteristic of waterlogged soils and peats such as Cotton Grasses *Eriophorum* spp.. The larvae of the Chequered Skipper occur on patches of well-aerated soils (*i.e.* that allows water movement through the soil), often close to the richer soils of woodland, where the foodplant grows in a luxuriant form, typically in association with tall Bog Myrtle *Myrica gale* and Birch scrub *Betula pubescens* (Ravenscroft 1994b). These patches are only sometimes close to nectar sources along the shelter of the woodland edge or on patches of more base-rich soils.

The butterfly is univoltine and flies from the third week of May until the end of June (mid-July in some years). Adults may live up to three weeks although the average is around 10 days (Ravenscroft 1992). They are highly active and mobile. Adults may travel large distances from larval hostplants before they encounter suitable nectar patches or areas for mate location where they congregate. Some females in particular are thought to move several kilometres and individuals are probably widely scattered towards the end of the flight period (Ravenscroft 1992).

Males are territorial and defend an airspace 3-4m across (Collier 1986, Davis 1990, Ravenscroft 1994c). They are usually located in warm, sheltered areas, either amongst scrub, along a woodland edge or a bracken front. Low vegetation and a number of taller perches within the territory are important to maintain high temperatures and good vision. Concentrations of males may occur in particularly suitable areas and airspace is defended vigorously. Females require large quantities of nectar and may gather in patches of Bugle

Ajuga reptans and Marsh Thistle *Cirsium palustre* growing on wet, richer soils amongst rushes *Juncus* spp. or light Sallow *Salix* sp. scrub, or occasionally on Bluebells *Hyacinthoides non-scripta* found in exposed areas of the woodland edge or amongst Bracken (Ravenscroft 1994b). Individual females may be found at such patches across the entire range of *C. palaemon* in the absence of other features important to the species.

Eggs are laid singly on the upperside of a leaf blade of *M. caerulea* and take 2-3 weeks to hatch by late June or early July. The larvae live in a series of shelters made by rolling a leaf blade and securing it with silk. They live high on the foodplant, between 20-30cm from the ground. Shelters are thought to be anti-predatory but they may also play a microclimatic role (Ravenscroft 1992). About six to seven shelters are made in the first three instars before the larva becomes free-living in early September through to hibernation in late October or early November. The larva feeds extensively in this final stage and its damage becomes conspicuous to the trained eye. It feeds higher on the foodplant than the shelter stages, between 35cm-50cm, and is more vulnerable to grazing (Ravenscroft 1995a).

Full-grown larvae hibernate in a shelter made from 2-3 blades of *M. caerulea* (which may fall to the ground) and emerge in early spring. No further feeding takes place and the larvae pupate attached to a dead blade of *M. caerulea* between or among the bases of tussocks. Adults emerge after about six weeks.

Free-living larvae (later instars) suffer little loss to predators. The greatest mortality is in the egg and early shelters (early instars) and is mainly to invertebrate predators. Parasites have been recorded from eggs (*Trichogramma* sp.) and have emerged in cages containing pupae (*Crypteffigies albilarvatus* and *Cratichneumon fabricator*, both ichneumonids) but they appear not to be an important factor in population dynamics (Ravenscroft 1992).

The quality of the hostplant is critical to survival of larvae. Plants of *M. caerulea* that grow in poor conditions, such as those that are more waterlogged, have lower concentrations of nitrogen. Larvae develop slowly and die on these plants (Ravenscroft 1994d). Nevertheless, females lay some eggs in these situations. Plants of *M. caerulea* that grow on well-aerated soils are richer in nitrogen and larvae develop more successfully. Such plants are deeper green, often grow amongst dense, vigorous Bog Myrtle, Birch, Sallow or Alder *Alnus glutinosa*, scrub or are found on richer soils along the woodland edge, often in semi-shade, or amongst light Bracken cover. These plants also have a much longer growing period, staying green until late October, whereas other plants can start to brown in September before larval development is complete. Availability of foodplant at the end of the season may be crucial to larvae, which have an exceptionally long growing period and feed until hibernation (Ravenscroft 1994d).

In England, the Chequered Skipper primarily inhabited large woodland rides and rough grassland in and around woodlands (Collier 1986) and some populations were known from fen habitats. Similar habitats are occupied on the continent (Warren 1990). In England, the foodplant was believed to be mainly Wood False-brome *Brachypodium sylvaticum* growing along the edges of rides or amongst scrub (Collier 1986). This and other broad-leaved grasses such as Canary-grass *Calamagrostis canescens* and Wood Millett *Milium effusum* are also used on the continent (Warren 1990). However, few studies were made of the ecology of the species before its extinction in England and details of its exact breeding requirements are sparse.

There are probably similarities in habitat requirements in Scotland and England and techniques for successful management in Scotland provide an insight into that probably required in England. A cycle of woodland or scrub clearance provides a continuation of conditions for the Chequered Skipper in Scotland (Collier 1986, Young & Ravenscroft 1991).

In England, the species probably depended largely on woodland management, notably coppicing, to maintain open areas and wide rides (Warren 1990). In Scotland it is primarily a woodland edge species but woodland coppicing for domestic fuel and for charcoal furnaces would have been beneficial (Ravenscroft 1995a). Today, suitable management includes wayleaves beneath power lines that are cut at 7-10 year intervals through woodlands. The Chequered Skipper colonises these areas quickly, and they reach optimum suitability several years after cutting, when scrub development provides shelter at ground level (Ravenscroft 1994a). About one-third of known colonies (although many of these are small) breed to some extent within such wayleaves. Scrub clearance becomes necessary when nectar sources on which the butterfly depends become shaded. Habitats left ungrazed will eventually scrub over and browsing by deer, especially roe, is probably a key factor in natural maintenance of these areas. However, heavy grazing by livestock, usually cattle or sheep, will damage larval foodplants. Light grazing, or selective browsing by deer of saplings, is the preferred method of maintaining conditions for the Chequered Skipper (Ravenscroft 1994a,b, 1995a).

Precise habitat requirements of the Chequered Skipper in England are comparatively poorly known but are thought to include ungrazed grassland at the edges of woodland rides or within light scrub. Similar habitats are used in parts of western Europe where recent studies have found the butterfly breeding on a range of grasses in the shady edges of wide woodland rides (Warren 1990, Ravenscroft & Warren 1992). A range of other habitats are also used in western Europe including fens, coppiced woodland and calcicolous grassland with scrub. Some of these habitats were probably used in England (Collier 1966, 1972).

2.3 DISTRIBUTION AND POPULATION

Distribution

The Chequered Skipper occurs from Britain through Europe to Japan and in North America where it extends to Alaska (Collier & Emmet 1990, Scott 1986). In Europe it is found from Scandinavia to Greece, but the species is local throughout and absent from many countries including England, Portugal, Denmark, Ireland and much of Italy, Spain and France (Heath 1981a). Declines have been noted in many countries, including Holland, Czechoslovakia, France, Poland and Switzerland (Heath 1981a, Tax 1989).

The Chequered Skipper was first recorded in England in 1798 and was quite common in woodlands of the east midlands (mainly Bedfordshire, Cambridgeshire, Huntingdonshire, Lincolnshire and Northamptonshire) until the 1960s. There are old records in other parts of England, such as Dartmoor and possibly the Lake District (Collier 1986, Farrell 1973). Its decline was gradual and hardly noticed but its extinction was sudden. There were about 80 known sites at the turn of the century, 20 in the 1960s, but only six in 1971 before extinction in 1976 (Ravenscroft 1995a). It seems probable that a combination of factors was responsible. Declining coppicing practices would have increased shade levels in rides and glades and excluded the species from woodlands (Collier 1986, Warren 1990) and the

delayed effects of myxomatosis would have resulted in coarse grassland scrubbing over, despite initially improving the habitat for *C. palaemon* (Ravenscroft 1995a). Other factors, such as the destruction of marginal habitats around woodland, such as hedgerows, may have contributed to the isolation of habitats (Ravenscroft 1995a).

The butterfly was not known from Scotland until 1942 (Mackworth-Praed 1942), although records published later indicate the species was seen in 1939 (Evans 1949). Knowledge of its status has been poor until recently. Only five colonies were known by 1971, all close to Fort William, Inverness-shire (Farrell 1973). Recent efforts have increased the known total to 39 in 1984 (Collier 1986) and over 50 in 1993 (Ravenscroft 1994a). This reflects the elusive nature of the species (it remained unknown on one NNR for many years) and probably not a spread of the population. Currently, the species is known from 30 10km squares centred on Fort William: from Loch Arkaig in the north; east up Glen Spean to the 200m contour; south along Loch Linnhe, around Loch Creran to Loch Etive; and west along Loch Sunart to Ardnamurchan and Moidart (see Appendix 3).

Most breeding areas occur below the 200m contour along the edges of woodland at the bases of slopes, often beside lochs, rivers or burns. The expanse of semi-natural habitat and the inaccessibility of most of the landscape of this part of Scotland suggests that the butterfly remains overlooked within its range, although its distributional limits seem well defined. Further surveys of distribution are required.

It is thought that the distribution of the Chequered Skipper in Scotland is explained by a combination of bioclimatic boundaries and changes in topography affected by geology (Ravenscroft 1994d). These factors (mild climate, long growing season of plants, high rainfall, steep slopes) contribute to the presence of *M. caerulea* in a form suitable for successful development of larvae. Within the range of the Chequered Skipper in Scotland, however, the paucity of nectar sources close to woodland, compared with the abundance of nearby suitable larval foodplants, suggests that the amount of nectar available to adults may be a limiting factor (Ravenscroft 1992), in contrast to other butterflies studied (Thomas 1991). The range of the Chequered Skipper is subject to deposition of acid rain (DoE 1994) and the effects of this on the species are unknown.

Population structure

In Scotland, the Chequered Skipper does not occur in discrete colonies although there are "population centres". The abundant and almost continuous semi-natural habitat of the region means that populations may be scattered over wide areas and there are few obstacles to movement (Ravenscroft 1992). Suitable conditions for larvae are widespread and locally abundant. Observations made on adult mobility suggest that they are capable of moving quite large distances (Ravenscroft 1992). Females may move up to 1km within known flight areas but the majority are thought to emigrate after mating and may be widely scattered at the end of the flight period, perhaps up to several kilometres from colony centres. Some males may fly similar distances after emergence before settling in suitable flight areas. Thereafter, they move little owing to their territorial behaviour.

Populations therefore occur at low density over wide areas in Scotland and similar observations have been made on European populations (Warren 1990). Estimates of peak

population size at two of the largest colonies suggest populations of between 250-900 adults, but these were subject to high (unknown) rates of emigration and immigration and therefore large error (Faulkner 1989, Ravenscroft 1992). The cores of most populations are thought to be small and consist usually of less than 100 adults (Ravenscroft 1992, 1994a). Currently, only 10 core sites are recognised, although there are numerous smaller sites. Further studies of status are required.

Collecting still occurs on *C. palaemon* sites. Because the species generally occurs at low density but gathers in specific nectaring areas and territorial arenas, it may be vulnerable if collecting activities were to increase.

2.4 LIMITING FACTORS

Historical

Loss of open breeding habitat due to abandonment of traditional broadleaved woodland management in England, especially coppicing.

Destruction of woodland marginal habitats in England, including hedgerows.

Loss, often due to coniferisation, and isolation of deciduous woodland.

Advent of myxomatosis in England and scrubbing over of certain coarse grasslands.

Drainage and loss of fen habitats in England and catastrophic events such as flooding.

Historical clearance of woodland and recent planting with conifers in parts of Scotland.

Current and Future Limiting Factors

Overgrazing of habitat, usually by sheep, affecting larval habitats.

Under-grazing (by deer) and development of scrub after clearance, affecting adult habitats.

Reduction in deer numbers.

Spread and increasing maturity of coniferous plantations and associated drainage and exclusion of browsing animals.

Possible effects of Woodland Grant Schemes (e.g. excluding grazers to accelerate woodland regeneration).

Other changes in land-use, especially development of river floodplains.

Possible threat from regular muirburn.

Possible long-term effect from acid rain.

In England, the chief factor limiting re-establishment is the lack of suitably managed woodland on the scale that is required by this wide-ranging species.

Fragmentation and isolation of sites may be a serious limiting factor in England.

2.5 RESUME OF CONSERVATION TO DATE

Ecology and Conservation Requirements

The ecology of the butterfly in England was not fully understood before extinction and inappropriate management contributed to its extinction on some sites Collier (1966, 1972). Most information available concerns the distribution of the species in the years before extinction (e.g. Farrell 1973, 1974, Lamb 1974, Stark 1975, Heath 1981b). In recent years, populations occurring in northern continental Europe have been studied by Butterfly Conservation as part of a re-introduction programme to England. These have helped our understanding of the conditions required of English woodlands and support the view that habitat neglect and closure of rides and glades were primarily responsible for the extinction (Warren 1990, Ravenscroft 1991).

The Chequered Skipper has been well studied in Scotland. The Scottish Wildlife Trust conducted a series of studies on a nature reserve that supports the species (Houston 1976, Sommerville 1977, Hockey 1978, Lennard 1985). Various aspects of its ecology have been the subject of projects at the University of Aberdeen (Kelly 1983, Faulkner 1989, Davis 1990). A study of its ecology was commissioned by the Nature Conservancy Council in 1988, focusing mainly on two populations occurring on NNRs (Young & Ravenscroft 1991). Butterfly Conservation have complemented this work by funding wider surveys of site status and management (Ravenscroft 1994a, 1995b).

The Chequered Skipper depends on a mosaic of clearings and wood edges and suitable areas are created by occasional clearance of mature woodland or scrub. Experiments at Ariundle NNR have shown that adults will use patches of Bugle that have been cleared of Sallow scrub. Such base-rich patches, abundant in nectar sources, require clearance every 5-6 years. Wayleaves for power lines that are created and maintained by Scottish Hydro-Electric provide ideal conditions where they pass over suitable soils. These are cut on a 7-10 year cycle and wider rides are more suitable (>20m). For a short period in the past, coppicing for the charcoal industry was carried out roughly every 20 years and probably also provided suitable habitats. The Chequered Skipper can also utilise rides among forestry plantations managed in a similar fashion, and a number of sites occur within these. Most plantations, however, are too closed, and tree growth rapidly shades rides and woodland edges. Rides within plantation woodland need to be kept open and at least 25m wide, and ideally a native shrubby edge maintained by periodic coppicing.

The other key factors are grazing and browsing. Many former sites in Scotland have become unsuitable through overgrazing and other colonies are confined to the wettest areas of sites under heavy grazing pressure (Ravenscroft 1994a). A relaxation of grazing pressure by domestic stock at many sites might strengthen Chequered Skipper populations. In contrast, a reduction (or exclusion) of grazing and browsing animals is unusual but can be associated

with forestry plantations and other areas fenced to promote natural regeneration. An unknown number of colonies are subject to Woodland Grant Schemes. Exclusion of roe deer in particular may accelerate deterioration of Chequered Skipper habitats by allowing rapid scrub development. A reduction is preferable, to maintain some browsing pressure.

Distribution

Knowledge of the distribution of the Chequered Skipper has been greatly improved in recent years through the surveys of the Scottish Wildlife Trust (Moffat 1975, Shaw 1975, Sommerville 1977), the Nature Conservancy Council (Collier 1986, Young and Ravenscroft 1991) and Butterfly Conservation (Ravenscroft 1994a, 1995b). The range of the species is well-defined but it is still probably under-recorded within this, owing to the inaccessible landscape of much of its range (see Appendix 1).

Of known sites, there is a poor level of protection and conservationists have little direct influence on habitat management at most sites. Only 13 of 44 sites (29%) identified in 1993 are SSSI status and only three (7%) are on nature reserves. Opportunities exist, however, for influencing management at many other sites as 19 (43%) are on ground owned or managed by forestry organisations (Ravenscroft 1994a).

Current Work

Monitoring of Chequered Skipper populations is currently poor. One site (Ariundle NNR) is part of the National Butterfly Monitoring Scheme (since 1990) and only two other sites are monitored (Doire Donn by SWT since 1993 and Glasdrum NNR since 1991). Two additional sites were surveyed in 1995 as a baseline for future monitoring by the Scottish Diurnal Lepidoptera Project funded by SNH (D. A. Barbour pers. comm.). Problems in maintaining and increasing coverage include the unpredictable weather and the low density of potential recorders in the region.

Butterfly Conservation are promoting the conservation of the species through site surveys, data compilation and influencing site managers (*e.g.* Ravenscroft 1995b) and are preparing a booklet (funded by SNH and Scottish Hydro-Electric) describing conservation measures for the species for wide circulation. They have also initiated a programme of recovery in England and adults and eggs were introduced to a site in 1995. The success and implications of the project will be monitored by a student based at Keele University (Warren 1995).

Part 3 Actions and Work Programme

This section has been divided into the standard headings Policy and Legislative; Site Safeguard and Acquisition; Land Management; Species Protection and Licensing; Advisory; International; Future Research and Monitoring; Communications and Publicity; Review. Actions appear under one heading according to their major role and/or aim, and are given a low, medium or high priority. The lead organisation(s) concerned for each action is/are named.

3.1 POLICY AND LEGISLATIVE

Lead
organisation(s)
concerned

Action 1 PRIORITY: HIGH

Encourage sympathetic management of woodland and associated open habitats within present range by appropriate financial incentives.

**FA, EN,
SNH,**

Action 2 PRIORITY: MEDIUM

Encourage financial incentives for coppice restoration and beneficial woodland management in recent former range in the east midlands of England.

**FA, FE,
EN**

Action 3 PRIORITY: HIGH

Incorporate appropriate habitat management for Chequered Skippers on known sites or close to breeding areas. Refuse grants for conifer plantations when considering land management grants (e.g. WGS, Habitat Schemes, Farm Woods).

**FA,
SOAEFD**

3.2 SITE SAFEGUARD AND ACQUISITION

Action 4 PRIORITY: MEDIUM

Designate as SSSI five core colonies per search area (following existing guidelines) where this will improve management.

SNH

Action 5 PRIORITY: HIGH

Encourage protection of all core colonies through advice, management agreements and/or reserve acquisition.

ALL

Action 6 PRIORITY: HIGH

Oppose detrimental development proposals affecting known breeding areas.

**SNH, SWT,
BC**

3.3 LAND MANAGEMENT

Action 7 PRIORITY: HIGH

Encourage appropriate management on all known Chequered Skipper sites through advice and management plans, concentrating on the 10 core colonies.

**BC,
SNH**

Action 8 PRIORITY: HIGH

Seek to ensure suitable habitat management within all SSSIs and nature reserves with Chequered Skipper populations through management agreements.

**BC, SWT,
SNH**

Action 9 PRIORITY: HIGH

Encourage positive management of forestry plantations and wayleaves associated with broad-leaved woodland and incorporate requirements of the Chequered Skipper into forestry design plans and other management plans.

**FA, FE,
HE**

Action 10 PRIORITY: MEDIUM

Restore habitats of realistic potential in former range in England.

**FE, EN,
BC**

3.4 SPECIES MANAGEMENT, PROTECTION AND LICENSING

Action 11 PRIORITY: MEDIUM

Discourage collection of Chequered Skippers at all sites

ALL

Action 12 PRIORITY: HIGH

Continue re-establishment programme at FE site in eastern England, with detailed monitoring.

**BC, FE,
EN**

Action 13 PRIORITY: MEDIUM

Conduct five further strategic re-introductions to England, if suitably managed and extensive habitats can be found or restored.

BC, EN

3.5 ADVISORY

Action 14 PRIORITY: HIGH

Advise land managers where Chequered Skipper occurs on its distribution and appropriate management.

**BC, SNH,
SWT**

Action 15 PRIORITY: HIGH

Produce booklet on habitat management for the Chequered Skipper.

BC, SNH

3.6 INTERNATIONAL

Action 16 PRIORITY: MEDIUM

Exchange information on conservation requirements of the Chequered Skipper with other countries.

BC, JNCC

**3.7 FUTURE RESEARCH, SURVEY AND
MONITORING**

Action 17 PRIORITY: MEDIUM

Identify core colonies and conduct further surveys to confirm range.

BC, SNH

Action 18 PRIORITY: HIGH

Compile list of landowners and managers for all Chequered Skipper sites.

BC, SNH

Action 19 PRIORITY: HIGH

Monitor populations on 10 strongest sites, either by standard transects or timed counts and collate data annually to compare trends with management.

**BC, SNH,
SWT**

Action 20 PRIORITY: MEDIUM

Survey all known breeding areas at least once every five years.

BC, SNH

Action 21 PRIORITY: MEDIUM

Survey potential habitats in former range in England and assess the feasibility of establishing further populations.

BC, EN

Action 22 PRIORITY: MEDIUM

Conduct further research on the relationship of the Chequered Skipper with commercial forestry and other woodland management.

**FA, FE
BC, SNH,
HE, EN**

Action 23 PRIORITY: MEDIUM

Conduct research on the effects of Chequered Skipper management on their habitat as a whole and on other species, particularly the Pearl-bordered and Small Pearl-bordered Fritillaries.

**BC, SNH,
SWT**

Action 24 PRIORITY: MEDIUM

Investigate dispersal and metapopulation* structure.

**SNH, BC,
SWT**

Action 25 PRIORITY: LOW

Collect, identify and investigate role of parasitoids in population dynamics of the Chequered Skipper.

**BC, SNH,
SWT**

3.8 COMMUNICATIONS AND PUBLICITY

Action 26 PRIORITY: MEDIUM

Publicise this Action Plan, the status of the Chequered Skipper and the measures being taken to conserve it.

**BC, SNH,
EN**

* A metapopulation is a collection of local populations, connected by occasional dispersal, in which there are local extinctions and colonisations (Gilpin & Hanski, 1991).

3.9 REVIEW

Action 28 PRIORITY: HIGH

BC

Monitor this Action Plan annually and review every five years if necessary.

Key to abbreviations

BC	Butterfly Conservation
EN	English Nature
FA	Forestry Authority
FE	Forest Enterprise
HE	Scottish Hydro-Electric
JNCC	Joint Nature Conservation Committee
SNH	Scottish Natural Heritage
SOAEFD	Scottish Office Agriculture, Environment and Forestry Department
SWT	Scottish Wildlife Trust

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Appendix 1: Management requirements of the Chequered Skipper.

Habitat

Adults frequent patches of nectar sources growing in sheltered situations amongst scrub, or occasionally bracken, close to the woodland edge or within large clearings or rides in oak or birch woodland.

Nectar plants used are usually those that grow in relatively high densities where conditions are suitable, such as Bugle, Ragged Robin, Bluebell and Marsh Thistle, and are all species characteristic of more nutrient-rich ground (at least in Scotland).

Larvae occur on foodplants growing in more densely vegetated areas, such as Bog Myrtle flushes, Birch and Alder scrub, and amongst Bracken, as well as under the woodland edge. Purple Moor-grass tussocks in these situations are larger, richer in nutrients and have a prolonged season owing to favourable soil conditions. Plants in exposed or waterlogged areas and amongst heathers are generally unsuitable.

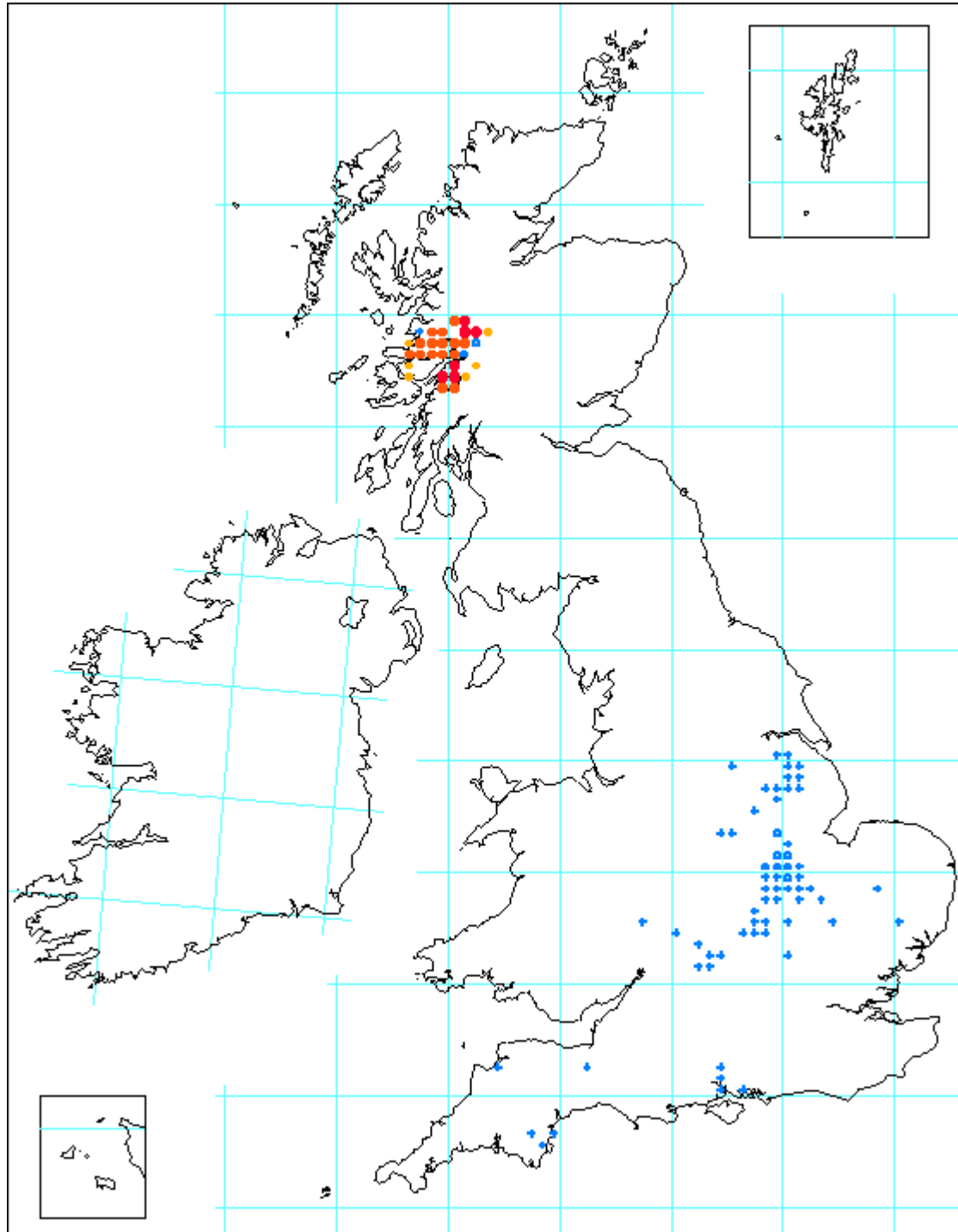
Management

Management should aim to promote maintenance and creation of open areas within woodland and prevent over-development of scrub. Ideal grazing and browsing levels are difficult to assess, but an absence of deer (especially roe) will cause deterioration of habitat. Grazing by domestic stock is tolerable only at very low densities. In the absence of grazing animals, periodic thinning of dense scrub over nectar patches is essential. Scrub invasion in larval areas is less limiting. Small clearings in woodlands should be at least 20m across. Rides and wayleaves through broad-leaved woodland should be at least 20-25m across and developing scrub thinned or cleared every 7-10 years, maintaining a varied vegetation structure across the width of the ride. In coniferous plantations, rides should be wider, at least 30m, and a deciduous fringe should be maintained in addition to the above recommendations. Where fenced plantations adjoin broad-leaved woodland, periodic scrub clearance or thinning will be necessary to check regeneration in the absence of grazing and browsing in areas between.

Appendix 2: The distribution of the Chequered Skipper in the UK.

Butterflies for the New Millennium project (2001). Copyright of Butterfly Conservation/Biological Records Centre.

(Dark full spot all records from 1995-1999; open circles all records between 1970-1982; cross all pre 1970 records).



Appendix 3: Distribution of the core colonies of the Chequered Skipper in western Scotland.
(Source: Ravenscroft 1994a)

