

**AUDIT OF PRIORITY SPECIES
OF RIVERS AND WETLANDS
Marsh Fritillary *Eurodryas aurinia* in
South Hampshire and the Isle of Wight**

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Environment Agency
Hampshire Area
Sarum Court
Sarum Road
Winchester
Hants SO22 5DP

Hampshire & the Isle
of Wight Wildlife Trust
8 Romsey Road
Eastleigh
Hants SO50 9AL

Jonathan Cox
Fig House
Poles Lane
Lymington
Hants SO41 8AB

HAMPSHIRE &
ISLE OF WIGHT
Wildlife
TRUST



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Marsh Fritillary *Eurodryas aurinia* in Hampshire and the Isle of Wight

1. Introduction

The following report has been commissioned by the Environment Agency (Southern Region). It has been prepared on behalf of the Hampshire and Isle of Wight Wildlife Trust and is one of seven audits covering species of rivers and wetlands that are considered to be a priority for conservation action by the Environment Agency and its partners. The species covered by the audits are:

Wetland and river molluscs

Anisus vorticulus

Pisidium tenuilineatum

Pseudanodonata complanata

Segmentina nitida

Vertigo moulinsiana

Freshwater Crayfish

Southern Damselfly

Marsh Fritillary

Black Bog Ant

Birds of Rivers and Reedbeds

Bittern

Kingfisher

Water Vole

2. Identification

This description is taken from Thomas (1986).

Adult: Although highly variable in both size and colour, the Marsh Fritillary has generally duller, less distinct and less golden markings than Britain's other Fritillaries. The upper wings are reddish orange, with yellow or white patches, and black veins and crossbars that may be blurred. It is the only Fritillary to have one row of black dots around the bottom edge of both sides of the hindwings but none on either side of the forewing. Like the closely related Glanville Fritillary and Heath Fritillary, the underwings have no trace of silver; the general impression is of dull black and orange on a dull yellow background.

Eggs: Prodigious batches of yellow glossy eggs are laid by the female, these are heaped up like hard fish roe on the leaf of the larval foodplant, devil's bit scabious *Succisa pratensis*. Each egg is oval with about twenty narrow ridges from the top to halfway down. Egg clusters soon turn red and can sometimes be found.

Larvae: The larvae (caterpillars) are easy to spot upon their food plant. They are bristly and uniformly black except for tiny white freckles on the sides. They bask openly in weak sunlight. In summer they live gregariously on a web spun over the foodplant before hibernating in a denser nest of silk amongst taller vegetation. In spring, caterpillars split into small groups as they grow larger and eventually live singly, but are still conspicuous.

Pupae: The pupae (chrysalis) is formed among dense vegetation and is difficult to locate. It is cream with black markings and orange points.

3. Legal Status

The Marsh Fritillary is listed on Annex II of the EU Habitats and Species Directive, this requires member states to protect its habitat through the declaration of Special Areas of Conservation (SAC).

The Marsh Fritillary is protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979, although the UK government has lodged a derogation for the species.

The Marsh Fritillary has recently been given full legal protection in Britain, being listed on Schedule 5 of the Wildlife and Countryside Act.

4. Ecology and Habitat Requirements

The following review of the ecology of Marsh Fritillary is taken largely from Barnett and Warren (1995).

Sub-species: The Marsh Fritillary often occurs in well-separated colonies with little apparent flow of individuals between populations. In many areas this leads to the establishment of local races. The differences between these are however not clear-cut and the variation within a single population can change radically with population size (Ford and Ford, 1930). Detailed descriptions of the major recognised sub-species occurring across Europe are given by Higgins and Riley (1970), Higgins (1975) and Mazel (1984). In general the UK sub-species is considered unique but no work has yet been done to determine the bio-chemical and genetic differences between the UK and other European forms.

Habitat: In the UK, colonies of Marsh Fritillary occur in two main biotopes;

- Damp, neutral or acidophilous grassland (usually open grassland but occasionally in woodland clearings)
- Dry calcicolous grassland.

Damp, neutral grassland is used throughout most of its range and is usually dominated by tussock forming grasses such as Purple Moor-grass *Molinia caerulea* or Tufted Hair-grass *Deschampsia cespitosa*. In terms of the National Vegetation Classification (NVC) these grasslands generally conform to the M24 *Molinia caerulea* - *Cirsium dissectum* fen meadow or M23 *Juncus effusus* - *Galium palustre* rush pasture, although MG5c *Cynosurus cristatus* - *Centaurea nigra* grassland *Danthonia decumbens* sub-community is also used (Rodwell, 1991 & Rodwell, 1992). In Hampshire, Marsh Fritillary has been recorded from a species rich variant of wet heath at Royden Woods, this has been described as M16 *Serratula tinctoria* nodum (Sanderson, 1990).

Dry, calcicolous grassland habitats are used predominantly in central southern Britain, where the butterfly breeds mainly on west or south-facing scarp slopes, probably because these are warmer and more suitable for larval development. (Warren 1993 and 1994). It is particularly associated with one sub-community type of the NVC, CG2b *Festuca ovina* - *Avenula pratense* grassland, *Succisa pratensis* - *Leucanthemum vulgare* sub-community, where the larval foodplant is especially abundant. On Salisbury Plain and Martin Down (Hampshire) Marsh Fritillary also utilise CG3 *Bromus erectus* grassland.

The butterfly has a single flight period between May and mid-July, with a peak period from end of May to mid-June. In England and Wales, the eggs are laid on larger specimens of the foodplant, typically growing in a turf height of 8-20 cm (Warren, 1994). Development of these larger plants and subsequent development of larval webs are highly susceptible to grazing pressure and most colonies occur where grazing is light, often with extensive cattle or horse grazing, or where grazing has recently been abandoned. Few sheep grazed sites are used, probably because of the highly selective grazing pressure exerted by sheep and their preference for Devil's-bit scabious. Horse grazing, especially by certain more primitive breeds (e.g. Welsh mountain ponies but presumably also New Forest ponies) provides suitable habitat on both calcicolous and acidophilous grasslands.

It is thought that the spread of the butterfly to calcicolous grassland sites has occurred during the last century because of the general relaxation of grazing pressure combined with the switch from sheep to cattle grazing, particularly over the last 50 years. (Warren, 1994).

Populations of Marsh Fritillaries fluctuate tremendously in size from year to year with larvae occasionally reaching great densities. The period from 1982 - 85 appears to have been such a time when the butterfly underwent a periodic expansion and was comparatively mobile. It is possibly more sedentary in lean years, contracting to core sites during sequences of poor seasons. The fluctuations appear to be dependent upon weather, food supply and the proportion of caterpillars killed by the parasitic braconid wasps of the genus *Cotesia*. Two species have been identified in Britain, *Cotesia melitaearum* and *Cotesia bignellii*. The former also parasitises some related butterflies including the Glanville Fritillary on the Isle of Wight. *C. bignellii* has only been reported as parasitising Marsh Fritillary in Britain.

The large fluctuations seen in Marsh Fritillary populations can cause problems if the habitats are small or of low quality and the butterfly population has become extremely small. Under such circumstances, an isolated colony can die out completely during troughs in the cycle. The periodic extinctions often give the appearance that colonies are shifting, either around fields or around a group of sites. In actual fact the phenomenon is probably caused by local extinctions which are balanced by periodic colonisations. Although the Marsh Fritillary is regarded as colonial and sedentary, recent research has shown that there is some emigration and movement and it may be that this butterfly, with its attendant parasitoids, is adapted to this 'metapopulation' structure (Warren, 1994), a metapopulation being defined as a collection of local populations, connected by occasional dispersal, in which there are local extinctions and colonisations. Given this feature of the species' population dynamics, it is vital to maintain colonies of metapopulations of Marsh Fritillary that are centred on relatively large areas, or a viable mosaic of suitable habitat so that the process of successful dispersal at times of high population levels compensates for the periodic local extinctions to which local populations are prone (Warren, 1994).

5. Distribution and Population

The distribution and population of Marsh Fritillary is extensively reviewed in Barnett and Warren (1995) and Warren (1994). The Marsh Fritillary is distributed all over western Europe, Russia, Asia Minor and across temperate Asia to Korea. It is declining in almost every European country and is now extinct in the Netherlands and Belgium (van Swaay, 1990). It is endangered in Hungary and Poland and vulnerable in Austria, Denmark, Eire, Germany, Greece, and Luxembourg (Heath, 1981). The butterfly is local and declining in Sweden, Switzerland and the UK but is still reasonably widespread in Finland, southern France and northern Spain.

The UK represents a major European stronghold of Marsh Fritillary in Europe, with an estimated >20% of the north west European colonies being located there (inferred from Heath, 1981). In addition, the UK populations of Marsh Fritillary are considered a separate and unique sub-species which further enhances the nature conservation importance of the UK for this species.

As with other countries in Europe, the UK populations of Marsh Fritillary have undergone rapid declines in recent years. In recognition of the importance of the UK for Marsh Fritillary conservation, a conservation action plan was published for the species in the Biodiversity Action Plan: UK Steering Group Report (HMSO 1995).

The Marsh Fritillary was once widely distributed throughout the UK but has declined substantially over the last 150 years (Heath et. al., 1984). In Britain, its range has declined by over 62% and it has recently died out over most of eastern England and eastern Scotland. Although it is still quite widespread in parts of south-west England and Wales, colonies are estimated to be disappearing at a rate of well over 10% per decade (Warren, 1994). Recent surveys (1990) indicated that there were 228 definite colonies in England, 111 in Wales, 35 in Scotland and 58 in Northern Ireland. There are an additional 106 possible colonies in the UK.

The situation is not as healthy as might be assumed from these figures, as most colonies are small and their extinction rate is high from natural as well as anthropogenic causes. Moreover, the information gathered suggests that emigration and formation of temporary colonies are common occurrences (often aided by ad hoc introductions). Simple dot-maps may therefore give a mis-leading impression of the butterfly's abundance. Certain habitats appear transient or are intrinsically suboptimal and patch occupancy is often short, leading to a constant state of flux in the butterfly's distribution. It is for this reason that self sustaining Marsh Fritillary populations tend to exist in areas or extensive habitat or clusters of suitable habitat that can support a metapopulation of the species.

The map in Appendix 1 shows the distribution of Marsh Fritillary in the UK (from Barnett and Warren, 1995). Eight key areas in England for the species have been circled, these are listed below:

- Mid Cornwall Moor and Bodmin Moor
- West Devon Culm Grasslands
- Dartmoor Rhos Pastures, Devon
- Blackdown Hills and Exmoor ESA, Somerset

- Blackmoor Vale, Dorset
- Salisbury Plain, Wilts
- N.E Hampshire
- Cumbria.

This list of key areas represent regions of England where there is the potential to conserve the metapopulation structure of the species. Their selection is based on current knowledge and further survey work may necessitate amendment of these in the future.

6. Historic Records of Marsh Fritillary in Hampshire and the Isle of Wight

Scattered colonies have occurred in various parts of Hampshire and the Isle of Wight. This includes records from both chalk and acid grassland sites. Goater (1974) lists historic records for each of the three Vice Counties. These are reproduced below. C = Chalk grassland sites, AG = acid grassland sites (these have been added to Goater's text).

V.C. 10 (Isle of Wight):

All sites mentioned for the Isle of Wight are on acid grassland in the north of the Island.

1. Parkhurst Forest, on the west side; singletons at Gurnard and near Newport (Morey, 1909).
2. - "has shrunk in its localities to I believe one and is reported to be losing ground there. The locality to the west of Parkhurst Forest... had a splendid number flying there in 1912, but in the following winter this ground was under water for many weeks and a good search in the next spring produced only 2 larvae, and one of these was ichneumonid. About 1918 or 1919 the spot was put under the plough. It is of considerable interest to know that Mr G. Nobbs is trying to establish the species in the Wight with stock from the Ringwood localities" (Jeffery, 1929).
3. Parkhurst Forest, 1954 (record contributed to Goater by C.W. Pierce).
4. Cranmore, a strong colony discovered by J. Wright in 1947: numbers gradually diminished and none seen since 1956.

V.C. 11 (South Hampshire): Numerous records of odd specimens given;

1. Royden, 1920-21, several; (AG)
2. Fordingbridge, plentiful in its old locality, 1919-21; (AG)
3. Hursley, several in a clearing; (C with clay cap, probably within Ampfield Wood)
4. Eastleigh, a very strong colony; (AG)
5. Owselbury, a few in a clearing, (C with clay cap)
6. Chandlers Ford, sparingly, common in some years (Fassnidge, 1929), (AG)
7. Martin Down, 1970, two in June; (C)
8. Eastleigh, 15 in Fassnidge's Collection. 1922-25; (AG)
9. South end of Chandlers Ford, small colony, early 1940s (J. Farrington reported to Goater), (AG)
10. Cranbury Park, Otterbourne, small colony, last observed 1952; (AG)
11. St Catherines Hill, a flourishing colony, 1940s and 1950s; (C)
12. Botley Wood, a strong colony still common there, 4th & 5th June 1960 (Goater). (AG)
13. Became extinct on St Catherines Hill in c. 1965. (C)

V.C. 12 (North Hampshire):

1. Pamber, in some plenty; Woolmer Forest, a strong colony (Fassnidge, 1923-24). (AG)
2. Burghclere Common, local; several in a garden at Burghclere, 1966 (Reported to Goater) (AG)
3. Pamber, singletons, 1942, 1944 (AG)
4. Aldershot district, widespread and locally common, but scarce in 1956 (Richards, 1957); (AG)
5. Hawley, increasing all over the area (Richards, 1949) (AG)

7. Population Trends and Current Status in Hampshire and the Isle of Wight

7.1 The Isle of Wight

7.1.1 Summary of trend and status

Apart from a recent introduction, Marsh Fritillary is extinct as a natural native species on the Isle of Wight. Despite this, the introduced population appears to be naturalising and may be self sustaining.

7.1.2 Trends and status of Marsh Fritillary on the Isle of Wight

Populations of Marsh Fritillary on the Isle of Wight were always small and localised to the wet acid grasslands around Parkhurst Forest and Cranmore.

The grasslands to the west of Parkhurst were largely reclaimed to agriculture by the end of the 19th century with a few pockets remaining through into the early part of the 20th century, these supported both Marsh Fritillary and Silver Studded Blue butterflies. All these remaining pockets of heathy vegetation around the edge of Parkhurst Forest seem to have been lost by 1920.

Apart from the loss of some habitat to 1930s plot development, the heathy grassland at Cranmore survived largely intact until the 1950s when large areas were planted by the Forestry Commission to create the Bouldnor and Cranmore plantations. Subsequently, the remaining areas of habitat became colonised with blackthorn scrub and secondary woodland. Marsh Fritillary seems to have survived at Cranmore until 1956 when it was presumably lost under the conifer plantations being established at that time.

There were no records of Marsh Fritillary from the Island until they were recorded in 1996 at two sites on the south-eastern side of Newtown Harbour. Further investigation revealed that these sites had been colonised from an introduced population in a third site in the vicinity.

7.2 Hampshire

7.2.1 Summary of trends and status

Notwithstanding widespread habitat deterioration and destruction, Hampshire Marsh Fritillary populations were sustained at fairly strong levels throughout the 1980s by a combination of introduction, translocation, re-establishment and support releases. Despite these efforts, the fundamental problems of habitat loss and deterioration lead to a crash in Marsh Fritillary populations in the mid 1990s. By 1996, Marsh Fritillary were confined to only two self sustaining populations in the county, with only one population, at Bentley Wood, within that part of Hampshire covered by the Southern Region of the Environment Agency.

7.2.2 Trends and status of Marsh Fritillary in Hampshire

In Hampshire the population history of Marsh Fritillary has been greatly affected by artificial establishment attempts (Oates and Warren, 1990). Early attempts at

establishment met with little success, due largely to poor understanding of the species habitat requirements. For instance, the well known Hampshire collector S.G. Castle-Russell (1866 - 1955) admitted attempting to establish Marsh Fritillary "scores of times, and never once have I succeeded in establishing a permanent colony never have the progeny I put down lasted for more than two seasons at the most."

A detailed analysis of the history of the species in Hampshire (Oates & Warren, 1990) shows that its recent status and distribution results almost entirely from re-establishment, introduction, translocation and support breeding. Of the 26 tetrad squares where the species bred during the 1980s, its presence in 16 (62%) was due exclusively to release and its (formerly natural) presence in a further four tetrads has been artificially maintained by support breeding.

The effect of this history of establishment was to maintain the Hampshire population of Marsh Fritillary at relatively healthy levels throughout the 1980s and into the early 1990s. Oates and Warren (1990) remark that without these deliberate releases, the species would have been "endangered at county level, being restricted to a couple of sites on the county's western border and about half a dozen neglected wet meadows in the Farnborough area."

During the late 1980s and early 1990s, populations of Marsh Fritillary survived in several locations in the county. The main sites and their history are summarised below.

Details of all Marsh Fritillary records held by the Butterfly Conservation, Hampshire Branch are given in Appendix 2.

The location of all records of Marsh Fritillary in Hampshire from 1990-1995 and for 1995 are given in Appendix 3.

7.2.3 North east Hampshire Sites (late 1980s - 1996) (Within Thames Region of the Environment Agency)

Foxlease and Ancells Farm Meadows (Foxlease and Ancells Meadows SSSI, GR SU825558-827570)

This site comprises an extensive series of wet meadows that have historically supported strong Marsh Fritillary populations. Much of the site is owned by the MoD, although parts are now managed by the Hampshire Wildlife Trust. Lack of grazing and consequent decline and shading of the foodplant lead to the probable extinction of this historic population in the early 1990s.

Habitat management is now being undertaken on the entire site with grazing re-introduced to Ancells Meadows in 1994 and to Foxlease Meadows in 1996. Grazing for several years will be needed to restore the Marsh Fritillary habitat.

The last definite record of Marsh Fritillary at this site was in 1993 although singles have been reported from Ancells Farm in 1995 and 1996 (pers. comm. Chris Hall). These may be individuals from a small surviving population or, perhaps more likely, from releases.

Bartley Heath (part of Hook Common and Bartley Heath SSSI, GR SU720350)

Small numbers of Marsh Fritillary were recorded consistently from 1985 until 1992 at this site, but none were seen in 1993 or since. This population was almost certainly artificially established and undoubtedly sustained by released individuals.

Eelmoor Marsh (part of Eelmoor Marsh SSSI, GR SU840250)

Marsh Fritillary were regularly recorded at this site until 1987. Habitat deterioration due to lack of management on this MoD site resulted in the loss of this historic population. Grazing was re-introduced in 1995 and the habitat is now much improved.

Minley Meadows (West Minley Meadow SSSI, GR SU812577)

The last reliable record from this site was in 1990 when 2 individuals were seen. The reason for the apparent loss of this colony is not known.

Conford Moor (part of Woolmer Forest SSSI, GR SU819333)

A rather isolated site in east Hampshire, to the south of the above sites. Owned by the National Trust, the colony of Marsh Fritillary died out due to an accidental heath fire in 1970. The colony was re-established under properly controlled and recorded conditions in 1983. The population survived until 1993/94. The reason for the loss is probably due to a lack of grazing and the small isolated position of the colony.

7.2.4 West Hampshire Sites (late 1980s - 1996)

Martin Down (Martin Down National Nature Reserve, GR SU040190-050180)

This is now probably the longest established natural colony of Marsh Fritillary surviving in Hampshire. The large size of the site and its management as a National Nature Reserve has enabled small populations of Marsh Fritillary to survive. This site is in the Environment Agency's Wessex Region.

Stockbridge Down (Stockbridge Down SSSI, GR SU380350)

A small introduced colony survived on Stockbridge Down for many years, feeding on Small scabious *Scabiosa columbaria* although trampling by horses and probably other natural factors resulted in the population decline. Recorded consistently from 1985 until 1993 with a two year gap until a single individual was recorded in 1996. This may suggest the colony is just surviving or, perhaps more likely, individuals are still being released into this sub-optimal downland site.

Ampfield Wood (GR SU400240)

This is an historic site for Marsh Fritillary. The site consistently supported Marsh Fritillary from 1983 to 1987, then no records until a singleton was seen in 1996. This was probably another released individual but may suggest the population is just hanging on.

Bentley Wood (Bentley Wood SSSI, GR SU250290)

This extensive woodland site straddles the Hampshire/Wiltshire border. It is managed by a Trust as a nature reserve. Colonies of Marsh Fritillary have been recorded in several locations within the wood and move around as habitat changes and populations naturally wax and wane. The population has survived here for many years and appears to be self sustaining.

Porton Down (Porton Down SSSI, GR 240383)

This extensive chalk grassland site also straddles the Hampshire/Wiltshire border. Marsh Fritillary populations here form an eastern extension of the large Salisbury Plain population which covers several thousands acres of chalk grassland. The last recorded Marsh Fritillary at this site was in 1990, although natural recolonisation is possible from Salisbury Plain during years of populations expansion.

7.2.5 New Forest Sites (late 1980s - 1996)

Blissford Farm (GR SU170130)

A moderately large colony was recorded at Blissford Farm, in an abandoned meadow on the north western edge of the New Forest in 1987. No records since, although equally no record of any surveyor visiting the site at the right time of year.

Woodgreen (GR SU173173)

A small colony of Marsh Fritillary (2-10 individuals) was recorded this site by the Wildlife Trust field surveyor in 1990. This is some 3 km north of the Blissford Farm site and may be linked with it. No record since 1990, although equally no record of any surveyor visiting.

Royden Woods (part of Royden Woods SSSI, GR SU325000)

Marsh Fritillary were probably introduced into this Wildlife Trust reserve and first recorded in 1986. The colony rapidly expanded to become moderately large by the late 1980s. This survived in an area of wet heathy grassland until 1992 when the last record was made. None have been seen since at this site.

7.3 Summary of Status of Marsh Fritillary in Hampshire and the Isle of Wight in 1996

The situation is confused by records of individuals seen at scattered locations that might suggest a colony is hanging on but more likely are the result of random introductions from captive bred stock. There is some pattern to the occurrence of these odd individual records that may suggest certain parts of the county are more prone to these unrecorded introductions than others. For instance, the records of individuals at Ampfield Wood and Stockbridge Down in 1996 and Crab Wood in 1995 suggests a centre of introductions in the Winchester area.

The well known north east Hampshire populations of Marsh Fritillary are outside of the Environment Agency Southern Region. These seem to have declined to the point of extinction due largely to habitat deterioration. Recent improvements in habitat management may enable a re-introduced population to survive here in the future.

There are also records from the south and west of the New Forest that might suggest an under recorded population of Marsh Fritillary survives in the mosaic of wet meadows that fringe the Forest.

Only two definite colonies of Marsh Fritillary are now surviving in Hampshire; Martin Down (in Environment Agency Wessex Region) and Bentley Wood on the Hampshire/Wiltshire border (all in Environment Agency South Region).

On the Isle of Wight the introduced colony seems to be spreading around the complex of unimproved grasslands to the south of Newtown Harbour. There are three reported colonies in this area and potential for these to spread quite widely around this part of the Island and become self sustaining.

8. Knowledge of Marsh Fritillary status and trends in Hampshire and the Isle of Wight and future survey requirements

Hampshire has a strong and active branch of Butterfly Conservation. There is regular recording of butterflies at most of the important sites in the county. In particular, the well known sites in the north east of Hampshire and the chalk sites to the west of Winchester (Stockbridge Down, Crab Wood, Ampfield Wood) and the Hampshire/Wiltshire border (Martin Down, Bentley Wood, Porton Down) are also well recorded.

The greatest gap in recording effort is in and around the New Forest. This area has a reputation for having been destroyed for butterflies through over grazing. Whereas much of the open Forest is undoubtedly too heavily grazed for Marsh Fritillary, there are numerous areas of wet heathy grassland associated with base enriched clays in the south of the Forest and in small fields and commons around the fringes of the Forest that could support colonies. Records of Marsh Fritillary exist at Blissford and Woodgreen in the north west of the Forest whilst rumours persist of other colonies in the open Forest (Neil Sanderson pers. comm.).

There is an urgent need to undertake a thorough survey for Marsh Fritillary in all known M23, M24 and associated Devil's-bit scabious rich vegetation types in and around the New Forest.

9. Current and Past Conservation Work for Marsh Fritillary

Apart from the re-introduced population of Marsh Fritillary at Conford Moor, none of the many releases that have occurred in both Hampshire and the Isle of Wight have been properly supervised and recorded in accordance with IUCN/JCCBI guidelines for species introduction. Whereas these un-authorized releases may have helped sustain the population of Marsh Fritillary, they cannot be considered as valid conservation projects and ultimately all but the recent release on the Isle of Wight have been seen to fail.

In the 1990s, the fundamental problem of habitat conservation and management for the species has been much more widely appreciated. For many sites in north east Hampshire, this realisation came too late. Habitat management in this part of the county is now considered ideal in many of the butterflies former sites but this has not prevented the Marsh Fritillary being lost from this part of the county.

The parts of Hampshire within the Southern Region of the Environment Agency have been subject to very limited conservation management. At Bentley Wood, the management of the reserve is tailored specifically to maintaining Marsh Fritillary in this extensive woodland block and appears to have been highly successful. Elsewhere there is a history of temporary populations appearing and disappearing, largely as a result of ill-conceived and unsustainable introduction attempts.

On the Isle of Wight, the recently introduced population has spread from the introduction site to a nearby hay meadow within the Newtown Harbour SSSI. The grassland around the Marsh Fritillary nests was excluded from the mowing regime in 1996 to preserve the nests. Ultimately this is an unsound and ecologically unsustainable management technique as the grassland has been historically managed as a hay meadow for most of this century and has a fauna and flora adapted to this regime. The temporary presence of an introduced species within this habitat should not be permitted to dictate the management of the rest of this ecosystem.

10. Future Strategies for Marsh Fritillary Conservation

10.1 National perspective

This perspective is taken largely from Barnett and Warren (1995).

There are two main reasons for the decline of the Marsh Fritillary in the UK.

1. Wholesale destruction and fragmentation of habitat as a result of development and agricultural improvement.
2. Inappropriate grassland management, either by too heavy grazing or abandonment of grazing.

The success of future management of Marsh Fritillary habitat is closely linked with the agricultural system, particularly in acidophilous grassland habitats. Conservation measures therefore need to be targeted primarily at the agricultural system.

Broad-scale nature conservation measures in the wider countryside, such as the Countryside Stewardship Scheme and Environmentally Sensitive Areas, are relatively new, and as yet do not have a large scale take-up. This is an important limiting factor when considering the increasing fragmentation and isolation of Marsh Fritillary colonies. In Britain, most colonies (47% in 1983) occupy very small patches of habitat, typically less than 2 ha and only 15% of occupied patches are greater than 10 ha (Warren, 1994). The generally small size of the colonies, combined with huge yearly fluctuations in abundance, caused partly in response to host-specific parasitoids, makes the butterfly very vulnerable to natural extinction. The natural pattern of existence of Marsh Fritillary, is in a metapopulation, in which there is natural extinction and re-colonisation of colonies within a larger geographic area. The wholesale destruction of agriculturally unimproved wet meadows throughout much of the UK has now broken these former metapopulations throughout most of its former range, leaving the butterfly restricted to many isolated and highly vulnerable colonies. Unlike measures to conserve other rare and threatened species, the acquisition of reserves specifically for Marsh Fritillary conservation does not constitute a viable long term conservation strategy. In the case of the Marsh Fritillary, it is vital to think about maintaining large areas of land with networks of colonies and potentially suitable, but not always occupied habitat. There is a need to focus conservation effort on those regions of the UK where there is the potential to maintain or restore such networks of suitable habitat, with gaps between these of no more than 10 km (the butterfly's dispersal distance). There are perhaps three such areas in the Environment Agency's Southern Region.

10.2 Potential for Marsh Fritillary conservation in Southern Region of the Environment Agency (Hampshire and the Isle of Wight)

The former north east Hampshire sites for Marsh Fritillary obviously have great potential for restoration of Marsh Fritillary colonies but this is beyond the scope of this report.

Bentley Wood supports the only apparently self sustaining Hampshire population of Marsh Fritillary in the Southern Region of the Environment Agency. This site appears well managed and monitored. It is however, largely isolated from other extensive areas of potential habitat and there is little scope for expanding the Marsh Fritillary population beyond the current boundary of the wood.

The records of Marsh Fritillary on downland are all from rather isolated sites with generally unsuitable habitat, as for instance the colony on Stockbridge Down. There are no collections or clusters of grasslands on the Hampshire chalk which could form a network of sites with suitable habitat to sustain a metapopulation of Marsh Fritillary.

There are two areas of Hampshire (in the Environment Agency Southern Region) that show potential for the restoration of Marsh Fritillary populations. The largest area of potentially suitable Marsh Fritillary habitat survives in and around the New Forest. In the New Forest fringe, many of the potentially suitable wet meadows and heathy grasslands are currently too heavily grazed (due partly to the growth of horsiculture) or have been abandoned. It is possible that through a properly publicised and directed New Forest Marsh Fritillary conservation project, groups of suitably managed wet grassland meadows could be developed around the fringes of the Forest. These could be close enough together to allow a metapopulation of Marsh Fritillary to be sustained.

In the open Forest it is possible that Marsh Fritillary survives at low density in areas of wet heathy grassland. Little can be done to alter the management of these areas to improve them for Marsh Fritillary, although the development of healthy Marsh Fritillary populations on the fringes of the Forest may allow these more marginal sites in the open Forest to be colonised in good years.

The other region of Hampshire with potential to support a self sustaining Marsh Fritillary population is in the south east of the county, centred on Botley Wood SSSI. Botley Wood supported Marsh Fritillary until at least 1960. These were probably associated with old wet meadows that were being progressively afforested at about this time. Today, Devil's-bit scabious rich, wet acid grassland survives in the wide rides in and young plantations in Botley Wood and in several small wet meadows throughout this part of south Hampshire (extending from Moorgreen Meadows SSSI in the west to Hook Heath and Lye Heath Meadows SSSI in the east). Although fairly dispersed, a network of suitable habitat could be created in this region of the county, centred upon a re-established Marsh Fritillary colony in Botley Wood. Habitat management in the meadow sites would need to be reviewed on a site basis to ascertain if habitat could be improved for Marsh Fritillary. Most importantly, habitat management would need to be improved in Botley Wood to create a series of lightly grazed glades and well managed interlinking wide rides. This site is now largely owned by Hampshire County Council and Forest Enterprise and offers great potential for the creation of extensive areas of Marsh Fritillary habitat.

On the Isle of Wight, the area chosen for the recent unofficial introduction of Marsh Fritillary is in the centre of the most extensive area of suitable habitat for the butterfly in the county. This includes the grazed grassland with Harts Farm Meadows, the rides within Walters Copse (formerly an old meadow that developed as secondary woodland in the late 19th century), other grazed grasslands on the east of Newtown Harbour and the Cranmore grasslands to the west of the Harbour. Future monitoring will be

required to record any further population expansion into these areas. It will also be interesting to record whether the parasitic wasp *Cotesia melitaenarum* is able to spread from the Glanville Fritillary populations in the south of the Island to these new Marsh Fritillary colonies.

11. Discussion and Conclusion

The history of the Marsh Fritillary in Hampshire and the Isle of Wight mirrors that which has been described for the UK as a whole (Barnett and Warren, 1995 & Warren 1994). In the north and east of the county, Marsh Fritillary colonies were widespread throughout the 1980s. A combination of habitat destruction and deterioration have caused these populations to crash during the 1990s to a stage where Marsh Fritillary is now probably extinct in this part of the county.

In other parts of Hampshire, Marsh Fritillaries survived in probably sub-optimal habitats for many years, largely as a result of the release of captive bred stock. The only colonies to remain self sustaining through until the present are those on the Hampshire/Wiltshire border at Martin Down and Bentley Wood. Only one Marsh Fritillary population, at Bentley Wood, now survives within the Southern Region of the Environment Agency in Hampshire.

Despite the history of decline, a better understanding of the ecology of Marsh Fritillary now enables us to take a strategic view of Marsh Fritillary conservation in Hampshire and the Isle of Wight. Hampshire contains more wet acid grasslands than any county in central southern England and offers probably the greatest potential for developing networks of appropriately managed Marsh Fritillary habitat. Apart from the traditional centre of population in the north east of the county (within Thames Region of the Environment Agency), there are two areas of Hampshire that offer significant potential for the establishment of self sustaining Marsh Fritillary populations.

The largest of these potential key areas for Marsh Fritillary is centred on the New Forest. Here, there is evidence that the butterfly may survive at a low population level, both in the Crown Lands of the New Forest and the complex mosaic of small meadows and commons that fringe it. A detailed survey of this resource is urgently needed to validate this potential population and assess suitable conservation strategies before it is lost.

The second potential area is centred on Botley Wood in the south east of the county. This historic Marsh Fritillary site was lost during the 1960s as a result of habitat deterioration. Its extensive network of rides and clearings offer great potential for habitat restoration for Marsh Fritillary (as well as other insects) through the removal of tree cover, the re-introduction of extensive grazing and associated ride management. Once established as a population core, there is further potential to encourage the spread of Marsh Fritillary throughout a network of smaller wet meadow sites across south-east Hampshire.

On the Isle of Wight the recent unofficial introduction of Marsh Fritillary to a site on the south-eastern edge of Newtown Harbour has already lead to its colonisation of two adjacent sites. Whereas one of these is probably un-sustainable in the long term, there is good potential for the butterfly to spread throughout a series of small sites around Newtown Harbour and possibly to establish a self sustaining metapopulation.

12. Recommendations for future action

12.1 New Forest

		Cost	Priority
Action 1	Plot location of all potential Marsh Fritillary grassland and heathland within and around the New Forest using survey data held by HCC/EN/HWT.	£ 400	Very High
Action 2	Undertake survey of potential habitat (identified from above review) and previously known colonies (Blissford/ Woodgreen/ Royden Woods etc.) to give accurate picture of Marsh Fritillary status in and around the New Forest.	Upto £4000	Very High
Action 3	Based upon results of the above survey, consider development of a Marsh Fritillary Conservation Project (perhaps linked to other species) for the New Forest fringe.		High

12.2 South-east Hampshire

Action 4	Review the management of Botley Wood with HCC/FE and consider potential for habitat restoration/enhancement (for Marsh Fritillary and other insect species).	Nil	Very High
Action 5	Plot location of all potential Marsh Fritillary grassland and heathland within south Hampshire, using survey data held by HCC/EN/HWT.	£400	High

12.3 Isle of Wight

Action 6	Monitor established Marsh Fritillary colonies to record population changes.	£500 annually	Very High
Action 7	Identify, map and describe all potential Marsh Fritillary habitat within 5 km of Newtown Harbour.	£200	High
Action 8	Ensure annual monitoring of sites containing suitable Marsh Fritillary habitat to record further expansion of the introduced colony.	£150 annually	High
Action 9	Encourage appropriate management of potential habitat to create a network of sites containing suitable Marsh Fritillary habitat in this part of the Island.	Nil	Medium
Action 10	Monitor parasitism of established populations to record presence of <i>Cotesia melitaearum</i> .	Nil	Low

12.4 Other sites

Action 11	Encourage, and if appropriate assist with, continued monitoring and habitat management in Bentley Wood	Nil	Medium
Action 12	Encourage continued monitoring of sites that held Marsh Fritillary in last 10 years.	Nil	Medium

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Appendix 1

Table 1 Key Areas ** Of Marsh Fritillary Colonies In The UK (see Figure 1)

England

1. Mid Cornwall Moor and Bodmin Moor
2. West Devon Culm Grasslands*
3. Dartmoor Rhos Pastures, Devon*
4. Blackdown Hills & Exmoor ESA, Somerset
5. Blackmore Vale, Dorset*
6. Salisbury Plain, Wiltshire*
7. N.E. Hampshire
8. N.Cumbria

Wales

9. Mid and South Glamorgan
10. Gower Peninsula, West Glamorgan*
11. Llanelli and SE Carmarthen, Dyfed*
12. Preseli and North Pembrokeshire, Dyfed
13. Ceredigion Rhos Pastures, Dyfed*

Scotland

14. Western Islay, Argyll*
15. Knapdale and Taynish, Argyll*

N. Ireland

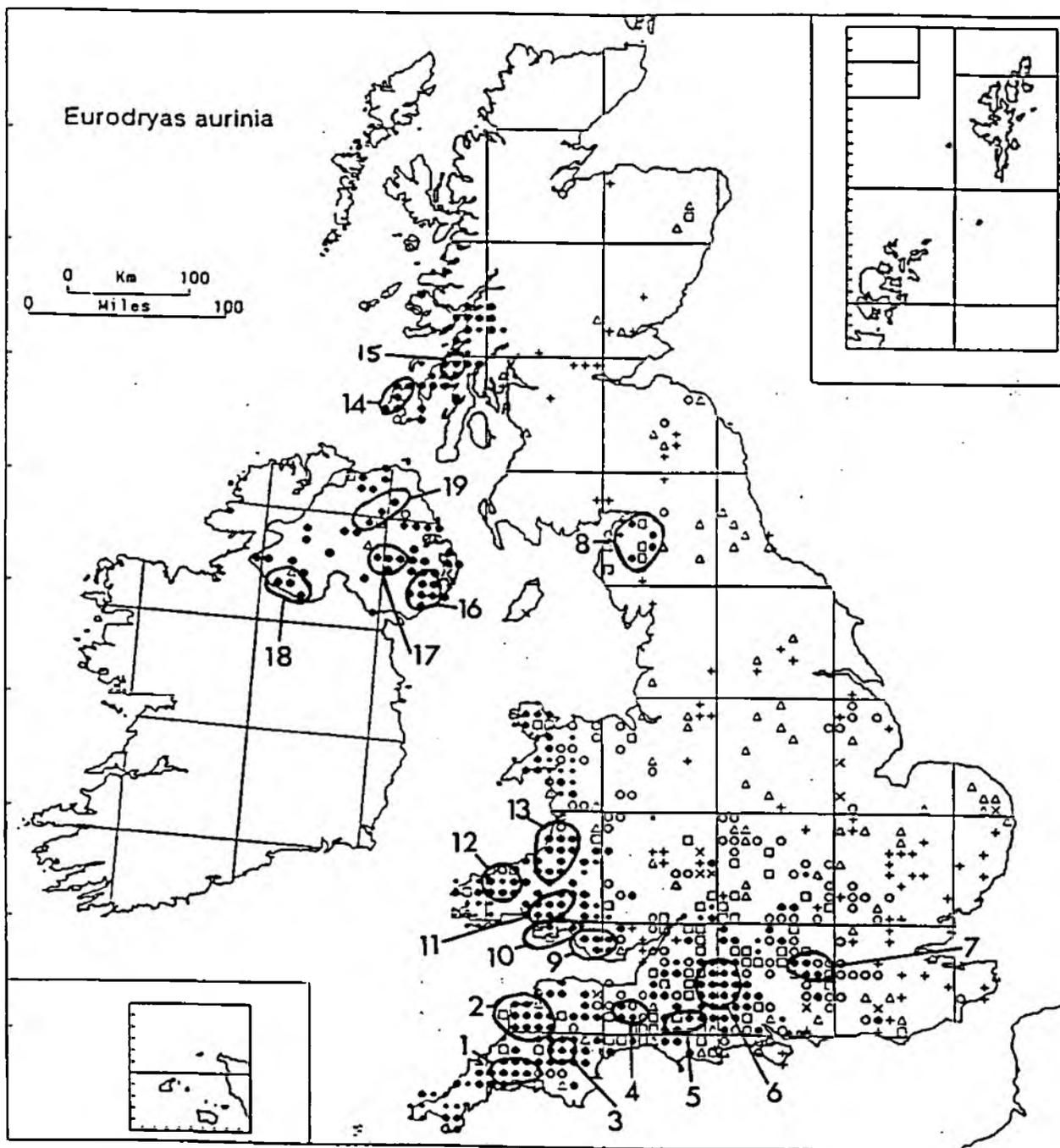
16. S.E. Down
17. N. Armagh / N.W. Down*
18. S. Fermanagh*
19. S.E. Londonderry / W. Antrim

* priority areas with large populations or dense aggregations of populations.

** The key areas shown remain provisional, and may need to be revised in light of future survey work.

Appendix 1

Figure 1 The Distribution of the Marsh Fritillary, *Eurodryas aurinia* (key areas circled). Map produced courtesy of BRC.



- definite 1990 colonies
- possible 1990 colonies
- ◻ post 1970, colonies presumed extinct
- 1940 - 1969
- △ 1900 - 1939
- + pre 1900
- x failed establishments

Appendix 2

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BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
AMPFIELD WOOD	SU405245	1983	1	TRANSECT
	SU405245	1984	1	TRANSECT
	SU405245	1985	3	TRANSECT
	SU405245	1985	1	GCE
	SU390240	1986	2	GCE
	SU390240	1987	0	GCE

	Grid Ref.	Year	Status	Recorder
ANCELLS FARM	SU825558	1992		CH

	Grid Ref.	Year	Status	Recorder
ANCELLS MEADOW	SU825558	1982	Y	CB
	SU825558	1983	A	ARGM
	SU825558	1984	L	ARGM
	SU824558	1985	A	CRH
	SU825558	1986	B	CRH
	SU825558	1986	L	ARGM
	SU825558	1987	A	CRH
	SU825558	1988	B	CRH
	SU825558	1989	L	CRH
	SU825558	1991	A	CP
	SU825559	1992	B	CRH
	SU825559	1993	0	ALB
	SU825558	1993	B	CP

	Grid Ref.	Year	Status	Recorder
ANSELLS FARM	SU825558	1986	2	CH
	SU825558	1989	4	ARDW
	SU825558	1989		PB
	SU825558	1989	B	PB

	Grid Ref.	Year	Status	Recorder
ASHFORD HILL MEADOW	SU564620	1985	3	MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
BAKERS GLADE, ROYDON	SU317013	1992	B	AB/LW

	Grid Ref.	Year	Status	Recorder
BARTLEY HEATH	SU728535	1985	2	RL
	SU728535	1988	2	AJH
	SU728530	1989	2	HT
	SU730535	1989	2	NRPS
	SU728535	1989	3	PB
	SU730534	1990	1	TMH
	SU730535	1990		TMH
	SU728535	1990	0	HT
	SU728535	1990	B	AJH
	SU730535	1990		PB
	SU730535	1990		TMH
	SU730535	1990	2	AW
	SU728525	1991	0	PAB
	SU720530	1992		HT
	SU728534	1992	B	HT
	SU727535	1992	A	CRVH
	SU720530	1992		PB
	SU720530	1992		CRVH
	SU728535	1993	0	CRVH

	Grid Ref.	Year	Status	Recorder
BEECHWOOD COPSE	SU261295	1995	B	AW

	Grid Ref.	Year	Status	Recorder
BEECHWOOD COPSE, WILTS	SU235283	1994	C	AW

	Grid Ref.	Year	Status	Recorder
BENTLEY WOOD	SU250290	1987	2	GCE
	SU250290	1987	2	AJH
	SU250290	1988	0	AJH
	SU261293	1989	2	ISS
	SU260292	1989	2	BPF
	SU259293	1990	2	RT

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

SU260290	1990		ARDW
SU260290	1990	4	AW
SU260290	1990		RT
SU261293	1990	2	EAP
SU261293	1990		EAP
SU260293	1992	C	BPF
SU262294	1993	B	DG
SU250290	1993		DGG
SU250290	1993		MJS
SU235283	1994	Y	AW
SU256292	1994	C	BGi
SU235283	1995	A	AW
SU258293	1995	L	PS
SU235283	1995	B	PS
SU240290	1995	C	AW
SU235283	1995	C	AW
SU240290	1995	B	PS
SU240290	1995	C	PS

	Grid Ref.	Year	Status	Recorder
BLISSFORD FARM, FORDINGBRIDGE	SU170130	1987	3	MG

	Grid Ref.	Year	Status	Recorder
CONFORD	SU819333	1990	3	MRO

	Grid Ref.	Year	Status	Recorder
CONFORD MOOR	SU819333	1987	3	GCMR

	Grid Ref.	Year	Status	Recorder
CONFORD BOG	SU820334	1992		AMJ

	Grid Ref.	Year	Status	Recorder
CONFORD BOG, LIPHOOK	SU820320	1989	3	MRO
	SU820334	1993		MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
CONFORD MOOR	SU835317	1991		MRO
	SU820334	1992		AB/LW
	SU820334	1992	B	AB/LW
	SU820334	1993	0	ALB

	Grid Ref.	Year	Status	Recorder
CONFORD, nr LIPHOOK	SU820334	1992		MRO

	Grid Ref.	Year	Status	Recorder
COPSE FARM, EVERSLEY	SU791603	1986	2	CH

	Grid Ref.	Year	Status	Recorder
CRAB WOOD	SU430290	1995	A	D&JD

	Grid Ref.	Year	Status	Recorder
DEAN HILL RNAD	SU260260	1984	2	CWC
	SU260260	1987	0	CWC

	Grid Ref.	Year	Status	Recorder
EELMOOR FLASH	SU842529	1986		CH

	Grid Ref.	Year	Status	Recorder
EELMOOR MARSH	SU839529	1976	L	CRH
	SU841531	1981	B	AB
	SU840531	1982	L	ARGM
	SU840530	1982	A	AB
	SU841531	1983	B	AB
	SU841531	1983	B	PC
	SU841531	1984	C	ARGM
	SU840520	1986	3	MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	SU841531	1987	C	PC
	Grid Ref.	Year	Status	Recorder
FLEET POND	SU825546	1985	A	MN
	SU824551	1986	1	CH
	SU823552	1990	A	MS
	Grid Ref.	Year	Status	Recorder
FOXLEASE	SU825570	1983	5	AJH
	SU825568	1984	5	AJH
	SU826568	1985	5	AJH
	SU526568	1987	2	AJH
	SU825570	1988	2	AJH
	SU827570	1989	3	PJT
	SU832569	1989	3	PJT
	Grid Ref.	Year	Status	Recorder
HOLBURY WOOD	SU293284	1984	2	RT
	SU293284	1984	2	RT
	Grid Ref.	Year	Status	Recorder
KM SQUARE	SU410230	1995		GCE
	Grid Ref.	Year	Status	Recorder
LAFFAN'S PLAIN	SU845535	0		
	SU845535	1986	2	CH
	Grid Ref.	Year	Status	Recorder
MARTIN DOWN	SU045195	1987	3	AJH
	SU045195	1988	3	MJG
	SU043195	1988	3	AJH
	SU045195	1988	2	AJH
	SU045195	1989	2	MG
	SU049188	1989	2	AJB/LW
	SU049188	1989	2	AJB/LW

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

SU055188	1989	2	TMH
SU055183	1990	4	TMH
SU045195	1990	2	MJG
SU055190	1990		DCL
SU050180	1990		PB
SU048190	1990		BPF
SU058192	1991	B	TMH
SU045195	1991	B	PH
SU040180	1991		PD
SU040180	1991		PH
SU040180	1991		TMH
SU045195	1991	L	PH
SU040180	1991		MJG
SU055190	1991		DCL
SU045195	1992		SS
SU045195	1992		RKC
SU042195	1992	B	IJC
SU045195	1992		IJC
SU045195	1992		MJG
SU058192	1993	B	PS
SU040197	1993	C	DG
SU058192	1993	B	PS
SU051188	1993	B	SFC
SU058192	1993	C	PS
SU045195	1993		SFC
SU045195	1993		PRW
SU040190	1993	B	BE
SU045195	1993		PRD
SU045195	1993		MJG
SU045195	1993	B	TMH
SU045195	1993		MJG
SU045195	1993		TMH
SU045195	1993		DGG
SU043193	1994	B	PO
SU058192	1994	B	PS
SU043193	1994		PO
SU055181	1994		PRD
SU043193	1994	B	PO
SU040190	1994	L	TB
SU040190	1994	B	PBro
SU048194	1994	B	JMB
SU045195	1994		PBro
SU055183	1994	B	BH
SU058192	1994	C	PS
SU058192	1995	B	S&PR
SU040180	1995		P&PG

MARTIN DOWN NORTH

Grid Ref.	Year	Status	Recorder
SU040180	1982	2	TRANSECT
SU040180	1984	2	TRANSECT

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH

RECORDS FOR MARSH FRITILLARY

SU040180	1985	1	TRANSECT
SU040180	1986	1	TRANSECT
SU040180	1987	1	TRANSECT
SU040180	1988	1	TRANSECT

Grid Ref.	Year	Status	Recorder
MARTIN DOWN SOUTH			
SU040190	1982	2	TRANSECT
SU040190	1984	2	TRANSECT
SU040190	1985	2	TRANSECT
SU040190	1986	1	TRANSECT
SU040190	1993	C	PRW

Grid Ref.	Year	Status	Recorder
MARTIN DOWN, BOKERLEY DYKE			
SU035198	1990	1	BPF

Grid Ref.	Year	Status	Recorder
MARTIN DOWN, KITTS GRAVE			
SU034204	1990	1	BPF

Grid Ref.	Year	Status	Recorder
MARTIN DOWN, NORTH TRANSECT			
SU040190	1993	A	TRANSECT

Grid Ref.	Year	Status	Recorder
MARTIN DOWN, SOUTH TRANSECT			
SU050180	1991	A	TRANSECT
SU050180	1993	B	TRANSECT

Grid Ref.	Year	Status	Recorder
MINELEY (LINKLATER'S)			
SU835568	1993	0	ALB

Grid Ref.	Year	Status	Recorder
MINLEY			
SU826568	1978	5	PJT
SU826568	1979	5	PJT
SU826568	1980	5	PJT

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

SU826568	1981	5	PJT
SU826568	1982	5	PJT
SU826568	1983	5	PJT
SU826568	1984	5	PJT
SU826568	1985	5	PJT
SU827570	1988	3	PJT
SU833568	1988	2	PJT
SU832569	1988	2	PJT
SU820560	1990	2	AJH

	Grid Ref.	Year	Status	Recorder
PORTON DOWN	SU240383	1986	3	ISS
	SU240383	1987	2	ISS
	SU240383	1988	0	ISS
	SU240383	1989	0	ISS
	SU240383	1990	2	ISS

	Grid Ref.	Year	Status	Recorder
PUREWELL, DORSET (VC11)	SZ160930	1995		MJS

	Grid Ref.	Year	Status	Recorder
PYESTOCK WOOD	SU837537	1986	1	CH

	Grid Ref.	Year	Status	Recorder
ROYDON WOODS	SU320005	1990		MB
	SU316016	1992		AB/LW

	Grid Ref.	Year	Status	Recorder
ROYDON WOODS - BAKERS TRANSECT	SU325000	1990	3	MB

	Grid Ref.	Year	Status	Recorder
ROYDON WOODS, BAKER'S TRANSECT	SU325000	1986	2	MB
	SU325000	1987	3	MB
	SU325000	1988	3	MB
	SU325000	1989	3	MB

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH

RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
SOUTHWOOD	SU838555	1973	D	MOD
	SU838555	1976	D	MOD
	SU838555	1985	B	CRH
	SU855555	1986	2	CH
	SU838555	1987	L	CRH
	SU838555	1988	A	CRH

	Grid Ref.	Year	Status	Recorder
STOCKBRIDGE DOWN	SU380350	1985	2	RT
	SU380347	1987	3	NRP-S
	SU378345	1987	3	TRANSECT
	SU387346	1987	3	AB/LW
	SU380350	1987	2	AJB
	SU378345	1988	2	TRANSECT
	SU380350	1988	2	BPF
	SU380350	1988	3	MP
	SU380350	1988	2	BPF
	SU380350	1988	3	AB/LW
	SU380350	1988	2	BPF
	SU380350	1988	1	RAT
	SU385346	1989	2	NRPS
	SU383348	1989	2	AJB/LW
	SU377350	1989	2	RAT
	SU385347	1989	2	ARDW
	SU380349	1989	2	BPF
	SU375350	1990	3	BPF/MMF
	SU375350	1990		EAP
	SU380350	1990	2	PB
	SU380349	1990	4	BPF
	SU375350	1990		BPF
	SU374346	1990	2	AJB/LJW
	SU375350	1990		AJB/LJW
	SU375350	1990	3	IJC
	SU375350	1990	3	NRPS
	SU375350	1990		TJN
	SU375350	1990	2	EAP
	SU375350	1990	2	BPF/MMF
	SU370340	1990	B	TRANSECT
	SU380340	1991		JHT
	SU380340	1991		RTC
	SU370340	1991	C	JHT
SU380340	1991	B	AJB/LJW	
SU380340	1991		AJB/LJW	
SU380348	1991	B	NRPS	
SU370340	1991	B	TRANSECT	

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

SU380349	1991	A	BPF/MMF
SU380350	1992	B	BPF
SU380350	1992	C	PW
SU388346	1992	B	BGi
SU370340	1992	A	TRANSECT
SU380350	1992	B	NRPS
SU380340	1992		BPF
SU387346	1993	B	TMH
SU388346	1993	B	PS
SU387346	1993	B	BPF
SU380340	1993		TMH
SU380340	1993		BPF
SU380350	1993	B	JT

	Grid Ref.	Year	Status	Recorder
STOCKBRIDGE DOWN AREA	SU387346	1993	0	ALB

	Grid Ref.	Year	Status	Recorder
TETRAD	SU400220	1988		MRO
	SU560620	1988		MRO
	SU320540	1988		MRO
	SU160120	1988		MRO
	SU820540	1988		MRO
	SU620600	1988		MRO
	SU700440	1988		MRO

	Grid Ref.	Year	Status	Recorder
TETRAD - BARTLEY	SU720520	1988		MRO

	Grid Ref.	Year	Status	Recorder
TETRAD - BENTLEY WOOD	SU260280	1988		MRO

	Grid Ref.	Year	Status	Recorder
TETRAD - CONFORD	SU800320	1988		MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
TETRAD - COPSE FARM	SU780600	1988		MRO
TETRAD - EELMOOR	SU840520	1988		MRO
TETRAD - FLEET POND	SU820540	1988		MRO
TETRAD - FOXLEASE	SU800560	1988		MRO
	SU820560	1988		MRO
TETRAD - HOLBURY WOOD	SU280260	1988		MRO
TETRAD - NEW FOREST	SU300000	1988	I	MRO
TETRAD - SOUTHWOOD	SU840540	1988		MRO
TETRAD - STOCKBRIDGE	SU380340	1988		MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
TETRAD - WHITEHOUSE FARM	SU840560	1988		MRO

	Grid Ref.	Year	Status	Recorder
WARNBOROUGH GREEN	SU730518	1990	1	TMH

	Grid Ref.	Year	Status	Recorder
WEST DOWN, CHILBOLTON	SU383390	1988	2	JG
	SU385390	1989	B	TJN
	SU385390	1989	B	TJN
	SU390390	1990	B	TRANSECT
	SU383390	1990		GCE

	Grid Ref.	Year	Status	Recorder
WEST MINLEY MEADOW	SU815585	1986	2	CH
	SU812577	1987	C	CRH
	SU812577	1988	L	CRH
	SU812577	1988	2	AJH
	SU812577	1989	3	CH
	SU812577	1989	D	CRH

	Grid Ref.	Year	Status	Recorder
WHITEHOUSE FARM	SU840565	1985	1	CH

	Grid Ref.	Year	Status	Recorder
WOODGREEN	SU173173	1990	B	JR

	Grid Ref.	Year	Status	Recorder
WOOLBURY ESCARPMENT	SU382356	1989	2	MRO

BUTTERFLY CONSERVATION HAMPSHIRE BRANCH
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RECORDS FOR MARSH FRITILLARY

	Grid Ref.	Year	Status	Recorder
WOOTTON COPPICE	SU240000	1985	?	PH

Appendix 3

MARSH FRITILLARY 1990-95

