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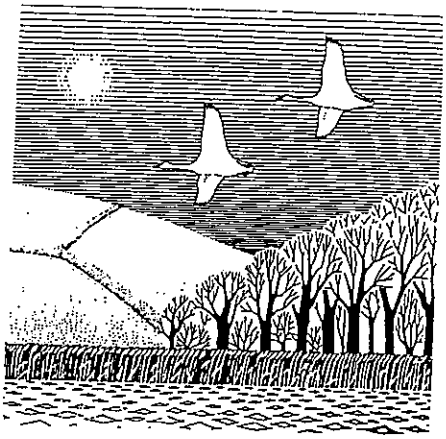

TROOPERS HILL LOCAL NATURE RESERVE

MANAGEMENT PLAN

MARCH 1999

FOR

BRISTOL CITY COUNCIL

TROOPERS HILL

MANAGEMENT PLAN

SUMMARY

Troopers Hill is a Local Nature Reserve owned by Bristol City Council. Its main ecological importance lies in the acidic grassland and heath it supports - the best examples of these habitat types in Bristol and the former County of Avon. It is also of importance for its industrial archaeology and is a prominent view point. The site is very well used by local people.

Management over the past few years has been on a small scale, comprising localised scrub clearance, an annual hay cut on a small part of the site and maintenance of facilities such as paths and steps. A monitoring programme was established in 1994 in order to identify any changes to the site's vegetation. No adverse changes have been observed during this monitoring programme.

It is proposed that management continues along the same lines, with the only regular tasks being the scrub clearance, hay cut and monitoring. Paths, gates, signs etc will be maintained as necessary. The interpretative leaflet should be updated and efforts should be made to establish a Community Action Group based on the site.

1 SITE DETAILS

1.1 Name

Troopers Hill.

1.2 Location

Central grid reference ST 628 371. The site lies in Eastern Bristol and overlooks the River Avon to the south-west. It is part of a cluster of important wildlife sites which includes Dundridge Wood, Crews Hole, Eastwood Farm and the River Avon itself. Together these sites form a wildlife corridor linking the city to wildlife sites further east along the River Avon.

1.3 Local Planning Authority

Bristol City Council.

1.4 Conservation Status

The site is a Local Nature Reserve (designated in 1995) and a Site of Nature Conservation Importance in recognition of its importance for wildlife in the context of the former county of Avon. The chimney and the line of an associated tunnel are Grade 2 listed structures.

1.6 Area

8.4 hectares (21 acres).

1.7 Nature of Legal Interest

The freehold of the site was purchased by Bristol City Council in 1956 from a private owner.

2 ACCESS

2.1 Access Policy

The access policy at Troopers Hill is to allow free pedestrian access to the whole site and to encourage quiet enjoyment of the site and its wildlife.

Access to the site is open and unrestricted to pedestrians. The main access points to the site are from Troopers Hill Road, the corner of Troopers Hill Road and Greendown and at the north-western corner of the site. Two definitive footpaths cross the site and there are a number of informal footpaths. A surfaced path circles the hill top and there are several other well used routes across the site.

3 SITE DESCRIPTION

3.1 History

The name Troopers Hill is believed to come from the civil war when there was fighting between Royalists and Parliamentarians on the hill.

Industrial activity was intensive on and around Troopers Hill in the nineteenth century and in the early years of the twentieth century and has had a profound influence on the appearance and ecology of the site.

Quarrying for pennant sandstone to supply building material is thought to have started during the middle ages and continued sporadically into the twentieth century. These quarries are responsible for features such as the gully which runs through the hill and stone terracing on the southern edge of the site. Coal, fire clay and iron have also been mined. In the nineteenth century tramways were constructed in order to export the quarried stone from the site.

There are several deep coal mines, with entrances off the site, running under Troopers Hill. Small scale open cast coal mining was attempted on the hill in the late 1890s and early 1900s but was unsuccessful. Material which appears to be coal spoil from this mining is present in the centre of the site but Cornwell 1990 considers this material to be a result of the outcropping of natural coal seams.

The most prominent legacy of this industrial past on Troopers Hill is the chimney. This was used for venting gases from a factory located at the bottom of Troopers Hill. The nature of this factory is not known - a tar works, a chemical plant and a pottery factory have all been suggested. A tunnel once linked the chimney with this works and its line can be made out in places as a slight depression in the ground. The structure at the foot of the hill was used to house coal mine winding gear.

The site has remained as open land throughout its history and some agricultural land use probably coexisted throughout with the industrial activities. In the nineteenth century donkeys are known to have been kept on the hill and it was known locally as Donkey Island.

No management work is known to have been carried out between the 1930s and 1991.

Conservation management commenced in 1991 when a series of capital works was implemented. The primary objective of these works was to prevent and reverse damage caused by erosion. The main measures undertaken were resurfacing of existing main paths; provision of a perimeter fence to prevent access by cars and motorbikes; and restoration of areas of erosion through temporary fencing and reseeding. In 1992 Landmark Environmental Consultants drew up a Management Plan on behalf of Bristol Development Corporation, who at the time were the planning authority for the area. Subsequent to the production of that management plan two interpretative boards were installed and there was a litter removal day involving local people. Footpath maintenance and improvement has been carried out. A biennial programme of photographic and vegetation monitoring, which has concentrated on the distribution of heath species on the site, was commenced in 1994 and continued in 1996 and 1998. Following recommendations made in these reports small scale scrub removal has been undertaken. A hay cut has been taken from a small area of tall grassland in the north-eastern corner of the site.

Natural events have also had an influence on the ecology of Troopers Hill in recent years. In 1995 dry summer weather allowed a serious grass fire to sweep across the hill, with significant short-term effects on the vegetation. Long-term effects of the fire have been largely beneficial, in controlling scrub encroachment and regenerating areas of heath and grassland. Heavy rainfall in the summer of 1997 led to a flood which washed away sections of footpath, necessitating their repair.

3.2 Physical

The highest point on Troopers Hill is 254 feet above sea level. The Hill is made up of pennant sandstone interbedded with small seams of mudstones, fireclays and coal. In places the coal seams outcrop on the surface of the hill. These rocks have weathered to produce thin free-draining acidic soils. Much of the site has developed extremely thin and impoverished soils. The site as a whole is very exposed but gullies and depressions on the site give extremely sheltered conditions in places.

3.3 Biological

Flora

The most extensive vegetation type on the hill is acidic grassland. Frequent grasses here include common bent (*Agrostis canina*), sheep's fescue (*Festuca ovina*), red fescue (*Festuca rubra*) and wavy hair-grass (*Deschampsia flexuosa*). Frequent herbs in these areas include sheep's sorrel (*Rumex acetosella*), mouse-ear hawkweed (*Pilosella officinalis*) and buckshorn plantain (*Plantago coronopus*). Around rock outcrops and where erosion has occurred the sward is thinner and more broken mosses (including *Polytrichum spp*) and various *Cladonia* lichens are frequent and higher plant species present include early hair-grass (*Aira praecox*), thyme-leaved sandwort (*Arenaria serpyllifolia*) and small mouse-ear chickweed (*Cerastium semidecandrum*). In several areas scattered plants of ling (*Calluna vulgaris*) and bell heather (*Erica cinerea*) are found in this grassland sward and in places their growth becomes dense enough to form heathland. In a few areas where the soil is deeper or has been enriched taller grassland is present. This taller grassland is dominated by cocksfoot (*Dactylis glomerata*) and supports a variety of herbs including black knapweed (*Centaurea nigra*) and meadow vetchling (*Lathyrus pratensis*).

Light scrub is scattered across the site and is especially frequent along the west facing slope of the hill. This light scrub is dominated by broom (*Cytisus scoparius*) and bramble (*Rubus fruticosus agg*). Herbaceous plants associated with this scrub include wood sage (*Teucrium scorodonium*), golden rod (*Solidago virgaurea*), imperforate St John's wort (*Hypericum maculatum*) and wild carrot (*Daucus carota*). Dense scrub grows along the south-east facing slope of the hill along Troopers Hill Road and also along the western edge of the site where it forms the boundary of Crewes Hole woodland. This scrub is dominated by hawthorn (*Crataegus monogyna*) but along the western edge of the site in particular it also includes silver birch (*Betula pendula*), goat willow (*Salix caprea*) and oak species (*Quercus robur, Quercus petraea* and the introduced *Quercus cerris*). Two patches of the introduced Japanese knotweed (*Reynoutria japonica*) is present on the edge of the scrub.

Fauna

The fauna of the site has been less well surveyed than the flora has. Casual records of birds present have been made during other surveys. Few bird species have been seen on the grassland areas, although meadow pipits are often present outside the breeding season and kestrel often hunt over the site. The scrub areas support a larger range of birds. Species regularly present during the summer include willow warbler, whitethroat, long-tailed tit, greenfinch and bullfinch. A nightingale was heard singing for a few days during the spring of 1998.

Other species of vertebrate recorded on the site include badger (a sett on the slope above Troopers Hill Road) and common lizard and slow worm. The level of badger activity on the site appears to have increased since 1998.

Insect recording has concentrated on the site's butterflies. Grayling (*Hipparchia semele*) was first seen on the site in 1985 and has been recorded in most subsequent years. It is associated with short grassland and rock outcrops on the site. Other species of grassland butterfly which have been recorded include common blue (*Polyommatus icarus*), small copper (*Lycaena phlaeas*) and small heath (*Coenonympha pamphilus*). The only other group of insects for which there are reasonably complete records are grasshoppers and bush-crickets. The grasshoppers present include a large population of mottled grasshopper (*Myreomattix maculatus*). A few other insect records have been gathered in recent years and a local naturalist (David Gibbs) has carried out a small amount of survey work on the bees and flies of Troopers Hill. Although only a few species have been recorded these include several rare and scarce species. The populations of burrowing bees are notably large and diverse.

Evaluation

The site supports the only substantial area of acidic grassland and heath in Bristol and the best developed surviving example in the former County of Avon. Since acidic soils are uncommon in the area 25 of the plant species recorded here are included in the list of Notable Plant Species in the former County of Avon, although they may be much more common in other parts of the country where acidic soils are frequent. These species are:

Common bent	*Agrostis canina*
Silvery hair-grass	*Aira caryophyllea*
Early hair-grass	*Aira praecox*
Thyme-leaved sandwort	*Arenaria serpyllifolia ssp leptoclados*
Ling	*Calluna vulgaris*
Small mouse-ear chickweed	*Cerastium semidecandrum*
Heath grass	*Danthonia decumbens*
Wavy hair-grass	*Deschampsia flexuosa*
Bell heather	*Erica cinerea*
Blue fleabane	*Erigeron acer*
Fennel	*Foeniculum vulgare* (probabaly introduced)
Heath bedstraw	*Galium saxatile*
Soft grass	*Holcus mollis*
Imperforate St John's wort	*Hypericum maculatum*
Bitter vetch	*Lathyrus linifolius*
Narrow-leaved everlasting pea	*Lathyrus sylvestris*
Heath woodrush	*Luzula multiflora*
Buckshorn plantain	*Plantago coronopus*
Sessile oak	*Quercus petraea*
Sheep's sorrel	*Rumex acetosella*
Golden rod	*Solidago virgaurea*
Least trefoil	*Trifolium micranthum*
Common corn salad	*Valerianella locusta*
Squirrel's tail fescue	*Vulpia bromoides*

Rat's tail fescue *Vulpia myuros*

In addition White's Flora of Bristol (1912) lists several other notable plant species which have not been recorded at the site in recent years. These include knotted clover (*Trifolium striatum*), birdsfoot (*Ornithopus perpusillus*) and sand spurrey (*Spergularia rubra*).

The colony of grayling butterflies is the only one known in Bristol and this is a County Notable Species. The colony of mottled grasshopper on Troopers Hill is probably the largest in Bristol and this is also a County Notable Species. Although little recording of other groups has been carried out four nationally scarce insects (3 bee species and single beetle and fly species) have been recorded. The rarest insect which has been recorded is the nomad bee *Nomada lathburniana*, a Red Data Book species. This small bee is a parasite on the burrowing bee *Andrena cineraria*. Until it was found on Troopers Hill it was believed to have been extinct in South-western England and to occur from Lancashire northwards only. The presence of the large and distinctive dotted bee fly *Bombylius discolor* is also especially noteworthy. It has declined dramatically in recent decades - there are records from 40 ten kilometre squares since 1970 but only 16 since 1989. Most of its known colonies are now restricted to sea cliffs. Its ecology is not adequately understood but its larvae are parastic on burrowing bees of the genus *Andrena* which require bare earth. The adult bee-fly also requires flowering plants on which to feed in the early spring. This insect is the target of an English Nature Species Action Plan and a programme of ecological research is planned for 1999, which should elucidate its habitat requirements. Initial survey work suggests that dotted bee-fly is fairly numerous and widespread on Troopers Hill. The large and diverse populations of *Andrena* species on Troopers Hill are of importance in their own right (David Gibbs, pers. comm.).

Badgers are protected by law and are scarce in Bristol.

The majority of the notable species found on the site are dependent on acidic grassland. Several of the plant species require a broken sward with bare soil or rock and this bare ground is also extremely valuable for solitary bee species, bee flies, mottled grasshopper and probabaly other insects. The mixture of scrub, heath, both tall and short grassland and bare ground, with a wide variety of aspects and degrees of shelter, indicates that Troopers Hill is likely to be very valuable for invertebrates as a whole. The scrub supports fewer notable plant species but it is likely that further recording would reveal additional invertebrate interest associated with the scrub.

The site is one of the most important for nature conservation in Bristol and makes a large contribution to the biodiversity of the city. It is also of strategic importance as part of a network of sites forming a wildlife corridor along the River Avon.

3.4 Public Use

Troopers Hill is very well used for informal recreation. Many people walk, and walk dogs, on the hill both on the formal paths and elsewhere on the site. Cycling is discouraged but does take place. It is a popular informal play area for children.

There are two interpretative sign boards on the hill and Bristol City Council has published a site leaflet. The steps on the site have recently been repaired. There is little evidence of vandalism on the site but littering and dog fouling both occur. The Rangers Service organised a series of guided walks across the site during the summer of 1998.

4 SITE OBJECTIVES

4.1 Main Site Objectives

1 To maintain and where possible enhance the quality and extent of acidic grassland and heath, including its associated bare earth, on the site.
2 To maintain areas of scrub on the site, especially scrub such as broom which is dependent on an acidic substrate.
3 To provide suitable facilities for quiet recreation on the site, providing that these do not conflict with nature conservation requirements.
4 To encourage community involvement in the site, to encourage active involvement in the management of the site and increased appreciation of its wildlife.

5 MANAGEMENT OPERATIONS

5.1 Rationale

Grassland and Heath

Troopers Hill is unusual in that on the whole its grassland has not required management in order to maintain its nature conservation interest. This is probabaly due to two factors:

- The soil is extremely infertile and free-draining and this prevents or inhibits the growth of rank grassland species and scrub.
- Trampling by members of the public favours the plant and insect species of short and sparse grassland for which the site is valuable.

A small area has more fertile soil and the grassland here has required an annual hay cut in order to prevent its being dominated by rank grasses and its botanical diversity declining.

The monitoring programme has revealed that most of the areas of heath on the site are stable or are increasing. Small scale scrub clearance has been recommended in a number of areas where heathland or grassland is being encroached upon. Where this has been carried out it has been successful in promoting a more extensive and more vigorous growth of heath species.

Some further scrub clearance is recommended in this plan. When scrub clearance is carried out goat willow and silver birch should be retained since these species are of particular value for invertebrates.

Scrub

Management of scrub has not been carried out except where scrub has been removed from areas of heath. The fire of 1995 had a profound influence on scrub on parts of the hill. In places broom scrub has been replaced by bramble and bracken but in other places broom scrub is regenerating; elsewhere grassland or heath has regenerated on areas where scrub was burnt off. The fire had some beneficial effects

but fires should be discouraged, although it is recognised that they are likely to occur in the future.

The scrub around the badger sett should be left unmanaged in order to avoid disturbance to these animals. Elsewhere small areas of scrub should be cut on a rotation in order to promote new growth. This provides habitat of value to birds and invertebrates.

Access

There are few conflicts between public use of the site and its nature conservation interest and trampling plays a, important role in maintaining short grassland. The bare earth which trampling causes creates vital habitats for bees, for which the site is very important. Excessive trampling, however, could lead to destruction of significant areas of vegetation and slope instability. Maintenance of, and improvement to, the site's footpath network is required in order to control erosion and a large amount of this work has recently been carried out. Access by cars or motorbikes or by large numbers of bicycles would have an adverse impact on the site's nature conservation importance. The fences on the perimeter of the site should be maintained so that such access is prevented. Litter is deposited on the site, especially around footpaths. It is unsightly and suppresses the growth of vegetation and should be regularly removed.

Greater awareness of the site's ecological importance amongst members of the public can increase their enjoyment of the site and restrict any potential areas of conflict. The notice boards at the site should be updated and the information leaflet should be revised and re-published.

Monitoring and Survey

It is important, especially in the absence of regular large-scale management, that features of ecological value on the site are monitored. The established programme of vegetation monitoring should be continued and regular butterfly monitoring should also be carried out. Recent survey work has begun to reveal substantial invertebrate interest on Troopers Hill. A systematic series of surveys should be carried out in order to establish the presence of notable species, their distribution on the site and their management needs.

The botanical survey data is not comprehensive and is also out of date. A further survey should be carried out early in the season when the species recorded in White's Flora of Bristol but not subsequently should be visible.

Community Involvement

The site offers opportunities for involvement by school groups and other community groups. Such groups could assist in site management, survey and research and individuals would gain from such involvement. Health and Safety requirements and the need for a high standard of work mean that some management tasks such as removal of scrub from heath on the steep southern slopes of the hill are not suitable for volunteer groups unless they are well-trained and closely supervised. Since opportunities for involvement in management on Troopers Hill are limited any community action group should also be involved in the adjacent Crewes Hole scrub and woodland where there are substantial management needs - for example the removal of invasive species such as holm oak and Japanese knotweed.

5.2 Project Register

1 Cut the tall grassland in the north-eastern corner of the site as shown on the map. Remove the cuttings from the site as hay.
Timing - annually in early August.

2 Remove scrub from areas of heath as shown on the map and as recommended in the biennial monitoring reports.
Timing - biennially in December.

3 Cut down small areas of scrub as shown on the map on a five yearly rotation in order to promote young scrub growth.
Timing - biennially in December.

4 Maintain the footpaths and associated gates, stiles and steps on the site.
Timing - annually in October as required.

5 Remove litter from the site.
Timing - throughout the year.

6 Maintain the site's perimeter fences.
Timing - annually in October as required.

7 Repair the noticeboards as necessary.
Timing - when necessary.

8 Revise and re-publish the site leaflet.
Timing - year 3.

9 Check the safety of features on the site such as the chimney and ensure that repairs are carried out by the responsible body.
Timing - annually - April.

10 Continue the programme of vegetation and photographic monitoring.
Timing - August in years ending in even digit.

11 Initiate programme of butterfly monitoring by establishing a fixed route around the hill which the surveyor should walk and identify numbered stretches of this route. This route should be walked by the surveyor weekly through the summer and butterflies seen within 5 metres either side of the centreline of the route should be noted. Numbers of each species seen on each visit in each numbered section of the route should be recorded.
Timing - annually - May to September.

12 Carry out insect survey, concentrating on Hymenoptera and providing an assessment of the nature of the entomological value of Troopers Hill, the distribution of this interest and any management required to maintain or enhance the interest.
Timing - year 2 - April to August.

13 Update plant survey.
Timing - year 2 - May.

14 Establish Community Action Group by publicising a meeting through a mail drop, posters at local libraries etc.
Timing - year 1.

6 BIBLIOGRAPHY AND ACKNOWLEDGEMENTS

6.1 Bibliography

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6.2 Acknowledgments

Many thanks are due to David Gibbs of 121 Clouds Hill Road, St George, Bristol, BS5 7LG, for freely providing insect records.

Appendix 1 Plant Species List (Surveys 1985 to 1999)

Sycamore	*Acer pseudoplatanus*
Yarrow	*Achillea millefolium*
Ground elder	*Aegopdium podagraria*
Common bent	*Agrostis capillaris*
Velvet bent	*Agrostis canina*
Brown bent	*Agrostis vinealis*
Silvery hair-grass	*Aira caryophyllea*
Early hair-grass	*Aira praecox*
Crow garlic	*Allium vineale*
Meadow foxtail	*Alopecurus pratensis*
Sweet vernal grass	*Anthoxanthum odoratum*
Thale cress	*Arabidopsis thaliana*
Thyme-leaved sandwort	*Arenaria serpyllifolia ssp leptoclados*
Thyme-leaved sandwort	*Arenaria serpyllifolia ssp serpyllifolia*
Daisy	*Bellis perennis*
Silver birch	*Betula pendula*
Lop grass	*Bromus hordaceaus*
Sterile brome	*Bromus sterilis*
Buddleia	*Buddleja davidii*
Ling	*Calluna vulgaris*
Black knapweed	*Centaurea nigra*
Centaury	*Centaurium erythraea*
Red valerian	*Centranthus ruber*
Common mouse-ear chickweed	*Cerastium fontanum*
Clustered mouse-ear chickweed	*Cerastium glomeratum*
Small mouse-ear chickweed	*Cerastium semidecandrum*
Snow-in-summer	*Cerastium tomentosum*
Rosebay willowherb	*Chamaerion angustifolium*
Creeping thistle	*Cirsium arvense*
Spear thistle	*Cirsium vulgare*
Hawthorn	*Crataegus monogyna*
Smooth hawksbeard	*Crepis capillaris*
Rough hawksbeard	*Crepis vesicaria*
Crested dog's-tail	*Cynosurus cristatus*
Broom	*Cytisus scoparius*
Cocksfoot	*Dactylis glomerata*
Heath grass	*Danthonia decumbens*
Tufted hair-grass	*Deschampsia caespitosa*
Wavy hair-grass	*Deschampsia flexuosa*
Teasel	*Dipsacus fullonum*
Male fern	*Dryopteris filix-mas*
Field horsetail	*Equisetum arvense*
Bell heather	*Erica cinerea*
Blue fleabane	*Erigeron acer*
Spring whitlow grass	*Erophila verna*
Hemp agrimony	*Eupatorium cannabinum*
Sheep's fescue	*Festuca ovina*

Red fescue	*Festuca rubra*
Fennel	*Foeniculum vulgare*
Ash	*Fraxinus excelsior*
Cleavers	*Galium aparine*
Heath bedstraw	*Galium saxatile*
Cut-leaved cranesbill	*Geranium dissectum*
Ivy	*Hedera helix*
Yorkshire fog	*Holcus lantus*
Soft grass	*Holcus mollis*
Wall barley	*Hordeum murinum*
Meadow barley	*Hordeum secalinum*
Imperforate St John's wort	*Hypericum maculatum*
Perforate St John's wort	*Hypericum perforatum*
Common catsear	*Hypochaeris radicata*
Laburnum	*Laburnum anagyroides*
White dead nettle	*Lamium album*
Bitter vetch	*Lathyrus linifolius*
Meadow vetchling	*Lathyrus pratensis*
Narrow-leaved everlasting pea	*Lathyrus sylvestris*
Autumnal hawkbit	*Leontodon autumnalis*
Ox-eye daisy	*Leucanthemum vulgare*
Wild privet	*Ligustrum vulgare*
Perennial rye-grass	*Lolium perenne*
Bird's-foot trefoil	*Lotus corniculatus*
Field woodrush	*Luzula campestris*
Heath woodrush	*Luzula multiflora*
Apple	*Malus domestica*
Common mallow	*Malva sylvestris*
Black medic	*Medicago lupulina*
Tall melilot	*Melilotus altissima*
Grape hyacinth	*Muscari armeniacum*
Timothy	*Phleum pratense*
Mouse-ear hawkweed	*Pilosella officinalis*
Buckshorn plantain	*Plantago coronopus*
Ribwort plantain	*Plantago lanceolatus*
Ratstail plantain	*Plantago major*
Annual meadow-grass	*Poa annua*
Rough-stalked meadow-grass	*Poa trivialis*
Tormentil	*Potentilla erecta*
Creeping cinquefoil	*Potentilla reptans*
Self-heal	*Prunella vulgaris*
Blackthorn	*Prunus spinosa*
Bracken	*Pteridium aquilinum*
Turkey oak	*Quercus cerris*
Holm oak	*Quercus ilex*
Sessile oak	*Quercus petraea*
Pedunculate oak	*Quercus robur*
Meadow buttercup	*Ranunculus acris*
Bulbous buttercup	*Ranunculus bulbosus*

Lesser celandine	*Ranunculus ficaria*
Creeping buttercup	*Ranunculus repens*
Japanese knotweed	*Reynoutria japonica*
Dog rose	*Rosa canina agg*
Bramble	*Rubus fruticosus agg*
Sorrel	*Rumex acetosa*
Sheep's sorrel	*Rumex acetosella*
Curled dock	*Rumex crispus*
Broad-leaved dock	*Rumex obtusifolius*
Wood dock	*Rumex sanguineus*
Goat willow	*Salix caprea*
Elder	*Sambucus nigra*
Rock stonecrop	*Sedum reflexum*
Common ragwort	*Senecio jacobaea*
Oxford ragwort	*Senecio squalidus*
Groundsel	*Senecio vulgaris*
Golden rod	*Solidago virgaurea*
Hedge woundwort	*Stachys sylvatica*
Tansy	*Tanacetum vulgare*
Wood sage	*Teucrium scorodonium*
Lesser trefoil	*Trifolium dubium*
Least trefoil	*Trifolium micranthum*
Red clover	*Trifolium pratense*
White clover	*Trifolium repens*
Coltsfoot	*Tussilago farfara*
Gorse	*Ulex europaeus*
Common corn salad	*Valerianella locusta*
Wall speedwell	*Veronica arvensis*
Ivy-leaved speedwell	*Veronica hederifolia*
Field speedwell	*Veronica persica*
Common vetch	*Vicia sativa*
Common dog violet	*Viola riviniana*
Squirrel's tail fescue	*Vulpia bromoides*
Rat's tail fescue	*Vulpia myuros*

Appendix 2 Butterfly Species Recorded (Surveys 1985 - 98)

Small skipper	*Thymelicus sylvestris*
Large skipper	*Ochlodes venata*
Clouded yellow	*Colias crocea*
Brimstone	*Gonepteryx rhamni*
Large white	*Pieris brassicae*
Small white	*Pieris rapae*
Green-veined white	*Pieris napi*
Orange tip	*Anthocharis cardamines*
Small copper	*Lycaena phlaeas*
Common blue	*Polyommatus icarus*
Holly blue	*Celastrina argiolus*
Red admiral	*Vanessa atalanta*

Painted lady	*Vanessa cardui*
Small tortoiseshell	*Aglais urticae*
Peacock	*Inachis io*
Comma	*Polygonia c-album*
Speckled wood	*Pararge aegeria*
Marbled white	*Melanargia galathea*
Grayling	*Hipparchia galathea*
Gatekeeper	*Pyronia tithonus*
Meadow brown	*Maniola jurtina*
Small heath	*Coenonympha pamphilus*
Ringlet	*Aphantopus hyperantus*

Appendix 3 Moth Species Recorded (Casual observations 1994-98)

Long horn moth	*Adella reamurella*
Silver Y	*Autographa gamma*
Rush veneer	*Nomophila noctuella*
Grass moth	*Agriphila tristella*
Grass moth	*Agriphila straminella*
Grass moth	*Agriphila inquinitella*
Bramble leaf-miner	*Stigmella aurella*

Appendix 4 Grasshoppers and Bush-crickets Recorded (Surveys 1994-98)

Mottled grasshopper	*Myreomattix maculatus*
Field grasshopper	*Chorthippus brunneus*
Meadow grasshopper	*Chorthippus brunneus*
Dark bush-cricket	*Pholidoptera griseoaptera*
Speckled bush-cricket	*Leptophyes punctatissima*

Appendix 5 Other Insect Species Recorded (Surveys 26th May 1995, 4th May 1998 and casual records)

Hymenoptera

Nomada goodeniana
Nomada fucata

Na Species - occurs in 30 or fewer ten kilometre squares in Britain

Nomada lathburniana

RDB Species - occurs in 15 or fewer ten kilometre squares in Britain

Sphecodes monilicornis
Lasioglossum parvulum
Andrena fulva
Andrena wilkella
Andrena tibialis
Andrena pubescens
Andrena cineraria
Andrena flavipes

Andrena humilis	Nb Species - occurs in 31-100 ten kilometre squares in Britain	
Hemiptera		
Acanthosoma haemorrhoidale	Hawthorn shield bug	
Peritrechus geniculatus		
Coleoptera		
Cryptocephalus aureolus	Nb species (recorded from 31 to 100 ten-kilometre quares in Britain)	
Diptera		
Eristalis tenax	Drone fly	
Eristalis pertinax	Drone fly	
Platychéirus albimanus	Hoverfly	
Episyrphus balteatus	Hoverfly	
Epistrophe eligans	Hoverfly	
Bombylius major	Dark-edged bee-fly	
Bombylius discolor	Dotted bee-fly	Nationally notable species