

**Invertebrates at Brook Meadow (Lumley Meadow SINC),  
Emsworth, Hampshire, in July 2004**

Report to Brook Meadow Conservation Group by Martin C. Harvey  
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# **Invertebrates at Brook Meadow (Lumley Meadow SINC), Emsworth, Hampshire, in July 2004**

## **1. Introduction**

Brook Meadow is in Hampshire (Havant Borough), near Emsworth in the south-east corner of the county (Map 1). The majority of the site is in vice-county 11, South Hampshire, with a small area on the eastern side falling in vice-county West Sussex (this area was not included in the current survey). A large portion of the part of the site that is in Hampshire has been identified by Hampshire County Council as a Site of Importance for Nature Conservation (SINC), under the name Lumley Meadow SINC. The centre grid reference is SU751061.

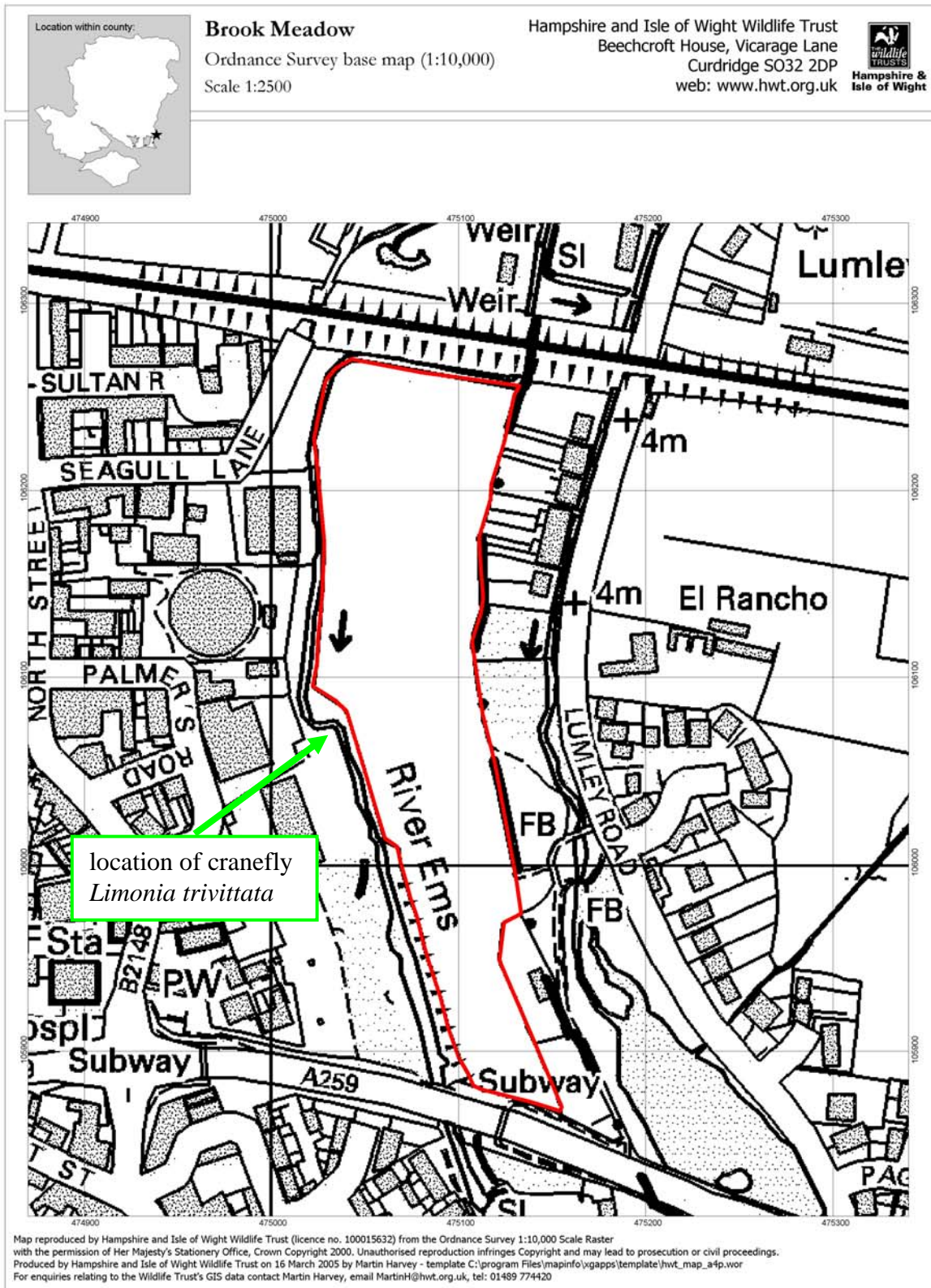
The land is owned by Havant Borough Council, and managed by the Brook Meadow Conservation Group. A botanical habitat survey was carried out in 1998 by Ian Ralphs for the Hampshire Habitat Survey project. Brook Meadow contains a mixture of grassland and scrub, with mature trees at the edges and bordering the River Ems, a chalk river that flows around the north and west boundaries of the site. To the south there are indicators of saline-influenced communities. Brook Meadow is surrounded by houses and gardens, with light industrial units to the west. To the north is the Portsmouth-Chichester railway line, and to the south the Ems passes under the A259 to drain into Chichester Harbour.

Access is obtained from a public footpath crossing the southern part of the Meadow.

The main areas of open vegetation are rather rank, especially in the southern field, but do contain plenty of nectar sources from plants such as thistles, meadowsweet and hogweed. The banks of the River Ems have some good riverside vegetation. There are some large willows, including some dead and decaying branches, that are providing useful dead-wood habitat.

This report details the results of a brief invertebrate survey commissioned by the Brook Meadow Conservation Group in 2004. Species found are listed and comments are provided on the invertebrate habitats present.

Map 1. Brook Meadow, showing boundary (in red) of Lumley Meadow SINC and capture location of scarce crane fly *Limonia trivittata*.



## 2. Recording undertaken

For this survey recording was undertaken during a single visit on 6 July 2004, from approx. 10am to 3pm GMT. This was a warm and mostly sunny day. The survey consisted of general recording of day-active invertebrates, mostly by netting individual insects and sweeping vegetation, and some investigation of dead willow wood at river's edge. Two small water traps (one yellow and one white) were also set out on arrival and collected at the end of the fieldwork.

Recording work was aimed at sampling a range of the terrestrial invertebrate species present, and assessing the site for its potential invertebrate habitats. Most effort was spent on the open North and Central meadow areas, plus the river banks. It should be realised that many invertebrate species are apparent for only a small part of the year, and the species recorded from this single visit will be a small fraction of the total number of species that the site supports. The aquatic fauna of the river was not sampled.

## 3. Summary of species recorded

The visit in July 2004 produced 99 records of 83 invertebrate species, including one Nationally Scarce species and seven Local species (Table 1; see Appendices for full record details and species accounts). One vertebrate species, the Brown Rat *Rattus norvegicus*, was also recorded.

Table 1. Number of invertebrate species in each national status category

<b>Unknown</b>	<b>Common</b>	<b>Local</b>	<b>Nationally Scarce</b>	<b>Total</b>
1	71	9	2	<b>83</b>

The proportions of Common, Local, Nationally Scarce and Red Data Book invertebrate species can be compared with other wetland sites (Table 2).

Table 2. Comparison with other wetland sites

	<b>Brook Meadow</b>	<b>Priors Mill Meadow<sup>1</sup></b>	<b>Mowbray Fields fill pond<sup>2</sup></b>	<b>Cholsey Marsh<sup>3</sup></b>
Common	85.6%	87.6%	69.5%	70.0%
Local	10.8%	5.8%	20.5%	21.1%
Nationally Scarce	2.4%	0.8%	2.5%	2.5%
Red Data Book	0.0%	0.8%	0.5%	1.7%
total no. of species recorded	83	121	200	237
area	2.8 ha	0.7 ha	1 ha	12 ha
time spent surveying	5 person-hours	5¼ person-hours (including moth-trapping)	11 person-hours (including moth-trapping)	26 person-hours (including moth-trapping)
survey date	July 2004	June 2000	July 1999	July/August 1998

<sup>1</sup> : source: Harvey 2000

<sup>2</sup> : source: Harvey 1999

<sup>3</sup> : source: Harvey and Storey 1999

This comparison must be treated with caution – although all four sites include at least some wet grassland the other habitats are different, and the sites received varying amounts of survey time using sampling methods that are not entirely comparable. Priors Mill Meadow in north Hampshire is an unmanaged riverside area that had become very rank with nettles. Mowbray Fields fill pond in southern Oxfordshire (now designated as a Local Nature Reserve) is a mixture of marsh, carr and grassland. Cholsey Marsh in southern Oxfordshire (a Wildlife Trust reserve) contains Thames-side marsh, grassland and scrub. However, the figures do suggest that Brook Meadow supports a reasonably distinctive fauna; not as diverse as the two nature reserves, which is to be expected given the greater variety of plant species and habitat structure at the two larger sites, but of better quality than the unmanaged site.

#### 4. Nationally Scarce species

Details are given below for the two Nationally Scarce species recorded at Brook Meadow in 2004. The classification “Nationally Scarce” denotes a species which has been recorded from between 16 and 100 10-km squares in Great Britain (altogether there are approximately 2,800 national grid 10-km squares covering Great Britain). “Nationally Scarce/Na” denotes a species recorded from between 16 and 30 10-km squares in Great Britain

##### 4.1 A crane fly *Limonia trivittata* (Nationally Scarce)

A small crane fly which is widespread but very local throughout Britain, and is found in wet woodland on calcareous soils, especially near rivers. Its biology is not known although there seems to be an association with Butterbur *Petasites hybrida* in some cases and it is possible that the larva develops in petioles or rootstock (Falk 1991b, Ball 1997).



The related species *Limonia tripunctata*, copyright Malcolm Storey/www.bioimages.org.uk

At Brook Meadow one male of this crane fly was found among trees at the river edge, on the western (unmanaged) bank, see Map 1. Its presence is likely to be dependent on continued tree cover along parts of the river. If Butterbur is present in this area it too should be retained; Butterbur is certainly present at Brook Meadow, e.g. there are patches further downstream, near the sluice, and to the east near the Lumley gate (Frances Jannaway pers. comm.).

There appear not to be any photos of this species on the web, but other members of the genus *Limonia* can be seen at the Bioimages website: [www.bioimages.org.uk/HTML/T24502.HTM](http://www.bioimages.org.uk/HTML/T24502.HTM)

#### 4.2 A solitary bee *Lasioglossum pauxillum* (Nationally Scarce/Na)

A mining bee found in south-east England. It became more frequent during the 1990s, and may no longer qualify for Nationally Scarce status. It has been recorded from a variety of



*Lasioglossum pauxillum*, copyright Malcolm Storey/  
[www.bioimages.co.uk](http://www.bioimages.co.uk)

open habitats including sandy heathland, calcareous grassland, coastal locations such as soft rock cliffs and probably other disturbed spots such as sand pits and chalk quarries. The bee nests in burrows in the ground, preferring light sandy clays (Falk 1991a, Ball 1997, Edwards and Broad 2005).

At Brook Meadow two females of this bee were found in the middle/northern grassland area. It requires open vegetation with patches of bare ground in which to nest, and a variety of flowering plants as pollen and nectar sources.

Photos of this bee can be found on the Bioimages website:  
[www.bioimages.org.uk/HTML/R156693.HTM](http://www.bioimages.org.uk/HTML/R156693.HTM)

There is also a photo of its nest on the website of the Bees, Wasps and Ants Recording Society: [www.bwars.com/frames/main/members/photos/mike\\_edwards/#](http://www.bwars.com/frames/main/members/photos/mike_edwards/#)

### 5. Other species recorded

The other species recorded include nine which are classified as “Local” at a national level (i.e. species which have been recorded from between 101 and 300 of the approx. 2,800 national grid 10-km squares covering Great Britain), as well as 71 Common species and 1 whose national status is unclear.

The Local species found at Brook Meadow included three more solitary bees, *Andrena flavipes* (another ground-nesting species), *Hylaeus communis* (nests in stems of plants such as Bramble) and *Megachile versicolor* (a leaf-cutter bee that builds its nests in plants stems or other holes and crevices); all these bees require good sources of nectar and pollen.

The majority of the Common species recorded are, unsurprisingly, widespread species that are found in a variety of habitats, but they include species that breed in dead wood, such as the beetle *Rhinosimus planirostris* and the solitary wasps *Crossocerus annulipes* and *C. podagricus* (these wasps nest in old beetle bore-holes), and characteristic species of wet meadows/marshes, such as the snipe flies *Chrysopilus cristatus* and *C. asiliformis*, which breed in wet, decaying wood and vegetation, and the stilt bug *Cymus melanocephalus*, associated with rushes *Juncus* spp.

## 6. Habitat assessment

Brook Meadow contains a mixture of wet meadow, water courses and boundary scrub/trees. These habitats have the potential to support large numbers of invertebrates, and within the general habitat categorisations there are a large number of 'micro-habitats' each with its own specialised invertebrate species. For general information on managing habitats for invertebrates see Kirby 1992. Benstead *et al.* (1997) give a general guide for wet grassland management, including valuable information on management for invertebrates.

### 6.1 Open grassland vegetation

The main areas of open grassland vegetation in the north and central meadows (Appendix 3, photo 1) have been managed by cutting, and this is likely to remain the only viable management option. The danger to invertebrates from cutting is twofold: when the cutting takes place it obviously has a drastic impact on the species present at the time, and repeated cutting of large areas can produce an even vegetation structure lacking in the structural variation that is essential for diverse invertebrate communities. However, if vegetation is left neither cut nor grazed then it will change in structure anyway, so the dangers of undertaking management have to be set against the certainty of the habitat changing if left unmanaged.

Cutting in summer can have a particularly high impact on invertebrates, both directly and because of the resulting loss of flowers, while cutting in winter damages those species that overwinter inside the stems, flowerheads or fruits of herbaceous plants.

These dangers can be avoided if it is possible to cut the site on a rotational basis, so that different sections are cut in different years. Part of the grassland should be left uncut for at least a year at a time, perhaps two or three years, while other areas are cut more frequently. This would maintain a range of habitat structure, with areas of longer and shorter vegetation, and a wide variety of flowering plants to provide nectar and pollen for invertebrates to feed on (see Appendix 3, photos 2, 3 and 4).

Cuttings should be removed from the site to prevent nutrient build-up and to ensure that areas of bare ground/mud are available (bare ground is important for invertebrates because it provides areas for basking and hunting, and some species lay eggs into wet mud at the edges of water).

### 6.2 River margins

River margins have their own characteristic invertebrate fauna, separate from both terrestrial species and aquatic species; in reality, there is a continuum of habitat from permanently under water, through seasonally/occasionally under water, to wet mud and swamp or fen vegetation, through to drier river bank habitats. Management should aim to provide a good range of these transitional habitats. Areas of bare mud and bare gravel at the river edges will support specialist invertebrates (Appendix 3, photo 5), while areas of taller, denser vegetation will support plant-feeding species and may also be important sources of nectar and pollen for terrestrial species (Appendix 3, photo 6).

The amount of shade over the margins will also have an impact on the species present. Areas that are unshaded or partially shaded will probably host the largest numbers of species, certainly the largest numbers of the bigger, more noticeable species, but shaded river margins do have their own specialists as well, of which the crane fly *Limonia trivittata* (see 4.1 above) is an example.

The wooded margins in the vicinity of the capture point for *L. trivittata* (see Map 1 and Appendix 3, photo 7) should be retained. Elsewhere there is scope for sensitive reduction in shade, e.g. by removing some trees and scrub. Another option that can provide good invertebrate habitat is to pollard individual trees. This is a frequent management technique for riverside willows, and indeed has been carried out already at Brook Meadows (Appendix 3, photo 8). Pollarding involves cutting out the crown of a tree and branches to re-grow from the main trunk; advice should be sought from the Environment Agency before considering such work on riverside trees.

### **6.3 Trees/scrub**

The tree and scrub species found at Brook Meadow are valuable for invertebrates, both directly as foodplants (e.g. willows support one of the highest total number of plant-feeding invertebrates of any tree species) and in providing shelter and structural variation. If the meadow is to be maintained as an open meadow it may be necessary to control trees and scrub to prevent them invading the open areas. There are a number of fallen tree limbs on the site, mostly willow, in a variety of situations, and these are potentially important for invertebrates. Bees and wasps will nest in holes in exposed, sun-dried timber (Appendix 3, photo 9), while some fly species breed in wet, decaying timber which has fallen into the ditches. Removal of dead wood from the site would have a negative effect on the invertebrate fauna.

## **7. Summary**

Overall, Brook Meadow fulfils a valuable role in supporting biodiversity in the heart of Emsworth. The current survey was based on a single visit, and will have only recorded a small fraction of the total species present, but even so two nationally scarce species were found. The range of more widespread species and the number of individuals is both of interest in its own right and forms an integral part of the wider ecosystem, e.g. by acting as a food source for vertebrate species. As management develops the site has great potential to increase in interest, and to support a more distinctive community of wetland, grassland and woodland invertebrates.

## **8. Acknowledgements**

Thanks to Frances Jannaway of the Brook Meadow Conservation Group for arranging access and showing me round the site, also to Brian Fellows (chair of the Conservation Group) who accompanied me during fieldwork and contributed several insect specimens. Thanks to Malcolm Storey for permission to use photos from his website [www.bioimages.org.uk](http://www.bioimages.org.uk).

## **9. Contact details**

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## Appendix 1: Species list and summary species accounts for Brook Meadow

Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Coleoptera	<i>Rhagonycha fulva</i>	Common red soldier beetle	(Scopoli, 1763)	Common	grassland	7-10mm long orange red soldier beetle with black tips to the wing cases. Adults very common on umbelliferous flowers in late July, predatory on other insects. Larvae predatory at base of grasses etc.
Coleoptera	<i>Malthinus flaveolus</i>	a soldier beetle	(Herbst, 1786)	Common	trees/scrub	Small grey and yellow soldier beetle. Adults often on foliage rather than flowers and possibly therefore overlooked. Larvae carnivorous, possible under bark of dead twigs or branches. Locally common throughout Britain.
Coleoptera	<i>Malachius viridis</i>	a malachite beetle	Fabricius, 1787	Local	grassland	5mm long metallic green malachite beetle with red tips to the elytra. Predatory. Adults generally found on flowers, particularly of umbels - larvae probably living as predators in dead plant stems. Locally common in dry grasslands on sea cliffs and dunes in southern Britain. Mainly, but not exclusively coastal, particularly in the northern part of its range.
Coleoptera	<i>Propylea quattuordecimpunctata</i>	14-spot Ladybird	(Linnaeus, 1758)	Common	various	3.5-5mm long black and yellow angular spotted ladybird. Larvae aphidophagous. Very common in most habitats, including gardens.
Coleoptera	<i>Adalia bipunctata</i>	2-spot Ladybird	(Linnaeus, 1758)	Common	various	4-5.5mm long very variable coloured ladybird. Commonest form red with 2 black spots. Most habitats. Often vast migrations from the continent. Feeds on aphids. Very common.
Coleoptera	<i>Adalia decempunctata</i>	10-spot Ladybird	(Linnaeus, 1758)	Common	various	A small (5mm) ladybird. Generally common in most habitats though it has a preference for trees and bushes in woods where the larvae feed on aphids.
Coleoptera	<i>Coccinella septempunctata</i>	7-spot Ladybird	Linnaeus, 1758	Common	various	6.5-8mm long red ladybird with 7 black spots. Gardens, hedgerows etc. Larvae aphidophagous. Very common, often with vast immigrations from the continent.
Coleoptera	<i>Oedemera nobilis</i>	Swollen-thighed Beetle	(Scopoli, 1763)	Common	grassland	Shining metallic green beetle found on flowers. Larvae in dead plant stems. Common in S England, becoming rare in the N.
Coleoptera	<i>Rhinosimus planirostris</i>	a false weevil	(Fabricius, 1787)	Common	trees	3mm long bronze brown beetle with very elongate mouthparts. Common in woodland, usually under bark but also in fungi, leaf litter, moss etc.
Coleoptera	<i>Plagioderma versicolora</i>	a leaf beetle	(Laicharting, 1781)	Local	trees	Small metallic blue leaf beetle feeding on willows in marsh and fenland. Southern species, becoming rare in the north.
Coleoptera	<i>Neocrepidodera ferruginea</i>	a leaf beetle	(Scopoli, 1763)	Common	grassland/thistles	3-4mm long reddish flea beetle feeding on foliage of thistles. Very common.
Coleoptera	<i>Parethelcus pollinarius</i>	a weevil	(Forster, 1771)	Common	grassland/nettles	A dark-bodied weevil with an extensive covering of reddish-yellow scales, 3 - 3.7mm. long, feeding on nettles. Widely distributed and common.
Diptera	<i>Tipula lateralis</i>	a crane fly	Meigen, 1804	Common	water margins	A common and widespread crane fly which is found in both lowland and upland areas and occurs by streams, ponds and other water margins, including seepages in fields and on coastal cliffs. The larva is aquatic.
Diptera	<i>Austrolimnophila ochracea</i>	a crane fly	(Meigen, 1804)	Common	trees/scrub	A drab brown crane fly, breeds in dead wood (even in small pieces), common in woods throughout Britain.
Diptera	<i>Limonia trivittata</i>	a crane fly	(Schummel, 1829)	Nationally Scarce	trees: damp calcareous woodland	A small crane fly which is widespread but very local throughout Britain, including Scottish islands, and found in wet woodland on calcareous soils, especially near rivers. Its biology is not known although there seems to be an association with butterbur. * <i>Petasites hybrida</i> *, in some cases and it is possible that the larva develops in petioles or rootstock.
Diptera	<i>Chrysopilus asiliformis</i>	a snipe fly	(Preyssler, 1791)	Common	wetland	Small snipe fly found in lush damp vegetation, often near streams or ponds. Local abundant in the south, scarce in the north.
Diptera	<i>Chrysopilus cristatus</i>	a snipe fly	(Fabricius, 1775)	Common	wetland	Fly which is found in lush vegetation in damp places. The larvae occur in extremely rotten wood and other rotting vegetable matter. Common and widespread.

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Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Diptera	<i>Chrysops caecutiens</i>	a horse fly	(Linnaeus, 1758)	Common	various	Yellow and black horse fly. Commonest member of the genus especially in the south and west.
Diptera	<i>Chloromyia formosa</i>	a soldier fly	(Scopoli, 1763)	Common	various	A soldier fly which is widespread and common throughout Britain, inhabiting woods, hedges, parks and gardens. The larva feeds in rotting vegetable matter in damp soil, rotting bark and leaf litter. The adult, which is a very common flower visitor, especially to umbels of hogweed in mid-summer.
Diptera	<i>Melanostoma scalare</i>	a hoverfly	(Fabricius, 1794)	Common	various	An extremely common and widespread hoverfly found in grassy places throughout Britain but rarely extends into mountains or moorlands. The larva hatches from a white egg laid on the lower leaves of plants in damp situations and feeds on aphids and sometimes other insects. The small, elongate, black and yellow adult is often observed taking pollen whilst visiting flowers and grasses.
Diptera	<i>Platycheirus albimanus</i>	a hoverfly	(Fabricius, 1781)	Common	various	Small grey and black hoverfly. Hedgerows, woodland margins, gardens etc. The larvae are predatory on aphids. One of the commonest hoverflies and with a very long flight period.
Diptera	<i>Episyrphus balteatus</i>	a hoverfly	(De Geer, 1776)	Common	various	An orange and black banded hoverfly, generally distributed and very common. In most years, numbers are greatly boosted by immigration from the continent. Larvae are The larvae are predatory on aphids.
Diptera	<i>Eupeodes corollae</i>	a hoverfly	(Fabricius, 1794)	Common	various	Black and yellow hoverfly. One of the commonest hoverflies in gardens, grassland, hedgerows and woodland edge. Large scale movements, both within Britain and to and from the continent, are well documented. Larvae predatory on aphids. Widespread and abundant.
Diptera	<i>Eupeodes luniger</i>	a hoverfly	(Meigen, 1822)	Common	various	A black and yellow hoverfly, very common in open and wood edge habitats. Found on the wing from April to November. Larvae predatory on aphids.
Diptera	<i>Sphaerophoria scripta</i>	a hoverfly	(Linnaeus, 1758)	Common	various	An elongate, yellow and black hoverfly which is widely distributed and generally common, often abundant and found most commonly on open grassland. In some years the resident population is boosted by migration from the continent. The larva feeds on aphids on herbaceous plants.
Diptera	<i>Syrphus ribesii</i>	a hoverfly	(Linnaeus, 1758)	Common	various	A yellow and black banded hoverfly, widely distributed and generally common. Larvae are predators on aphids.
Diptera	<i>Syrphus vitripennis</i>	a hoverfly	Meigen, 1822	Common	various	A migratory hoverfly widespread and abundant in Britain. The larva is aphidophagous on herbaceous plants. The adult is a black and yellow hoverfly which commonly visits flowers and flies from March to November.
Diptera	<i>Cheilosia illustrata</i>	a hoverfly	(Harris, [1780])	Common	grassland	A bee mimic hoverfly. The larvae of this genus are miners in the stems and roots of plants and it seems likely that this species is associated with large umbellifers such as hogweed on which the adults are typically seen. Adults locally common in mid summer.
Diptera	<i>Cheilosia proxima</i>	a hoverfly	(Zetterstedt, 1843)	Common	grassland/ thistles	A black hoverfly, larvae feed on the outside of thistle roots (especially *Cirsium palustre*), frequent and widespread.
Diptera	<i>Eristalis arbustorum</i>	a hoverfly	(Linnaeus, 1758)	Common	various	A moderately-sized brown and orange hoverfly. Larvae are of the rat-tailed maggot type, and develop in foul water, wet decaying vegetation, etc. Widely distributed and generally common.
Diptera	<i>Physocephala rufipes</i>	a parasitic fly	(Fabricius, 1781)	Local	various	A bee-killing fly found in meadows, heaths and open-structured woodland, usually feeding on umbels and composites. The larvae are parasitoids of adult bees.
Diptera	<i>Meiosimyza rorida</i>	a fly	(Fallén, 1820)	Common	trees: damp woodland	Small yellow fly. Larvae of this family live in decaying vegetable matter. Adults sit on foliage in shady situations, especially damp woodland. Widespread and common.
Diptera	<i>Tricholauxania praeusta</i>	a fly	(Fallén, 1820)	Common	trees: damp woodland	Yellow fly found in damp shady places. Larvae of this family are general saprophages found in decaying vegetable matter, fungi etc. Widespread and common.

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Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Diptera	<i>Opomyza germinationis</i>	a fly	(Linnaeus, 1758)	Common	grassland	Small fly with strongly marked wings. The larvae of this family are stem borers in grasses. Extremely abundant in grassy places throughout Britain north to Orkney. Larvae feed within the stems of many common grasses.
Diptera	<i>Scathophaga stercoraria</i>	a dung fly	(Linnaeus, 1758)	Common	grassland	The common yellow dung fly is a widespread and usually abundant predatory fly which breeds in dung, especially fresh cow-dung but a wide variety of other sorts can be used.
Diptera	<i>Phania funesta</i>	a parasitic fly	(Meigen, 1824)	Unknown	not clear	A small black tachinid fly, parasitic, possibly on cydnid bugs. Found in southern England and the Midlands. Flies from late May to late August. (Belshaw 1993.)
Hemiptera - Heteroptera	<i>Dicyphus epilobii</i>	a plant bug	Reuter, 1883	Common	grassland/ willowherb	A plant bug which lives on great willow-herb, * <i>Epilobium hirsutum</i> *, and is common and widely distributed throughout Britain. The eggs overwinter. The adult is always fully winged and can be found from mid-July to October or sometimes even later and there may be two broods a year.
Hemiptera - Heteroptera	<i>Dicyphus errans</i>	a plant bug	(Wolff, 1804)	Common	various	Widely distributed and generally not uncommon throughout Britain, at least partly predacious and found on a wide range of low-growing plants. Occurs in a wide range of habitats.
Hemiptera - Heteroptera	<i>Calocoris norwegicus</i>	a plant bug	(Gmelin, 1788)	Common	various	The potato capsid. A common and widely distributed species, polyphagous, and occasionally a pest of crop and garden plants. Found in a wide range of habitats.
Hemiptera - Heteroptera	<i>Liocoris tripustulatus</i>	a plant bug	(Fabricius, 1781)	Common	grassland/ nettles	A common plant bug which feeds on stinging nettle, * <i>Urtica dioica</i> *, throughout Britain in any habitat where its host will grow. It is also occasionally found on a number of other plants. The adult overwinters but the male does not live as long after hibernation, usually perishing by the time the female is egg-laying. All stages are plant feeders and attack buds, stems and, especially, flowers and fruits of nettle.
Hemiptera - Heteroptera	<i>Lygus rugulipennis</i>	European Tarnished Plant Bug	Poppius, 1911	Common	various	A widely distributed and common bug throughout Britain. Polyphagous. Can occur in a wide range of habitats, but is particularly associated with ruderal communities.
Hemiptera - Heteroptera	<i>Stenotus binotatus</i>	Timothy Grassbug	(Fabricius, 1794)	Common	grassland	A widely distributed and common plant bug in England and Wales, rarer or absent in the north. Feeds on grasses in a wide range of habitat types from open dry grassland to damp woodland rides.
Hemiptera - Heteroptera	<i>Leptopterna dolabrata</i>	a grass bug	(Linnaeus, 1758)	Common	grassland	A meadow bug which is common throughout Britain and feeds on grasses in a wide range of grassland types as well as in grassy places in woods and marshes. The feeding of both larva and adult leaves spotting on grass blades and deformation of flowers and grains. The eggs overwinter in the lower six inches of the stems of host grasses.
Hemiptera - Heteroptera	<i>Notostira elongata</i>	a grass bug	(Geoffroy, 1785)	Common	grassland	A common and widely distributed, though predominantly southern, grassbug which is found in a wide variety of grassy places on reasonably dry, neutral to calcareous soils.
Hemiptera - Heteroptera	<i>Stenodema calcarata</i>	a grass bug	(Fallén, 1807)	Common	grassland	A very common grassbug, found on grasses in a wide range of habitat types throughout Britain.
Hemiptera - Heteroptera	<i>Stenodema laevigata</i>	a grass bug	(Linnaeus, 1758)	Common	grassland	A common and widely distributed grassbug, found throughout most of Britain but becoming rare in the extreme north. It lives on grasses in a wide range of habitat types but shows a preference for damper and more luxuriant grasslands, including woodland clearings and river banks. Nymphs and adults feed on the sap and juices of a wide variety of grasses, particularly meadow foxtail, timothy, red fescue, bent and wavy hair-grass. They are especially fond of the flowerheads, piercing and sucking the buds and unripe grains.

Invertebrates at Brook Meadow

Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Hemiptera - Heteroptera	<i>Orthotylus marginalis</i>	Dark Green Apple Capsid	Reuter, 1883	Common	trees	A common plant bug which occurs throughout Britain and is particularly associated with willows and sallows but is also found on Alder and Apple and rarely on currants and Blackthorn. The eggs are laid in the young wood, usually near the buds, overwinter and hatch the following spring. The green larva is very predacious, feeding on red spider mites, aphids and other small insects.
Hemiptera - Heteroptera	<i>Plagiognathus arbustorum</i>	a grass bug	(Fabricius, 1794)	Common	various	A widespread and common plant bug which occurs throughout Britain in a wide range of habitats. It is polyphagous, and a predator but is particularly associated with stinging nettle, * <i>Urtica dioica</i> *.
Hemiptera - Heteroptera	<i>Cymus melanocephalus</i>	a stilt bug	Fieber, 1861	Common	wet grassland	Confined to the southern half of England and Wales, and commoner in the south-east than elsewhere. Associated with * <i>Juncus</i> *, and occurring in all habitats where that plant grows.
Hemiptera - Heteroptera	<i>Eysarcoris fabricii</i>	a shield bug	(Kirkaldy, 1904)	Common	various	Widely distributed and common in the southern half of England, this species has spread greatly in the present century. It is particularly associated with hedge woundwort, * <i>Stachys sylvatica</i> * but has been found on a number of other hosts in a wide range of habitat types.
Hemiptera - Homoptera	<i>Philaenus spumarius</i>	Cuckoo-spit bug	(Linnaeus, 1758)	Common	various	A small (5.3 - 6.9mm.) froghopper, very variably patterned in brown, black and white. Larvae develop in froth lumps on a wide range of plants. Found throughout Britain and generally abundant throughout the summer on a wide variety of trees and low plants.
Hymenoptera	<i>Lasius niger sens. lat.</i>	an ant		Common	various	A small black ant found in bushy scrubland, gardens and wet places. Only occurs in grassland if there are stones or mounds of * <i>Lasius flavus</i> * available. The nest is usually constructed under stones or logs, but nests of other species may be invaded and colony size averages 5,500. Widely distributed, but apparently absent from some parts of Scotland. One of the commonest ants.
Hymenoptera	<i>Vespula germanica</i>	German Wasp	(Fabricius, 1793)	Common	various	A social wasp which typically nests underground at depths of up to 22cm, both in banks and in flat ground. Aerial nests are unusual and always in an enclosed space such as a cavity wall.
Hymenoptera	<i>Vespula vulgaris</i>	Common Wasp	(Linnaeus, 1758)	Common	various	Social wasp which typically forms large colonies underground. The nest is started in an existing cavity such as a mouse nest, in rockeries or in rubbish heaps, usually in a bank rather than on flat ground. Aerial nests occur, but are always in enclosed spaces such as cavity walls, attics or hollow trees. Widespread and common.
Hymenoptera	<i>Crossocerus annulipes</i>	a digger wasp	(Lepeletier & Brulle, 1835)	Common	trees: dead wood	Small solitary wasp nesting in decaying wood. Predatory on planthoppers. Common in S England, becoming local northward.
Hymenoptera	<i>Crossocerus podagricus</i>	a digger wasp	(Vander Linden, 1829)	Common	trees: dead wood	A solitary wasp. Nests in small holes in dead wood, fence posts, etc. Nest is usually provisioned with small Diptera. Common.
Hymenoptera	<i>Ectemnius continuus</i>	a digger wasp	(Fabricius, 1804)	Common	trees: dead wood	Medium sized, black and yellow solitary wasp nesting in rotten wood or plant stems and preying on Diptera, mainly hoverflies and Muscids. Adults often seen on umbels. England, Wales and Scotland north to Perth. Common.
Hymenoptera	<i>Lindenius albilabris</i>	a digger wasp	(Fabricius, 1793)	Common	open vegetation	Digger wasp preying on Heteroptera and Diptera. Nests in sandy soil. Common in southern England.
Hymenoptera	<i>Andrena bicolor</i>	Gwynne's Mining Bee	Fabricius, 1775	Common	open vegetation	A solitary bee which is common in lowland areas in all sorts of open woodland and grassland situations. Burrows are not aggregated and are difficult to find. It is double brooded. A wide range of flowers are visited. Common throughout England, Wales and southwest Scotland.
Hymenoptera	<i>Andrena flavipes</i>	Yellow Legged Mining Bee	Panzer, 1799	Local	open vegetation	A conspicuously banded solitary bee nesting in large but very compact colonies. Very local but widely distributed. Rare in the north.

Invertebrates at Brook Meadow

Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Hymenoptera	<i>Andrena semilaevis</i>	a mining bee	Perez, 1903	Common	open vegetation	A solitary bee nesting in the ground in a wide range of open habitats, including disturbed sites, and also in open woodland. Many flowers can be visited, but some preference for *Veronica* and Apiaceae. Usually single brooded, but a second brood recorded in some seasons. Common and widespread north to Midlothian.
Hymenoptera	<i>Apis mellifera</i>	Honey Bee	Linnaeus, 1758	Common	various	The common honey bee. It is a domesticated species, although occasional colonies may persist in the wild for a few years in hollow trees, etc.
Hymenoptera	<i>Bombus lapidarius</i>	Large Red Tailed Bumble Bee	(Linnaeus, 1758)	Common	various	A common bumblebee of gardens and hedgerows. It is mainly black with a red tail and the male has a broad yellow collar. The nests are often under stones.
Hymenoptera	<i>Bombus lucorum</i>	White-tailed Bumble Bee	(Linnaeus, 1761)	Common	various	A common black, white and yellow bumblebee found in gardens and hedgerows. It often breeds in old vole nests.
Hymenoptera	<i>Bombus pratorum</i>	Early Bumble Bee	(Linnaeus, 1761)	Common	various	A rather small black and yellow bumblebee with a red tail. On the wing quite early in the year and may be finished by the end of July. Sometimes there is a second brood later in the summer. The nest is often well above ground, in bird nests or nest boxes for example. Widely distributed and common.
Hymenoptera	<i>Chelostoma campanularum</i>	Harebell Carpenter Bee	(Kirby, 1802)	Local	trees/ grassland	A small, elongate solitary bee. The female gathers pollen mainly from <i>Campanula</i> flowers (e.g. Harebells). Nests in small holes such as old beetle borings in dead wood and posts. Local, in southern Britain.
Hymenoptera	<i>Halictus tumulorum</i>	a mining bee	(Linnaeus, 1758)	Common	open vegetation	A small bee nesting in the ground. Found in a range of habitats and can use a variety of flowers for food. Widespread and common.
Hymenoptera	<i>Hylaeus communis</i>	Common Yellow Face Bee	Nylander, 1852	Local	scrub/ grassland	A solitary bee which nests in the hollow, dead stems of bramble and dock and feeds especially at bramble flowers.
Hymenoptera	<i>Lasioglossum morio</i>	Brassy Mining Bee	(Fabricius, 1793)	Common	open vegetation	A small solitary bee, dark brassy-green in colour. Nests in burrows in the ground. Widespread.
Hymenoptera	<i>Lasioglossum pauxillum</i>	a mining bee	(Schenck, 1853)	Nationally Scarce/Na	open vegetation	A mining bee recorded from a wide variety of situations from scattered locations in southern England including sandy heathland, calcareous grassland, coastal locations such as soft rock cliffs and probably other disturbed spots such as sand pits and chalk quarries. Nesting occurs in light soil.
Hymenoptera	<i>Megachile versicolor</i>	a leaf-cutter bee	Smith, F., 1844	Local	various	A leaf cutter bee. The female cuts semi-circular sections from leaves and uses them to build a sausage shaped nest in plant stems or other crevices and has been recorded building a nest in a burrow in sand. Southern Britain.
Hymenoptera	<i>Nomada fabriciana</i>	Fabricius' Nomad Bee	(Linnaeus, 1767)	Common	open vegetation	A black and yellow solitary bee which is cleptoparasitic on bees of the genus <i>Andrena</i> , especially <i>A. bicolor</i> . Widespread and locally common.
Lepidoptera	<i>Chrysoteuchia culmella</i>	Garden Grass-veneer	(Linnaeus, 1758)	Common	grassland	A somewhat variable moth with forewings creamy white variably streaked and suffused darker, and hindwings greyish. The larvae feed on the culms of various grasses in which they overwinter. Pupation takes place in the surrounding soil. It occurs in all grassland types and is widely distributed and common throughout Britain.
Lepidoptera	<i>Thymelicus lineola</i>	Essex Skipper	(Ochsenheimer, 1808)	Local	grassland	Frequents unimproved grassland, hedgerows, verges, etc., the larva feeding on <i>Dactylis glomerata</i> and <i>Holcus mollis</i> , less often found on <i>Brachypodium sylvaticum</i> and <i>B.pinnatum</i> . Mainly south-east England and East Anglia, though noted in southern and south-west England and possibly overlooked elsewhere.

Invertebrates at Brook Meadow

Order	Taxon	Vernacular	Authority	National status	Main habitat	Species account (after Ball 1997)
Lepidoptera	<i>Ochlodes faunus</i>	Large Skipper	(Turati, 1905)	Common	grassland	A very common butterfly in southern Britain but is more local in the very northernmost part of England and rare in Scotland, except the South West. It frequents rough grassland, wasteground and woodland rides with a preference for ungrazed south-facing slopes and can tolerate a high proportion of scrub, though it does not like more open, grazed turf. The eggs are laid singly under the blades of soft grasses, particularly bromes and yorkshire fog, * <i>Holcus lanatus</i> *, and hatch after two to three weeks. Mowing or grazing is damaging to this species as it needs a continuity of tussocks and clumps of the larval foodplants. Although it is tolerant of scrub this could shade out its foodplant grasses if it becomes too dominant.
Lepidoptera	<i>Lycaena phlaeas</i>	Small Copper	(Linnaeus, 1761)	Common	open vegetation	A common butterfly throughout Britain wherever its foodplant grows but it favours areas with light soils. Ragwort is the favoured nectar-source, particularly in the autumn brood, and roosting takes place on dead seed heads of grasses. The eggs are laid very selectively on fresh growth of sorrels and sometimes docks and hatch after about one or one and a half weeks. The slug-like caterpillar feeds by day and rests at the base of the foodplant. This butterfly can suffer from its foodplants becoming over-run with grasses and needs plenty of bare and exposed areas to form suitable, discrete colonies.
Lepidoptera	<i>Aglais urticae</i>	Small Tortoiseshell	(Linnaeus, 1758)	Common	various/ nettles	A widespread and common butterfly, sometimes abundant throughout Britain, and is first seen in early spring after having hibernated from the previous autumn in houses, sheds and outbuildings. The eggs are laid in untidy batches beneath the leaves of stinging nettle and the young caterpillar spins a protective communal silken web and feeds on surrounding leaves. New webs are formed as areas are defoliated and are also used for basking in the sunshine and roosting.
Lepidoptera	<i>Polygonia c-album</i>	Comma	(Linnaeus, 1758)	Common	various/ nettles	The larva feeds on * <i>Urtica dioica</i> *, * <i>Humulus lupulus</i> * and * <i>Ulmus</i> * spp. The historical distribution of this species has fluctuated greatly though presently it occurs in the entire southern half of Britain.
Lepidoptera	<i>Pyronia tithonus</i>	Gatekeeper / Hedge Brown	(Linnaeus, 1771)	Common	grassland/ scrub	Common in southern Britain north to mid Yorkshire. Very rare north of that. Grassy places, including woodland rides etc. Larvae feed on coarse grasses.
Lepidoptera	<i>Maniola jurtina</i>	Meadow Brown	(Linnaeus, 1758)	Common	grassland	A very common to abundant butterfly throughout Britain, inhabiting almost any habitat and utilising even minimal areas of grassland to breed. It survives best in grasslands with a good mosaic of different turf heights and where scattered, mixed scrub is in proximity. It is never abundant on short-cropped sites and rarely common in swards dominated by tall, dense, coarse grasses. The eggs are laid on shorter turf, females seemingly preferring the junction of areas of long and short grass, and hatch after two to three and a half weeks. The caterpillar will feed on any species of grass through the summer and autumn before overwintering, but early instars prefer fine grasses before moving on to coarser ones. Bramble, thistles, ragworts and knapweeds are the favoured nectar plants. Roosting takes place in long grasses and on tall flower heads. The adults are often found carrying red mites.
Neuroptera	<i>Chrysoperla carnea</i> agg.	a green lacewing		Common	various	A green lacewing. It is found in a wide range of habitats, and is a common species in gardens. The larvae are active predators, and are usually found on the foliage of shrubs and trees. It is found throughout Britain as a resident, and may also occur as a migrant. It is generally common, but particularly abundant in the south.

Invertebrates at Brook Meadow

<b>Order</b>	<b>Taxon</b>	<b>Vernacular</b>	<b>Authority</b>	<b>National status</b>	<b>Main habitat</b>	<b>Species account (after Ball 1997)</b>
Odonata	<i>Calopteryx splendens</i>	Banded Demoiselle	(Harris, 1782)	Local	rivers	Large metallic blue (males) or metallic green (females) damselfly. Prefers slow flowing streams and rivers, usually with muddy bottoms. Sometimes occurs on canals and, very rarely, lakes. Males are active fliers and can be found well away from breeding sites. Locally common in the lowlands of southern Britain and Ireland, but thinning out westwards and scarce to absent in Cornwall and north-west Wales. Scarce or absent from northern Britain. Absent from Scotland.
Orthoptera	<i>Chorthippus parallelus</i>	Meadow Grasshopper	(Zetterstedt, 1821)	Common	grassland	A medium-sized grasshopper with reduced wings, usually brown and/or green in colour. It is found in all types of moderately long grassland, particularly in moister areas. Very widely distributed and generally common.
Rodentia	<i>Rattus norvegicus</i>	Brown Rat	(Berkenhout, 1769)			

## Appendix 2: Full details of invertebrate records for Brook Meadow

Date of fieldwork: 6 July 2004. All records recorded and determined by Martin C. Harvey.

All data is stored on the MapMate database system and has been copied to Hampshire Wildlife Trust and Hampshire Biodiversity Information Centre.

Classification 1	Classification 2	Species	English name	Quantity	Sex	Method	Site	OSGridRef	Comment
Coleoptera	Cantharidae	<i>Rhagonycha fulva</i>	Hogweed Bonking Beetle	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Coleoptera	Cantharidae	<i>Malthinus flaveolus</i>	a soldier beetle	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Coleoptera	Melyridae	<i>Malachius viridis</i>	a malachite beetle	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Coleoptera	Coccinellidae	<i>Propylea quattuordecimpunctata</i>	14-spot Ladybird	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Coleoptera	Coccinellidae	<i>Adalia bipunctata</i>	2-spot Ladybird	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Coleoptera	Coccinellidae	<i>Adalia decempunctata</i>	10-spot Ladybird	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i>	7-spot Ladybird	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Coleoptera	Oedemeridae	<i>Oedemera nobilis</i>	Swollen-thighed Beetle	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Coleoptera	Salpingidae	<i>Rhinosimus planirostris</i>	a false weevil	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Coleoptera	Chrysomelidae	<i>Plagioderma versicolora</i>	a leaf beetle	3	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Coleoptera	Chrysomelidae	<i>Neocrepidodera ferruginea</i>	a leaf beetle	2	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Coleoptera	Curculionidae	<i>Parethelcus pollinarius</i>	a weevil	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Tipulidae	<i>Tipula lateralis</i>	a cranefly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Limoniidae	<i>Austrolimnophila ochracea</i>	a cranefly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Limoniidae	<i>Limonia trivittata</i>	a cranefly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Rhagionidae	<i>Chrysopilus asiliformis</i>	a snipefly	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Rhagionidae	<i>Chrysopilus asiliformis</i>	a snipefly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Rhagionidae	<i>Chrysopilus asiliformis</i>	a snipefly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Diptera	Rhagionidae	<i>Chrysopilus cristatus</i>	a snipefly	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Diptera	Rhagionidae	<i>Chrysopilus cristatus</i>	a snipefly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.

Invertebrates at Brook Meadow

Classification 1	Classification 2	Species	English name	Quantity	Sex	Method	Site	OSGridRef	Comment
Diptera	Tabanidae	<i>Chrysops caecutiens</i>	a horsefly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Stratiomyidae	<i>Chloromyia formosa</i>	a soldierfly	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Diptera	Stratiomyidae	<i>Chloromyia formosa</i>	a soldierfly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Melanostoma scalare</i>	a hoverfly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	Confirmed by microscope.
Diptera	Syrphidae	<i>Platycheirus albimanus</i>	a hoverfly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Episyrphus balteatus</i>	a hoverfly	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Diptera	Syrphidae	<i>Eupeodes corollae</i>	a hoverfly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Eupeodes corollae</i>	a hoverfly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Syrphidae	<i>Eupeodes luniger</i>	a hoverfly	1	male	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Diptera	Syrphidae	<i>Eupeodes luniger</i>	a hoverfly	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Sphaerophoria scripta</i>	a hoverfly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Sphaerophoria scripta</i>	a hoverfly	Present	male	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Diptera	Syrphidae	<i>Syrphus ribesii</i>	a hoverfly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Syrphidae	<i>Syrphus vitripennis</i>	a hoverfly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Cheilosia illustrata</i>	a hoverfly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Cheilosia proxima</i>	a hoverfly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Syrphidae	<i>Eristalis arbustorum</i>	a hoverfly	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Diptera	Conopidae	<i>Physocephala rufipes</i>	a conopid fly	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Diptera	Lauxaniidae	<i>Meiosimyza rorida</i>	a fly	1	female	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Lauxaniidae	<i>Tricholauxania praeusta</i>	a fly	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Opomyzidae	<i>Opomyza germinationis</i>	a fly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Scathophagidae	<i>Scathophaga stercoraria</i>	Yellow Dung Fly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Diptera	Tachinidae	<i>Phania funesta</i>	a parasitic fly	1	male	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Heteroptera	Miridae	<i>Dicyphus epilobii</i>	a plant bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.

Invertebrates at Brook Meadow

Classification 1	Classification 2	Species	English name	Quantity	Sex	Method	Site	OSGridRef	Comment
Heteroptera	Miridae	<i>Dicyphus errans</i>	a plant bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Heteroptera	Miridae	<i>Calocoris norwegicus</i>	a plant bug	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Liocoris tripustulatus</i>	a plant bug	2	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Heteroptera	Miridae	<i>Lygus rugulipennis</i>	European Tarnished Plant Bug	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Stenotus binotatus</i>	Timothy Grassbug	3	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Heteroptera	Miridae	<i>Stenotus binotatus</i>	Timothy Grassbug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Heteroptera	Miridae	<i>Leptopterna dolabrata</i>	a grass bug	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Notostira elongata</i>	a grass bug	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Notostira elongata</i>	a grass bug	2	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Heteroptera	Miridae	<i>Stenodema calcarata</i>	a grass bug	2	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Stenodema laevigata</i>	a grass bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Orthotylus marginalis</i>	Dark Green Apple Capsid	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Heteroptera	Miridae	<i>Plagiognathus arbustorum</i>	a grass bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Miridae	<i>Plagiognathus arbustorum</i>	a grass bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Heteroptera	Lygaeidae	<i>Cymus melanocephalus</i>	a stilt bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Heteroptera	Pentatomidae	<i>Eysarcoris fabricii</i>	a shieldbug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Homoptera	Cercopidae	<i>Philaenus spumarius</i>	Cuckoo-spit bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Homoptera	Cercopidae	<i>Philaenus spumarius</i>	Cuckoo-spit bug	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Formicidae	<i>Lasius niger sens. lat.</i>	an ant	3	worker	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Vespidae	<i>Vespula germanica</i>	German Wasp	1	worker	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Vespidae	<i>Vespula vulgaris</i>	Common Wasp	1	worker	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Sphecidae	<i>Crossocerus annulipes</i>	a digger wasp	1	female	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Hymenoptera	Sphecidae	<i>Crossocerus podagricus</i>	a digger wasp	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.

Invertebrates at Brook Meadow

Classification 1	Classification 2	Species	English name	Quantity	Sex	Method	Site	OSGridRef	Comment
Hymenoptera	Sphecidae	<i>Crossocerus podagricus</i>	a digger wasp	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Sphecidae	<i>Crossocerus podagricus</i>	a digger wasp	1	male	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Hymenoptera	Sphecidae	<i>Ectemnius continuus</i>	a digger wasp	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Sphecidae	<i>Lindenius albilabris</i>	a digger wasp	1	male	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Andrena bicolor</i>	Gwynne's Mining Bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Andrena flavipes</i>	Yellow Legged Mining Bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Andrena semilaevis</i>	a mining bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Apis mellifera</i>	Honey Bee	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Hymenoptera	Apidae	<i>Bombus lapidarius</i>	Large Red Tailed Bumble Bee	Present	worker	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Hymenoptera	Apidae	<i>Bombus lapidarius</i>	Large Red Tailed Bumble Bee	1	male	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Bombus lucorum</i>	White-tailed Bumble Bee	1	worker	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Bombus pratorum</i>	Early Bumble Bee	Present	worker	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Hymenoptera	Apidae	<i>Halictus tumulorum</i>	a mining bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Apidae	<i>Hylaeus communis</i>	Common Yellow Face Bee	1	male	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Apidae	<i>Lasioglossum morio</i>	Brassy Mining Bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): South Meadow	SU751059	Voucher retained.
Hymenoptera	Apidae	<i>Lasioglossum morio</i>	Brassy Mining Bee	1	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Lasioglossum morio</i>	Brassy Mining Bee	2	female	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Lasioglossum pauxillum</i>	a mining bee	2	female	Captured	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Chelostoma campanularum</i>	Harebell Carpenter Bee	1	female	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Megachile versicolor</i>	a leaf-cutter bee	1	female	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Hymenoptera	Apidae	<i>Nomada fabriciana</i>	Fabricius' Nomad Bee	2	female	Water trap (1 yellow, 1 white)	Brook Meadow (Lumley Meadow SINC): Mid + North Meadow	SU751062	Voucher retained.
Lepidoptera	Pyralidae	<i>Chrysoteuchia culmella</i>	Garden Grass-veneer	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	

Invertebrates at Brook Meadow

<b>Classification 1</b>	<b>Classification 2</b>	<b>Species</b>	<b>English name</b>	<b>Quantity</b>	<b>Sex</b>	<b>Method</b>	<b>Site</b>	<b>OSGridRef</b>	<b>Comment</b>
Lepidoptera	Hesperiidae	<i>Thymelicus lineola</i>	Essex Skipper	4	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Hesperiidae	<i>Ochlodes faunus</i>	Large Skipper	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Lycaenidae	<i>Lycaena phlaeas</i>	Small Copper	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Nymphalidae	<i>Aglais urticae</i>	Small Tortoiseshell	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Nymphalidae	<i>Polygonia c-album</i>	Comma	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Satyridae	<i>Pyronia tithonus</i>	Gatekeeper / Hedge Brown	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Lepidoptera	Satyridae	<i>Maniola jurtina</i>	Meadow Brown	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Neuroptera	Chrysopidae	<i>Chrysoperla carnea</i> agg.	a lacewing	1	not recorded	Captured	Brook Meadow (Lumley Meadow SINC): by River Ems	SU750061	Voucher retained.
Odonata	Calopterygidae	<i>Calopteryx splendens</i>	Banded Demoiselle	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Orthoptera	Acrididae	<i>Chorthippus parallelus</i>	Meadow Grasshopper	Present	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	
Rodentia	Muridae	<i>Rattus norvegicus</i>	Brown Rat	1	not recorded	Field record / observation	Brook Meadow (Lumley Meadow SINC): centre grid ref	SU751061	

### Appendix 3: Site photos for Brook Meadow

*Photo 1.*

Grassland area looking north. Some structural variation and nectar sources but becoming rather rank and unvaried.



*Photo 2.*

Bramble boundary to southern grassland. Provides valuable nectar source but should not be allowed to expand at the expense of open habitats.



*Photo 3.*

Thistle patch south of main footpath. Although not very interesting botanically it provides another valuable nectar source.



*Photo 4.*

Bank at southern end of Brook Meadow. Has potential to provide bee nesting sites, but currently too overgrown. Suggest clearing small patches back to bare ground.



*Photo 5.*

Small exposure of shingle at edge of river, possibly only a temporary feature when water levels are low, but just one example of a riverside micro-habitat that can be important for invertebrates.



*Photo 6.*

Tall riverside vegetation is another good source of nectar for invertebrates. Ideally, the bankside vegetation should be cut in rotation so that there are always patches of tall vegetation, short vegetation and bare ground.



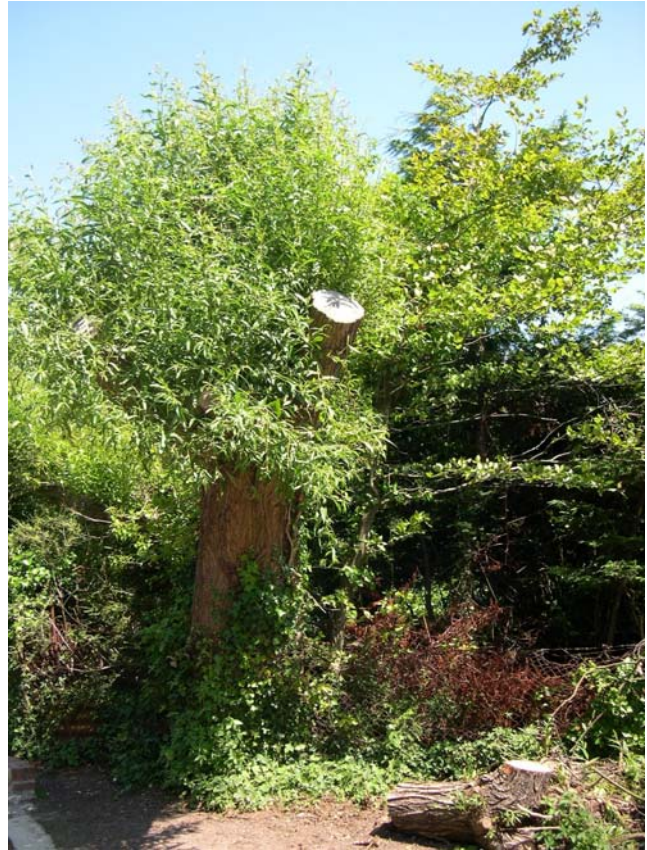
*Photo 7.*

Location of capture of scarce crane fly *Limonia trivittata*. Wet woodland areas and shaded open water support their own range of distinctive invertebrate communities. While sunlight water and riverbanks are also very valuable for invertebrates, shaded habitat should be maintained as well.



*Photo 8.*

Pollarded willow at northern end of Meadow. Pollarded trees can provide valuable habitats for invertebrates living in dead and decaying wood. This tree trunk was supporting nests of solitary wasps, which were utilising holes bored in the wood by beetles.



*Photo 9.*

A dead tree limb that has been positioned in the open grassland at the north of the Meadow. Dead wood will always provide habitat for invertebrates, and it is good to have dead wood in a range of situations – dry wood in sunlight supports a different fauna to damp wood in shade.

