

**Botanical and Invertebrate Surveys on Louie  
Memorial Fields**

**A Report to North Hinksey Parish Council  
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## Contents

1.0 Introduction.....	3
1.1 Aims.....	3
2.0 Methods.....	4
3.0 Results.....	4
3.1 Southernmost fen area.....	4
3.2 Lower wetland and tufa area to North of site.....	6
3.3 Woodland (the Copse).....	6
3.4 Deadwood fauna.....	8
3.5 Relic Limestone grassland.....	8
4.0 Comments on the species of conservation importance.....	9
4.1 <i>Cnemacantha muscaria</i> .....	9
4.2 <i>Lipsothrix nervosa</i> .....	10
4.3 <i>Vanoyia tenuicornis</i> .....	12
4.4 <i>Seri obscuripennis</i> .....	12
4.5 <i>Cheilosia soror</i> .....	13
5.0 Conclusions on important invertebrates on site.....	14
6.0 Management Recommendations - Habitat Remediation and Enhancement.....	14
6.1 The stream and its immediate corridor.....	14
6.2 Woodland diversity enhancement.....	14
6.3 Relic Limestone grassland.....	15
6.4 Fen and general wetland area enhancement .....	15
7.0 Summary and conclusions.....	17
8.0 Acknowledgements.....	17
9.0 Glossary.....	18
10.0 References.....	19
Appendix – Tables of species recorded .....	19-24

## 1.0 Introduction

Louie Memorial Fields is situated on a North facing hill on predominantly Upper Corallian limestone rock; which grades down the hill to sandy limestone and then to a Lower Corallian clay layer, upon which small portions of calcareous (alkaline) fen have developed. A historic aerial photograph of the site from the period 1939-1952 shows that most of the area of the current park at that time had few trees (except along the line of the stream) and appears open, presumably grazed, grassland. Subsequent invasion of trees on part of the site (especially to the East bank of the stream) has occurred to produce the secondary woodland known as the copse, which now occurs around the stream, fen and to the North end of the site. Thus in general, the secondary, scrubby woodland of the Eastern side of the valley is no more than 65 years old. Most of the rest of the site is currently close mown grassland used for recreation, with a small area of longer grassland adjacent to the copse margins. A path through the copse and alongside the fen provides for further informal recreation.

Alkaline fens are now a rare and declining habitat in Britain, indeed in the EU as a whole. The following is taken from the JNCC Habitat Account for the Alkaline Fens section of the SAC (Special Areas of Conservation) selection criteria (1):

*'A significant proportion of the Alkaline fens surviving in the EU are believed to occur in the UK and Sweden. Alkaline fen vegetation has declined dramatically in the EU generally in the past century. Alkaline fens occur over a widely scattered geographical range in the UK, but are unevenly and locally distributed, with important concentrations of the habitat in East Anglia, in northern England, and on Anglesey in north Wales. Alkaline fen vegetation has declined dramatically in the past century in the UK, and in many parts of the country only small, fragmentary stands survive.'*

The Louie Memorial Fields fen is such a small surviving fragment and as such is likely to be of high conservation value. Such a fen will have most likely started formation 10,000 years ago at the end of the last glaciation. With the retreat of the ice sheets (which did not reach as far as Oxfordshire) and climate warming, plants and animals would have invaded the calcareous spring areas and started the process of peat formation. Such spring-fed fens are thus habitats of great antiquity and will contain complex assemblages of plants and invertebrates that have developed over a very long time. Fens are very attractive to grazing animals as they contain juicy vegetation even in dry summers and large herbivores would have kept fen vegetation open and short even before humans came on the scene with their domesticated grazing animals. Grazing from horses, cows and sheep would have kept the fen open and short until the cessation of this activity in the mid 20<sup>th</sup> Century. Since then willow scrub has invaded and the herbaceous vegetation has become tall and dominated by a few aggressive species.

The grassland at this site is partly on a limestone soil and thus is potentially also of importance if it has not been enriched, re-seeded or otherwise improved. **Lowland calcareous grassland** is a UKBAP habitat (2) and it was important to investigate the species of this aspect of Louie Memorial Fields.

### 1.1 Aims

I was asked to carry out a biological survey to detect any species of conservation importance, mainly in relation to the wetland areas. The two groups most likely to contain such important species in fens and calcareous grassland are plants (including mosses and liverworts) and invertebrates, therefore these are the main focus of this work. This information will better inform the site management, so that the whole

wildlife assemblage, including species of conservation concern, will continue to have the most appropriate management for the health of their populations.

One of the most important invertebrate groups that are found in calcareous fens is the **True Flies** (Diptera) although important beetles and molluscs may also be present. Within the flies, species in the **soldier fly** family (Stratiomyidae) and the **crane fly** families (Tipulidae and Limoniidae) are most likely to contain important species using this site for breeding. Thus identification has concentrated on these groups. Unfortunately the late start time of the surveys (June) meant that important species that emerge only in April and May will have been missed. To get a fuller picture of the invertebrate interest in these two fly families, visits starting at the end of March are important.

### **2.0 Methods**

Visits to the site were for two hours on each of four occasions: 15<sup>th</sup> June, 6<sup>th</sup> Aug, 29<sup>th</sup> Aug and 4<sup>th</sup> Oct 2009. Invertebrates were collected by examining flowers, examining deadwood for evidence of larval borings, examining leaves for evidence of larvae and sweep-netting in suitable warm sunny conditions. However on two of these occasions rain and/or colder weather meant few insects were available to catch by net. The focus of these collections was on flies (Diptera) as this is the group most likely to have important species depending on the fen habitat. It is important to realise that in this preliminary survey, no systematic attempt was made to collect beetles, molluscs, bugs, spiders, lepidoptera (butterflies and moths) or other invertebrates, although a few were recorded in passing. Important species could easily be present in these groups not sampled. On 29<sup>th</sup> August fungi were collected for rearing fly larvae breeding in them. Due to the late start time (15<sup>th</sup> June 2009) for this survey and time constraints, this is only a very preliminary survey of invertebrate interest. This survey thus completely misses those insects active only in early spring and these could include several important species known to breed in fens.

The method is qualitative and is designed to find the maximum number of species of actual or potential conservation concern in the limited time available.

### **3.0 Results**

A full survey of all plant species including mosses and liverworts has been carried out along with a preliminary survey of certain groups of invertebrates and fungi. The species recorded in this survey are presented in the tables in the Appendix. Some invertebrates remain still to be identified, but sufficient identifications have been achieved to give a good picture of the importance of the habitats on site. Readers are referred to the hydrological report of C. Lamberth for maps showing the locations of the areas discussed below (5).

#### **3.1 Southernmost Fen area**

To the east of the stream, a small fen area has developed dominated by great horsetail (*Equisetum telmateia*), branched bur-reed (*Sparganium erectum*), hemp agrimony (*Eupatorium cannabinum*) and sedges (*Carex acutiformis/riparia*, *Carex pendula*). Occasional common valerian (*Valeriana officinalis*) and rushes (*Juncus inflexus*, *Juncus articulatus*) are present. Under these tall plants there was a carpet of bugle (*Ajuga reptans*) with mosses and liverworts (especially *Pellia endiviifolia*) with occasional mats of creeping jenny (*Lysimachia nummularia*). Recent clearing and

scrub removal seems to have stimulated amounts of the small wavy bittercress (*Cardamine flexuosa*) plants. There are considerable mats of plicate sweet grass (*Glyceria plicata*) near the path. A late summer visit showed large amounts of water mint (*Mentha aquatica*) in flower which was extremely attractive to bees, butterflies, flies and other insects. Insects were also very attracted to the flowers of the occasional plants of wild angelica (*Angelica sylvestris*). To the west of the stream a shaded area of peaty damp soil colonised by pendulous sedge (*Carex pendula*) under trees adjacent to the stream appears to represent a part of the original fen that has undergone succession to wet woodland.



Whilst no rare fen plants were detected, it is possible that annual cutting and removal of the tall fen vegetation may allow enough light to reach the peat to stimulate germination of seed of species that occurred many years ago, which may include some of the scarce fen plants characteristic of other fens nearby in Oxfordshire. Some species can return from seed after more than 20-30 years of unsuitable shading by tall vegetation and scrub. Regular cutting and removal of tall fen vegetation will definitely benefit the breeding of rare invertebrates on site (see species comments below).



Sweep netting revealed fen-specific soldier flies, crane flies and snail-killing flies as predicted. Some interesting species mentionable are the large patterned-wing crane fly *Tipula maxima*, always found in such good wet sites and the spotted wing Sciomyzid (snail-killing) fly *Hydromya dorsalis*. This is not a rare fly, but is confined to such wet situations where its host marsh snails live and is indicative that rarer snail-killing flies may be present. Both species are found in good quality sites. The Nationally Scarce long-horned soldier fly (*Vanoyia tenuicornis*) was swept from the fen vegetation. This is one where the larvae live under the waterlogged moss and liverwort mat in such calcareous sites. Flies of the fen may use the woodland (feeding on honey dew on leaves) and deadwood breeding flies and beetles of the woodland may depend on the nectar sources like water mint and angelica flowers in the fen. The habitats are not separate from the view of the mobile invertebrates.

### **3.2 Lower wetland and tufa area to the North of the site**

South of the concrete path there is a wetland area dominated by water cress (*Rorippa nasturtium aquaticum*) fool's water cress (*Apium nodiflorum*) and great hairy willow herb (*Epilobium hirsutum*). This lack of floristic diversity indicates fairly recent colonisation of open water by these marsh plants. Slightly further uphill to the North, extensive seepage areas with tufa formation were detected under tall vegetation, trees and scrub. Such tufa formation seepage areas are a rare habitat type and are potentially very valuable breeding sites for important invertebrates, but they are currently very shaded, restricting the range of species which can use them. Cutting and removing the tall herbaceous vegetation and scrub in these areas will increase their usefulness by allowing light and warmth to reach the surface. Bryophyte (moss and liverwort) mats can then develop and the heat will allow soldierfly and crane fly larvae to complete their development more easily.

### **3.3 Woodland (the Copse)**

This is secondary woodland, composed of field maple (*Acer campestre*), ash (*Fraxinus excelsior*), cf. crab apple (*Malus* sp), blackthorn (*Prunus spinosa*), cherry plum (*Prunus cerasifera*) and with abundant over-mature common hawthorn (*Crataegus monogyna*) and (often dying) elder (*Sambucus nigra*); the last two being

relics of the original scrub which invaded the original limestone grassland post 1952. Occasional native holly (*Ilex aquifolium*) yew (*Taxus baccata*) spindle (*Euonymus europaeus*) and guelder rose (*Viburnum opulus*) were encountered. Non-British native woody species include shrubby honeysuckle (*Lonicera nitida*) Sycamore (*Acer pseudoplatanus*) Norway maple (*Acer platanoides*) horse chestnut (*Aesculus hippocastanum*) and a garden shrubby *Viburnum* sp. The field maples may have come as seeds from an exceptionally large, veteran, field maple tree on the west bank of the stream outside the park boundary and possibly on an ancient hedge line. There are relatively few mature pedunculate oaks (*Quercus robur*) present, with a few overgrown hazel coppice stools (*Corylus avellana*) and very large white willows (*Salix alba*) in the lowest part of the woodland beyond the concrete path.

The ground flora is relatively species-poor as is common in secondary woodland. It is dominated by abundant non-flowering ivy (*Hedera helix*), wood avens (*Geum urbanum*) enchanter's nightshade (*Circaea lutetiana*), herb Robert (*Geranium robertianum*) hedge woundwort (*Stachys sylvatica*) with patches of the wood false brome grass (*Brachypodium sylvaticum*) and with nettles (*Urtica dioica*), brambles (*Rubus fruticosus* agg.) and some redcurrant (*Ribes rubrum*) abundant in the lower woodland on more nutrient enriched soil. Patches of dog's mercury (*Mercurialis perennis*) have possibly spread out from the original old hedge line adjacent to the stream. There were dead remains of some bluebells at time of survey, but it is suspected that these will be the garden origin Spanish bluebells, rather than the British native ones. The reason for this idea is evidence of plants coming from the dumping of garden rubbish like the gladdon (*Iris foetidissima*). Other garden rubbish indicators are ground elder (*Aegopodium podagraria*) near the concrete path.

There are no indicators of ancient woodland in the copse, but it is interesting that a patch of sweet woodruff (*Galium odoratum*) was found near the stream on the East bank. This is an ancient woodland indicator and it is suggested that it has spread out from the stream bank which may have been an ancient hedge line where woodland indicators can sometimes survive. Wood speedwell (*Veronica montana*) is a relatively local native species of interest that was found in the lower areas of the woodland at the bottom of the hill.

Valuable elements of this woodland include the flowering ivy up the trees – important nectar, pollen for insects and hibernation sites for insects, bats and possible nest sites for birds. Fruits of crab apple, elder, bramble and cherry plum provide good food sources for birds, rodents and badgers on site. Dead wood in the copse, particularly in the damper areas near the fen, shows evidence of importance for deadwood fungi and insects.

Sweep netting in the woodland produced fly species that breed in deadwood in the stream (*Lipsothrix nervosa*) and the fen (*Tipula maxima*) illustrating the point that the copse may be important for stream and fen organisms and habitats should not be considered separately for such mobile species.

### **3.4 Deadwood fauna**

This brief survey indicates a good deadwood fauna might occur on site. The patterned wing crane fly *Epiphragma ocellare*, has larvae that burrow in quite dry deadwood, but most species require the dead wood to be moist. The small, deadwood-breeding longhorn beetle, *Pogonochoerus hispidus* was swept from angelica flowers and the **Nationally Scarce** fly *Seri obscuripennis* was reared from the **bay polypore** fungus growing on dead wood on damp soil. The yellow and black wasp mimic hoverfly *Myathropa florea* was caught on ivy flowers in October. This species breeds in rot holes in old trees and is an indication that there may be more important species using rot holes in the old trees present. There are substantial rotting tree trunks lying on damp soil in the lower woodland. This is an excellent situation and where ever possible, dead wood and old diseased trees must be left where they fall and not cleared away off site as there will be many beetles, flies and other organisms that will be using them. Apart from contributing to biodiversity, these organisms provide food for insect-eating birds and even the badgers on site.

### **3.5 Relic Limestone grassland**

The short mown and longer grassland on the most sloping part of the site showed some species which indicate the presence of relic low nutrient limestone grassland flora, although much of the turf up near the car park and down the hill to the children's play area shows evidence of nutrient enrichment, perhaps from fertilizer application or nutrient input from dog faeces and urine. At the bottom of the hill the grass looked particularly nutrient enriched and low in species diversity.

In the lower-nutrient, marginal, long grass areas on the slope; calcareous plant indicator species of particular interest were common rest harrow (*Ononis repens*), upright brome grass (*Bromopsis erecta*), bird's foot trefoil (*Lotus corniculatus*) rough hawkbit (*Leontodon hispidus*) lady's bedstraw (*Galium verum* and hoary plantain (*Plantago media*). Also noteworthy are common knapweed (*Centaurea nigra*) greater knapweed (*Centaurea scabiosa*) field scabious (*Knautia arvensis*) hedge bedstraw (*Galium mollugo*) and agrimony (*Agrimonia eupatoria*). Most of these were in the long grass area, but the rough hawkbit, hedge bedstraw, bird's foot trefoil and hoary plantain were much commoner in the short mown grass. Field scabious, greater and common knapweeds have attractive flowers that are particularly valuable nectar sources for butterflies, bees and other insects.

Sweep-netting the longer grass revealed the presence of 2 specimens of the **Nationally Scarce** fly *Cnemocantha muscaria*.





*Marginal long grassland to the copse, containing common rest harrow, lady's bedstraw, knapweeds and field scabious*

#### **4.0 Comments on Species of Conservation Importance**

The site quality for invertebrates is here assessed with reference to the species found which are considered to be of national scarcity in the various 'Reviews of Nationally Scarce Insects' (7) (8). These reviews place all nationally scarce species into categories according to their degree of rarity and their vulnerability to extinction and are accepted as the 'official' Joint Nature Conservation Committee designations. See the **Glossary** for more details on these designations.

#### **4.1 *Cnemacantha muscaria*, a Lauxaniid fly (Current Status: RDB3, but going down to 'Lower Risk, Nationally Scarce' in a forthcoming publication)**



Two specimens of this small black fly with smoky wings were swept from the fragment of long relic limestone grassland on the edge of the copse in June. Its life cycle is not known, but previous published records are mostly from grassland with a few from riverbank or woodland. I have previously swept it (rarely) from under-managed grassy areas on calcareous soil in Oxfordshire.

**Management:** retain the long grassland on the edge of the woodland and expand the width of the long grass strip if possible. Cut the long grass for hay in August and rake off the risings to an unimportant area of the site where the nutrient enrichment from

the decay of the hay will not damage the habitat (suggest remove to the **bottom** of the hill and place on an already nutrient enriched area (it is easy to recognise these areas as they are dominated by common nettles). After the hay cut, the vegetation would benefit from a couple of close cuts during September (as weather allows) – this will create bare areas free of thatch which will encourage seed germination of a limestone flora. The grass intended to be long, should not be cut from November to August the next year. It is very important that all hay is removed from the area once cut and not left to lie for any time at all.

**4.2 *Lipsothrix nervosa* (Southern Yellow Splinter- a small yellow crane-fly) Status: UK BAP Priority Species** (A species listed as a priority for conservation action under the UK Biodiversity Action Plan (2))



*Lipsothrix nervosa*, the Southern Yellow Splinter crane-fly reared from deadwood

One specimen was found by sweeping near the stream on 15<sup>th</sup> June 2009. This is a Southern species with a distribution that does not reach Scotland. There are only a few previous records for this species in Oxfordshire at other good fen sites with wet woodland. The larvae of this species need waterlogged, soft, rotting dead wood (twigs and branches) in streams or wet woodland. Threats to this species are discussed by an expert on this species, A. Godfrey, who states:

*'The crane-fly *Lipsothrix nervosa* is included as a BAP Priority Species on account of its endemic status (only found in the UK), although recent work has shown that there are contemporary records from Germany and Switzerland. It is quite widespread in southern England, the south Midlands and Wales where it is associated with shaded seepages, spring lines and streams in deciduous woodland.'* ...

*..... Whilst this crane-fly is not under any immediate threat in Wales, the loss or degradation of woodland seepages through woodland clearance, conifer afforestation, drainage or water abstraction, and the removal of fallen timber from watercourses could easily result in the loss of individual populations.'* ... (3).

**Management** – retain dead wood of all sizes from logs to small twigs in wet areas. Ensure a continual supply of such dead wood enters the stream or lies on wet peat. This means keeping woodland next to the stream corridor in areas where the trees do not shade the important open fen habitat. Do not clear wood from the stream channel.



*Dead wood in the stream at Louie Memorial Fields - ideal habitat for breeding of the Southern yellow splinter cranefly, *Lipsothrix nervosa**



*Piles of yellow frass (excreta) on waterlogged wood indicating presence of burrowing of live *Lipsothrix* larvae in the waterlogged dead wood in the stream*

**4.3 *Vanoyia tenuicornis* – (Long horned soldier-fly) Status: Notable (Nationally Scarce).** This small yellow and black soldier fly is predominantly found in calcareous fens. The larvae live in tufa-rich areas usually under dense mats of waterlogged mosses and liverworts such as the Endive Pellia (*Pellia endiviifolia*) found here. One male swept from the fen vegetation in June. Can be common in Oxfordshire because of the numbers of calcareous fens in this county, but nationally uncommon, found only in the south and east of England and South Wales (6).

**Management** – ensure the fen area is cut annually with the vegetation removed, to ensure plenty of light gets to the peat to ensure the growth of the waterlogged moss and liverwort mat which is the breeding site of this species. Protect the catchment of the fen from development or anything which may change the water quality or works to reduce the water flow from the aquifer to the fen. Make plans to maintain high water levels in the fen to combat the predicted reduction in rainfall over the next 50 years as a result of global warming.

**4.4 *Seri obscuripennis* (a Platypezid or ‘Flat-footed’ fly) (Status: Lower Risk, Near Threatened)**

This is a small fly where the males are black and the females brown. It breeds only in a specific polypore fungus which grows on dead wood (the **Bay Polypore, *Polyporus durus***). Six caps of this fungus were found on logs lying in a damp area near the fen. One cap taken later produced several flies of this species.



*Bay Polypore fungus, breeding habitat of the fly *Seri obscuripennis* (female and male in the upper two photographs)*

The fly has rarely been caught by sweeping and used to have Red Data Book Status. However I have found that collecting its specific food fungus and breeding the fly out from the larvae has shown that it is commoner than thought, at least in Oxfordshire, thus its status has been revised down slightly to '**Lower Risk, Near Threatened**' (8).

**Management** – retain deadwood piles on site in damp shaded situations and old or diseased trees that might support the growths of the Bay Polypore fungus within which this species breeds.

**4.5 *Cheilosia soror* (a hoverfly) Old Status 'Nationally Scarce', but now being found more widely (4) so merits only 'Local' Status in Oxfordshire.** This black hoverfly is found in chalk and limestone areas in the South and East and there is evidence that it breeds in truffle fungi. Although there is no direct evidence of truffles here, these fungi are most likely to be associated with the mature trees (especially oak) on site. **Management:** Retain mature, native trees on site to support the truffles and provide plenty of flower nectar sources such as angelica to provide food for adult flies.

## **5.0 Conclusions on important invertebrates on site**

Four insects of conservation status and one of local importance recorded in very preliminary brief surveys by only the methods of sweeping and rearing from fungi indicate that this is potentially a very important site for invertebrates. It must be remembered that this study has found only a sample of organisms and the area will actually hold very many more invertebrate species in total and it is quite probable that more scarce and rare species live here. Fuller surveys at different times of the year and using additional collection methods (like pitfall traps, flight interception traps) would undoubtedly reveal more species of conservation importance.

## **6.0 Management Recommendations - Habitat Remediation and Enhancement**

### **6.1 The stream and its immediate corridor**

Fallen timber of all sizes, from twigs to branches, should **NOT** be removed from the watercourse, as all these may potentially be the breeding sites for the important UKBAP Priority Species **Southern Yellow Splinter cranefly** (*Lipsothrix nervosa*). Some woodland needs to be retained near the watercourse to provide a constant supply of dead twigs falling into the water to provide future breeding sites and ensure continuity of the population of this important species (2). I observed that all dead wood in the stream had been removed near the collapsed willow adjacent to the fen on my site visit on 4<sup>th</sup> Oct 2009. I had previously observed that this dead wood contained active *Lipsothrix* larvae as evidenced by the photographs presented here in. Such removal activities should not continue. Fresh breeding sites for *Lipsothrix* larvae should now be re-created by actual placement of deadwood from clearing activities into the stream water. It could take a year or more for freshly-cut wood to become rotten enough to be attractive to this insect for egg-laying, so some older deadwood should be placed in the stream as well. Where the stream runs past the fen, large old willows may be kept pollarded to ensure continuity of wood supply to the stream, but minimal shading on the adjacent fen.

In view of the predicted increase in flash flooding events due to climate change (which will produce more intense, shorter duration, rainstorms) measures need to be taken to prevent erosion in the stream which might remove important waterlogged deadwood. The catchment of the stream needs to be protected from development which could result in an increase in impermeable surfaces and increased run-off. Erosion control measures that could be applied to the stream with benefit to *Lipsothrix nervosa* are discussed in the hydrological report of C. Lamberth (5).

### **6.2 Woodland diversity enhancement**

The secondary woodland of the copse is dark and dense in places and contains many dying, spindly trees with a very poor ground flora, dominated by non flowering ivy. It also has a number of non-native shrubs or trees. To increase the floristic interest and biodiversity of the woodland copse areas the following are suggested:

- Remove non-native species of garden plants and shrubs as follows: Shrubby Honeysuckle (*Lonicera nitida*) Shrubby St John's wort (*Hypericum* sp), garden *Viburnum* sp, gladdon (*Iris foetidissima*) and Norway Maple (*Acer platanoides*). Space created by their removal could be left open to develop woodland ground flora (add bluebells, for example) or planted up with

attractive native shrubs useful to wildlife such as guelder rose, spindle and wayfaring tree. These all have flowers useful to insects and berries much liked by birds and mammals.

- Remove shaded, dying hawthorn and elder trees in very dense areas to let more light in to create glades which can be planted with native woodland shrubs and ground flora as mentioned above. Opening up the woodland should be targeted at areas away from known badger setts. If further protection from disturbance is required in the areas immediately around badger setts, I recommend the transplanting of prickly, shade tolerant evergreen shrubs (such as native holly) to around the badger sett area to work as barriers or screens. I observed numerous young holly plants in the copse under-story. These would be ideal, if moved in winter, to the required areas and replanted immediately. After transplanting, some cutting back of the branches may be necessary to reduce water loss in the first year until new root growth has been made.
- Regarding increasing the diversity of ground flora, volunteer activity on site could include digging up portions of the sweet woodruff (*Galium odoratum*) patch and planting them more widely throughout the woodland to increase the population. Seed of native British bluebells (*Hyacinthoides non-scriptus*) and primroses (*Primula vulgaris*) might be acquired and scattered on the soil in summer, making sure these are put in the areas of damper soil, because these flowers will not survive soil which dries out in summer such as that up on the steep banks of the hill.

### **6.3 Relic Limestone Grassland**

- The flora and fauna of this area would benefit from a **wider strip** of long grass being left uncut until mid August. It is then very important that the long grass is cut and **immediately raked off** (never left to lie) and piled in an unimportant area so that light may get down to the soil and encourage germination of buried seed. This will encourage the growth of attractive wildflowers that will provide more nectar and pollen sources for bees, butterflies and other insects. Personal communication with Parish council members indicates that orchids used to flower in this long grass area. They were undoubtedly lost due to grass cutting with allowing the cuttings to lie and rot in situ, with consequent nutrient enrichment. With the correct management of cutting removal detailed here, such orchids may be allowed to return and biodiversity thus be regained.
- No fertilizer or weedkiller should be applied to any of this grassland in the future. This should allow the calcareous grassland species to flourish and increase in population.

### **6.4 Fen and general wetland area enhancement**

Open, short-maintained fen adjacent to the spring emergence zone is the most valuable of the habitat types on site. This is more valuable than the wet woodland habitat that will develop in these areas if they are left unmanaged. Consideration should be given to reverting areas currently wet woodland to fen if possible.

Luckily the fen species at this site do NOT include such very aggressive dominant species like common reed (*Phragmites australis*) and greater reedmace (*Typha latifolia*) therefore control of the fen vegetation is going to be much easier on this site than in nearby good fen sites which do have these species such as Hinksey Heights Nature Reserve on Harcourt Hill.

- Annual cutting and clearing of tall herbaceous vegetation and any developing willow scrub will be beneficial to the fen. The risings to be removed from the fen surface area off to a less important area of the site where they may be piled to rot and maybe provide hibernation sites. This will allow more light and warmth to the peat surface, encouraging the development of invertebrate larvae. It is especially important to reduce the dominance of such species as great horsetail, branched bur-reed and sedges. Reduction in these will encourage more flowers useful as nectar and pollen sources for insects (angelica, water mint, common valerian, hemp agrimony). Nectar and pollen sources are important for the insects to complete their life cycles by providing energy and protein for egg laying.
- If large trees are overhanging and shading the fen, the shading effect should be reduced by pollarding the trees.
- As regarding the lower wetland, cutting of the tall herbaceous vegetation will be valuable because it will reduce the dominance of the aggressive species great hairy willow herb (*Epilobium hirsutum*) which is currently threatening to completely take over the wetland.
- Areas near the lower wetland where there are seepages with **tufa formation** should be targeted for clearance of scrub and tall vegetation. There are rare flies and beetles that breed specifically in these tufa-rich areas and these would benefit from more heat and light getting to the fen tufa-forming surface.
- No large, open water ponds should be created in any of the fen, or tufa seepage zones as these habitats are too important to suffer any loss of area.
- Small temporary scrapes or wet hollows in the lower wetland will enhance biodiversity. See the hydrological report of C. Lamberth (5) for details of these.





*Wild angelica is one of the most important fenland flowers to encourage specifically for the benefit of insects*

### **7.0 Summary and Conclusions**

- This study has confirmed the expected value of the fen habitat for insects and demonstrated that the grassland and deadwood on site also contain important invertebrate species.
- It is recommended that no large open water pond is constructed as this would result in too much loss of valuable wetland fen area on this quite small site. The excavation of small temporary areas of open water in the lower wetland is acceptable and will add to the biodiversity.
- The fen, lower wetland area and tufa seepage areas flora and fauna will benefit from annual cutting and clearing of tall herbaceous vegetation and scrub.
- Consideration should be given to reverting areas currently wet woodland to open fen.
- It is recommended that the catchment of the fen be protected into the future from development or any activity which works to reduce the water flow from the aquifer to the fen. Make plans to maintain high water levels in the fen to combat the effects of the predicted reduction in rainfall over the next 50 years as a result of global warming. See the report of C. Lamberth for further details (5).
- No dead wood at all should be removed from the stream and the '**unblocking of the stream**' instruction (apart from the removal of domestic waste/rubbish) should be removed from the management instructions given to OCV in their task days on site. Dead wood should be replaced in the stream and erosion control instated.
- Recommendations for biodiversity enhancement of the grassland area are given.
- Recommendations are given for biodiversity enhancement in the copse areas if this is deemed desirable and compatible with the recreational use of the site.

### **8.0 Acknowledgements**

Thanks are due to Alan Stubbs for help with crane-fly identifications and to Peter Chandler and John and Barbara Ismay for discussions on the current status and distribution of the fly *Cnemacantha muscaria*. Thanks are also due to Curt Lamberth for discussions on the site hydrology.

## **9.0 Glossary**

### ***Information on Status Categories of Insects of Conservation Importance found on Site***

Status categories from Falk (7) Falk and Chandler (8):

#### **Red Data Book Category 1. RDB1-ENDANGERED**

Taxa in danger of extinction if causal factors continue unabated. Includes species occurring as a single colony or only in habitats which are much reduced and highly threatened or which have shown a rapid and continuous decline.

#### **Red Data Book Category 2. RDB2-VULNERABLE**

Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating. Includes species of which most or all populations are decreasing and those which are confined to vulnerable habitats.

#### **Red Data Book Category 3. RDB3 - RARE**

Taxa with small populations that are not at present endangered or vulnerable, but are at risk; usually localised within restricted geographical areas or habitats or are thinly scattered over a wider range. Includes species estimated to exist in only fifteen or less post 1970 10km squares or, if more, then in vulnerable habitat.

#### **Nationally Scarce Category a (Previously Notable a) NSa or Na**

Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in 30 or fewer 10km squares or, in less well recorded groups, within 7 or fewer Vice Counties.

#### **Nationally Scarce Category b (Previously Notable b) NSb or Nb**

Taxa which do not fall within the RDB categories but which are uncommon in Great Britain and are known to occur in between 31 and 100 10km squares or, in less well recorded groups, between eight and twenty vice counties.

#### **Lower Risk (Near Threatened) LR (NT)**

A newer category in more recent publications. Taxa which are close to qualifying for Vulnerable, RDB3

## Local

Taxa which are uncommon enough to be of local importance in the county, but common enough on a national level to have no national conservation status. These are often species that used to have Notable/Nationally Scarce designation, but which have been found more widely in recent years due to increased recording effort.

## 10.0 References

1. **JNCC Habitat account of Habitats Directive feature 7230, Alkaline fens.** The Habitats Directive: selection of Special Areas of Conservation in the UK, [www.jncc.gov.uk/protectedsites/SACselection/habitat.asp?FeatureIntCode=H7230 - 44k](http://www.jncc.gov.uk/protectedsites/SACselection/habitat.asp?FeatureIntCode=H7230-44k)
2. **New UK Priority Species and Habitats List:** <http://www.ukbap.org.uk/newprioritylist.aspx>
3. **Godfrey, A. (2002) *The larval requirements of the crane fly *Lipsothrix nervosa*.*** Unpublished report to the Countryside Council for Wales.
4. **Ball, S.G. & Morris, R.K.A.(2007). *A review of the scarce and threatened flies of Great Britain. Part x: Syrphidae. Species Status x: 1-x*** Joint Nature Conservation Committee, Peterborough.
5. **Lamberth, C. (2009) *Investigation of the fen hydrology and surface water flows of Louie Memorial Park.*** Unpublished report to North Hinksey Parish Council
6. **Porter, K (1992) *An Atlas of Oxfordshire Diptera: Stratiomyidae.*** Occasional Paper No. 16. Oxfordshire Museums Service.
7. **Falk, S. (1991) Research and Survey in Nature Conservation No. 39 *A review of the scarce and threatened flies of Great Britain (part 1)*** Joint Nature Conservation Committee, Peterborough.
8. **Falk, S.J, and Chandler, P. J., (2005) *A review of the scarce and threatened flies of Great Britain. Part 2: Nematocera and Aschiza not dealt with by Falk (1991)*** Species Status 2: 1-189 Joint Nature Conservation Committee, Peterborough.

## Appendix – Tables of Species Recorded in this study

Louie Memorial Fields

Species scientific name	common name	Date	Abundance/Nos.	National Status	comment
<b>Flowering plants, trees, ferns</b>					
<i>Acer campestre</i>	field maple	15.06.2009	frequent		in secondary woodland
<i>Acer platanoides</i>	norway maple	15.06.2009	occasional		in secondary woodland
<i>Aegopodium podagraria</i>	ground elder	28.08.2009	occasional		in secondary woodland
<i>Aesculus hippocastaneum</i>	horse chestnut	28.08.2009	rare		in secondary woodland
<i>Agrimonia eupatoria</i>	agrimony	15.06.2009	occasional		mown grassland and long grass
<i>Ajuga reptans</i>	bugle	15.06.2009	common		in fen
<i>Anthriscus sylvestris</i>	cow parsley	15.06.2009	occasional		woodland edge
<i>Apium nodosum</i>	fool's water cress	06.08.2009	occasional		lower wetland
<i>Arrhenatherum elatius</i>	false-oat	15.06.2009	frequent		long grassland
<i>Bellis perennis</i>	common daisy	28.08.2009	common		mown grassland area
<i>Brachypodium sylvaticum</i>	wood false-brome	15.06.2009	occasional		woodland
<i>Bromopsis erecta</i>	upright brome	15.06.2009	occasional		long grassland
<i>Bromus sterilis</i>	sterile brome	15.06.2009	occasional		car park
<i>Calystegia sepium</i>	great bindweed	28.08.2009	rare		fen area
<i>Cardamine flexuosa</i>	wavy bitter cress	15.06.2009	occasional		fen area
<i>Carex hirta</i>	hairy sedge	15.06.2009	frequent		fen area
<i>Carex pendula</i>	pendulous sedge	15.06.2009	common		fen area
<i>Carex sp ? riparia/acutiformis</i>	lesser pond sedge	06.08.2009	common		fen
<i>Centaurea scabiosa</i>	greater knapweed	15.06.2009	rare		in long grass on woodland edge
<i>Chamerion angustifolium</i>	rose-bay willow-herb	28.08.2009	occasional		lower woodland area
<i>Circaea lutetiana</i>	enchanter's nightshade	15.06.2009	common		in woods
<i>Cirsium palustre</i>	marsh thistle	15.06.2009	occasional		fen
<i>Cornus sanguinea</i>	dogwood	28.08.2009	occasional		woodland
<i>Corylus avellana</i>	hazel	15.06.2009	occasional		old coppice stools in lower woodland
<i>Crataegus monogyna</i>	common hawthorn	15.06.2009	frequent		woodland
<i>Cynosurus cristatus</i>	crested dog's tail grass	15.06.2009	occasional		long grassland
<i>Dactylis glomerata</i>	cock's foot grass	15.06.2009	frequent		long grassland
<i>Dryopteris filix mas</i>	male fern	15.06.2009	rare		woodland
<i>Epilobium hirsutum</i>	great hairy willow herb	28.08.2009	locally abundant		lower wetland area
<i>Epilobium parviflorum</i>	hoary willowherb	15.06.2009	occasional		fen
<i>Equisetum telmateia</i>	great horsetail	15.06.2009	frequent-abundant		fen
<i>Euonymus europaeus</i>	spindle	28.08.2009	2		woodland
<i>Eupatorium cannabinum</i>	hemp agrimony	15.06.2009	common		in fen
<i>Festuca arundinacea</i>	tall fescue grass	15.06.2009	occasional		long grassland
<i>Festuca gigantea</i>	giant fescue grass	15.06.2009	occasional		invading fen
<i>Festuca pratensis</i>	meadow fescue grass	15.06.2009	rare		long grassland
<i>Filipendula ulmaria</i>	meadowsweet	15.06.2009	occasional		fen
<i>Fraxinus excelsior</i>	ash	15.06.2009	common		woodland
<i>Galium aparine</i>	cleavers	15.06.2009	occasional		scrub
<i>Galium mollugo</i>	hedge bedstraw	28.08.2009	occasional		short mown grassland
<i>Galium odoratum</i>	sweet woodruff	28.08.2009	1 patch, 3m		in wooded area adjacent to stream
<i>Geranium robertianum</i>	herb robert	15.06.2009	frequent		woodland

Louie Memorial Fields

Species scientific name	common name	Date	Abundance/Nos.	National Status	comment
<b>Flowering plants, trees, ferns</b>					
<i>Geum urbanum</i>	wood avens	15.06.2009	frequent		woodland
<i>Glyceria maxima</i>	reed sweet grass	15.06.2009	occasional		fen
<i>Glyceria plicata</i>	plicate sweet grass	15.06.2009	occasional		fen
<i>Hedera helix</i>	ivy	15.06.2009	abundant		woodland
<i>Holcus lanatus</i>	yorkshire fog grass	15.06.2009	common		long grassland
<i>Hyacinthoides sp</i>	? Spanish bluebell	15.06.2009	occasional		possibly garden escapes- spanish bluebells
<i>Hypericum sp.</i>	a shrubby St John's Wort	28.08.2009	1		woodland, a garden escape
<i>Hypericum tetrapterum</i>	square stalked St John's Wort	28.08.2009	occasional		fen
<i>Ilex aquifolium</i>	holly	28.08.2009	occasional		woodland
<i>Iris cf foetidissima</i>	gladdon	28.08.2009	2 clumps		drier parts of woodland ? Dumped
<i>Juncus articulatus</i>	jointed rush	28.08.2009	occasional		fen
<i>Juncus inflexus</i>	hard rush	15.06.2009	occasional		fen
<i>Knautia arvensis</i>	field scabious	06.08.2009	occasional		long grass and mown grassland
<i>Lamium album</i>	white dead nettle	28.08.2009	rare		woodland
<i>Leucanthemum vulgare</i>	oxeye daisy	28.08.2009	occasional		mown grassland area only
<i>Lolium perenne</i>	perennial rye grass	15.06.2009	common		mown grassland area only
<i>Lonicera nitida</i>	shrubby honeysuckle	28.08.2009	5 bushes		garden plant escaped
<i>Lotus corniculatus</i>	bird's foot trefoil	28.08.2009	occasional		short mown grassland only
<i>Lysimachia nummularia</i>	creeping jenny	15.06.2009	occasional		fen and stream edges
<i>Lythrum salicaria</i>	purple loosestrife	15.06.2009	occasional		fen
<i>Malus sp cf sylvestris</i>	crab apple	28.08.2009	occasional		in secondary woodland
<i>Medicago lupulina</i>	black medick	15.06.2009	occasional		mown grassland
<i>Mentha aquatica</i>	water mint	15.06.2009	frequent		fen
<i>Mercurialis perennis</i>	dog's mercury	15.06.2009	occasional		woodland
<i>Ononis repens</i>	rest harrow	06.08.2009	4 plants		in long grassland on wood edge
<i>Phleum pratense</i>	timothy	15.06.2009	rare		long grassland
<i>Plantago lanceolata</i>	ribwort plantain	15.06.2009	common		short mown grassland
<i>Plantago major</i>	greater plantain	15.06.2009	occasional		short mown grassland
<i>Plantago media</i>	hoary plantain	28.08.2009	occasional		only on mown grassland
<i>Poa trivialis</i>	rough stalked meadow grass	28.08.2009	occasional		long grassland
<i>Potentilla anserina</i>	silverweed	15.06.2009	rare		fen
<i>Potentilla reptans</i>	cinquefoil	15.06.2009	occasional		grasslands
<i>Prunella vulgaris</i>	self-heal	15.06.2009	frequent		in mown grassland
<i>Prunus cerasifera</i>	cherry plum	15.06.2009	1		large tree near lower wetland
<i>Prunus spinosa</i>	blackthorn	15.06.2009	frequent		woodland
<i>Pulicaria dysenterica</i>	fleabane	15.06.2009	occasional		in fen
<i>Ranunculus acris</i>	meadow buttercup	15.06.2009	occasional		grasslands
<i>Ranunculus repens</i>	creeping buttercup	15.06.2009	occasional		fen
<i>Ribes nigrum</i>	blackcurrant	28.08.2009	occasional		woodland
<i>Ribes rubrum</i>	redcurrant	28.08.2009	occasional		woodland
<i>Rorippa nasturtium-aquaticum</i>	water cress	06.08.2009	locally common		carpeting pond area & lower wetland

Louie Memorial Fields

Species scientific name	common name	Date	Abundance/Nos.	National Status	comment
<b>Flowering plants, trees, ferns</b>					
<i>Rubus caesius</i>	dewberry	15.06.2009	occasional		in secondary woodland
<i>Rubus fruticosus</i> agg.	bramble	15.06.2009	frequent		in secondary woodland
<i>Rubus</i> sp. cf 'himalayan giant'	cultivated blackberry	28.08.2009	occasional		in secondary woodland
<i>Rumex acetosa</i>	sorrel	15.06.2009	occasional		in mown grassland
<i>Salix alba</i>	white willow	28.08.2009	rare		lower woodland below concrete path
<i>Salix cinerea</i>	grey willow	28.08.2009	occasional		lower wetland
<i>Salix fragilis</i>	crack willow	28.08.2009	frequent		stream corridor
<i>Sambucus nigra</i>	elder	15.06.2009	frequent		in secondary woodland
<i>Scrophularia auriculata</i>	water figwort	15.06.2009	pccasional		fen
<i>Solanum dulcamara</i>	woody nightshade	28.08.2009	occasional		fen
<i>Sparganium erectum</i>	branched bur-reed	15.06.2009	locally frequent		in fen
<i>Stachys sylvatica</i>	hedge woundwort	15.06.2009	occasional		in secondary woodland
<i>Taxus baccata</i>	yew	28.08.2009	rare		in secondary woodland
<i>Tragopogon pratense</i>	goatbeard	28.08.2009	rare		by the car park
<i>Trifolium pratense</i>	red clover	15.06.2009	occasional		mown grassland
<i>Trifolium repens</i>	white clover	15.06.2009	common		mown grassland
<i>Trisetum flavescens</i>	yellow oat grass	15.06.2009	occasional		long grassland
<i>Urtica dioica</i>	nettle	15.06.2009	locally abundant		woodland
<i>Valeriana officinalis</i>	common valerian	28.08.2009	occasional		fen
<i>Veronica beccabunga</i>	brooklime	15.06.2009	locally frequent		fen
<i>Veronica chamaedrys</i>	germander speedwell	15.06.2009	occasional		long grassland
<i>Veronica montana</i>	wood speedwell	15.06.2009	occasional		woodland
<i>Viola riviniana</i>	common dog-violet	28.08.2009	rare		woodland
<i>Viburnum</i> sp	garden variety	15.06.2009	2 bushes		woodland
<b>Bryophyta (Mosses &amp; Liverworts)</b>					
<i>Calliergonella cuspidata</i>	Pointed Spear-moss	28.08.2009	frequent		fen
<i>Climacium dendroides</i>	Tree-moss	28.08.2009	occasional		woodland
<i>Cratoneuron filicinum</i>	Fern-leaved Hook-moss	28.08.2009	locally frequent		tufa depositing areas
<i>Kindbergia praelonga</i>	Common Feather-moss	28.08.2009	common		on rotting logs in fen
<i>Pellia endiviifolia</i>	Endive Pellia (liverwort)	28.08.2009	locally frequent		fen, stream banks
<i>Plagiomnium undulatum</i>	Hart's-tongue Thyme-moss	28.08.2009	occasional		on rotting logs in fen
<i>Rhizomnium punctatum</i>	Dotted Thyme-moss	28.08.2009	occasional		on rotting logs in fen
<b>Fungi</b>					
<i>Auricularia auricula-judae</i>	jelly ear	28.08.2009	rare		on old elder wood
<i>Daedaleopsis confragrosa</i>	blushing bracket	28.08.2009	rare		on fallen willow logs
<i>Flammulina velutipes</i>	velvet shank	04.10.2009	rare		on dead elder
<i>Ganoderma applanatum</i>	artist's bracket	28.08.2009	rare		on log in fen
<i>Hypholoma fasciculare</i>	sulphur tuft	04.10.2009	numerous		on old willow tree
<i>Polyporus durus (badius)</i>	bay polypore	28.08.2009	5 caps on 1 log		on dead log
<i>Postia subcaesia</i>	blueing bracket	28.08.2009	2		on dead branch
<i>Xylaria polymorpha</i>	deadman's fingers	28.08.2009	1		on dead log

Louie Memorial Fields

Diptera (True Flies)	common name	Date	Abundance/Nos.	National Status	comment
<i>Austrolimnophila ochracea</i>	crane fly	15.06.2009	1		fen
<i>Baccha elongata</i>	hoverfly	06.08.2009	1		fen
<i>Cheilosia impressa</i>	hoverfly	06.08.2009	1m		fen
<i>Cheilosia pagana</i>	hoverfly	06.08.2009	1f		fen
<i>Cheilosia soror</i>	hoverfly	06.08.2009	1f	Local	fen
<i>Cheilotrichia cinerascens</i>	crane fly	15.06.2009	1		fen
<i>Chrysogaster cemitiorum</i>	hoverfly	15.06.2009	1m		fen
<i>Chrysogaster solstitialis</i>	hoverfly	06.08.2009	2m		fen
<i>Cnemacantha muscaria</i>	lauxaniid fly	15.06.2009	1	RDB3/Nat Scarce	long grass on field
<i>Dicranomyia modesta</i>	crane fly	15.06.2009	1		fen
<i>Dolichopus popularis</i>	Dolichopodid fly	15.06.2009	1		fen
<i>Ellipteroides lateralis</i>	crane fly	15.06.2009	3		fen
<i>Epiphragma ocellare</i>	crane fly	15.06.2009	1		woodland
<i>Erioptera lutea</i>	crane fly	15.06.2009	1		fen
<i>Eristalis sp</i>	hoverfly	04.10.2009	numerous		on ivy flowers
<i>Hydromya dorsalis</i>	sciomyzid fly	15.06.2009	1		fen
<i>Limonia nubeculosa</i>	crane fly	15.06.2009	6		woodland
<i>Limonia phragmatidis</i>	crane fly	15.06.2009	3		woodland
<i>Limonia trivittata</i>	crane fly	15.06.2009	1		fen
<i>Lipsothrix nervosa</i>	Southern Yellow Splinter	15.06.2009	1f	UK BAP Priority sp	stream, fen
<i>Lipsothrix remota</i>	crane fly	15.06.2009	4		fen
<i>Liriomyza eupatori</i>	agromyzid fly	28.08.2009	numerous		as leaf mine on hemp agrimony, fen
<i>Molophilus medius</i>	crane fly	15.06.2009	1		fen
<i>Myathropa florea</i>	hoverfly	04.10.2009	1		woodland
<i>Neolimonia dumetorum</i>	crane fly	15.06.2009	1		fen
<i>Nowikia ferox</i>	tachinid fly	06.08.2009	1		fen
<i>Opomyza germinationis</i>	Opomyzid fly	15.06.2009	1		woodland
<i>Pachygaster atra</i>	dark winged black soldierfly	15.06.2009	1		woodland
<i>Paradelphomyia senilis</i>	crane fly	15.06.2009	1		woodland
<i>Poecilobothrus nobilitatus</i>	Dolichopodid fly	15.06.2009	1		fen
<i>Pseudolimnophila sepium</i>	crane fly	15.06.2009	1		fen
<i>Ptychoptera albimana</i>	fold wing crane fly	04.10.2009	1f		fen
<i>Riponnensia splendens</i>	hoverfly	15.06.2009	1f		fen
<i>Sargus bipunctatus</i>	twin spot centurion soldierfly	04.10.2009	1f		woodland
<i>Scathophagia stercoraria</i>	dung fly	15.06.2009	1		woodland
<i>Seri obscuripennis</i>	Platyezid fly	29.08.2009	1m	Lower Risk/Near Threatened	reared 18.09.2009 from fungus Polyporus badius (durus) on rotting log
<i>Symplecta stictica</i>	crane fly	15.06.2009	1		fen
<i>Tachina fera</i>	tachinid fly	28.08.2009	1		fen
<i>Tipula fulvipennis</i>	crane fly	28.08.2009	2m,2f		woodland
<i>Tipula lateralis</i>	crane fly	15.06.2009	1		fen
<i>Tipula maxima</i>	crane fly	15.06.2009	1		fen
<i>Tipula maxima</i>	crane fly	28.08.2009	1		wood near fen
<i>Tipula unca</i>	crane fly	15.06.2009	1		fen
<i>Vanoyia tenuicornis</i>	long horned soldierfly	15.06.2009	1m	Nationally Scarce	fen
<i>Volucella pellucens</i>	hoverfly	28.08.2009	1		woodland

Louie Memorial Fields

Species scientific name	common name	Date	Abundance/Nos.	National Status	comment
<b>Hymenoptera (bees)</b>					
<i>Apis mellifera</i>	honey bee	28.08.2009	several		long grass on field
<i>Bombus pascuorum</i>	ginger bumble bee	28.08.2009	1		long grass on field
<i>Hylaeus sp</i>	solitary bee	15.06.2009	1		long grass on field
<b>Coleoptera (Beetles)</b>					
<i>Gastrophysa viridula</i>	dock beetle	15.06.2009	2		on docks
<i>Pogonochoerus hispidus</i>	a longhorn beetle	15.06.2009	1		woodland
<i>Oulema sp cf melanopus</i>	cereal leaf beetle	15.06.2009	numerous		fen
<i>Harmonia axyridis</i>	harlequin ladybird	04.10.2009	1		woodland
<b>Lepidoptera (Butterflies and moths)</b>					
<i>Pararge aegeria</i>	speckled wood	28.08.2009	2		woodland
<i>Artogeia rapae</i>	small white	28.08.2009	1		fen
<i>Pieris brassicae</i>	large white	28.08.2009	1		fen
<b>Hemiptera (Bugs)</b>					
<i>Pentatoma rufipes</i>	forest bug	15.06.2009	1 nymph		woodland
<i>Mirus striatus</i>	a grass bug	15.06.2009	numerous		long grass on field
<i>Cicadella viridis</i>	a froghopper	06.08.2009	numerous		in fen
<i>Acanthosoma haemorrhoidale</i>	hawthorn shieldbug	06.08.2009	1		
<b>Orthoptera (crickets)</b>					
<i>Leptophyes punctatissima</i>	speckled bush cricket	15.06.2009	6 nymphs		woodland
<b>Mollusca (snails)</b>					
<i>Cepaea nemoralis</i>	banded snail	28.08.2009	1		woodland
<i>Helix aspersa</i>	garden snail	04.10.2009	10		in crevice in old tree
<i>Succinia sp</i>	a marsh snail	28.08.2009	3		fen, lower wetland
<b>Vertebrata</b>					
<i>Rana temporaria</i>	frog	28.08.2009	1 adult		fen
<i>Sciurus carolinensis</i>	grey squirrel	04.10.2009	1		woodland
<i>Meles meles</i>	badger	28.08.2009			as diggings, latrine and sett in copse