

**Headwater Streams  
of the Churnet Valley**

**An assessment of the invertebrate interest**

*A report for:*

Staffordshire Wildlife Trust

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**Report title: Headwater streams – an assessment of their invertebrate interest**

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## Contents

<b>1</b>	<b>Introduction .....</b>	<b>5</b>
1.1	The study area.....	5
1.2	Background to the study .....	5
1.2.1	Why the Churnet Valley? .....	5
1.3	The selected streams and sampling points .....	5
1.3.1	Collyhole Brook.....	5
1.3.2	Dydon Wood.....	6
1.3.3	Gibridging Wood .....	6
1.3.4	Foxtwood.....	6
1.3.5	Hudford Brook.....	7
1.3.6	Kirkstead Brook.....	7
<b>2</b>	<b>Survey methods.....</b>	<b>8</b>
2.1	Change in method.....	8
2.2	Key taxa .....	8
2.3	Analysis.....	8
<b>3</b>	<b>Results.....</b>	<b>9</b>
3.1	Survey statistics .....	9
3.2	Analysis of survey results .....	9
3.3	SAT detail .....	10
3.3.1	Sandy river margin (W114).....	10
3.3.2	Seepage (W126).....	10
3.3.3	Other SATs of low importance.....	11
<b>4</b>	<b>Discussion.....</b>	<b>11</b>
4.1	Species/groups.....	11
4.2	Individual stream assessment .....	12
4.2.1	Collyhole Brook.....	12
4.2.2	Dydon Wood.....	13
4.2.3	Gibridging Wood .....	13
4.2.4	Foxtwood.....	13
4.2.5	Hudford Brook.....	14
4.3.6	Kirkstead Brook.....	15
<b>5</b>	<b>Conclusions .....</b>	<b>15</b>
5.1	Differences in recording effort .....	16
5.2	Differences between base-rich and base-poor sites .....	16
<b>6</b>	<b>Recommendations for future work.....</b>	<b>16</b>
<b>7</b>	<b>References .....</b>	<b>18</b>
<b>Annex 1 – Species lists.....</b>		<b>19</b>
	Collyhole Brook species list .....	19
	Dydon Wood species list .....	21
	Gibridging Wood species list .....	23
	Foxtwood species list.....	24
	Hudford Brook species list.....	26
	Kirksteads Brook Species list .....	29
<b>Appendix.....</b>		<b>32</b>
	Appendix I: Photographs .....	33
	Appendix II: Definitions of Red Data Book etc (follows Shirt 1987) .....	37
	Appendix III – Additional species records from Nick Mott .....	38
	Appendix IV: Species photographs.....	39

## Figures

<i>Figure 1.1: The Dydon Wood</i> .....	6
<i>Figure 1.2: Kirksteads Brook – surface water over mud and rocks forming ideal conditions for many species of Diptera.</i> .....	7
<i>Figure 3.1: Site statistics</i> .....	9
<i>Figure 3.2: Represented SATs</i> .....	10
<i>Figure 3.3: Example of woodland seepage, Foxtwood.</i> .....	11
<i>Figure 4.1: Silted area at sample point 3</i> .....	12
<i>Figure 4.2: Foxtwood. Open, shallow stream with a lack of abundant cover and deadwood.</i> .....	14

## **1 Introduction**

### **1.1 The study area**

The area in which the project sits is broadly defined as the Churnet Valley. This is a large area of deep-sided valleys with headwater streams, seepages and gullies feeding into the River Churnet, the principal river of the Staffordshire Moorlands. The majority of the valley's landscape is wooded, largely broad-leaved, though some coniferous plantation exists. The broad-leaved woodland is represented by predominantly replanted ancient and secondary woodland with the underlying geology being of carboniferous millstone grit, giving rise to a neutral to acidic bias (base-poor). The exception to this is towards the extreme east of the catchment where the geology shifts to carboniferous limestone (base-rich) and therefore the flora and invertebrate fauna can be different.

There is one sample site that sits outside this catchment area, the Kirksteads Brook. This headwater stream feeds into the River Manifold and lies within the South-West Peak of the Peak District National Park. This was selected for a number of reasons. One, it represents a high quality limestone influenced headwater stream, a type yet to be sampled in Staffordshire, and secondly since the Hudford Brook has some potential limestone influences it would prove a useful comparison site and serves to highlight the difference between headwater types.

### **1.2 Background to the study**

This study is an extension and continuation of work that is being undertaken by Staffordshire Wildlife Trust into the County's headwater stream resource. The initial work centred on investigations into the quality of headwater streams at Cannock Chase Area of Outstanding Natural Beauty (AONB). This three year study (2006-2009) highlighted a number of streams of high quality and gleaned much valuable information on the faunal diversity of the area which leads to the enhancement of the woodland streams on the AONB for a wide range of scarce assemblages and species of UK concern. These included the white-clawed crayfish (*Austropotamobius pallipes*), otter (*Lutra lutra*), and many Red Data Book (RDB) invertebrates. The success of this detailed work and subsequent enhanced management of a number of streams has resulted in other areas of the county being identified as requiring similar efforts. In 2010, Staffordshire Wildlife Trust launched the Staffordshire Headwaters project to continue this work at a number of sub-catchment areas including the Churnet tributaries, the Upper Stour and the Swarbourn.

#### *1.2.1 Why the Churnet Valley?*

The Churnet Valley is perhaps the premier valley system in Staffordshire with large areas of woodland, flower-rich pasture, marsh and fen, all influenced by the actions and features of headwater streams that feed the larger main rivers.

Targeted survey work of representative headwater streams would provide an insight to the biodiversity of the area and highlight key species and assemblages. This entire information gathering exercise has a focus towards developing a strategy for identifying practical conservation measures to support these species, assemblages and principally to improve the overall health of the valley system and its water resources.

### **1.3 The selected streams and sampling points**

The headwater stream survey sites were selected by Nick Mott (Senior Wetlands Ecologist) at Staffordshire Wildlife Trust.

#### *1.3.1 Collyhole Brook*

The Collyhole Brook is located on the western edge of the Churnet Valley. The stream is approximately 1-2 metres wide and of moderate flow (low=sluggish, high=fast). It is

overhung by vegetation and crossed by fallen trees, predominately alder (*Alnus glutinosa*). The bottom end of the survey section features a silted up pool surrounded by reeds, silt “mudflats”, sandy deposits and carr.

### 1.3.2 Dydon Wood

This woodland is on the eastern edge of the Churnet Valley where the geology changes from carboniferous millstone grit to carboniferous limestone. The woodland is steep-sided producing a valley with high humidity. The stream is narrow with a series of riffles and deep scour pools. The steep-sided valley produces high quantities of fallen deadwood and there are many woody debris dams and physical features within the stream. The stream itself may be influenced by base-rich chemistry from the seepages that give rise to this stream as it starts out on limestone before entering the millstone grit geology and valley proper.



Figure 1.1: Dydon Wood

### 1.3.3 Gibriding Wood

Located in the centre of the Churnet Valley, this is a very small (less than 1m wide in places), gorged stream in a steep, east-facing woodland. There was, at the time of survey, little water in the upper reaches of this headwater stream, a character of such watercourses, particularly during dry periods as with the spring of 2011.

### 1.3.4 Foxtwood

This stream flows from steep terrain but, once the stream reaches this section, it slows as it reaches the floor of the Churnet Valley. The study area for the tributary is near to the main river and is therefore relatively wide in comparison to its contemporaries in the area. It is up to 2.5m wide in places. The streamside is not well-vegetated in places and there are lower quantities of woody debris within the stream than other streams of the area. It does have some interesting seepage features however.

### *1.3.5 Hudford Brook*

This site is on the extreme east of the area. It abuts an area of limestone and one or more of the sample points along the stream may be influenced by this geology. The stream is very small, rising from seepage lines on open grassland. The stream itself sees a departure away from the wooded valley headwater streams previously described to open habitat streams with seepages.

### *1.3.6 Kirksteads Brook*

This site, as previously mentioned is outside the Churnet Valley, but is a useful comparison to the Hudford Brook and the wooded sites as it is on limestone and represents a very different type of headwater stream and associated habitat. This stream is very small, circa 1m wide or less and is probably strongly influenced by the limestone geology. It is also largely open with only small reaches shaded or influenced by bankside scrub.

*Figure 1.2: Kirksteads Brook – surface water over mud and rocks forming ideal conditions for many species of Diptera.*



## **2 Survey methods**

### **2.1 Change in method**

Collyhole Brook, Dydon Wood, Gibbridding Wood and Foxtwood all employed the same survey method as with previous surveys of headwater streams at Cannock Chase.

Each of the above sites was sampled using the same sampling method as for Jukes (2009). This is a set of 3 samples for each stream; individual samples being of 15 minute duration. Within this timeframe bankside vegetation overhanging trees and any in-channel debris were swept and the contents emptied at periods within the 15 minute sample for later examination.

Hudford Brook and Kirkstead Brook adopted a more rigorous 4 sample set of 20 minutes for each sample. Given that only one visit could be undertaken at each stream it was decided to alter this method partly to compare with the 3 sample method as it is assumed that it would generate a more representative species list from which greater levels of accuracy in the interpretation could be gained as a greater level of effort is placed upon the survey area. This method would also ally itself more closely to relatively new national guidelines for standardised invertebrate sampling (Drake et al, 2007).

### **2.2 Key taxa**

Diptera forms the basis of this work supplemented by any additional species from other groups that may assist with site appraisal. For example, the presence of white-clawed crayfish or oligolectic bees (those that only collect pollen from a narrow range of plant species or families) would help in the summary of the sites.

The key Diptera taxa are:

- Dolichopodidae
- Empidoidea
- Ephydriidae
- Larger Brachycera
- Lauxanidae
- Sciomyzidae
- Syrphidae
- Tipuloidea
- Other incidental acalypterate fly families

### **2.3 Analysis**

Each species list is analysed using ISIS (Lott et al, 2009 version). ISIS is a software application created by Natural England for the primary use in Common Standards Monitoring (CSM) of nationally designated Sites of Special Scientific Interest (SSSI) but it can be employed to help assess a wide range of other sites. Its most valuable asset is in highlighting key intrinsic features of importance, known as SATs (Specific Assemblage Types).

The main reason for using ISIS for this work is that any future management of sites can be compared to this original data collection and any improvements to the streams can be quantified, a particularly useful tool for funding applications, reporting, assessment and the justification of on-going management work.

To compliment ISIS, particularly where species lists are generic and do not offer sufficient insight into SATs, surveyor experience and known ecologies of key species is required to understand the health of the stream course and its associated fauna.



### 3 Results

#### 3.1 Survey statistics

Individual species lists and ISIS results tables can be found in Annex 1 of this report.

142 separate species were recorded during the surveys from the targeted taxonomic groups. The breakdown is presented in the table below

Species were identified by A.Jukes with partial outsourcing to Martin Drake or verification of problematic material.

Site name	Geology	Habitat type	Number of species	RDB	NS	Local	1 <sup>st</sup> County records
<i>Collyhole Brook</i>	Carboniferous Millstone grit series	Broad-leaved woodland	41	0	1	6	2
<i>Dydon Wood</i>	Carboniferous Millstone grit series	Broad-leaved woodland	24	0	0	8	1
<i>Gibridging Wood</i>	Carboniferous Millstone grit series	Broad-leaved Woodland	15	0	2	1	2*
<i>Foxtwood</i>	Carboniferous Millstone grit series	Broad-leaved Woodland	29	0	1	1	1*
<i>Hudford Brook</i>	Carboniferous Millstone grit series/limestone	Grassland, scrub, tree lines. Partly shaded, open	55	0	0	13	1
<i>Kirksteads Brook</i>	Carboniferous limestone	Grassland, fen, tree line. Partly shaded, open	62	0	1	14	3

Figure 3.1: Site statistics

#### Notes:

\**Dicranota robusta* was recorded from Coombs Valley RSPB reserve but this was over 20 years ago. *D.robusta* was also found simultaneously at Gibridging Wood and Foxtwood. In 2011.

RDB – Red Data Brook

NS – Nationally Scarce

#### 3.2 Analysis of survey results

A total of 142 species were recorded from the selected target groups. This list includes 10 species not previously recorded in Staffordshire including *D.robusta* (Nationally Scarce) that has only been previously recorded over 20 years ago at Coombs Valley RSPB reserve. It also includes 4 species of Nationally Scarce (NS) status but does not include *Chalcosyrphus eunotus* (a NS hoverfly) which is known to be along at least 3 of these stream courses (Dydon Wood, Gibridging Wood and Collyhole Brook; Mott, *pers comm*, 2011).

The most frequent BATs (Broad Assemblage Type) according to ISIS (2009 version) are fast-flowing rivers and permanent wet mire, as expected for such sites. The SATs below reveal greater intrinsic detail.

SAT	Sandy river margin	Seepage	Dung	Flower rich resource
Site				
<i>Collyhole brook</i>	*		*	
<i>Dydon wood</i>		*		
<i>Gibriding wood</i>			*	
<i>Foxtwood</i>				
<i>Hudford brook</i>	*		*	
<i>Kirkstead brook</i>		*	*	*

Figure 3.2: Represented SATs

### 3.3 SAT detail

#### 3.3.1 Sandy river margin (W114)

Although more analogous with lowland rivers, this feature is embedded along 2 of the headwater streams. Along the Collyhole, the feature is most dominant where the millstone grit deposits from the scouring action of the stream aggregates at the silted pool on the lower reaches of the survey section. The first county record, crane fly *Eloeophila trimaculata* (Nationally Scarce) was recorded from this location. The SAT is present further upstream as well, where it settles as silty/sandy exposed sediments. The Hudford Brook, although partly base-rich also shows signs of being base-poor, particularly along the western channels of this small headwater system. This difference in geology over a very small area is exhibited in subtle differences in the invertebrate diversity between the two sides of the catchment. The millstone grit side, and sandy river margin SAT is represented by the presence of the tiger crane fly species *Nephrotoma analis*, a species more commonly associated with lowland rivers. However, the exposure of small areas of sandy substrate along the shaded stream channel maybe sufficient for this species to have colonised this site. However there are larger watercourses and waterbodies in the area that may also be potential natal sites for this species.

#### 3.3.2 Seepage (W126)

Recorded along 2 streams (Dydon Wood and Kirkstead Brook) this feature is created from groundwater sources (Drake, 2007). The shaded seepages along Dydon Wood arise from the millstone grit series and emerge through the gorges along the sides of the steeply incised stream channel. The species highlighting this feature at Dydon Wood is *Dicranomyia fusca*, a crane fly. With greater recording effort at other key periods a more in depth understanding of the species utilising the seepage features would be attained. However, it can be suggested given the abundance and apparent quality of the seepages arising from the valley gorges that these features are of high value to the stream and woodland.

At Kirkstead Brook the seepage is highlighted by the presence of the soldierfly *Oxycera pardalina*. This first county record, Nationally Scarce species is associated with surface

seepages, tufa and wet rocks. There is an extensive and very high quality resource of these features at Kirkstead Brook found in a number of locations along the side of the stream and extending up the steep-sided valley grasslands.

Seepages are a major contributor to species diversity and are the breeding site of many scarce invertebrates, including soldierflies. Other streams in the area also possess these features, for example Ruelow and Bank Lane woods near Froghall where these surface features are very extensive and uninterrupted for much of their course. It is likely, given the frequency and apparent quality of some of these seepages that at least a reasonable assemblage of seepage associated invertebrates is present along the Churnet Valley (A.Jukes, *pers obs*, 2011).

Figure 3.3: Example of a woodland seepage at Foxtwood.



### 3.3.3 Other SATs of low importance

Dung is represented by the common hoverfly *Rhingia campestris* and is found at most woodland sites and the rich flower resource is highlighted by the presence of the stem-nesting bee *Hylaeus communis*, a common solitary bee found foraging on the fen habitat on the upper reaches of the Kirkstead Brook.

## 4 Discussion

### 4.1 Species/groups

With 142 species recorded this is a reasonable sample from which to base some discussion points.

The dolyflies (Dolichopodidae) are well represented with 32 recorded species. The craneflies (Tipuloidea) are also well presented (31 species) with 2 species of national significance. They are also represented in a wide range of niches from shaded seepages to deadwood. There are also a number of more generic species of damp and/or shaded habitats such as *Limonia nubesculosa*. Although a greater sample of the area, including multiple visits to key sites, would be required to fully appreciate this level of fidelity and quality of the assemblage types, the range of species with different fidelities to niche situations suggests the area has good variation in habitat, particularly when using the Dolichopodid and Tipuloidea data. Another group well represented are the Empidoidea (danceflies). Amongst the group are those associated with shaded habitats and particularly dappled light, bankside vegetation and running water, such as *Hilara* species, typical species of woodland streams with dappled light. The recorded hoverflies are relatively few. This is largely due to the time of year with 4 out of the 6 sites sampled in early to mid-May. However, this early survey period did record *Portevina maculata*. This hoverfly is only found in the presence of wild garlic (*Allaria petiolata*) and subsequently a localised species of good quality woodlands. In the Churnet Valley it is quite widespread and can be found in most wild garlic locations, (A.Jukes, *pers*

obs). The early sampling period for the majority of the sites was undertaken to increase the chances of finding more host sites for the Nationally Scarce and coarse woody debris hoverfly, *Chalcosyrphus eunotus*. Although it was not encountered during these standardised surveys, incidental recording by the author and Nick Mott (Staffordshire Wildlife Trust) has revealed its presence along all 3 of the woodland streams sampled (Collyhole Brook, Dydon Wood and Gibridging Wood: see Appendix III for these and more additional records by Nick Mott). *C.eunotus* is also present at a number of other woodland streams in the Churnet Valley. All of these streams have a good renewable supply of small pieces of coarse woody debris, the preferred breeding habitat for this species (Jukes, 2010 and Speight, *pers comm*, 2011).

The July surveys were undertaken at the sites that are known to possess base-rich seepages. Hudford Brook and, in particular, Kirksteads Brook have seepages that are of potential interest. Sampling provided the evidence for this. *Oxycera nigricornis* (first Staffordshire county record) and *O.pardalina* (first Staffordshire county record) were both found in the vicinity to base-rich seepages on the Hudford and Kirksteads Brooks, respectively. These are difficult species to find and it is thought that given a more rigorous and lengthy sampling period, a greater range of high fidelity species, specifically soldierfly fauna could be found, with special attention paid to the Kirkstead Brook tufa, wet rocks and scrub.

## 4.2 Individual stream assessment

### 4.2.1 Collyhole Brook

The Collyhole Brook survey section is relatively undisturbed and as such exhibits a relatively high degree of heterogeneity along its course. There appears to be a reasonable, continuous supply of coarse woody debris for the high fidelity saproxylic species such as *Lipsothrix* crane flies and *Chalcosyrphus eunotus*. It is a typical upland, shaded stream course with moderate levels of humidity. The most significant feature of this stream is the silted pool at sample point 3. This is a departure from its natural course, giving rise to an open “glade” where reedbeds and mudflats have developed. This is a very rich Diptera site with an abundance of dolyflies and crane flies utilising the silt for courtship, feeding and breeding.



Figure 4.1: Silted area at sample point 3

It is difficult to ascertain whether this feature is a positive or negative attribute. It does increase the diversity of the stream as it provides niches not available further up or downstream, but as it is manmade the feature is not natural and therefore partly out of place with the other sections of the stream. On balance however, strictly on an invertebrate level and not withstanding water flow, deposition rates, impingement on upstream stretches of the stream, this open character and silt and reedbed feature will contribute to Diptera diversity. There appears to be no long-term management issues to this stream, with the exception of monitoring the effects of the silted pond.

#### 4.2.2 *Dydon Wood*

The stream course running through Dydon Wood rises on carboniferous limestone before entering the carboniferous millstone grit series. This may affect the water chemistry, which in turn may partially affect the species composition of the woodland stream, however no evidence of this was found from sampling the Diptera component of the site. A number of key features are present along the stream, mainly seepages and sphagnum bog (decomposing bryophytes and other organic matter on the sides of the stream, seepages and gorges may provide the locations for this feature). The very high humidity in some parts of this deeply-incised channel is thought to be particularly rich in Diptera. Given the early season sampling (to coincide with some key species) the results do not fully express the quality of the stream. In particular, detailed survey of the seepages that run down the rocks and the mossy edges to these are likely to yield a significant Diptera fauna. It is thought that there is potential for *Xylota florum* to be found along this stream, a Nationally Scarce species found at one very similar site in the Staffordshire Moorlands, Coombs Valley RSPB reserve. Other key features of this stream are the flower-rich vernal flora, dense bankside vegetation, abundant coarse woody debris and heterogeneity.

As long as the woodland surrounding the stream and the upper reaches on open grassland are not altered then the stream should retain its quality. Potential issues however may come from upstream where the headwater rises from surface and groundwater. If this is affected through a single catastrophic pollution event or alteration in farming practices, it could potentially harm the woodland stream fauna. Long-term liaison and management of these headwaters and the risings of the stream is a primary issue.

#### 4.2.3 *Gibriding Wood*

This east-facing woodland is extremely steep. The stream rises at the top of the woodland and is therefore very small as it passes through the wood. At the time of survey much of the upper reaches of the channels were near-dry. Where water starts to flow it is shallow and the channel is very narrow and deeply incised. As with Dydon Wood, this stream, due to the incised channel and steep valley sides, has very high levels of humidity, a feature that is conducive to invertebrates prone to desiccation such as craneflies. The site only yielded 15 species, largely due to the very high temperatures during this period of spring. Not withstanding this, 2 Nationally Scarce species were recorded, both first county records for Staffordshire. The stream has a good supply of coarse woody debris of small and medium size. This is essential for the high fidelity saproxylic species found in such woodland streams including *Chalcosyrphus eunotus*, a species known to be on this stream course. Issues that may affect this site include run-off from surrounding farmland and also from the road above the site where the stream course rises. Continual input of woody debris does not appear to be an issue at this conservation managed woodland.

#### 4.2.4 *Foxtwood*

Foxtwood, in the middle of the Churnet Valley and near to the River Churnet, is the stream of greatest physical difference to the other headwater stream sample sites (other than the base-rich sites). It is wider, shallower and not as humid as the others. Despite these seemingly different physical characters the fauna is similar to the other streams sampled and therefore representative of the area. It includes the Nationally Scarce deadwood cranefly *Dicranota*

*robusta*, which is also found at Gibridding Wood. There is a good representation of dolyflies (Dolichopodidae), danceflies (Empidoidea) and craneflies (Tiploidea) along this stream and although no SATs were highlighted by ISIS (2009) it is thought that with greater levels of survey “seepage” would be present given the physical features recorded at the time of sampling. The lack of key species though intrinsic to the SATs however indicates that the features may not be as strong as at other sites and therefore in need of management though greater survey effort would be required to clarify this however. Notwithstanding this, the site lacks the abundance of deadwood seen at some other woodland streams. It also has a more open canopy and the bankside vegetation, (important for Diptera) is sometimes reduced, perhaps due to occasional grazing from stock in the adjacent field (at sample points 1 and 2). Encouraging a buffer fringe to the stream that enables a corridor of tall herbage and trees to establish may be beneficial. This fringe, over time will produce greater levels of dappled light, foraging resources for predatory flies and contribute to the deadwood element as twigs and branches snap off into the stream. This may benefit the long-term health if the stream is to retain its woodland headwater identity.

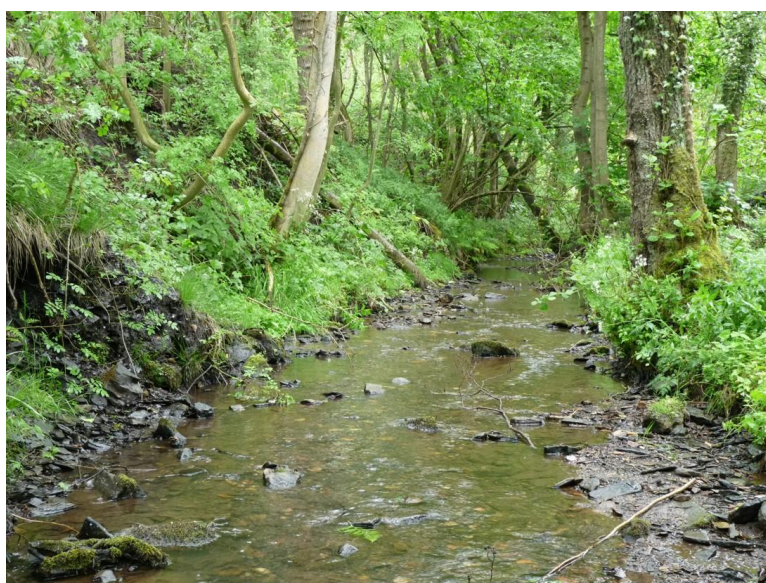


Figure 4.2: Foxtwood. Open, shallow stream with a lack of abundant cover and deadwood.

#### 4.2.5 Hudford Brook

The Hudford Brook is a complex site. It is a series of springs rising from a number of different fields running down field boundaries, either in full sun, partial shade or full shade. The site also appears to be affected by differing geologies. The western side is influenced by the carboniferous millstone grit (base-poor), whereas the eastern side appears to be influenced by the carboniferous limestone (base-rich). This is reflected in the species composition and species distribution across the site. In the east base-rich species including *Oxycera nigricornis* prosper, a large number were recorded from scrub adjacent to flushes along the stream channel. In the west the tiger crane fly *Nephrotoma analis* (a sandy river species) was recorded. This is an unusual find for a small stream however given the geology (silts, sands, gravels, etc.) that have deposited in small amounts along one of the channels it is possible that it is breeding in these locations, although larger watercourses and waterbodies are nearby.

Issues that may occur include the improvement of the pasture on which the fields sit. Any nutrient enrichment may alter the water quality of the site to the detriment of the invertebrate fauna. The presence of grazing stock is a positive attribute, particularly on the eastern side where poaching along sections of the stream and flushes create microhabitats for breeding flies, including soldierflies and dolyflies. Excessive grazing and poaching however should be seen as a negative to the site. Actions and improvements to the site would be to monitor scrub

encroachment on the limestone part of the site, and where necessary reduce this to isolated stands or small sections of continuous scrub. It is important that there is a variety of situations from full sun to full shade along this stream to benefit the range of recorded species.

#### 4.3.6 *Kirksteads Brook*

This site sits apart from the previous sites however is still contextual as it is a headwater stream and serves to compliment a growing series of base-rich headwaters initiated during this project. The Kirkstead Brook is a good example of an upland spring-fed stream with surface water seepages, moss covered ground, tussocks and wet rocks. These niche features are of particular important to the high fidelity species such as soldierflies (Stratiomyidae) and craneflies. The Nationally Scarce soldierfly *Oxycera pardalina* was recorded along this stream. It was recorded from scrub adjacent to an area of seepage and tufa. The site is grazed and this inhibits rank grass dominance and the establishment of scrub. As previously mentioned, some poaching is beneficial to Diptera associated with small muddy puddles and open mud within grassland swards and adjacent to water margins. Given the high quality of the site it is thought that an even greater range of seepage Diptera could be found if a focussed survey was undertaken. Also, there are a number of isolated scrub features away from the stream channel. These are of particular importance to “lekking” soldierflies and although not part of the sampling effort during this targeted survey, closer scrutiny of these features may be a useful addition to future surveys of base-rich open habitat headwater stream sites.

The uppermost part of the stream is fenced and grazing allowed up to the fence line. Behind this fence, against the stream is typical fen flora including meadowsweet (*Filipendula ulmaria*). It is suggested that, to encourage a greater area of fen the fencing should be widened to approximately 5m or greater from the streamside. This would allow more flowering plants to establish and the ground to become more saturated as it would be better protected from evaporation. This fenced area can then be grazed intermittently to poach the ground, inhibit succession and provide a heterogeneous habitat. Monitoring would be required to ensure the correct levels of stock and amount of time the stock where allowed into the partitioned area, however it is suggested that it would be a productive exercise to increase the overall stream quality.

## 5 Conclusions

This headwater streams’ survey included two sets of streams from different habitat types including shaded, humid woodlands and base-rich open sites. Sampling this variety of sites has provided a snapshot of the invertebrate fauna present in or near the Churnet Valley. Based on the presence of a number of Nationally Scarce species and species not previously recorded in Staffordshire, it highlights the lack of recording in the area and subsequent understanding of the role headwater streams play in the Churnet Valley.

Given the overall areas of the Churnet Valley and there are potentially hundreds of woodland streams, grassland seepages and flushes, coupled with the amount of woodland and grassland sites that are of current high conservation value (Local wildlife site, SSSI) then it is likely that there is a high quality and high fidelity suite of species along the Churnet Valley to be uncovered. Through greater recording of a wide range of sites from heavily shaded and humid millstone grit with seepages and coarse woody debris to open habitat, base-rich sites a very good understanding of the area’s invertebrates can be attained. From gaining this information, a picture of the health of the water quality, streamside vegetation and current and past management practices can be built up to inform the latest management plans to protect and enhance key sites and more holistically, provide generic information to landowners on

management of all types of site to the benefit of streams and wetland features that pass through their land.

The goal should be to provide this information in an easily digestible form for landowners and conservation practitioners to utilise to protect features of current value and increase the potential of degraded and redundant features on a host of different sites. The potential of the Churnet Valley is large, but only through liaison and a communal, harmonised management strategy can wide and robust habitats and subsequent assemblages be created for the benefit of the valley's biological health and to buffer from impending climate changes and the effects this will have on the habitats and species within the valley.

### **5.1 Differences in recording effort**

The original work done by Jukes and Mott (2006-07) then subsequently Jukes (2009) used a 3-sample method for the streams, each sample duration being 15 minutes. This worked well as 3 visits were undertaken along each stream course during a season. This survey method was reduced to a single visit for this round of surveys in the Churnet Valley but still utilised the 15 minute and 3 sample method to retain continuity with previous works. After evaluation alongside experimentation with a 4 sample method with each sample being 20 minutes it is reasonably clear that the 4 sample method is more efficient for rapid assessment. Although the 4 sample method was undertaken during optimal conditions and also on species-rich seepages and streams it does appear that if single visit surveys are to be undertaken over the long term (as this reduces costs and allows more sites to be sampled in any given season) then the 4 sample method should be employed. If there is a greater level of funding or multiple visits are available for key sites then these should still operate on a 4 sample set regardless of the number of visits. The reason for this is that, if required, proportional comparisons can be made with other, single visit surveys taken at similar dates, therefore allowing fair evaluation even where sites have had differing levels of recording effort.

### **5.2 Differences between base-rich and base-poor sites**

There does appear to be a difference in the two types of headwater. The base-poor sites are not as species-rich although the early sampling period does inhibit this. The base-rich sites also produce a much greater number of "local" species. This is due to a number of factors but includes the fidelity of a number of species to these specific features. Also, good quality limestone streams and flushes are not common features of the wider countryside, outside protected reserves. The wooded sites possess more frequently seen features and the species recorded are broadly more generic in their habitat preferences, therefore a greater number of submitted records for those species to recording schemes have been made.

The abundance of local species along the base-rich sites also highlights the lack of recording on such niche habitats as it is likely that a number of the "local" species are in fact more common. Similarly, some of the "local" species may prove to be much more restricted in their range than previously thought. Only through such works as this and submission of records to National recording schemes can a true reflection of actual distribution be attained.

## **6 Recommendations for future work**

- Use the 4 sample method rather than 3 sample method as this gives greater levels of detail, particularly when sampling during sub-optimal weather or periods. On open habitat sites, consider undertaking additional spot sampling of nearby scrub and flower resources to detect the presence of "lekking" or foraging Diptera associated with the stream, namely soldierflies.



*Undertake survey of a wide range of headwater stream sites including:*

- Carboniferous millstone grit, shaded, humid valleys. E.g. Consall Woods
- Carboniferous millstone grit, steep-sided valleys with surface seepage. E.g. Banks Lane woods and Ruelow Woods, Froghall, Coombs Valley RSPB reserve
- Carboniferous millstone grit seepages and flushes: E.g. Winkhill, Broomyshaw, Cauldon Lowe
- Carboniferous limestone steep-sided valleys. E.g. Manifold Valley (outside Churnet valley), possibly Okeover Hall
- Carboniferous limestone surface seepages/tufa. E.g. Stanton Pastures SSSI.
- Continue the rapid assessment approach of single site visits. Once the rapid assessments have taken place for the year, evaluation of the rapid assessment will highlight sites (or specific features) worthy of revisiting for more rigorous sampling in the following years to gain a deeper more thorough understanding of the key features intrinsic to that high quality site, such as tufa, seepages and coarse woody debris. This information can then be used more widely across similar sites where the features are present, informing management plans and stewardship scheme options.

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## Annex 1 – Species lists

### Collyhole Brook species list

Collyhole Brook	Grid Ref
Sample point 1	SK00755069
Sample point 2	SK00635049
Sample point 3	SK00455021

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Diptera</b>	<b>Two-winged flies</b>			
<b>Family: Syrphidae</b>	<b>Hoverflies</b>			
<i>Cheilosia albitarsis sens. str.</i>	a hoverfly	3	Common	13-May-11
<i>Lejogaster metallina</i>	a hoverfly	3	Common	13-May-11
<i>Leucozona lucorum</i>	a hoverfly	3	Common	13-May-11
<i>Melanogaster hirtella</i>	a hoverfly	3	Common	13-May-11
<i>Melanostoma scalare</i>	a hoverfly	3	Common	13-May-11
<i>Neoscia meticulosa</i>	a hoverfly	3	Local	13-May-11
<i>Neoscia podagrica</i>	a hoverfly	1	Common	13-May-11
<i>Rhingia campestris</i>	a hoverfly	1	Common	13-May-11
<b>Family: Stratiomyidae</b>	<b>Soldierflies</b>			
<i>Beris chalybata</i>	a soldierfly	3	Common	13-May-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Argyra diaphana</i>	a dolyfly	3	Common	13-May-11
<i>Argyra sp</i>	a dolyfly	3	N/A	13-May-11
<i>Campsicnemus curvipes</i>	a dolyfly	3	Common	13-May-11
<i>Dolichopus campestris</i>	a dolyfly	1	Common	13-May-11
<i>Dolichopus wahlbergi</i>	a dolyfly	3	Common	13-May-11
<i>Dolichopus popularis</i>	a dolyfly	3	Common	13-May-11
<i>Rhaphium consobrinum</i>	a dolyfly	1	Local	13-May-11
<i>Rhaphium crassipes</i>	a dolyfly	1,3	Local	13-May-11
<i>Rhaphium nasutum</i>	a dolyfly	1	Local	13-May-11
<i>Rhaphium riparium</i>	a dolyfly	3	Common	13-May-11
<i>Syntormon denticulatum</i>	a dolyfly	3	Local	13-May-11
<b>Family: Empidoidea</b>	<b>Danceflies</b>			
<i>Dolichocephala irrorata</i>	a dancefly	3	Common	13-May-11
<i>Empis nuntia</i>	a dancefly	3	Common	13-May-11
<i>Empis trigramma</i>	a dancefly	3	Common	13-May-11
<i>Hilara maura</i>	a dancefly	3	Common	13-May-11
<i>Ocydromia glabricula</i>	a dancefly	3	Common	13-May-11
<i>Platypalpus agilis</i>	a dancefly	3	Common	13-May-11
<i>Rhamphomyia crassirostris</i>	a dancefly	1,2,3	Common	13-May-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Dicranomyia chorea</i>	a cranefly	2	Common	13-May-11
<i>Dicranota bimaculata</i>	a cranefly	1	Local	13-May-11
<i>Dicranota pavida</i>	a cranefly	2,3	Common	13-May-11
<i>Eloeophila trimaculata</i>	a cranefly	1	NS	13-May-11
<i>Erioptera fuscipennis</i>	a cranefly	3	Common	13-May-11

<i>Limonia nubeculosa</i>	a crane fly	1	Common	13-May-11
<i>Pedicia littoralis</i>	a crane fly	1,2	Common	13-May-11
<i>Phylidorea fulvonervosa</i>	a crane fly	3	Common	13-May-11
<i>Tipula luna</i>	a crane fly	3	Common	13-May-11
<i>Tipula oleracea</i>	a crane fly	3	Common	13-May-11
<b>Family: Sciomyzidae</b>	<b>Snail-killing flies</b>			
<i>Renocera pallida</i>	a snail-killing fly	1	Common	13-May-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			
<i>Hydrellia griseola</i>	a shore fly	3	Common	13-May-11
<i>Scatella stagnalis</i>	a shore fly	3	Common	13-May-11
<b>Family: Lonchoptidae</b>	<b>Acalypterate fly family</b>			
<i>Lonchoptera bifurcata</i>	a fly	1,2,3	Common	13-May-11
<b>Family: Diastidae</b>	<b>Acalypterate fly family</b>			
<i>Diastata fuscata</i>	a fly	1	Common	13-May-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W114	sandy river margin	1		2	
F006	dung	1		1	
W312	Sphagnum bog	1		1	
Visibility threshold (no. spp. used to calculate score)		0			

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	27			11	
W3	permanent wet mire	22			9	
F3	shaded field & ground layer	10			4	
F2	grassland & scrub matrix	7			3	
W2	mineral marsh & open water	5			2	
M3	saltmarsh, estuary & mud flat	2			1	
Visibility threshold (total no. spp. used to calculate rarity score)			15			

#### Technical statistics:

Number of species	41
Number of errors in species list	1

## Dydon Wood species list

Dydon Wood	Grid Ref
Sample point 1	SK13604495
Sample point 2	SK13064481
Sample point 3	SK12924469

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Diptera</b>	<b>Two-winged flies</b>			
<b>Family: Syrphidae</b>	<b>Hoverflies</b>			
<i>Portevinia maculata</i>	a hoverfly	2,3	Local	10-May-11
<b>Family: Stratiomyidae</b>	<b>Soldierflies</b>			
<i>Beris chalybata</i>	a soldierfly	1,3	Common	10-May-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Dolichopus campestris</i>	a dolyfly	3	Common	10-May-11
<i>Dolichopus plumipes</i>	a dolyfly	1	Common	10-May-11
<i>Rhaphium crassipes</i>	a dolyfly	1	Common	10-May-11
<b>Family: Empidoidea</b>	<b>Danceflies</b>			
<i>Empis digramma</i>	a dancefly	3	Common	10-May-11
<i>Empis nuntia</i>	a dancefly	1,3	Common	10-May-11
<i>Empis praevia</i>	a dancefly	3	Local	10-May-11
<i>Hilara discoidalis</i>	a dancefly	1,3	Local	10-May-11
<i>Hilara nigrina</i>	a dancefly	2,3	Local	10-May-11
<i>Platypalpus agilis</i>	a dancefly	3	Common	10-May-11
<i>Rhamphomyia crassirostris</i>	a dancefly	1,2,3	Common	10-May-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Austrolimnophila ochracea</i>	a cranefly	3	Common	10-May-11
<i>Dicranomyia fusca</i>	a cranefly	1	Local	10-May-11
<i>Dicranota pavida</i>	a cranefly	3	Common	10-May-11
<i>Euthyneura gyllenhali</i>	a cranefly	1	Local	10-May-11
<i>Limonia nubeculosa</i>	a cranefly	2,3	Common	10-May-11
<i>Limonia phragmitidis</i>	a cranefly	3	Common	10-May-11
<i>Pedicia littoralis</i>	a cranefly	1,2,3	Local	10-May-11
<i>Tipula fascipennis</i>	a cranefly	3	Common	10-May-11
<i>Tipula vittata</i>	a cranefly	3	Local	10-May-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			
<i>Hydrellia griseola</i>	a shorefly	1,2,3	Common	10-May-11
<b>Family: Lonchoptidae</b>	<b>Acalypterate fly family</b>			
<i>Lonchoptera bifurcata</i>	a fly	2,3	Common	10-May-11
<b>Family: Lauxanidae</b>	<b>Acalypterate fly family</b>			
<i>Minettia longipennis</i>	a fly	2	Common	10-May-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W126	seepage	1		2	
W312	Sphagnum bog	1		1	
Visibility threshold (no. spp. used to calculate score)		0			

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	21			5	
F2	grassland & scrub matrix	17			4	
F3	shaded field & ground layer	17			4	
A2	wood decay	8			2	0
W2	mineral marsh & open water	8			2	
W3	permanent wet mire	8			2	

Visibility threshold (total no. spp. used to calculate rarity score)	15
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**Technical statistics:**

Number of species	24
Number of errors in species list	0

## Gibbridding Wood species list

Gibbridding Wood	Grid Ref
Sample point 1	SK03024499
Sample point 2	SK03144502
Sample point 3	SK03254480

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Diptera</b>	<b>Two-winged flies</b>			
<b>Family: Syrphidae</b>	<b>Hoverflies</b>			
<i>Rhingia campestris</i>	a hoverfly	3	Common	10-May-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Dolichopus plumipes</i>	a dolyfly	3	Common	10-May-11
<b>Family: Empidoidea</b>	<b>Danceflies</b>			
<i>Hilara cornicula</i>	a dancefly	1,2	Local	10-May-11
<i>Platypalpus agilis</i>	a dancefly	3	Common	10-May-11
<i>Platypalpus longicornis</i>	a dancefly	2	Common	10-May-11
<i>Rhamphomyia crassirostris</i>	a dancefly	1,2,3	Common	10-May-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Austrolimnophila ochracea</i>	a cranefly	1,2	Common	10-May-11
<i>Dicranota pavida</i>	a cranefly	2,3	Common	10-May-11
<i>Dicranota robusta</i>	a cranefly	1,3	NS	10-May-11
<i>Limonia nubeculosa</i>	a cranefly	1,2,3	Common	10-May-11
<i>Pedicia littoralis</i>	a cranefly	3	Common	10-May-11
<i>Tipula fascipennis</i>	a cranefly	1,2		10-May-11
<b>Family: Sciomyzidae</b>	<b>Snail-killing flies</b>			
<i>Tetanocera phyllophora</i>	a snail-killing fly	3	NS	10-May-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			
<i>Ditrichophora fuscella</i>	a shorefly	3	Common	10-May-11
<b>Family: Lonchoptidae</b>	<b>A fly</b>			
<i>Lonchoptera bifurcata</i>	a fly	1,2	Common	10-May-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
F006	dung	1		1	

Visibility threshold (no. spp. used to calculate score)

0

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	27			4	
F2	grassland & scrub matrix	13			2	
F3	shaded field &	13			2	

	ground layer			
A2	wood decay	7	1	0
W2	mineral marsh & open water	7	1	

Visibility threshold (total no. spp. used to calculate rarity score) 15

#### Technical statistics:

Number of species	15
Number of errors in species list	0

#### Foxtwood species list

Foxtwood	Grid Ref
Sample point 1	SK02444809
Sample point 2	SK02504793
Sample point 3	SK02854779

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Diptera</b>	<b>Two-winged flies</b>			
<b>Family: Stratiomyidae</b>	<b>Soldierflies</b>			
<i>Beris chalybata</i>	a soldierfly	3	Common	12-May-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Argyra diaphana</i>	a dolyfly	2	Common	12-May-11
<i>Campsicnemus curvipes</i>	a dolyfly	2	Common	12-May-11
<i>Dolichopus campestris</i>	a dolyfly	2	Common	12-May-11
<i>Dolichopus wahlbergi</i>	a dolyfly	1	Common	12-May-11
<i>Rhaphium crassipes</i>	a dolyfly	2	Common	12-May-11
<i>Rhaphium riparium</i>	a dolyfly	2	Common	12-May-11
<i>Syntormon pallipes</i>	a dolyfly	3	Common	12-May-11
<b>Family: Empidoidea</b>	<b>Danceflies</b>			
<i>Empis nuntia</i>	a dancefly	3	Common	12-May-11
<i>Hilara discoidalis</i>	a dancefly	2	Common	12-May-11
<i>Hilara discoidalis</i>	a dancefly	3		12-May-11
<i>Hilara nigrina</i>	a dancefly	1,2	Common	12-May-11
<i>Hilara quadrifasciata</i>	a dancefly	3	Common	12-May-11
<i>Rhamphomyia albohirta</i>	a dancefly	3	Unknown	12-May-11



<i>Rhamphomyia crassirostris</i>	a dancefly	3	Common	12-May-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Austrolimnophila ochracea</i>	a crane fly	2,3	Common	12-May-11
<i>Dicranota robusta</i>	a crane fly	1	NS	12-May-11
<i>Limonia nubeculosa</i>	a crane fly	2	Common	12-May-11
<i>Limonia phragmitidis</i>	a crane fly	1,2,3	Common	12-May-11
<i>Lipsothrix remota</i>	a crane fly	3	Common	12-May-11
<i>Molophilus serpentiger</i>	a crane fly	1	Common	12-May-11
<i>Pedicia littoralis</i>	a crane fly	1,2	Common	12-May-11
<i>Tipula fascipennis</i>	a crane fly	1,2	Common	12-May-11
<i>Tipula variicornis</i>	a crane fly	3	Common	12-May-11
<i>Tipula vittata</i>	a crane fly	1	Local	12-May-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			
<i>Hydrellia griseola</i>	a shore fly	2	Common	12-May-11
<b>Family: Lauxaniidae</b>	<b>Acalypterate fly family</b>			
<i>Minettia longipennis</i>	a fly	2	Common	12-May-11
<i>Minettia rivosa</i>	a fly	1	Common	12-May-11
<i>Tricholauxania praeusta</i>	a fly	2	Common	12-May-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score

Visibility threshold (no. spp. used to calculate score)

0

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	48			14	
F3	shaded field & ground layer	17			5	
F2	grassland & scrub matrix	10			3	
A2	wood decay	3			1	0
	mineral marsh & open					
W2	water	3			1	
W3	permanent wet mire	3			1	

Visibility threshold (total no. spp. used to calculate rarity score)

15

Technical statistics:

Number of species	29
Number of errors in species list	0

## Hudford Brook species list

Hudford brook	Grid Ref
Sample point 1	SK09364580
Sample point 2	SK09414562
Sample point 3	SK08914565
Sample point 4	SK08834574

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Diptera</b>	<b>Two-winged flies</b>			
<b>Family: Syrphidae</b>	<b>Hoverflies</b>			
<i>Eristalis pertinax</i>	a hoverfly	3	Common	09-Jul-11
<i>Helophilus pendulus</i>	a hoverfly	2	Common	09-Jul-11
<i>Melanostoma mellinum</i>	a hoverfly	1,2	Common	09-Jul-11
<i>Melanostoma scalare</i>	a hoverfly	1	Common	09-Jul-11
<i>Platycheirus albimanus</i>	a hoverfly	1,3,4	Common	09-Jul-11
<i>Platycheirus angustatus</i>	a hoverfly	4	Common	09-Jul-11
<i>Platycheirus clypeatus</i>	a hoverfly	1,3	Common	09-Jul-11
<i>Platycheirus scambus</i>	a hoverfly	1,3	Common	09-Jul-11
<i>Platycheirus tarsalis</i>	a hoverfly	1	Local	09-Jul-11
<i>Rhingia campestris</i>	a hoverfly	2	Common	09-Jul-11
<i>Riponnensia splendens</i>	a hoverfly	3	Local	09-Jul-11
<i>Sphaerophoria interrupta</i>	a hoverfly	1	Local	09-Jul-11
<b>Family: Rhagionidae</b>	<b>Snipeflies</b>			
<i>Chrysopilus cristatus</i>	a snipefly	1,2,3,4	Common	09-Jul-11
<i>Rhagio scolopaceus</i>	a snipefly	3	Common	09-Jul-11
<b>Family: Stratiomyidae</b>	<b>Soldierflies</b>			
<i>Beris vallata</i>	a soldierfly	1,2,3,4	Common	09-Jul-11
<i>Oxycera nigricornis</i>	a soldierfly	1	Local	09-Jul-11
<b>Family: Tabanidae</b>	<b>Horseflies</b>			
<i>Haematopota pluvialis</i>	a horsefly	1,3,4	Common	09-Jul-11
<b>Family: Asilidae</b>	<b>Robberflies</b>			
<i>Machimus atricapillus</i>	a robberfly	2	Common	09-Jul-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Argyra perplexa</i>	a dolyfly	2	Common	09-Jul-11
<i>Campsicnemus marginatus</i>	a dolyfly	2	Local	09-Jul-11
<i>Chrysotus gramineus</i>	a dolyfly	1,3	Common	09-Jul-11
<i>Dolichopus brevipennis</i>	a dolyfly	1	Local	09-Jul-11
<i>Dolichopus plumipes</i>	a dolyfly	1,2,3	Common	09-Jul-11
<i>Dolichopus popularis</i>	a dolyfly	2	Common	09-Jul-11
<i>Dolichopus trivialis</i>	a dolyfly	3	Common	09-Jul-11
<i>Dolichopus unguatus</i>	a dolyfly	1,2,3	Common	09-Jul-11
<i>Dolichopus wahlbergi</i>	a dolyfly	1,2,3	Common	09-Jul-11
<i>Hydrophorus balticus</i>	a dolyfly	1	Local	09-Jul-11
<i>Poecilobothrus nobilitatus</i>	a dolyfly	1,2	Common	09-Jul-11
<i>Rhaphium appendiculatum</i>	a dolyfly	2,3	Common	09-Jul-11
<i>Rhaphium crassipes</i>	a dolyfly	3	Local	09-Jul-11
<i>Sympycnus desoutteri</i>	a dolyfly	1,2,3	Common	09-Jul-11
<i>Syntormon denticulatum</i>	a dolyfly	1,2	Local	09-Jul-11

<b>Family: Empidoidea</b>	<b>Danceflies</b>			
<i>Empis livida</i>	a dancefly	4	Common	09-Jul-11
<i>Hilara nigrina</i>	a dancefly	4	Local	09-Jul-11
<i>Hybos culiciformis</i>	a dancefly	3	Common	09-Jul-11
<i>Platypalpus pseudofulvipes</i>	a dancefly	4	Common	09-Jul-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Erioconopa trivialis</i>	a crane fly	2	Common	09-Jul-11
<i>Nephrotoma analis</i>	a crane fly	4	Local	09-Jul-11
<i>Nephrotoma flavescens</i>	a crane fly	3	Common	09-Jul-11
<i>Pilaria discicollis</i>	a crane fly	3	Common	09-Jul-11
<i>Pseudolimmophila sepium</i>	a crane fly	2	Common	09-Jul-11
<i>Tipula fascipennis</i>	a crane fly	1,3	Common	09-Jul-11
<i>Tipula pruinoso</i>	a crane fly	2	Local	09-Jul-11
<i>Tipula unca</i>	a crane fly	4	Common	09-Jul-11
<b>Family: Sciomyzidae</b>	<b>Snail-killing flies</b>			
<i>Limnia unguicornis</i>	a snail-killing fly	1	Common	09-Jul-11
<i>Pherbina coryleti</i>	a snail-killing fly	1	Common	09-Jul-11
<i>Renocera strobli</i>	a snail-killing fly	1,2	Local	09-Jul-11
<i>Tetanocera elata</i>	a snail-killing fly	1,3,4	Common	09-Jul-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			
<i>Notiphila cinerea</i>	a shore fly	1,2	Common	09-Jul-11
<i>Parydra coarctata</i>	a shore fly	2	Common	09-Jul-11
<b>Family: Lonchoptidae</b>	<b>A fly</b>			
<i>Lonchoptera bifurcata</i>	a fly	2	Common	09-Jul-11
<b>Family: Lauxaniidae</b>	<b>Acalypterate fly family</b>			
<i>Minettia longipennis</i>	a fly	4	Common	09-Jul-11
<i>Tricholauxania praeusta</i>	a fly	2	Common	09-Jul-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W114	sandy river margin	1		2	
F006	dung	1		1	
W312	Sphagnum bog	1		1	

Visibility threshold (no. spp. used to calculate score)

0

**The broad assemblage types represented in this list are as follows:**

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W1	flowing water	23			12	
F2	grassland & scrub matrix	19			10	
W3	permanent wet mire	17			9	
W2	mineral marsh &	13			7	

	open water		
F3	shaded field & ground layer	8	4
F1	unshaded early successional mosaic	2	1

Visibility threshold (total no. spp. used to calculate rarity score)	15
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**Technical statistics:**

Number of species	55
Number of errors in species list	2

## Kirksteads Brook Species list

Kirksteads Brook	Grid Ref
Sample point 1	SK08815675
Sample point 2	SK08605687
Sample point 3	SK08435697
Sample point 4	SK08395699

Scientific Name	Common Name	Sampling points	National Status	Date
<b>Order: Hymenoptera; aculeata</b>				
<b>Family: Colletidae</b>	<b>Solitary bees</b>			
<i>Hylaeus communis</i>	Common Yellow Face Bee	1	Common	11-Jul-11
<b>Order: Diptera</b>				
<b>Family: Syrphidae</b>				
<b>Hoverflies</b>				
<i>Cheilosia bergenstammi</i>	a hoverfly	3	Common	11-Jul-11
<i>Chrysogaster solstitialis</i>	a hoverfly	4	Common	11-Jul-11
<i>Episyrphus balteatus</i>	a hoverfly	2	Common	11-Jul-11
<i>Eristalis horticola</i>	a hoverfly	2	Common	11-Jul-11
<i>Melanogaster hirtella</i>	a hoverfly	4	Common	11-Jul-11
<i>Melanostoma scalare</i>	a hoverfly	2,3,4	Common	11-Jul-11
<i>Neoascia podagrica</i>	a hoverfly	2	Common	11-Jul-11
<i>Platycyberus clypeatus</i>	a hoverfly	2	Common	11-Jul-11
<i>Platycyberus granditarsus</i>	a hoverfly	2	Common	11-Jul-11
<i>Platycyberus rosarum</i>	a hoverfly	2,3	Local	11-Jul-11
<i>Platycyberus tarsalis</i>	a hoverfly	3	Local	11-Jul-11
<i>Rhingia campestris</i>	a hoverfly	2,3	Common	11-Jul-11
<i>Syrpita pipiens</i>	a hoverfly	3	Common	11-Jul-11
<b>Family: Empidoidea</b>				
<b>Danceflies</b>				
<i>Bicellaria vana</i>	a dancefly	1	Common	11-Jul-11
<i>Empis livida</i>	a dancefly	4	Common	11-Jul-11
<i>Empis nuntia</i>	a dancefly	1	Common	11-Jul-11
<i>Hilara chorica</i>	a dancefly	1,2,3	Common	11-Jul-11
<i>Hilara clavipes</i>	a dancefly	4	Common	11-Jul-11
<i>Ocydromia glabricula</i>	a dancefly	4	Common	11-Jul-11
<i>Platypalpus longiseta</i>	a dancefly	2	Common	11-Jul-11
<i>Platypalpus pallidiventris</i>	a dancefly	4	Common	11-Jul-11
<i>Platypalpus pseudofulvipes</i>	a dancefly	1,2	Common	11-Jul-11
<b>Family: Rhagionidae</b>				
<b>Snipeflies</b>				
<i>Chrysopilus cristatus</i>	a snipefly	1,2,3,4	Common	11-Jul-11
<b>Family: Stratiomyidae</b>				
<b>Soldierflies</b>				

<i>Beris geniculata</i>	a soldierfly	2,4	Common	11-Jul-11
<i>Beris vallata</i>	a soldierfly	12,3,4	Common	11-Jul-11
<i>Chloromyia formosa</i>	a soldierfly	2,4	Common	11-Jul-11
<i>Microchrysa flavicornis</i>	a soldierfly	2	Common	11-Jul-11
<i>Oxycera pardalina</i>	a soldierfly	2	Nationally Scarce A	11-Jul-11
<b>Family: Tabanidae</b>	<b>Horseflies</b>			
<i>Haematopota crassicornis</i>	a horsefly	4	Local	11-Jul-11
<i>Haematopota pluvialis</i>	a horsefly	2,3	Common	11-Jul-11
<b>Family: Dolichopodidae</b>	<b>Dolichopodid Flies</b>			
<i>Argyra diaphana</i>	a hoverfly	3	Common	11-Jul-11
<i>Argyra leucocephala</i>	a dolyfly	4	Common	11-Jul-11
<i>Argyra perplexa</i>	a dolyfly	2,4	Local	11-Jul-11
<i>Campsicnemus curvipes</i>	a dolyfly	4	Common	11-Jul-11
<i>Campsicnemus pusillus</i>	a dolyfly	1	Local	11-Jul-11
<i>Chrysotus blepharosceles</i>	a dolyfly	3	Local	11-Jul-11
<i>Chrysotus gramineus</i>	a dolyfly	3	Common	11-Jul-11
<i>Dolichopus brevipennis</i>	a dolyfly	2	Local	11-Jul-11
<i>Dolichopus phaeopus</i>	a dolyfly	1	Local	11-Jul-11
<i>Dolichopus plumipes</i>	a dolyfly	1,2,3	Common	11-Jul-11
<i>Dolichopus popularis</i>	a dolyfly	3,4	Common	11-Jul-11
<i>Dolichopus simplex</i>	a dolyfly	4	Common	11-Jul-11
<i>Dolichopus trivialis</i>	a dolyfly	1,3,4	Common	11-Jul-11
<i>Dolichopus wahlbergi</i>	a dolyfly	2,3	Common	11-Jul-11
<i>Poecilobothrus nobilitatus</i>	a dolyfly	1	Common	11-Jul-11
<i>Sympycnus cirripes</i>	a dolyfly	3	Local	11-Jul-11
<i>Sympycnus desoutteri</i>	a dolyfly	1,2	Common	11-Jul-11
<i>Syntormon pumilum</i>	a dolyfly	2	Local	11-Jul-11
<b>Family: Tipuloidea</b>	<b>Craneflies</b>			
<i>Erioptera divisa</i>	a cranefly	4	Local	11-Jul-11
<i>Pedicia littoralis</i>	a cranefly	1,2	Local	11-Jul-11
<i>Phylidorea fulvonervosa</i>	a cranefly	2	Common	11-Jul-11
<i>Tipula fulvipennis</i>	a cranefly	3	Common	11-Jul-11
<i>Tipula lateralis</i>	a cranefly	1	Common	11-Jul-11
<i>Tipula pruinosa</i>	a cranefly	2, 3	Local	11-Jul-11
<b>Family: Sciomyzidae</b>	<b>Snail-killing flies</b>			
<i>Hydromya dorsalis</i>	a snail-killing fly	1	Common	11-Jul-11
<i>Renocera strobli</i>	a snail-killing fly	1,2	Local	11-Jul-11
<i>Tetanocera elata</i>	a snail-killing fly	3,4	Common	11-Jul-11
<i>Tetanocera hyalipennis</i>	a snail-killing fly	4	Common	11-Jul-11
<b>Family: Ephydriidae</b>	<b>Shore flies</b>			

<i>Notiphila cinerea</i>	a shorefly	1	Common	11-Jul-11
<i>Parydra coarctata</i>	a shorefly	3	Unknown	11-Jul-11
<i>Scatella tenuicosta</i>	a shorefly	4	Common	11-Jul-11
<b>Family: Lonchoptidae</b>	<b>A fly</b>			
<i>Lonchoptera bifurcata</i>	a fly	2	Common	11-Jul-11

SAT code	SAT name	No. spp.	Condition	Percentage of national species pool	Related BAT rarity score
W126	seepage	1		2	
F006	dung	1		1	

Visibility threshold (no. spp. used to calculate score)

0

The broad assemblage types represented in this list are as follows:

BAT code	BAT name	Representation (1-100)	Rarity score	Condition	BAT species richness	IEC
W3	permanent wet mire	28	147		17	
W1	flowing water	20			12	
F2	grassland & scrub matrix	15			9	
W2	mineral marsh & open water	10			6	
F3	shaded field & ground layer	5			3	

Visibility threshold (total no. spp. used to calculate rarity score)

15

Technical statistics:

Number of species	62
Number of errors in species list	1

## **Appendix**

**Appendix I: Photographs**

**Appendix II: Red Data Book (RDB) definitions**

**Appendix III: Additional species records from Nick Mott**

**Appendix IV: Species photographs**



## Appendix I: Photographs

### Collyhole Brook



### Dydon Wood



**Gibriding Wood**



## Hudford Brook



## Kirkstead Brook



## **Appendix II: Definitions of Red Data Book etc (follows Shirt 1987)**

### **Red Data Book category 1 - Endangered**

Species which are known or believed to occur as only a single population within one 10km square of the national grid.

### **Red Data Book category 2 - Vulnerable**

Species declining throughout their range or in vulnerable habitats.

### **Red Data Book category 3 - Rare**

Species which are estimated to exist in only fifteen or fewer post 1970 10km squares. This criterion may be relaxed where populations are likely to exist in over fifteen 10km squares but occupy small areas of especially vulnerable habitat.

### **Nationally Notable (Scarce) category A - Notable A**

Taxa which do not fall within the RDB category but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well recorded groups between eight and twenty vice counties.

### **Nationally Notable (Scarce) category B - Notable B**

Taxa which do not fall within the RDB category but which are none-the-less uncommon in Great Britain and thought to occur in 31 and 100 10km squares of the National Grid or, for less well recorded groups between eight and twenty vice counties.

### **Nationally Notable (Scarce) - Notable**

Species which are estimated to occur within the range of 16 to 100 10km squares. The subdividing of this category into Notable A and Notable B has not been attempted for many species in this part of the review.

**Appendix III – Additional species records from Nick Mott, Staffordshire Wildlife Trust**

• **Collyhole Brook**

05/05/11

**Syrphidae**

*Chalcosyrphus eunotus*

• **Dydon Wood**

24/5/11

**Tipuloidea**

*Dolichopeza albipes*

*Lipsothrix remota*

*Tipula maxima*

• **Gibriding**

25/5/11

**Tipuloidea**

*Tipula maxima*

*Lipsothrix remota*

**Dolichopodidae**

*Argyra argyria*

**Syrphidae**

*Chalcosyrphus eunotus*

*Eristalis tenax*

• **Foxtwood**

12/5/11

**Tipuloidea**

*Dolichopeza albipes*

*Lipsothrix remota*

• **Hudford Brook**

11/5/11

**Tipuloidea**

*Ephigramma ocellare*

*Tipula maxima*

**Syrphidae**

*Chalcosyrphus eunotus*

*Xylota segnis*

*Rhingia campestris*

**Ephemeridae**

*Ephemera danica*

**Osmylidae**

*Osmylus fulvicephalus*

• **Kirkstead Brook**

9/5/11 & 24/5/11

**Tipuloidea**

*Dolichopeza albipes*

*Ephigramma ocellare*

*Lipsothrix remota* (10 adults, >100 exuviae)

*Schummelia varicornis*

*Tipula maxima*

**Odonata**

*Libellula depressa*

#### Appendix IV: Species photographs

*Oxycera pardalina* – Nationally Scarce soldierfly (first county record).  
Kirksteads Brook.



*Oxycera nigricornis* – a local soldierfly (first county record).  
Hudford Brook.

