Distribution of the stiletto-fly *Cliorismia rustica* on Cheshire rivers

Stephen Hewitt & John Parker

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Stephen Hewitt
28 Castle Drive
Penrith
Cumbria CA11 7ED
Email: SteveH@carlisle.gov.uk

John Parker
16 Brunswick Road
Penrith
Cumbria CA11 7LT
Email: jpcumbria@btinternet.com

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Summary

Cliorismia rustica is a nationally rare stiletto-fly associated with sandy deposits on riverbanks. It is listed as a Priority species in the UK Biodiversity Action Plan.

The aim of this survey, undertaken in 2007 and 2008, was to establish the distribution of *C. rustica* on a number of rivers in Cheshire.

A secondary aim of the survey was to sample sites for other specialist Diptera of Exposed Riverine Sediments (ERS) in the course of the *C. rustica* study.

During the survey, stiletto-fly larvae were collected and reared from sand deposits on the rivers Bollin, Dane, Etherow, Tame and Goyt. *C. rustica* was recorded from 14 sites on these five rivers in Cheshire. The species is widespread on the middle reaches of the Dane and the Bollin, with another population centred on the lower reaches of the Etherow and Tame, linked by the Goyt. These results identify Cheshire as an important national locus for *C. rustica*. The sandy deposits on the banks of these rivers provide suitable habitat for a strong population over a relatively wide area in the county, providing a northern stronghold for the species.

Differences in the situation of *C. rustica* larvae between the Eden in Cumbria and the Bollin and Dane in Cheshire were noted and are discussed.

The weather during the summer of 2007 was very wet and resulted in persistent high flows in the rivers, making survey work difficult. As a result no adult *C. rustica* were seen during the survey and numbers of Diptera in general were low, but some sites were resurveyed in 2008. Nevertheless 155 different species of Diptera were recorded during the survey. In addition to *C. rustica*, 14 other species of high fidelity to ERS were collected. These included the UK BAP Priority cranefly, *Rhabdomastix japonica*, new to Cheshire on the Dane at Radnor Bridge. Other ERS Diptera recorded included a further three Red Data Book species and one recently discovered new to Britain, along with four nationally scarce species. Most of these species are normally associated with sandy rather than stony ERS deposits, in keeping with the sandy nature of the Cheshire rivers and the specific targeting of sand deposits in this survey to search for *C. rustica*.

In addition to the ERS specialists mentioned above, a single Endangered (now Data Deficient) and eight nationally scarce (Notable/Nb) Diptera have been identified.

1 Introduction

The primary aim of this study was to establish the distribution of *C. rustica* on rivers in Cheshire. *C. rustica* is a nationally rare stiletto-fly (Falk, 1991) which is listed as a Priority species in the UK Biodiversity Action Plan. The species was first discovered in Britain on the R. Bollin at Bowdon in Cheshire in 1875 (Cooke, 1878), and was later reared from a larva on the Etherow at Broadbottom in 1962 (Stubbs & Drake, 2001). The species has recently been discovered at single localities on both the Dane and the Bollin in Cheshire (Bates *et al*., 2006). *C. rustica* has been considered to have a very local distribution on sandy lowland rivers of southern and midland England and Wales, centred on rivers in the Welsh Borders and in Surrey and Sussex, although extending northwards with single records from the 1980s for Cumbria and Yorkshire (Stubbs & Drake, *op. cit*.; Drake, 1991). Recently, it has also been discovered on rivers in Cumbria, Yorkshire, Northumberland and Perthshire (Drake *et al.*, 2007; Hewitt *et al*., 2007; Hewitt & Parker, in prep.).

Studies by Skidmore (2001) and Drake (2004) in south Wales have established that the larvae of *C. rustica* have a preference for areas of sandy riverbank with some open sand and a little herbaceous vegetation nearby. Larvae can occur some distance from the water's edge and are not generally found in 'in-channel' deposits.

A secondary aim of the survey was to sample sites for other specialist Diptera of Exposed Riverine Sediments (ERS) in the course of the *C. rustica* work. Hewitt *et al* (2007) provide a definition of ERS:

Exposed (above water), recently deposited, fluvial sediments, with or without vegetation cover, on active river systems.

Whilst *C. rustica* is clearly an ERS species within this definition, since it requires fluvially deposited sand, it will be apparent that *C. rustica*-type sand deposits can be very different in nature and distribution to the open or partially vegetated, in-channel, sand and shingle bars that are utilised by many other ERS specialist invertebrates. Thus, a survey focused on finding *C. rustica* sites will not necessarily pick up the best sites for other ERS invertebrates. The larval stages of most other ERS Diptera are poorly understood and consequently these species are most easily sampled as adults. Adults of different species of ERS Diptera are found variously between April and September, with a peak in numbers and diversity in late May through June. Hewitt *et al (op. cit.)* provide a list of high fidelity ERS Diptera, indicating particular strength in the families Tipulidae, Limoniidae, Therevidae, Hybotidae, Empididae, Dolichopodidae, and Ephydridae. Consequently these families were targeted during this survey. Survey work was hampered by both time (the contract was not commissioned until late May 2007 – well into the survey season for ERS Diptera) and weather (the very wet summer of 2007 caused severe flooding throughout England, including Cheshire).

2 Methods

2.1 Site selection

The rivers Bollin and Dane were selected for survey as each had a population of *C. rustica* identified in recent survey (Bates *et al.,* 2006). The River Etherow was also identified for survey as there is a historical record of *C. rustica* from that river. The River Weaver was also considered, although there are no records of *C. rustica* here and it is not clear whether suitable habitat exists on the river. In the light of findings during the survey and looking at the map it appeared that the Goyt and the Tame could offer suitable conditions for the stiletto-fly and sites on these rivers were also visited.

2.2 Sites visited

Table 1. Sites visited in 2007/2008

RIVER	SITE	GRID REF	VISIT(S)	ERS substrate?	Threvid larvae found?*	Diptera sampled?
Dane	Radnor Bridge,	SJ832652	21 May 2007	Y	Y	Y
Dane	Congleton Weir	SJ860632	21 May 2007	Y	Y	Y
Dane	Buglawton, Congleton	SJ868641	21 May 2007	N		
Dane	Rode Hall	SJ888657	21 May 2007	Y	N	Y
Dane	Bosley Br.	SJ913650	21 May 2007	N		
Dane	Hugbridge	SJ931636	21 May 2007	N		
Dane	Cranage Br., Holmes Chapel	SJ757677	21 May 2007	N		
Dane	Saltersford Br., (right bank)	SJ772678	28 Jun 2007	Y	N	Y
Dane	Saltersford Br., (left bank)	SJ772678	28 Jun 2007	Y	Y	Y
Dane	Sweetenham	SJ795667	21 May 2007	N		
Dane	Byley Hall Br. Middlewich	SJ715674	28 Jun 2007	N		
Dane	Ravenscroft Hall Br.	SJ702672	28 Jun 2007	N		
Dane	Bostock House	SJ692671	28 Jun 2007, 15 May 2008	Y	Y	Y
Dane	Rudheath	SJ670729	15 May 2008	Y	Y	
Dane	Northwich Viaduct	SJ660735	15 May 2008	Y	N	Y
Weaver	Church Minshull	SJ665617	28 Jun 2007	N		
Weaver	Church Minshull	SJ665610	15 May 2008	Y	N	
Weaver	Lea Green	SJ672630	15 May 2008	Y	N	
Bollin	Prestbury Sewage Wks.	SJ893787	21 May 2007, 31 Jul 2007	Y	Y	Y
Bollin	Macclesfield	SJ911746	21 May 2007	N		
Bollin	Macclesfield	SJ905754	21 May 2007	N		
Bollin	Mottram Hall	SJ888795	21 May 2007	N		
Bollin	Newton Hall	SJ877805	31 Jul 2007, 15 May 2008	Y	N	Y
Bollin	Varden Ho. Br., Wilmslow	SJ861810	21 May 2007	N		
Bollin	The Carrs, Wilmslow	SJ839820	21 May 2007	N		
Bollin	Giants Br., Styal Country Pk.	SJ824834	19 Jul 2007	Y	Y	Y
Bollin	Dairy Ho., Hale	SJ781853	19 Jul 2007	?		Y
Bollin	The Priory, Hale	SJ758852	19 Jul 2007	?		Y

Bollin	Dunham Woodhouse	SJ723877	19 Jul 2007	?		Y
Bollin	Wet Gate	SJ710881	19 Jul 2007	N		
Bollin	Heatley Br.	SJ702888	19 Jul 2007, 9 May 2008	Y	Y	
Bollin	Heatley Br., d/s of	SJ700887	9 May 2008	Y	Y	
Bollin	Yarwood Heath	SJ750854	19 Jul 2007	N		
Bollin	Bollington Mill, Little Bollington	SJ370870	9 May 2008	Y	Y	
Bollin	Reddish (site 1)	SJ691887	9 May 2008	Y	Y	
Bollin	Reddish (site 2)	SJ693887	9 May 2008	Y	Y	
Etherow	Compstall	SJ965907	28 Jun 2007	Y	Y	
Etherow/Goyt	Compstall	SJ961903	28 Jun 2007	?		
Etherow	Broadbottom	SJ998933	31 Jul 2007	Y	Y	Y
Etherow	Broadbottom	SJ994934	28 Jun 2007	?		
Etherow	Wooley Bridge	SK009958	31 Jul 2007	N		
Goyt	New Mills	SJ998853	28 Jun 2007	N		
Goyt	New Mills	SJ990853	28 Jun 2007	N		
Goyt	Hague Bar	SJ987855	28 Jun 2007	N		
Goyt	Woodend	SJ979859	28 Jun 2007	N		
Goyt	Brabyns Pk, Compstall	SJ963901	28 Jun 2007	N		
Goyt	Woodbank Park	SJ913906	15 May 2008	Y	Y	
Tame	Tame Country Pk, Brinnington	SJ906918	9 May 2008	Y	Y	
----------	Dunham Park	SJ741873	9 May 2008	N	Y	

* ? = substrate marginally suitable for *C. rustica* larvae

2.3 Survey methods

C. rustica is best surveyed by looking for the larvae, which are active predators in dry, loose sand deposited on riverbanks. The larvae are most readily found in spring and early summer, although they can be found less frequently later in the year. Survey for suitable sand deposts and larvae within them, becomes increasingly difficult during the summer as vegetation gets progressively denser. Larvae of *C. rustica* are not easily identified from those of other species in the family Therevidae and must be reared to adulthood in order to establish specific identity. Adults of *C. rustica* are on the wing from mid-June through to mid-August

50 sites were visited (see Table 1.) at least once in six days of fieldwork – four in summer 2007 and two in May 2008. Since the priority for this survey was to find sites for *C. rustica*, it was important to search for larvae as soon as possible. Consequently a visit to Cheshire was organised immediately the contract was issued and a number of sites on the Dane and Bollin were visited on 21st May 2007. Our experience of *C. rustica* has shown that suitable larval habitat is created where sand is deposited high on riverbanks during winter spates. The location of these sand deposits is determined by the topography of the river, with constrictions to the river flow, caused by gorges, cliffs and bridges, often causing sand to be dumped by the floodwaters. Consequently we made a rapid assessment of these Cheshire rivers by stopping at bridges to search for suitable substrate in which to look for larvae.

As well as searching for larvae by hand-searching suitable areas of loose sand, we swept areas of ERS and adjacent vegetation and hand-searched ERS for adults of other specialist ERS Dipteran species. Any Therevid larvae found were reared in captivity to adulthood, when their specific identity could be determined.

2.4 General account of fieldwork

Starting at Holmes Chapel on 21st May 2007, we worked our way up the River Dane as far as Hugbridge on the A523 and then picked up the River Bollin in Macclesfield and followed it down to Wilmslow. This method gave us a quick introduction to the nature of the rivers in Cheshire and was successful in that first day in locating a number of sites with Therevid larvae. Upstream of Congleton, the River Dane becomes progressively more stony and we found very few and limited patches of only marginally suitable substrate for *C. rustica* larvae on this stretch of the river. Following the River Bollin downstream from Macclesfield, we found *C. rustica* larvae in sand deposits by the sewage works at Prestbury (where they had previously been recorded by Martin Drake (Bates *et al* 2006)) but failed to find any other larvae, or obviously suitable areas of substrate along the river that day.

Unfortunately, due to previous commitments, it was not possible to revisit Cheshire until early June. By this time rivers throughout England were in full spate. This situation continued by and large throughout the summer survey period. In trying to avoid periods of high flow and/or downright wet days, it was 28th June before we were able to get to Cheshire again. By this stage of the season the vegetation on the riverbanks had grown up and it was difficult to identify and access sand deposits that were potentially suitable for *C. rustica*. We started at the confluence of the Dane and Wheelock on the northern edge of Middlewich. The Dane just below the confluence with the Wheelock at SJ692671 has some suitable sand deposited but no Therevid larvae could be found on this occasion. The river levels had clearly been well up in the preceding days and weeks and remained high. The number of ERS flies in general was very low and this was probably due to the recent very wet weather and high flows. The left bank of the Dane downstream of Saltersford Bridge (SJ772678) by Holmes Chapel had good areas of sand deposited further from, and higher above, the main river channel and several Therevid larvae were collected here and later reared. Other ERS Diptera were also sampled, although again diversity was low. By early afternoon it was again raining and sampling of adult flies had to be abandoned. We visited a number of points along the River Goyt from New Mills downstream to Romiley, where it is joined by the Etherow. The Goyt is a stony river and no suitable deposits of sand were found until the confluence with the Etherow, where a potentially suitable deposit was noted on the right bank, but could not be accessed from our position. One kilometre up the Etherow at Compstall there is sand deposited on the right bank immediately above the bridge, behind the mill. Here we found several Therevid larvae, which were later reared. The last site of the day was on the Etherow at Broadbottom, where we followed the right bank downstream from the bridge. Although some small patches of fluvial sand were encountered, they appeared of only marginal potential for Therevids and no larvae were found.

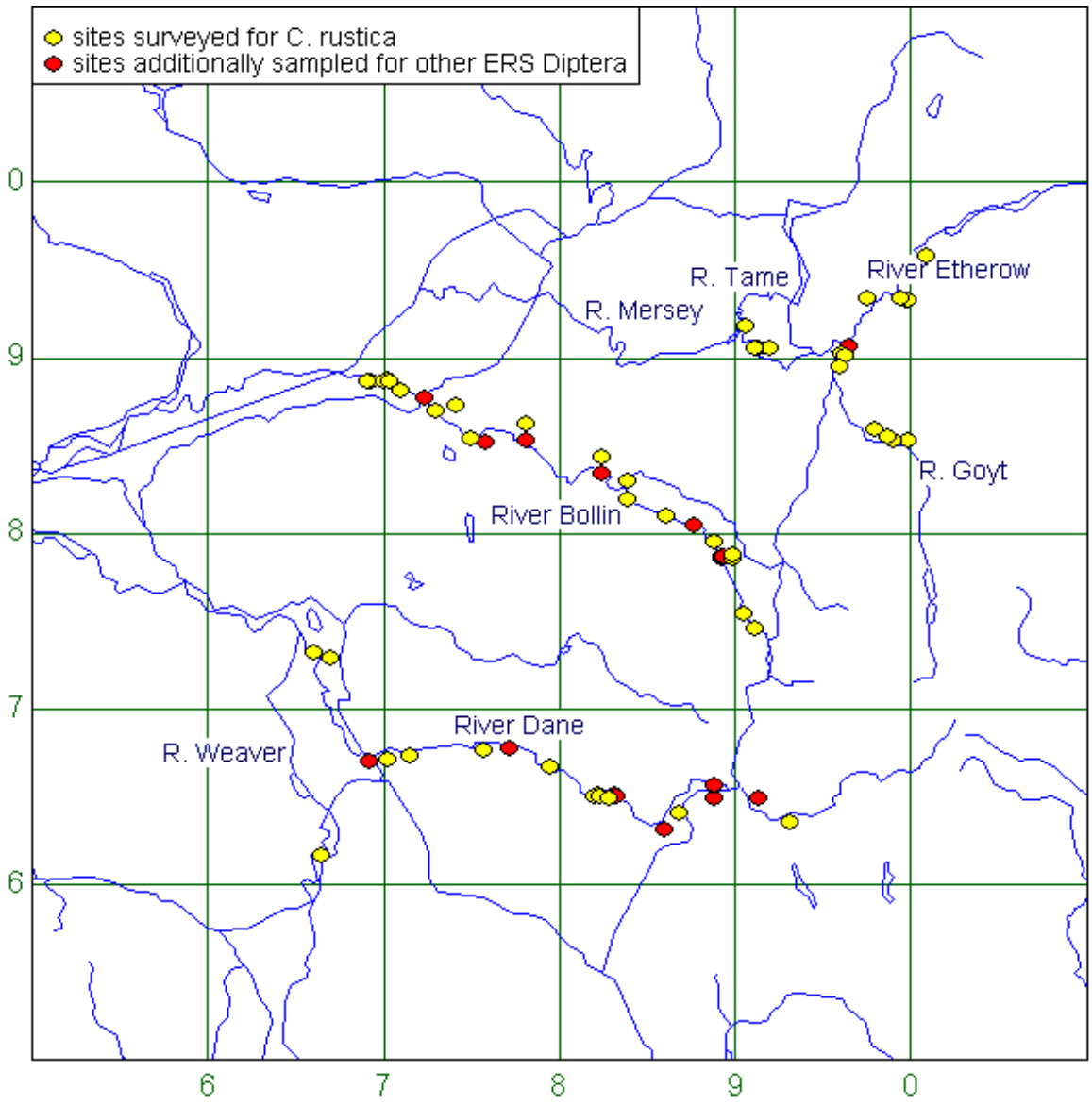
The summer continued very wet and the next visit was arranged at the last minute to take advantage of a brighter day on 19th July. On this occasion the Bollin was followed upstream from Heatley Bridge at Lymm to Styal Country Park at Wilmslow. The Bollin at Bowdon is the location of the first British record of *C. rustica* in 1875, but the species has not been reported on this stretch of the river since then. Again, survey of potential larval substrate was hindered by the dense vegetation at this stage of the season. A few potentially suitable patches of substrate were found but generally there was very little ERS to be seen and no Therevid larvae were found until two were collected from lightly vegetated sand deposited on the left bank of the river immediately below Giant's Castle footbridge (SJ824834) in Styal Country Park.

The final day's survey of the 2007 season was on 31st July when we met with Vicky Wilkins of Buglife and visited the River Bollin at Newton Hall (SJ877805) where despite a significant amount of apparently suitable ERS deposits, no larvae or adults of Therevids were found. Numbers of other ERS Diptera were also disappointing although some interesting species were noted. Moving on to the Sewage Works at Prestbury, where earlier in the season we had readily found Therevid larvae we were again unable to find adults or larvae of this family, until eventually we found a few larvae in an area of sand several yards from the main channel. Heading back north we called again at Broadbottom on the Etherow. This time following the left bank downstream from the road bridge where we found Therevid larvae in a lightly vegetated deposit of sand on the top of the bank.

Since fieldwork in 2007 was hampered by the extensive summer flooding and dense vegetation later in the season, it was decided to extend the survey into early 2008 to enable a search for Therevid larvae along the rivers before the vegetation grew up. Consequently on 9th May we visited sites on the lower Bollin from the Ship Canal upstream to Little Bollington. Therevid larvae were readily found just upstream of the canal at Reddish, around Heatly Bridge and at Bollington Mill. Dunham Park is adjacent to the Bollin at Little Bollington and a brief survey here found Therevid larvae in wood mould of veteran trees in the park. We next visited the River Tame in the Tame Country Park between Brinnington and South Reddish, where we again found and collected Therevid larvae in the sand deposits on the riverbank above and below the weir.

We returned to Cheshire on 15th May to complete the fieldwork, covering sites on the lower Dane from Northwich, where Therevid larvae were found at Rudheath, upstream to the confluence with the Wheelock, where Therevid larvae were found in sand at the site at Bostock House noted in 2007. A visit to the Wheaver at Church Minshull revealed suitable sand deposits in a short active section of the river but no Therevid larvae were seen. Finally we visited the River Goyt at Woodbank Park in Stockport where Therevid larvae were again found in sand deposits on the riverbank.

Fig. 1.Sites visited



3 Results

3.1 Survey for Cliorismia rustica

33 adults of *C. rustica* were reared from larvae collected at 13 different sites on five rivers in the survey - the Dane, the Bollin, the Goyt, the Tame and the Etherow. Suitable habitat for *C. rustica* was noted on the Weaver but the species was not recorded there.

Fig.2. C. rustica*, adult male*

River Dane
On the River Dane, *C. rustica* reached its upstream limit in Congleton (SJ860632) and its downstream limit at Rudheath, Northwich (SJ670729). Larvae were also found and reared within this reach of the river at Bostock House (SJ692671), Holmes Chapel (SJ772678) and in three separate sand deposits at Radnor Bridge (SJ832652). The species has also been recently recorded within this range, upstream of Saltersford Br. (SJ777676) (Bates *et al* 2006). The species appears to be widely distributed along this stretch of the river in suitable deposits of sand on the riverbanks where the sediments are being re-worked by the river.

River Bollin
On the River Bollin no additional sites were found upstream of the known population at Prestbury (SJ893787). Above this point the river quickly becomes stonier in nature and suitable habitat is in short supply. The downstream limit of *C. rustica* in this survey was at two sand deposits at Reddish (SJ691887 and SJ693887) just above the intersection with the Manchester Ship Canal. The river was not surveyed downstream of the canal but it is assumed that the interference of the canal will prevent the flood events that create the sandy deposits required by *C. rustica* larvae and reduce the energy of the river to re-work existing sediments. Other sites for *C. rustica* within these limits on the river were above and below Heatley Bridge (SJ702888), Bollington Mill (SJ730870) and in Styal Country Park at Giant's Castle (SJ824834). The 19th century record of the species from the Bollin at Bowdon [SJ78] falls within this range on the river. C. rustica appears to have a strong population on the river, on areas of loose sand deposited on top of the riverbanks by flood events and also in sand lower down the banks being re-worked by the river.

River Etherow

The survival of *C. rustica* on the Etherow was confirmed for the first time since the species was originally recorded at Broadbottom in 1962. The rearing of larvae collected at Compstall (SJ965907) confirms the identification and gives a downstream limit to its presently known distribution, although as stated above some potential habitat at the confluence with the Goyt was not sampled and may hold the species. The upstream limit in this survey and the site of the historical records was Broadbottom (SJ997933) where, in this survey, presumed *C. rustica* larvae were collected but failed to develop. Upstream of Broadbottom the river runs steeply between a series of reservoirs and no suitable habitat was found. The sites on the Etherow are partially vegetated deposits of loose sand dumped on the top of the riverbanks by flood events. The stretch of the river from Broadbottom down to Compstall is where the river issues from the confines of the hills, allowing it to slow and deposits some of its sand on the banks.

River Goyt

The upper reaches of the Goyt above the confluence with the Etherow were visited but were found to be stony with no appreciable sand content and so appear unsuitable for *C. rustica*. No larval habitat was found to sample on this stretch of the river. Downstream of the Etherow confluence, at Woodbank Park (SJ913906), the river contains more sand and although quite heavily trampled, *C. rustica* larvae were found in suitable habitat on the river bank here. This location was also the only ERS site in the survey from which a larva of the widespread stiletto-fly *Thereva nobilitata* was also reared.

River Tame

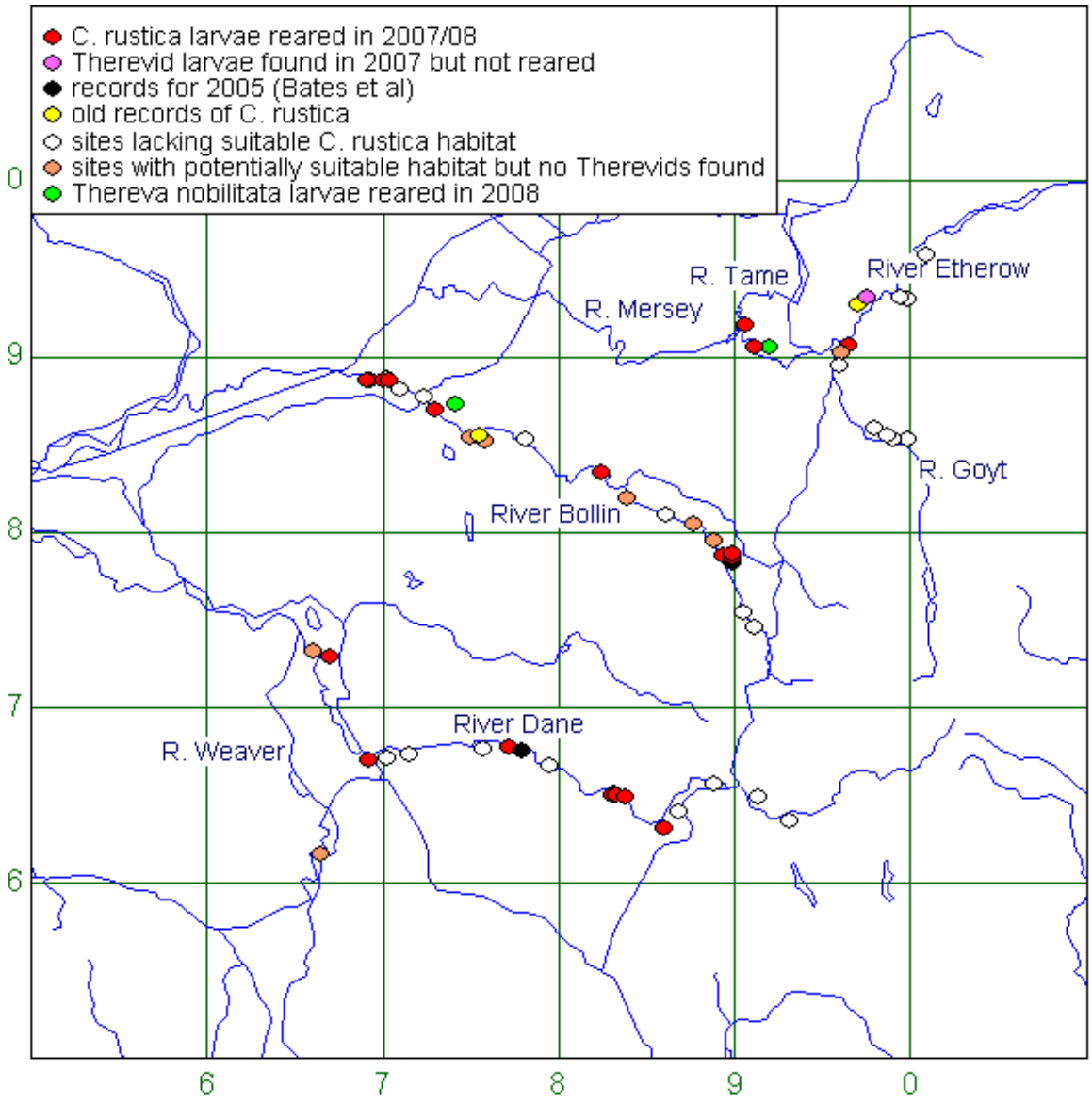
The River Tame meanders through Tame Country Park between Brinnington and South Reddish, Suitable sand deposits were found on the right bank below the weir at SJ9069108 and *C. rustica* was reared from larvae collected here. Small larvae were also found just upstream of this weir but failed to develop – it is assumed that they too were *C. rustica*. This was the limit of our exploration up the Tame and it is possible that populations of *C. rustica* will occur further upstream. However, the river is heavily engineered where it flows through built up areas just above the park.

River Weaver

The River Weaver was suggested to be unlikely to support *C. rustica*, as it is reported not to have the required sandy ERS habitat. The Ordnance Survey map supported this view as the topography of the catchment appears to lack sufficient size and fall to generate the flood deposits required by the fly larvae. The map did suggest that the best chance of suitable habitat for *C. rustica* on the Weaver would be about Church Minshuill, where the river flows through a shallow gorge and the constriction of its flow could generate flood deposits of sand on the banktops. The river was briefly visited at Church Minshull and apparently suitable sand deposits were found at SJ665610 and at SJ672630. No Therevid larvae were found and it may be that although suitable habitat occurs, this short stretch of river is too small and isolated to sustain a population of *C. rustica*.

Fig.3. C. rustica*, larva*

Fig. 4. *Cliorismia rustica* distribution in Cheshire



3.2 Survey of other Diptera on Exposed Riverine Sediments

The results of the incidental survey of other Dipteran species present on ERS during the survey were disappointing due to the very poor weather and flooding during the summer of 2007. Both species diversity and numbers were very low in the samples. **Table 3** gives a full list of the 155 species recorded in the survey against localities.

3.2.1 ERS specialist Diptera recorded

Fewer specialised ERS Diptera were recorded than might be expected, due to the adverse weather conditions over much of the survey period. **Table 2** lists the high fidelity ERS Diptera (as listed in Hewitt *et al.* (2007)) encountered during the survey and accounts of these species follow in order of priority and rarity. Accounts are adapted from those provided in the RECORDER 3 software.

Table 2. High fidelity ERS species recorded during the survey (species in bold are UKBAP Priority species)

Species	Status	Site														
		R. Bollin Dairy Ho. Fm., Hale	R. Bollin, Giant's Castle Br., Styal C.Pk.	R. Bollin, Newton Hall	R. Bollin, Prestbury Sewage Wks.	R. Bollin, The Priory, Hale	R. Dane, Radnor Bridge	R. Dane (left bank), Saltersford Br.	R. Dane (right bank), Saltersford Br.	R. Dane, Bosley Br.	R. Dane, Congleton Weir	R. Dane, Rode Hall	R. Etherow, Broadbottom (left bank)	R. Etherow, Compstall Mill	R. Wheelock, Bostock House	Total
Nephrotoma dorsalis	Notable/Nb	.	.	.	.	.	.	.	.	.	.	.	.	.	+	1
Nephrotoma lunulicornis	Notable/Nb	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Rhabdomastix edwardsi	Local	.	.	.	.	.	+	.	.	.	.	+	.	.	.	2
Rhabdomastix japonica	**RDB3**	**.**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1**
Arctoconopa melampodia	pRDB2	.	.	+	+	.	+	+	.	.	.	+	.	.	+	6
Hoplolabis areolata	Local	+	.	+	.	+	+	+	.	.	.	.	.	.	+	6
Hoplolabis vicina	Local	+	.	+	+	.	+	+	.	.	.	.	.	.	.	5
Hoplolabis yezoana	pRDBK	.	+	+	+	.	.	+	+	.	.	.	.	.	+	6
Tachydromia costalis	pRDB3	.	.	.	.	.	.	+	+	+	+	.	+	.	+	6
Tachydromia morio	Unknown	.	.	.	+	.	.	.	.	.	+	.	.	.	.	2
Platypalpus melancholicus	pRDB3	+	.	+	+	+	+	+	+	.	+	+	.	.	+	10
Rhaphium rivale	Notable/Nb	.	.	+	+	.	.	.	.	.	.	.	.	.	.	2
Teuchophorus calcaratus	Local	.	.	+	.	.	.	+	+	.	.	.	.	.	+	4
Lonchoptera nigrociliata	Notable/Nb	.	.	.	.	.	.	.	.	.	.	+	.	.	+	2
Athyroglossa glabra	Unknown	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Total		4	2	11	10	2	11	11	10	1	6	6	1	1	11	86

UK BAP Priority ERS species recorded

Rhabdomastix japonica **RDB3**

A cranefly confined to sandy river banks. The larvae are assumed to be aquatic. Distribution is centred on the Scottish highlands though also noted from Westmorland, Monmouthshire and Sussex. Formerly known as *R. hilaris*, recent ERS survey work has found this species at several additional locations.

Nationally Rare ERS species recorded

Hoplolabis yezoana **NEW TO BRITAIN (2004)**

A cranefly added to the British list in 1987 from rivers in Ireland. Discovered new to Great Britain on river sand/shingle in Cumbria in 2004. Now found on several sandy rivers in north and west Britain.

Arctoconopa melampodia **pRDB2**

A cranefly usually found on sandy river banks though it also occurs on a sandy coastal landslip. Larvae possibly develop in wet sand or rotting vegetation. Recorded from Dorset, Herefordshire, Cheshire, Lancashire and Elgin. Recent ERS survey work has located this species at several new locations

Tachydromia costalis **pRDB3**

A small black hybotid fly with shaded wings. An active predator of partially vegetated sandy ERS, where it runs rapidly and flies short distances. Larval habitat unknown.

Platypalpus melancholicus **pRDB3**

A largely black hybotid fly. Apparently restricted to sandy riverbanks with willow or other sparse vegetation, where it can be locally numerous. Larval habitat unknown.

Fig.5. Tachydromia costalis*, Broadbottom, R, Etherow, 31 July 2007*

Nationally Scarce ERS species recorded

Nephrotoma dorsalis **Notable/Nb**

Cranefly found on sandy, wooded river banks. Biology unknown. Widespread but very local .

Nephrotoma lunulicornis **Notable/Nb**

A cranefly of sandy river banks in western and northern districts. Apparently highly localised in distribution. Recent ERS survey work has found it at further locations.

Rhaphium rivale **Notable/Nb**

Medium sized metallic fly of northern riverbanks, known mainly from Scotland where it may be abundant. Recent ERS survey work has found it at more locations

Lonchoptera nigrociliata **Notable/Nb**

Small pointed-wing fly found along stony river edges. Has been recorded mainly from north-west England, the Welsh border counties and South Wales. Very local, but can be abundant where it occurs.

Other ERS species recorded

Rhabdomastix edwardsi **Local**

A small black cranefly of river banks in upland areas, especially where there are sandy sediments. Larvae probably aquatic.

Hoplolabis areolata **Local**

A cranefly confined to lowland rivers. Larvae presumably aquatic or semi-aquatic.

Hoplolabis vicina **Local**

A cranefly of northern and western rivers in their middle and lower reaches. Larvae presumed to be aquatic.

Teuchophorus calcaratus **Local**

A small dolichopodid fly, typically of shingle banks by rivers. England north to Yorkshire.

Fig.6. Hoplolabis sp. *Newton Hall, R. Bollin 31 July 2007*

Tachydromia morio **Local**

A small black hybotid fly with shaded wings.
An active predator on river shingle banks. Occurs on both sand and shingle and probably prefers shingle although not found on the most dynamic, coarse grade shingle of upland river stretches. Widespread but local on suitable ERS. Larval habitat unknown.

Athyroglossa glabra **Unknown**

No species account available.

3.2.2 Other Nationally Rare and Scarce Diptera recorded

Platypalpus ochrocera **RDB1**

Small hybotid fly recorded from damp broad-leaved woodland in Herefordshire. No other confirmed British records. Two specimens were taken at Newton Hall on the Bollin. They have been checked against specimens in the Chvala collection in the Hope Department at Oxford University.

Limonia trivittata **Notable/Nb**

A small cranefly which is widespread but very local throughout Britain, including Scottish islands, and found in wet woodland on calcareous soils, especially near rivers. Its biology is not known although there seems to be an association with butterbur, *(Petasites hybridus),* in some cases and it is possible that the larva develops in petioles or rootstock. The flight period is from June until August.

Dicranomyia ornata **Notable/Nb**

Cranefly. Adults usually found in association with butterbur *(Petasites hybridus)* and larvae have been reared from the decaying petioles of the plant. Records widely scattered in England and Scotland as far north as Midlothian. Old records comparatively numerous, but there are less than ten post 1960 sites known despite much more intensive collecting of this group in recent years so it is probably declining through habitat destruction. In at least one case mowing of riverside vegetation eliminated both the host plant and the cranefly. River 'improvement' schemes can also eliminate this species.

Eloeophila mundata **Notable/Nb**

Cranefly of streams in upland areas, usually found in the shade of alders. Biology unknown, but larvae probably develop in stream sediments. Local species of the south and west.

Molophilus niger **Notable/Nb**

A cranefly of vegetated streamsides in woods, usually in calcareous areas. Few widely scattered records throughout Britain. The larvae are thought to occur in soil.

Molophilus propinquus **Notable/Nb**

Cranefly found on sandy banks of streams and ditches. Larvae probably develop in damp sand. Widespread but very local, mainly in the north and west.

Platypalpus articulatoides **Notable/Nb**

A small Hybotid fly only known in Britain from Norfolk and Cambs.

Hilara albiventris **Notable/Nb**

Small empidid likely to be found flying over water. Collin records it from Monnow Valley (Hereford) and Brecknock (Wales).

Hilara pseudochorica **Notable/Nb**

Empidid fly likely to be found swarming over water. Collin reports it from Inverness, Notts, Hereford, Salop and Suffolk. Plant considers this an ERS specialist and it should perhaps be included in the list of high fidelity ERS Diptera, although Drake has recorded the species off ERS.

Figure 7. River Dane, Radnor Bridge, 21 May 2007

Fig.7.1

Point bars provide suitable ERS habitat for a variety of specialist ERS Diptera species including the UKBAP Priority cranefly Rhabdomastix japonica*. C. rustica larvae were reared from loose, vegetated sand at the inner edge of the bar.*

Fig.7.2

Sand deposited on top of the bank becomes vegetated with balsam and butterbur and provides suitable habitat for C. rustica larvae

Figure 8. River Dane, Congleton Weir, 21 May 2007

*The weir in the middle of Congleton (SJ860362), causes in the river to deposit a bank sand and shingle immediately below.*C. rustica *larvae were found here*.

Figure 9. River Dane, Bosley Bridge, 21 May 2007

A small area of sandy ERS here was of only very marginal potential for C. rustica *larvae, but the RDB3 ERS specialist* Tachydromia costalis *was recorded.*

Figure 10. River Dane, Saltersford Bridge, 28 June 2007

Fig.10.1.
Vegetated sandy ERS on the left bank.

C. rustica larvae

Fig.10.2
Areas of loose, partially vegetated sand produced several C. rustica *larvae*

Figure 11. River Dane, Rudheath, 15 May 2008

C. rustica *were reared from larvae collected here.*

Figure 12. River Dane Northwich Viaduct, 15 May 2008

Apparently suitable habitat yielded no Therevid larvae at this site.

Figure 13. River Dane, Bostock House, 28 June 2007

Fig.13.1
Recently deposited mud from flooding in June 2007

Fig.13.2
Sand dumped during summer 2007 flooding could provide future substrate for C. rustica *larvae. A C. rustica larva was found on the bank here in May 2008*

Figure 14. River Bollin, Prestbury Sewage works, 21 May 2007

Fig.14.1
Sand and shingle ERS. C. rustica *was reared from a larva found in loose, partially vegetated on this low-lying (in-channel) bar.*

Fig.14.2
Point bar of partially vegetated sand and shingle. C. rustica *larvae were found and reared from the vegetated sandy area.*

Figure 15. River Bollin, Prestbury Sewage Works, 31 July 2007

Fig.15.1
Vegetated, dry, sandy area in the loop of an oxbow well away from the main river channel supported C. rustica *larvae*

Fig.15.2
C. rustica *was reared from larvae collected here on 21st May and therevid larvae were found here again on 31st July*

Figure 16. River Bollin, Newton Hall, 31 July 2007

Fig.16.1
A stretch of actively re-working sediments appeared to have good potential for ERS invertebrates, although few were encountered on this visit, possibly due to extensive recent flooding.

Fig.16.2
Shingle bank with lenses of sand

Figure 17. River Bollin, Heatley Bridge, 9 May 2008

Fig. 17.1
C.rustica *larvae were found in vegetated sand on top of bank*

Fig.17.2
C. rustica *larvae were found in loose vegetated sand on top of bank where shading from the trees was less dense.*

Figure 18. River Bollin, d/s of Heatley Bridge, 9 May 2008

Fig. 18.1
C. rustica *larvae were found in loose sand at the top of the bank slope*

Fig 18.2
Suitable looking habitat was observed on the right bank but not sampled. C. rustica *larvae were found in sand deposits on the left bank here (SJ700887)*

Figure 19. River Etherow, Compstall, 28 June 2007

Fig.19.1
Sand deposited on the riverbank alongside the mill held several C. rustica *larvae*

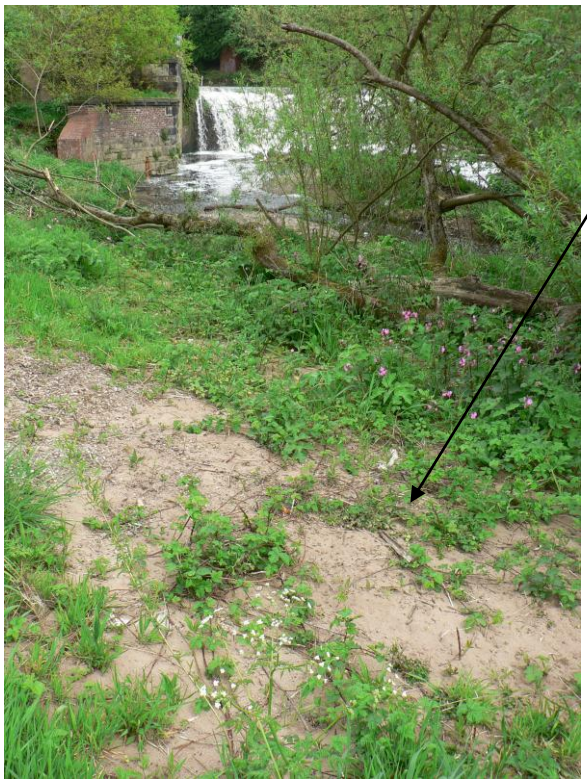
larvae

Fig.19.2
Close up of the sand deposit with area of sparse vegetation removed, beneath which larvae were found.

Figure 20. River Etherow (left bank), Broadbottom, 31 July 2007

Therevid larvae, most probably of C. rustica *(although not reared), were found in loose sand deposited on top of riverbank.*

Figure 21. River Tame, Tame Park, Brinnington, 9 May 2008



C. rustica *was reared from larvae collected from the partially vegetated loose sand deposited on the right bank below the weir.*

Figure 22. River Goyt, Woodbank Park, Stockport, 15 May 2008

Both C. rustica and T. nobilitata were reared from larvae collected in loose partially vegetated sand on the riverbank here.

Figure 23. River Weaver, Church Minshull, 15 May 2008

Fig. 23.1 *Apparently suitable habitat at SJ665610 yielded no Therevid larvae*

F

Fig.23.2 *Apparently suitable habitat at SJ672630 yielded no Therevid larvae*

4 Discussion

Cliorismia rustica has been recorded from 13 locations on five different rivers in Cheshire during this survey. At some of these locations larvae were found in a number of separate sand deposits. 11 of these locations were new sites for the species, one site was previously discovered in 2005 and the other was known from a single record in 1962. As a result of this survey the distribution of *C. rustica* on the rivers Dane and Bollin has been established, historical distributions of *C. rustica* on the Etherow and lower Bollin have been re-established, Additionally, the species has been discovered on two new rivers in the area – the Tame and the Goyt. The amount of suitable larval habitat provided by flood deposited sand on the banks of Cheshire rivers enables a healthy population of *C. rustica* to survive in Cheshire.

We found *C. rustica* larvae much lower down the bank and closer to 'in-channel' deposits on some Cheshire sites than we have come to expect on other northern rivers, where they are generally found in sand deposited well up the riverbank. Our Cumbrian studies have led us to believe that *C. rustica* larvae, whilst requiring fluvially deposited sand, do not like frequent or prolonged inundation and are hence generally found well up the bank in sands deposited by the highest floods. We wonder if the flow regime of some Cheshire rivers, particularly the Bollin, is such that flooding of the lower-lying sand deposits is sufficiently infrequent and of short duration to allow the species to colonise situations where it could not survive on the Eden in Cumbria. Perhaps significantly, later in the 2007 season, after the severe floods, we failed to find *C. rustica* larvae in these low-lying sediments and only managed to find them at locations higher up the riverbanks. These differences in situation between Cumbria and Cheshire may be due to the different nature of the deposits in the two counties. In Cumbria, the sand deposits utilised by *C. rustica* appear to be largely accreted from flood events in the deposition zone of the river, whilst on the Dane and the Bollin the deposits are perhaps more associated with reworking of alluvial deposits in the floodplain. It may be that the exceptional floods of summer 2007 will have depleted these in-channel populations, although they may at the same time have created fresh sand deposits that can be colonised by survivors. Most of the localities found in the survey were in typical banktop sand deposited by flood events.

The very wet summer of 2007 made sampling adult Diptera of ERS difficult. Of the 14 ERS specialist Diptera recorded in addition to C. rustica, most are species primarily associated with sandy deposits, in keeping with the sandy nature of Cheshire rivers and the focus of this survey on *C. rustica* habitat. The Priority cranefly *Rhabdomastix japonica*, recorded for the first time in Cheshire from the Dane at Radnor Bridge, prefers sandy ERS. The most widely recorded ERS specialist in the survey, other than *C. rustica*, was the RDB3 Hybotid fly *Platypalpus melancholicus*. This species appears to require partially vegetated (particulary willow bushes) sand deposits on riverbanks and seems to be particularly well distributed on Cheshire rivers. The other widely encountered specialist ERS Diptera – *Arctoconopa melampodia* (pRDB2), *Hoplolabis areolata, H. vicina, H. yezoana* (pRDBK) and *Tachydromia costalis* (pRDB3), all require sand or silt. The four craneflies require damp sediments or seepages, whilst *T. costalis* is a species of dry, partially vegetated sand including the top of in-channel ERS deposits up the riverbank, including the same type of sand deposits typically utilised by *C. rustica*.

A particularly striking difference to the situation in Cumbria is the apparent absence of other Therevid species on the rivers in Cheshire. The other ERS specialised Therevid that is *Spiriverpa lunulata*. This species is a true specialist of in-channel ERS and in Cumbria would perhaps be expected to replace *C. rustica* in some of the situations in which we have found *C. rustica* in Cheshire. The absence of *S. lunulata* from Cheshire is

perhaps not too surprising since it generally prefers more dynamic rivers with a higher percentage of shingle in the substrate mix. Although there are patches of apparently suitable habitat in Cheshire, these are rather small and isolated from the nearest known *S. lunulata* populations.

The other species of Therevid that we frequently encounter with *C. rustica* in Cumbria is the generalist *Thereva nobilitata*. Larval sampling and rearing along the Eden in Cumbria has found as many *Thereva nobilitata* larvae as *C. rustica*, and often in exactly the same sample sites. The almost complete absence of *T. nobilitata* on the Cheshire rivers is surprising, we reared just one *T. nobilitata* from sandy ERS in Cheshire (from the Goyt at Woodbank Park, Stockport) compared to 33 *C. rustica* larvae reared. It is worth noting that Therevid larvae (later reared and identified as *T. nobilitata*) were readily available during a brief search in the dead wood of the veteran trees at Dunham Park, whilst on the sandy riverbank at Bollington Mill immediately adjacent, only *C. rustica* was found. It may be that the flow regime of the Cheshire rivers generally floods the sand deposits just sufficiently to make them suitable for *C. rustica* but too wet for *T. nobilitata*. There must be some ecological division that restricts *C. rustica* to river banks, but allows *T. nobilitata* a wide distribution in dry, friable substrates, whilst keeping it out of in-channel fluvial deposits. In Cheshire this division of habitat preference appears to be generally mutually exclusive with the riverbank sands being apparently unsuitable for *T. nobilitata*, whilst in Cumbria *T. nobilitata* is widespread in banktop sand deposits and both species can sometimes occur together.

5 Conclusion

These results identify Cheshire as an important national locus for *C. rustica*. The sandy deposits on the banks of these rivers provide suitable habitat for a strong population over a relatively wide area in the county, providing a northern stronghold for the species. *C. rustica* is widespread on the middle reaches of the Dane and the Bollin, with another population centred on the lower reaches of the Etherow and Tame, linked by the Goyt.

Cheshire rivers also support a number of additional rare and scarce Dipteran specialists of ERS, primarily associated with sandy deposits.

6 Acknowledgements

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7 References

Bates, A.J., Drake, C.M. & Sadler, J.P. (2006) *The Coleoptera and Diptera fauna of exposed riverine sediments (ERS) on the rivers Weaver, Dane and Bollin: a survey report*. Environment Agency.

Cooke, E.B. (1878) Occurrence of *Thereva fuscipennis* Meigen, an addition to the British list of Diptera. *Ent. Mon. Mag.* **15.** 19.

Drake, C. M. (1991) *Provisional atlas of the Larger Brachycera (Diptera) of Britain and Ireland*. Biological records Centre, ITE.

Drake, M. (2004) Autecology of the immature stages of the stiletto fly *Cliorismia rustica* in the valleys of the Usk and Monnow, *CCW contract science report* No. **617**.

Drake, M., Godfrey, A., Hewitt, S.M. & Parker, J. (2007) *Sandy River Flies Project,* draft final report (February 2007). Buglife.

Falk, S. (1991) A review of the scarce and threatened flies in Great Britain (Part 1) *Reasearch & survey in nature conservation* No. 39. NCC.

Falk, S. & Crossley, R. (2005) *A review of the scarce and threatened flies of Great Britain. Part 3: Empidoidea*. JNCC

Hewitt, S., Atty, D., Parker, J., Read, J. & Sinclair, M. (2005) *Survey of the insects of exposed riverine sediments on the rivers Eden and Derwent in Cumbria in 2004*. Report to English Nature and the Environment Agency.

Hewitt, S.M., Parker, J. & Read, J. & Sinclair, M. (2007) *Survey of the invertebrates of exposed riverine sediments on Cumbrian rivers in 2005 – including a review of recent ERS invertebrate data for Cumbria.* Final report to Natural England (Cumbria Team) and the Environment Agency (Penrith Office).

Parker, J. (2006) *Hoplolabis yezoana* (Diptera, Limoniidae) new to Great Britain. *Dipterists Digest* **13**.2

Skidmore, P. (2001) The status of *Cliorismia rustica* (Diptera, Therevidae) in the valleys of the Usk and Monnow in 2000. *CCW contract science report* No. **427**.

Stubbs, A.E. & Drake, M. (2001) *British soldierflies and their allies.* Brit. Ent & Nat. Hist. Soc.

Table 3. All Diptera recorded during the survey.

High fidelity ERS species are shown in bold. UKBAP species are identified with an asterisk *

Species	Status	Site																						
		R. Bollin, Bollington Mill	R. Bollin Dairy Ho. Fm., Hale	R. Bollin, Dunham Woodhouse	R. Bollin, Giant's Castle Br., Styal	R. Bollin, Newton Hall	R. Bollin, Prestbury Sewage Wks.	R. Bollin, Reddish site 1	R. Bollin, Reddish site 2	R. Bollin, The Priory, Hale	R. Dane, Bostock House	R. Dane , Saltersford Br.(left bank)	R. Dane , Saltersford Br.(right bank)	R. Dane, Bosley Br.	R. Dane, Congleton Weir	R. Dane, Northwich Viaduct	R. Dane, Rode Hall	R. Dane, Radnor Bridge	R. Dane rudheath	R. Etherow, Broadbottom (left bank)	R. Etherow, Compstall Mill	R. Tame, Brinnington	R. Goyt, Woodbank	Dunham Park	Total
TIPULIDAE (craneflies)																								
Nephrotoma dorsalis	**Notable/Nb**	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	**1**
Nephrotoma guestfalica	**Local**	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	**3**
Nephrotoma lunulicornis	**Notable/Nb**	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	**1**
Nephrotoma quadrifaria	Common	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	2
Tipula lunata	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Tipula couckei	Local	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	3
Tipula lateralis	Common	.	.	.	.	+	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	3
Tipula montium	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	3
LIMONIIDAE (craneflies)																								
Limonia macrostigma	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Limonia nubeculosa	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	2
Limonia phragmitidis	Common	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	2
Limonia trivittata	Notable/Nb	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Limonia lutea	Unknown	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	1
Dicranomyia modesta	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Dicranomyia ornata	Notable/Nb	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	3
Rhipidia maculata	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Antocha vitripennis	Local	.	.	.	.	.	+	.	.	.	+	+	.	.	+	+	+	+	.	.	.	.	.	7
Dicranota bimaculata	Local	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2
Eloeophila mundata	Notable/Nb	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Brachylimnophilus nemoralis	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Pilaria discicollis	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Gonomyia recta	Local	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Rhabdomastix edwardsi	**Local**	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	**2**
Rhabdomastix japonica*	**RDB3**	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	**1**
Gonempeda flava	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	2
Cheilotrichia cinerescens	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Symplecta hybrida	Local	.	.	.	.	+	+	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	4
Symplecta stictica	Common	.	.	.	.	+	+	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	4
Erioptera fusculenta	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Erioptera lutea	Common	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Erioptera trivialis	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	2
Arctoconopa melampodia	**pRDB2**	.	.	.	.	+	+	.	.	.	+	+	.	.	.	+	+	+	.	.	.	.	.	**7**
Tasiocera murina	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Molophilus griseus	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2
Molophilus niger	Notable/Nb	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	3
Molophilus obscurus	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Molophilus crassipygus	Local	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Molophilus propinquus	Notable/Nb	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Molophilus pusilus		.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Hoplolabis areolata	**Local**	.	+	.	.	+	.	.	.	+	+	+	.	.	.	+	.	+	.	.	.	.	.	**7**
Hoplolabis vicina	**Local**	.	+	.	.	+	+	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	**5**
Hoplolabis yezoana	**pRDBK**	.	.	.	+	+	+	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	**6**
STRATIOMYIIDAE (soldierflies)																								
Beris morrisii	Local	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Oxycera rara	Local	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Oxycera trilineata	Local	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Praomyia leachii	Local	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Oplodontha viridula	Local	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

Species	Status	Sites																							
		R. Bollin, Bollington Mill	R. Bollin Dairy Ho. Fm., Hale	R. Bollin, Dunham Woodhouse	R. Bollin, Giant's Castle Br., Styal	R. Bollin, Newton Hall	R. Bollin, Prestbury	R. Bollin, Reddish site 1	R. Bollin, Reddish site 2	R. Bollin, The Priory, Hale	R. Dane, Bostock House	R. Dane , Saltersford Br.(left bank)	R. Dane , Saltersford Br.(right bank)	R. Dane, Bosley Br.	R. Dane, Congleton Weir	R. Dane, Northwich Viaduct	R. Dane, Rode Hall	R. Dane, Radnor Bridge	R. Dane Rudheath	R. Etherow, Broadbottom (left bank)	R. Etherow, Compstall Mill	R. Goyt, Woodbank	R. Tame, Brinnington	Dunham Park	Total
RHAGIONIDAE (snipe flies)																									
Chrysopilus asiliformis	Common	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Atherix ibis	Local	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Rhagio tringarius	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
TABANIDAE (horseflies)																									
Haematopota pluvialis	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
THEREVIDAE (stiletto-flies)																									
Cliorismia rustica*	**RDB3**	**+**	**.**	**.**	**+**	**.**	**+**	**+**	**+**	**.**	**+**	**+**	**.**	**.**	**+**	**.**	**.**	**+**	**+**	**+**	**+**	**+**	**+**	**.**	**14**
Thereva nobilitata	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+		+	1
HYBOTIDAE .																									
Tachydromia aemula	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	..	1
Tachydromia costalis	**pRDB3**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**+**	**+**	**+**	**+**	**+**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**6**
Tachydromia morio	**Unknown**	**.**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**2**
Platypalpus annulatus	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus annulipes	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus articulatoides	Notable/Nb	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus bilobatus	Local	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus calceatus	Common	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus coarctatus	Common	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Platypalpus cothurnatus	Local	.	.	.	+	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	4
Platypalpus interstinctus	Local	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus maculipes	Local	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus melancholicus	**pRDB3**	**.**	**+**	**.**	**.**	**+**	**+**	**.**	**.**	**+**	**+**	**+**	**+**	**.**	**+**	**+**	**+**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**11**
Platypalpus niger	Local	.	+	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	3
Platypalpus notatus	Common	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	2
Platypalpus ochrocera	RDB1	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Platypalpus pallidiventris	Common	.	.	+	.	+	.	.	.	.	+	+	.	.	.		.	.	.	.	.	.	.	.	4
Platypalpus pectoralis	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Ocydromia glabricula	Common	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	2
EMPIDIDAE (dance flies)																									
Rhamphomyia crassirostris	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.		.	.	.	.	.	.	.	.	1
Rhamphomyia laevipes	Local	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	1
Rhamphomyia nigripennis	Common	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	2
Rhamphomyia sulcata	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Empis aestiva	Common		.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	2
Empis nigripes	Common		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Hilara albiventris	Notable/Nb		.	.	+	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	4
Hilara brevistyla		.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hilara chorica	Common		.	.	.	+	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	2
Hilara cingulata	Local		.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Hilara flavipes/obscura	Unknown		+	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	3
Hilara fuscipes	Unknown		.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Hilara hirtipes	Unknown		.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	2
Hilara manicata	Common		.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Hilara maura	Common		.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	2
Hilara monedula	Common		.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hilara nigrina	Local		+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hilara obscura	Local		.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	3
Hilara pseudochorica	Notable/Nb		.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	2
Hilara quadrivittata	Common		.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	2
Hilara rejecta	Local		.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.		.	.	1
Chelifera stigmatica	Unknown		.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1

Species	Status	Sites																						
		R. Bollin, Bollington Mill	R. Bollin Dairy Ho. Fm., Hale	R. Bollin, Dunham Woodhouse	R. Bollin, Giant's Castle Br., Styal	R. Bollin, Newton Hall	R. Bollin, Prestbury	R. Bollin, Reddish site 1	R. Bollin, Reddish site 2	R. Bollin, The Priory, Hale	R. Dane, Bostock House	R. Dane , Saltersford Br.(left bank)	R. Dane , Saltersford Br.(right bank)	R. Dane, Bosley Br.	R. Dane, Congleton Weir	R. Dane, Nothwich Viaduct	R. Dane, Rode Hall	R. Dane, Radnor Bridge	R. Dane , Rudheath	R. Etherow, Broadbottom (left bank)	R. Etherow, Compstall Mill	R. Goyt, Woodbank	R. Tame, Brinnington	Dunham Park	Total
Hemerodromia baetica	Local	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	2
Hemerodromia unilineata	Local	.	.	.	+	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	4
Dolichocephala guttata	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1
Dolichocephala irrorata	Common	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
DOLICHOPODIDAE (long-headed flies)																									
Dolichopus brevipennis	Local	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus festivus	Common	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus griseipennis	Common	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus latelimbatus	Local	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2
Dolichopus longicornis	Local	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus pennatus	Common	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus popularis	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Dolichopus subpennatus	Common	.	.	.	.	+	+	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	4
Dolichopus trivialis	Common	.	.	+	.	+	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	5
Dolichopus ungulatus	Common	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	2
Hercostomus brevicornis	Local	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hercostomus celer	Local	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.	3
Hercostomus cupreus	Local	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	2
Hercostomus metallicus	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hercostomus nanus	Local	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	2
Hypophyllus obscurellus	Common	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Poecilobothrus nobilitatus	Common	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.	.	.	.	.	.	.	.	3
Hydrophorus balticus	Local	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	1
Medetera oscillans	Local	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Rhaphium caliginosum	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Rhaphium monotrichum	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Rhaphium riparium	Common	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.	.	.	3
Rhaphium rivale	**Notable/Nb**	**.**	**.**	**.**	**.**	**+**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**2**
Syntormon pallipes	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	2
Chrysotus spp.	Local	.	.	.	+	+	.	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	5
Argyra atriceps	Local	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Campsicnemus curvipes	Common	.	.	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	4
Campsicnemus pusillus	Local	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Sympycnus desoutteri	Common	.	.	.	.	+	+	.	.	.	.	.	.	.	+	.	+	+	.	.	.	.	.	.	5
Teuchophorus calcaratus	**Local**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**+**	**+**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**4**
Teuchophorus monacanthus	Local	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Xanthochlorus ornatus	Local	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Sciapus loewi	Local	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Sciapus platypterus	Common	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
LONCHOPTERIDAE																									
Lonchoptera furcata	Common	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	3
Lonchoptera lutea	Common	.	+	+	+	+	+	.	.	+	+	+	+	.	+	.	.	+	.	.	.	.	.	.	11
Lonchoptera nigrociliata	**Notable/Nb**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**2**
MICROPEZIDAE (stilt flies)																									
Calobata cibaria	Common	.	.	.	+	.	.	.	.	+	.	+	+	.	.	.	+	.	.	.	.	.	.	.	5
Calobata petronella	Common	.	.	.	+	.	+	.	.	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	5
SEPSIDAE (lesser dung flies)																									
Themira lucida	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Themira superba	Local	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Sepsis punctum	Common	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	1
Sepsis violacea	Common	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	2

Species	Status	Sites																						
		R. Bollin, Bollington Mill	R. Bollin Dairy Ho. Fm., Hale	R. Bollin, Dunham Woodhouse	R. Bollin, Giant's Castle Br., Styal	R. Bollin, Newton Hall	R. Bollin, Prestbury	R. Bollin, Reddish site 1	R. Bollin, Reddish site 2	R. Bollin, The Priory, Hale	R. Dane, Bostock House	R. Dane , Saltersford Br.(left bank)	R. Dane , Saltersford Br.(right bank)	R. Dane, Bosley Br.	R. Dane, Congleton Weir	R. Dane, Nothwich Viaduct	R. Dane, Rode Hall	R. Dane, Radnor Bridge	R. Dane Rudheath	R. Etherow, Broadbottom (left bank)	R. Etherow, Compstall Mill	R. Goyt, Woodbank	R. Tame, Brinnington	Dunham Park	Total
EPHYDRIDAE (shore flies)																								
Athyroglossa glabra	**Unknown**	**.**	**.**	**.**	**.**	**+**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**.**	**1**
Discocerina obscurella	Unknown	.	+	.	.	+	.	.	.	+	+	.	+	.	.	.	.	.	.	.	.	.	.	5
Ditrichophora calceata	Unknown	.	+	.	.	.	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	5
Ditrichophora palliditarsis	Unknown	.	.	.	.	+	.	.	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	5
Notiphila cinerea	Common	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	2
Notiphila riparia	Common	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Hydrellia griseola	Common	.	.	.	.	+	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	3
Hydrellia modesta	Common	.	.	.	.	+	+	.	.	.	+	+	+	.	+	+	+	.	.	.	.	.	.	8
Hydrellia obscura	Unknown	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	.	3
Parydra aquila	Common	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1
Parydra coarctata	Unknown	.	.	.	.	+	+	.	.	+	+	+	+	.	+	.	+	.	.	.	.	.	.	8
Scatella paludum	Unknown	.	.	.	.	+	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	3
Scatella stagnalis	Common	.	.	.	.	+	.	.	.	.	.	+	.	.	+	.	.	.	.	.	.	.	.	3
Scatella tenuicosta	Common	.	.	.	.	+	+	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	4