

**A desktop study of the
Insects of Exposed Riverine Sediments
in Lancashire & Cheshire**



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Cover photo: *Stenus fossulatus*, Stoneyhurst, 18 MAY 1968, Stan Bowstead
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Summary and discussion

This desktop study aims to provide an informative review of the current knowledge and available habitat for exposed riverine sediment (ERS) invertebrates in Lancashire and Cheshire, with some recommendations for further study. The objectives of the report are to 1) collate the existing data on the ERS invertebrate communities in Lancashire and Cheshire, and 2) identify gaps in knowledge and flag up rivers and locations which would potentially reward further survey.

ERS deposits occur in the deposition zones of rivers where they issue from the hills and the flow slows on the gentler gradients of the lowlands. Here sediment is dropped in slower flowing river sections and accretes as sediment bars along the river channel, or as flood deposited sand on riverbanks during spate events. The natural meandering of rivers also reworks the sediments of the flood plain, creating and recreating ERS deposits. This dynamic, ever shifting, environment creates a range of deposits at different stages of development and erosion at any given moment. A number of different invertebrate species show high fidelity to these ERS deposits, variously showing preferences for different grades of sediment at different stages of the natural succession of the deposits. The quality of ERS for invertebrates fundamentally depends on the surface geology of the catchment, which generates the sediments carried by the river. However, other factors such as compaction and siltation, which clog the interstices in the sediments used by many specialist ERS species, can greatly reduce the invertebrate interest of ERS deposits.

The data collated in this study provides information on the known historical and modern occurrence of high fidelity ERS invertebrates on rivers in Lancashire and Cheshire. These data are not a comprehensive representation of the distribution of ERS species in the region, past or present, but they do provide a perspective on the potential of different rivers to support ERS invertebrate communities and can be used to suggest areas of interest for contemporary survey.

7,741 records of 904 species have been collated. Of these 2,467 records are of 142 different species in Lancashire or Cheshire considered to have high or total fidelity to ERS, representing 68% of the total number of high fidelity ERS species recognised in the UK (Tables 1 & 2). 124 species in the collated data are designated as nationally rare or scarce, of which 81 are considered to exhibit high fidelity to ERS.

Much of the data collated and analysed in this report is historical and without geospatial coordinates. These have been attributed at monad level where a site name could be fairly precisely located or at hectad level when it could not. All these attributed grid references carry a level of uncertainty and more so with the monad level attributions. Thus hectad level analysis provides the most inclusive and accurate (if not the most useful) presentation of the results (Tables 3 & 4). The two hectads supporting the greatest diversity of high fidelity ERS invertebrates both contain stretches of the River Dane (SJ76, Holmes Chapel and SJ86, Congleton) with 66 and 57 species respectively. These hectads are followed by two containing stretches of the River Bollin (SJ88, Wilmslow and SJ87, Prestbury) with 56 and 51 species respectively. The River Lune flows through the 5th and 6th most diverse hectads (SD56, Caton and SD57, Arkholme) with 40 and 33 ERS species respectively.

The rankings change when the ERS Quality Index (ERSQI) is calculated for individual hectads (Table 5a-5c). SJ66 (Winsford - containing the Rivers Dane, Weaver and Wheelock) now comes top, followed by SD56 (Caton – River Lune), SJ88 (Wilmslow – Rivers Bollin and Dean), SJ76 (Holmes Chapel – River Dane) etc. However, it should be noted that the high ERSQI value for SJ66 is based on comparatively few qualifying species (18) compared with the 40+ qualifying species on which the ERSQI values of the other top 5 hectads are based. It is recognised that ERSQI values become unreliable when based on a low number of qualifying species and a minimum number of 15 species is recommended.

Analysis by tetrad gives a higher resolution view of the data but at the cost of some loss of accuracy and comprehensiveness. Records with only hectad level geo-references will be omitted and some attributed grid-references may have been mistakenly ascribed to the wrong monad/tetrad. Tetrad level mapping of ERS species diversity shows concentrations of high ERS invertebrate diversity in Cheshire, correlating with the extensive surface deposits of sand and gravel in that county. The River Lune also has a rich ERS invertebrate fauna, although the reason for this is less immediately obvious since, although the topography of the Lune lends itself to the creation of large ERS deposits, the surface geology of the catchment is not rich in sand and furthermore the river flood plain is largely pastoral, where trampling of the ERS by grazing stock can be expected to cause widespread damage to the invertebrate interest. It may be that the catchment topography leading to high velocity flows creates extensive ERS deposits and enables the river to keep reworking the surface deposits of its flood plain, which provide sufficient sand fraction to the ERS substrate. The shear size of these deposits will also favour ERS invertebrate communities.

It is useful to analyse data by different rivers, since ecological factors are likely to vary between catchments. However, a significant number of the collated records are not explicitly identified to a specific river. An effort has been made to ascribe records with no or vague grid-references to specific rivers where the location name indicates this can be done with a reasonable level of confidence. This process means that some records cannot be attributed to any particular river and a few may have been erroneously ascribed. Thus the accuracy and comprehensiveness of the data analysis for rivers is lower than for hectads. For example the RDB1 rove beetle, *Stenus fossulatus* was recorded by Stan Bowstead from "Stoneyhurst" in 1968, but although it seems likely that this riparian species was found on either the River Hodder or the Dean Brook, which flow either side of Stoneyhurst College, there is insufficient information to ascribe the record to either watercourse and so it is not included in the analysis by river.

River stretches identified as historically supporting ERS invertebrates have been virtually surveyed using Google Earth to identify any contemporary ERS deposits of potential value to ERS invertebrates and these have been mapped for each river. Whilst it is possible to recognise in-channel ERS deposits from Google Earth, sandy deposits on riverbanks are much harder to detect as they are often covered in vegetation in the summer months. Even when ERS deposits are identified it is not possible to say whether they are in suitable condition to support ERS invertebrates without a site visit. Adjacent land use can give a clue to the likely condition of a deposit; in pastureland trampling and dunging from grazing stock is likely to greatly reduce invertebrate interest and in built up areas heavy trampling from people can be equally damaging. These local impacts can change from year to year, if for example the field adjacent to an ERS deposit is given over to arable rather than grazed pasture. Thus much of the ERS deposits identified by remote survey will be revealed to be of limited value to ERS invertebrates when inspected on the ground. A few of the ERS deposits identified by remote survey were considered more likely to be of ERS invertebrate value and these have been highlighted with a yellow fill in the maps.

With 71 ERS species, the River Dane shows the highest diversity of specialist ERS species, closely followed by the River Bollin with 68 species, whilst the Lune ranks third with 42 species and the Weaver fourth with 28 ERS species (Table 6). These four rivers have each been the subject of targetted surveys in recent years and so it is perhaps not surprising that they have the highest numbers of specialist species recorded. It is also likely that these rivers were chosen for survey because of their known ERS invertebrate interest, so their position at the top of the rankings is quite probably fully justified.

These rankings are altered when the ERSQI is calculated for rivers from which more than 15 high fidelity ERS species have been reported (Table 7). The Lune achieves the highest ERSQI, followed in descending order by the Bollin, Dane, Hodder, Weaver and Goyt.

It is interesting to see which rivers without recent, targeted surveys feature near the top of the rankings, as these rivers may well reward further targeted survey. The River Hodder and the Calder catchment (comprising records from the R. Calder, Pendle, Colne, Don, Brun, Sabden Brook and Ogden clough) both score very well with 21 and 23 ERS species respectively and ERS QI values of 510 and 517 respectively, higher than that for the R. Weaver. The ERS QI value for the Hodder would be considerably higher if the record of *Stenus fossulatus* from Stoneyhurst were included in the calculation and a search of riparian landslips along the Hodder could prove fruitful for this species.

A second tranche of rivers with historical records of 10 ERS species each; the Rivers Goyt, Etherow and Tame also deserve attention. The Irwell also has 10 ERS species reported, but this total is bolstered by an ongoing targeted survey of ERS invertebrates (Hewitt, in prep).

With 9 ERS species the River Alt at Hightown, Formby appears to have potential, but it may be that several of these records relate to the dunes rather than the river itself.

The River Wyre and its tributary, the Brock each have 7 ERS species reported. Taken together the combined total for these is 10 ERS species, putting it on a par with tranche 2 rivers. Virtual survey via Google Earth reveals some areas of ERS with apparently good potential for ERS invertebrates, which would merit checking on the ground.

With just 6 ERS species reported, the River Ribble ranks surprisingly poorly. The Hodder empties into the Ribble and, given the apparent high quality of the Hodder, one might expect that the Ribble would also produce some high value ERS deposits, at least downstream of the confluence with the Hodder. It may be that land use along the Ribble is not conducive to maintaining ERS deposits in favourable condition for specialised invertebrates. Google Earth remote survey does pick up some potentially valuable ERS deposits, which merit survey visits and it might be worth including the Ribble with the Hodder as a subject for further ERS invertebrate survey work.

Among the river systems with just a few ERS species recorded from them; Holden Clough, near Ashton-under-Lyne, has historical records of 5 ERS species and Google Earth survey suggests that the River Medlock, into which the beck flows, may also provide ERS invertebrate habitat. The catchment of the River Tonge above Bolton has records of 6 ERS invertebrate species, although remote survey using Google Earth indicates only small deposits of ERS which seem unlikely to be of high value to ERS specialist communities. Colin Johnson reported 3 species of ERS beetles from the River Keer at Carnforth. Remote survey using Google Earth did not detect any significant ERS deposits along this stretch of the river.

Individual species that might reward specific targeted searches include the rove beetle *Stenus fossulatus*. Stan Bowstead's 1968 record of this species at Stoneyhurst [SD6939] is an interesting extension to the known range of this species, which is otherwise only known in the UK from riparian landslips in Northumberland, Cumbria and the Scottish Borders (Hewitt, 2000; Sinclair, 2003). The record is derived from the species records card index at Manchester Museum and does not seem to have been published. There is no further information on the precise location but it could have been on the banks of the River Hodder, or possibly on the Dean Brook on the west side of the college.

Suggested priorities for future targeted ERS invertebrate surveys are 1) The Rivers Hodder & Ribble, including a specific search for *Stenus fossulatus*. 2) The Calder catchment. 3) The rivers Goyt, Etherow and Tame. 4) The Wyre catchment.

Acknowledgements

I am grateful to all the individuals and organisations who have generously shared their data towards the production of this report. The regional Local Environmental Records Centres covering Lancashire and Cheshire: Manchester Conservation Unit, Merseyside Biobank, RECORD and LERN supplied data that they hold on a supplied list of specialist invertebrates of exposed riverine sediments. Adam Bates kindly provided datasets of the species that he and colleagues had identified in the course of detailed surveys that they carried out on the Rivers Bollin, Dane and Weaver in Cheshire in 2005. Buglife gave permission for the use of data generated from survey work they had commissioned in 2006 - on the R. Weaver in Cheshire, supplied by Martin Drake and on the R. Lune in Lancashire, supplied by Andy Godfrey - and further survey on Cheshire rivers in 2007-8 conducted by John Parker and the present author. Dmitri Logunov at the Manchester Museum and Tony Hunter at World Museum, Liverpool kindly provided access to their invertebrate collections and records. Finally, Gary Hedges should be acknowledged for his encouragement, support and apparently endless patience.

Introduction

Riverine sand and shingle banks are recognised to support specialist invertebrate communities. A number of invertebrate species are specialists of exposed riverine sediments (ERS), showing high or total fidelity to this habitat and many of these species are regarded as nationally rare or scarce. ERS invertebrate communities have been and continue to be impacted by several factors affecting habitat quality; including river engineering, water pollution, dunging from farm stock, siltation and compaction of substrates, gravel extraction and invasive species. As a result several specialist ERS invertebrate species are of conservation concern and sites supporting rich communities of ERS invertebrates are of conservation significance. Some rivers in Lancashire and Cheshire are known to be of high value for their ERS invertebrate communities and have been the subject of thorough surveys in recent decades. There are scattered historical records for other rivers in the region which might be indicative of further river stretches with valuable deposits of ERS.

Definition of Exposed Riverine Sediments (ERS)

Bates (2006) defined ERS as:

Exposed, within channel, fluviially deposited sediments (gravels, sands and silts) that lack continuous vegetation cover, whose vertical distribution lies between the levels of bank-full and the typical base flow of the river.

Hewitt *et al.* (2007) subdivided ERS into two types with the following definitions:

“Exposed, recently deposited, fluvial sediments (gravels, sands and silts), with or without vegetation cover, on active river systems.”

This definition allows the inclusion of a number of ERS species that utilise ERS deposits which may be entirely vegetated, at least at certain times of year and fluvial deposits which may lie beyond bank-full levels. For example some *Nephrotoma* crane-fly species occur as larvae in fluviially deposited sand deposited under trees in floodplain woodland and the larvae of the UK BAP stiletto-fly *Clorismia rustica* utilise deposits of loose sand on top of riverbanks, which are arguably not “within channel”.

“Exposed, bare or partially vegetated sediment on naturally eroding riverbanks, created and maintained by geofluvial processes.”

This definition covers those beetle species identified by Bates (2006) as ERS, which are more usually found on eroding riverbanks. To this list they added the riparian landslip specialist rove beetle, *Stenus fossulatus*.

Specialist invertebrates of exposed Riverine sediments

A number of insects and spiders are largely or entirely reliant on ERS habitat for their survival. Such obligate ERS species principally occur in certain families of Coleoptera (beetles) and Diptera (flies) together with a few species of Hemiptera - Heteroptera (true bugs) and Araneae (spiders).

Fowles (2005) recognises two classes of high fidelity ERS species:

Fidelity 1: *Species dependant for at least some stage of their lifecycle on bare or sparsely vegetated sediments on the banks of rivers. Some of these species may also inhabit exposed lacustrine sediments, particularly where wave action forms banks of sediment on lake shores, as these features are in many ways ecologically similar to riverine shoals.*

Fidelity 2: *Species strongly associated with exposed riverine sediments for at least some stage of their lifecycle, but also occurring in a wide range of habitat types, such as flushes, seepages, pond margins, etc., where the presence of bare sediment is of fundamental importance for some stage of their lifecycle.*

Invertebrate species associated with ERS habitats have been listed by Eyre & Lott (1997) and refined for beetles by Sadler & Bell (2002), Fowles (2005) and Bates (2006). Information on flies associated with riverine habitats, including ERS, has been given by Godfrey (1999), Drake *et al.* (2007) and Hewitt *et al.* (2007).

This report follows the list of high fidelity ERS beetles given by Bates (2006)¹, spiders given by Sadler & Bell (2002), true bugs listed by Hewitt *et al.* (2007) and flies recognised by Hewitt (2017). The compound list of all these taxa is provided in Appendix 1.

¹ Plus *Stenus fossulatus* as added by Hewitt *et al.* (2007)

Methodology

This report comprises a desk study of information from previous ERS invertebrate surveys in the region, together with published records, data held by local environmental records centres and museum specimen data and record cards. By and large there has been no attempt to verify the validity of these records beyond what has been done by the data suppliers, although records of one species² have been omitted and comments are made on the data pertaining to other species in one or two instances within this report.

Organisations and individuals known to have conducted recent studies of ERS invertebrates in the region were approached and requested to provide a copy of the data arising from those surveys. A list of specialist ERS invertebrate species was identified (see Appendix 1) and local environmental records centres were approached with requests for data on these species. Visits were made to Manchester and Liverpool Museums and data for the recognised ERS specialist invertebrate species was extracted from the collections and from card indexes of regional records. The regional literature was trawled for reports of specialist ERS species. Data was entered into the Recorder 6 software and output to Excel spreadsheet to analyse, score and rank areas (hectads) and rivers across the region.

The collated data was analysed to identify river stretches of historical and/or contemporary value for ERS invertebrates. Google Earth was then used to conduct a virtual survey of these rivers and the locations of potential ERS deposits were identified.

Data sources:

Full datasets from the following surveys:

Bates, A.J. (2005) Visual survey of exposed riverine sediments (ERS) on the Dane, Weaver and Bollin catchments. Environment Agency Northwest South Region.

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.

ERS spp. data from R. Lune and R. Weaver surveys 2006. In Drake, C.M., Godfrey, A., Hewitt, S.M. and Parker, J. (2007) *Fly Assemblages of Sandy Exposed Riverine Sediment - Final Report*. Buglife: 1-184.

Hewitt, S.M. and Parker, J. (2008) *Distribution of the stiletto-fly Clorismia rustica on Cheshire rivers*. Buglife: 1-35.

Data from Local Environmental Records Centres:

ERS spp. data search results from Cheshire LRC (2017)

ERS spp. data search results from Lancashire LRC (2017)

ERS spp. data search results from Manchester Conservation Unit (2017)

ERS spp. data search results from Merseyside Biobank (2017)

Other data sources:

Bell, D. and Sadler, J.P. (2003) The coleopteran fauna of exposed riverine sediments on the River Dane, Cheshire: a survey report. Report for the Environment Agency Northwest South Region.

Brighton, P. (2017) *The Diptera of Lancashire and Cheshire: Craneflies and Winter Gnats*. Lancashire and Cheshire Entomological Society.

Brighton, P. (2019) *The Diptera of Lancashire and Cheshire: Empidoidea, Part 1*. Lancashire and Cheshire Entomological Society.

² *Thinobius newberyi* – see page 15 for details

Kidd, L.N. and Brindle, A. (1959) *The Diptera of Lancashire and Cheshire. Part 1*. Lancashire and Cheshire Fauna Committee. 136pp.
Kidd, L.N. (1964) *The Diptera of Lancashire and Cheshire, Part 1 (Supplement)*. Lancashire and Cheshire Fauna Committee.
ERS spp. records held on card index at Manchester Museum
ERS spp. collections data held on card index at Manchester Museum
ERS spp. collections data held on card index at Liverpool Museum
Jennifer Newton ERS spp. data for R. Lune 2002-03
S. M. Hewitt data from ERS surveys in Lancashire in 2019-20

Analysis of the conservation value of ERS

The number of ERS species recorded at a 'site' gives a rough indication of the conservation interest of each 'site' but is affected by recording effort and also does not take into account the greater conservation value of 'sites' holding more rare and scarce species. Fowles *et al.* (1999) described a method of evaluating the conservation value of woodlands for saproxylic insects based on a system of awarding rarity scores to high-fidelity saproxylic species according to their national rarity status, the rarer species being awarded higher values. Sites could then be compared and ranked according to the calculated Saproxylic Quality Index (SQI). Sadler and Bell (2002) adapted this system for use with ERS beetles. The Sadler and Bell rarity scores, as adapted in Bates (2006), were adopted by Hewitt *et al.* (2007) and extended from ERS beetles to include other ERS taxa. This method of analysis has been used again in this report³.

The rarity scores accorded to each rarity designation are:

Common = 1, Local = 2, Very Local/Nr = 4, Nb/Notable/Nationally Scarce = 8, Na/RDBK = 16, RDB3/RDBI/Near Threatened/Data Deficient = 24, RDB2/VU and RDB1/EN = 32.

'Common', 'Local' and 'Very Local' designations are taken from Bates (2006) and Hewitt *et al.* (2007). Other designations are specified by JNCC as represented on the RECORDER 6 software: Version 6.26.2.286, Dictionary Version 0000004S, Database Version 000000C3. Some species that had National designation in Bates (2006) have subsequently been re-appraised and removed from the lists of designated species. These species are here attributed the status of 'Very Local' for the purposes of this report.

Awarding higher values to the rarer species enables the sites to be scored according to the number and rarity of specialist species recorded (ERS Quality Score). The score for each site can be divided by the total number of ERS species recorded, in an attempt to provide a balance to recording effort. This figure is referred to as the ERS Quality Index (ERS QI). It has been found that ERSQI values become unreliable when low numbers of species are used in the calculation and it has been recommended that ERSQI scores should be calculated using a minimum of 15 qualifying species.

³ *Pantheon* is a useful web-based application developed by Natural England and the Centre for Ecology & Hydrology to analyse invertebrate sample data. Although *Pantheon* recognises a number of species as having an association with ERS and will automatically calculate SQI scores for species lists, the *Pantheon* list of ERS species is not presently the same as that recognised in this report and so *Pantheon* has not been used in the analysis in this report. The rarity values accorded to different designations also differs between *Pantheon* and the system used in this report, although the principle of the calculation is the same.

Results and analysis

7,741 records of 904 species have been collated from the sources listed above. Since many of the records collated are historical and without original grid references, it has often been possible only to attribute geo-references to hectad level. Therefore hectad level analysis provides the most comprehensive visualisation of the distribution data.

Of these 7,741 records, 2,467 are of 143 different species in Lancashire or Cheshire considered to have high or total fidelity to ERS as defined by Bates (2006), Hewitt *et al.* (2007) and Hewitt (2017).

124 species in the collated data are designated as nationally rare or scarce, of which 81 are considered to exhibit high fidelity to ERS:

RDB1 – 1 species, *Stenus fossulatus*, which is considered to be a specialist of riparian landslips.

VU - 3 species in total, of which 2 are ERS specialists.

RDB3/Nationally Rare - 8 species in total, of which 6 are ERS specialists.

RDB I –11 species in total, of which 8 are ERS specialists

Data Deficient – 3 species, one of which, *Platypalpus ochrocer*, is an ERS specialist. A further 4 species, which are considered to be ERS specialists, have been added to the British list so recently that their status has not been reviewed and these have been assigned a designation of Data Deficient for the purposes of this report. These additional species are *Rhabdomastix eugeni*, *Hololabis yezoana*, *Tachydromia edenensis* and *Rhegmoclemina lunensis*.

Near Threatened - 9 species in total, of which 7 are ERS specialists.

Na – 6 species in total, of which 3 are ERS specialists.

Nationally Scarce/Notable/Nb –80 species in total, of which 49 are ERS specialists.

142⁴ specialist ERS species reported from Lancashire and Cheshire are included in the analysis and represent 68% of the total number of high fidelity ERS species recognised in the UK. Table 1 breaks down this total by taxon group.

Table 1

High fidelity ERS taxa in Lancashire & Cheshire as a percentage of the national pool

High fidelity ERS Taxa	National pool	Lancashire & Cheshire totals	L&C % of National Pool
Spiders	4	3	75
Beetles	129	92	71
Flies	68	44	65
Bugs	5	3	60
Total ERS species	206	142	68

Figure 1 presents the all data collated for this report in map form, with the geographic resolution of records plotted as grid squares and figures 2 and 3 map all records per hectad by number of records and number of species respectively.

⁴ *Thinobius newberyi* records are considered doubtful and have not been included in subsequent analysis of ERS value. See species account on p.14.

Figure 1. All records collated for this report, presented as grid squares

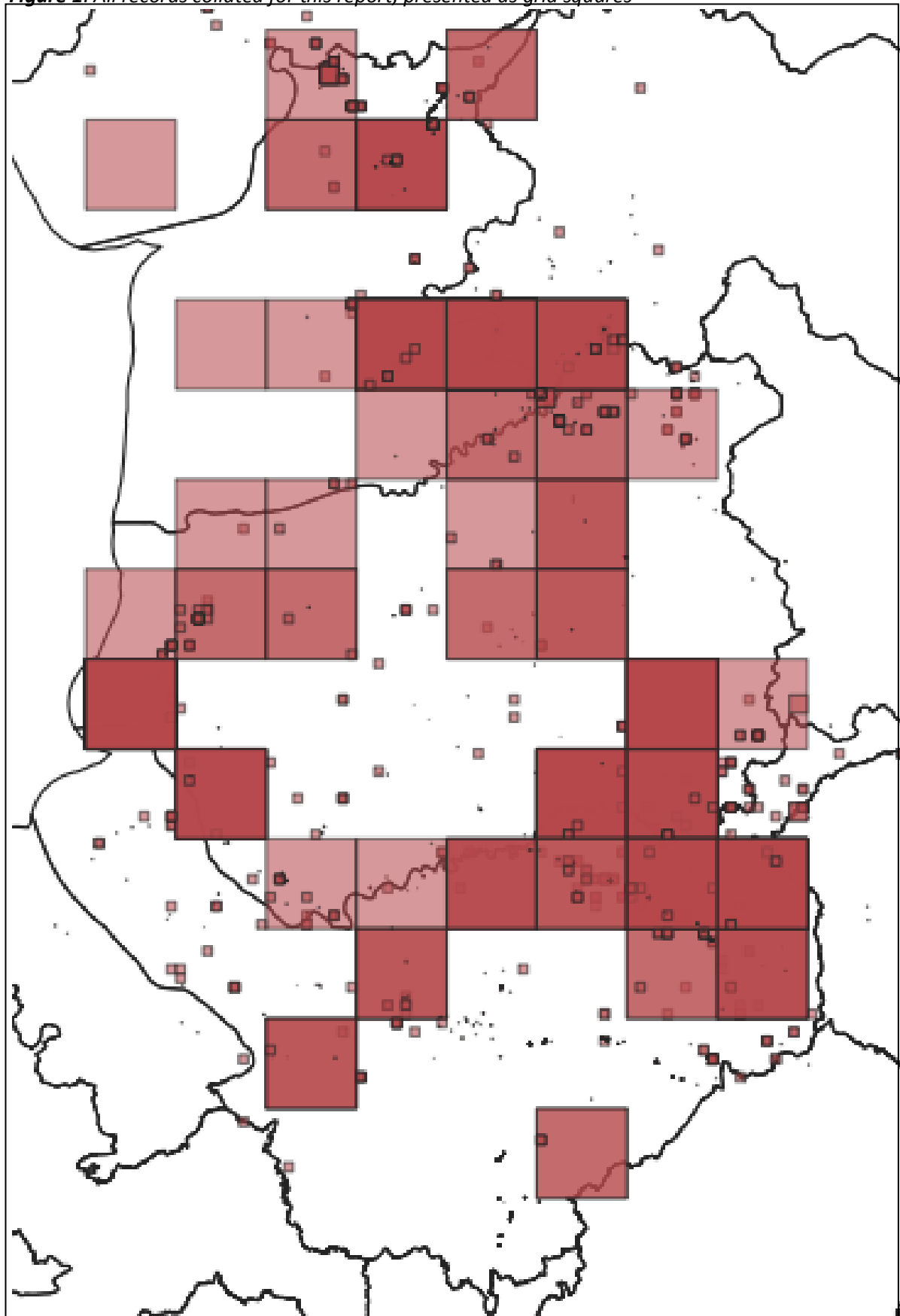


Figure 2. Hectad heat map of all records collated for this report by number of records.

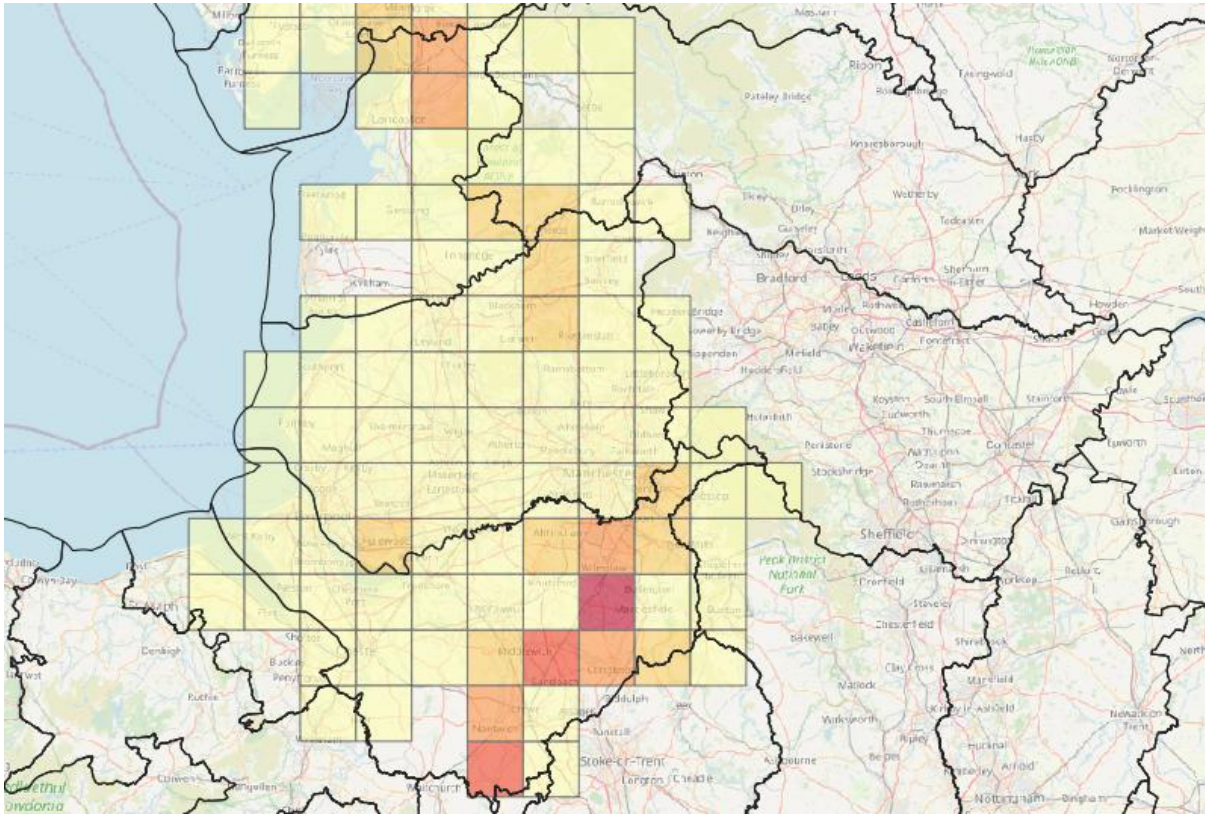
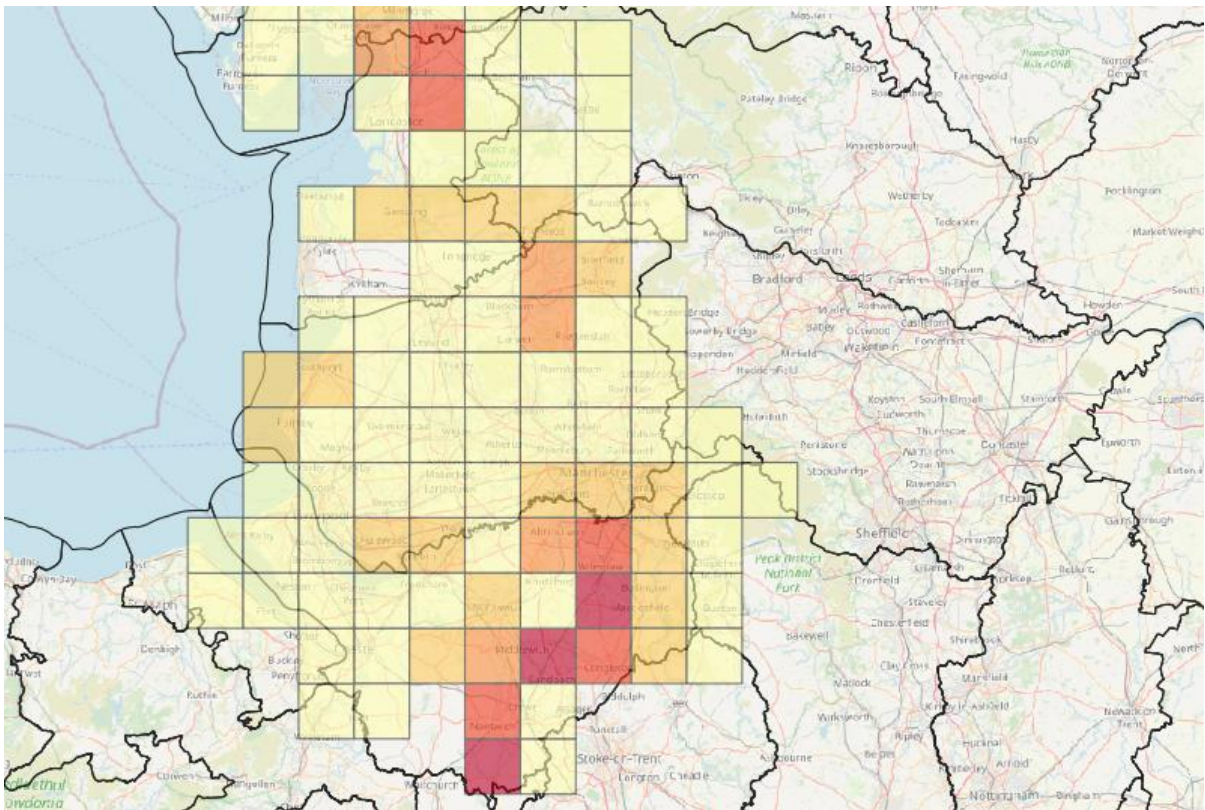


Figure 3. Hectad heat map of all records collated for this report by number of species.



High Fidelity ERS invertebrates reported from Lancashire and Cheshire

Table 2 lists all high fidelity ERS invertebrate species reported for Lancashire and Cheshire to date. Accounts of the 23 different high fidelity ERS invertebrates which have a designation of nationally rare or higher are given below and Appendix 2 provides brief accounts, derived from the RECORDER 3 software, of all ERS species reported from Lancashire and Cheshire.

Table 2. High fidelity ERS invertebrate species reported from Lancashire and Cheshire

Taxon	Status ¹	No. Hectads	No. Records
Araneae			
Linyphiidae			
<i>Caviphantes saxetorum</i> (Hull, 1916)	NT	1	4
Lycosidae			
<i>Arctosa cinerea</i> (Fabricius, 1777)	Local	3	24
<i>Pardosa agricola</i> (Thorell, 1856)	Common	11	74
Coleoptera			
Aegialiidae			
<i>Aegialia insularis</i> Pittino, 2006	Notable-B	9	14
Carabidae			
<i>Agonum micans</i> Nicolai, 1822	Common	7	11
<i>Amara fulva</i> (Müller, O.F., 1776)	Notable-B	14	25
<i>Asaphidion flavipes</i> (Linnaeus, 1761)	Common	18	36
<i>Asaphidion pallipes</i> (Duftschmid, 1812)	Notable-B	4	5
<i>Bembidion articulatum</i> (Panzer, 1795)	Very Local	7	12
<i>Bembidion atrocaeruleum</i> (Stephens, 1828)	Common	15	31
<i>Bembidion bipunctatum</i> (Linnaeus, 1761)	Notable-B	5	7
<i>Bembidion decorum</i> (Zenker in Panzer, 1800)	Common	15	63
<i>Bembidion dentellum</i> (Thunberg, 1787)	Local	16	24
<i>Bembidion femoratum</i> Sturm, 1825	Common	17	41
<i>Bembidion fluviatile</i> Dejean, 1831	NT	7	13
<i>Bembidion geniculatum</i> Heer, 1837/8	Very Local	8	14
<i>Bembidion gilvipes</i> Sturm, 1825	Notable-B	2	2
<i>Bembidion lunatum</i> (Duftschmid, 1812)	Notable-B	11	15
<i>Bembidion monticola</i> Sturm, 1825	Notable-B	10	17
<i>Bembidion prasinum</i> (Duftschmid, 1812)	Local	1	1
<i>Bembidion punctulatum</i> Drapiez, 1821	Common	11	82
<i>Bembidion quadripustulatum</i> Audinet-Serville, 1821	Notable-B	2	2
<i>Bembidion stomoides</i> Dejean, 1831	Notable-B	8	13
<i>Bembidion tibiale</i> (Duftschmid, 1812)	Common	21	116
² <i>Blemus discus</i> (Fabricius, 1792)	Notable-B	4	10
<i>Bracteon litorale</i> (Olivier, 1790)	Notable-B	9	50
<i>Clivina collaris</i> (Herbst, 1784)	Common	18	37
<i>Dyschirius aeneus</i> (Dejean, 1825)	Very Local	3	5
<i>Elaphropus parvulus</i> (Dejean, 1831)	Notable-B	6	18
<i>Thalassophilus longicornis</i> (Sturm, 1825)	Notable-A	3	4
Coccinellidae			
<i>Coccinella quinquepunctata</i> Linnaeus, 1758	RDB3	10	13
Dryopidae			
<i>Dryops nitidulus</i> (Heer, 1841)	NT	7	17

Taxon	Status ¹	No. Hectads	No. Records
Elateridae			
<i>Fleutiauxellus maritimus</i> (Curtis, 1840)	Notable-A	3	3
<i>Zorochochros minimus</i> (Lacordaire, 1835)	Common	11	27
Heteroceridae			
<i>Heterocerus marginatus</i> (Fabricius, 1787)	NS-excludes	8	22
Hydraenidae			
<i>Hydraena gracilis</i> Germar, 1824	Common	37	83
<i>Hydraena nigrita</i> Germar, 1824	Local	9	16
<i>Hydraena rufipes</i> Curtis, 1830	Nationally Scarce	1	1
<i>Ochthebius bicolon</i> Germar, 1824	Common	9	21
Hydrophilidae			
<i>Georissus crenulatus</i> (Rossi, 1794)	Nationally Scarce	3	7
<i>Helophorus arvernicus</i> Mulsant, 1846	Common	12	25
Ptiliidae			
<i>Ptenidium brenskiei</i> Flach, 1887	Notable	3	5
Staphylinidae			
<i>Acrotona exigua</i> (Erichson, 1837)	RDBK	2	15
<i>Aloconota cambrica</i> (Wollaston, 1855)	Local	9	17
<i>Aloconota currax</i> (Kraatz, 1856)	Local	4	7
<i>Aloconota eichhoffi</i> (Scriba, 1867)	Notable	2	4
<i>Aloconota insecta</i> (Thomson, C.G., 1856)	Local	16	38
<i>Aloconota sulcifrons</i> (Stephens, 1832)	Local	18	26
<i>Biblopectus minutissimus</i> (Aubé, 1833)	RDB-I	3	5
<i>Bledius annae</i> Sharp, 1911	Very Local	15	19
<i>Bledius erraticus</i> Erichson, 1839	RDB-I/Vulnerable ⁵	1	1
² <i>Bledius longulus</i> Erichson, 1839		9	16
<i>Bledius subterraneus</i> Erichson, 1839	Local	20	100
<i>Bledius terebrans</i> (Schiødte, 1866)	RDB-I/Vulnerable ⁵	3	6
<i>Brachygluta pandellei</i> (Saulcy, 1876)	RDB-I	1	2
² <i>Carpelimus gracilis</i> (Mannerheim, 1830)	Nationally Scarce ⁵	5	17
<i>C. manchuricus subsp. subtilicornis</i> (Roubal, 1946)	Very Local	3	4
<i>Carpelimus similis</i> Smetana, 1967	Notable	5	8
<i>Carpelimus subtilis</i> (Erichson, 1839)	Notable/Nat. Scarce ⁵	2	4
<i>Dasygnypeta velata</i> (Erichson, 1837)	Notable	1	1
<i>Deleaster dichrous</i> (Gravenhorst, 1802)	Notable-B	10	22
<i>Erichsonius signaticornis</i> (Mulsant & Rey, 1853)	Notable-B/Nat. Scarce ⁵	4	4
<i>Gnypeta carbonaria</i> (Mannerheim, 1830)	Local	9	10
² <i>Gnypeta rubrior</i> Tottenham, 1939		3	4
<i>Hydrosmeeta delicatissima</i> (Bernhauer, 1908)	RDB-I	1	14
<i>Hydrosmeeta eximia</i> (Sharp, 1869)	Very Local	2	2
<i>Hydrosmeeta fragilis</i> (Kraatz, 1854)	Notable	1	2
<i>Hydrosmeeta longula</i> (Heer, 1839)	Notable	3	16
<i>Hydrosmeeta subtilissima</i> (Kraatz, 1854)	Notable	8	26
<i>Ischnopoda scitula</i> (Erichson, 1837)	RDB-I	3	4
<i>Ischnopoda umbratica</i> (Erichson, 1837)	Very Local	1	1
<i>Lathrobium angusticolle</i> Boisduval & Lacordaire, 1835	Notable-B	2	8
<i>Lathrobium pallidipenne</i> Hochhuth, 1851	Notable/Nat. Scarce ⁵	11	12
<i>Meotica anglica</i> Benick in Muona, 1991	Notable	3	4
<i>Neobisnius prolixus</i> (Erichson, 1840)	RDB-I/Nat. Scarce ⁵	1	1
<i>Ocalea latipennis</i> Sharp, 1870	Very Local	2	2
<i>Ochtheophilus andalusiacus</i> (Fagel, 1957)	Notable/Nat. Scarce ⁵	3	10
<i>Ochtheophilus angustior</i> (Bernhauer, 1943)	Very Local/Nat. Scarce ⁵	3	6

Taxon	Status ¹	No. Hectads	No. Records
<i>Ochtheophilus aureus</i> (Fauvel, 1871)	Common	4	5
<i>Ochtheophilus omalinus</i> (Erichson, 1840)	Local	11	27
<i>Oxypoda exoleta</i> Erichson, 1839	Notable	6	13
<i>Philhygra debilis</i> (Erichson, 1837)	Very local	3	7
<i>Philhygra scotica</i> (Elliman, 1909)	Notable	2	3
<i>Stenus comma</i> Le Conte, 1863	Local	9	34
<i>Stenus fossulatus</i> Erichson, 1840	RDB1 Endangered	1	1
<i>Stenus guttula</i> Müller, P.W.J., 1821	Common	15	45
<i>Tachyusa coarctata</i> (Erichson, 1837)	Notable	5	22
<i>Tachyusa constricta</i> (Erichson, 1837)	Local	10	24
<i>Tetralaucopora longitarsis</i> (Erichson, 1837)	Local	10	12
<i>Tetralaucopora rubicunda</i> (Erichson, 1837)	Notable	4	4
<i>Thinobius bicolor</i> Joy, 1911	Notable-A/ Nat. Scarce ⁵	1	3
<i>Thinobius crinifer</i> Smetana, 1959	Notable/ Nat. Scarce ⁵	1	1
³ <i>Thinobius newberyi</i> Scheerpeltz, 1925	RDB-I/ Nat. Scarce ⁵	3	6
<i>Thinodromus arcuatus</i> (Stephens, 1834)	Local	6	9
<i>Thinonoma atra</i> (Gravenhorst, 1806)	Very Local	8	8
Diptera			
Anthomyiidae			
<i>Myopina myopina</i> (Fallén, 1824)	Local	4	4
Athericidae			
<i>Ibisia marginata</i> (Fabricius, 1781)	Local	3	5
Dolichopodidae			
<i>Diaphorus hoffmanseggii</i> Meigen, 1830	Nationally Rare	1	1
<i>Dolichopus longicornis</i> Stannius, 1831	Local	21	69
<i>Rhaphium gravipes</i> Haliday in Walker, 1851	Vulnerable	1	3
<i>Rhaphium nasutum</i> (Fallén, 1823)	Nationally Scarce	1	1
<i>Rhaphium patulum</i> (Raddatz, 1873)	Vulnerable	1	1
<i>Rhaphium penicillatum</i> Loew, 1850	Nationally Rare	1	2
<i>Rhaphium riparium</i> (Meigen, 1824)	Nationally Scarce	12	18
<i>Rhaphium suave</i> (Loew, 1859)	Nationally Rare	1	2
Empididae			
<i>Hilara albiventris</i> von Roser, 1840	Nationally Scarce	7	19
<i>Hilara biseta</i> Collin, 1927	Nationally Scarce	3	7
<i>Hilara pseudochorica</i> Strobl, 1892	Nationally Scarce	5	13
Ephydriidae			
<i>Athyroglossa glabra</i> (Meigen, 1830)	Local	8	49
<i>Ditrichophora palliditarsis</i> (Becker, 1896)	Local	7	45
Hybotidae			
<i>Platypalpus melancholicus</i> (Collin, 1961)	NT	7	33
<i>Platypalpus ochrocera</i> (Collin, 1961)	Data Deficient	1	1
<i>Platypalpus subtilis</i> (Collin, 1926)	Nationally Scarce	1	1
<i>Symbalophthalmus pictipes</i> (Becker, 1889)	Nationally Scarce	1	2
<i>Tachydromia costalis</i> (von Roser, 1840)	NT	8	23
<i>Tachydromia edenensis</i> Hewitt & Chvála, 2002	Data Deficient ⁴	1	1
<i>Tachydromia halidayi</i> (Collin, 1926)	Nationally Scarce	2	6
<i>Tachydromia morio</i> (Zetterstedt, [1838])	Local	4	8
<i>Tachydromia woodi</i> (Collin, 1926)	NT	2	3
Limoniidae			
<i>Arctoconopa melampodia</i> (Loew, 1873)	NT	7	25
<i>Hexatoma bicolor</i> (Meigen, 1818)	Local	1	12
<i>Hexatoma fuscipennis</i> (Curtis, 1836)	Local	1	8

Taxon	Status	No. Hectads	No. Records
<i>Hoplolabis areolata</i> (Siebke, 1872)	Local	12	57
<i>Hoplolabis vicina</i> (Tonnoir, 1920)	Local	12	28
<i>Hoplolabis yezoana</i> (Alexander, 1924)	Data Deficient ⁴	4	19
<i>Rhabdomastix edwardsi</i> Tjeder, 1967	Local	4	10
<i>Rhabdomastix eugeni</i> Stary, 2004	Data Deficient ⁴	1	1
<i>Rhabdomastix japonica</i> Alexander, 1924	RDB3 Rare	3	8
<i>Symplecta meigeni</i> (Zetterstedt, [1838])	RDB3 Rare	2	2
Lonchopteridae			
<i>Lonchoptera nigrociliata</i> Duda, 1927	Nationally Scarce	8	31
Pediciidae			
<i>Dicranota guerini</i> Zetterstedt, [1838]	Notable	6	17
<i>Dicranota robusta</i> Lundström, 1912	Notable	8	29
<i>Dicranota subtilis</i> Loew, 1871	Local	26	59
Scatopsidae			
<i>Anapausis talpae</i> (Verrall, 1912)	Local	2	10
<i>Rhegmoclemina lunensis</i>	Data Deficient ⁴	2	10
Therevidae			
<i>Clorismia rustica</i> (Panzer, [1804])	Nationally Scarce	9	26
<i>Spiriverpa lunulata</i> (Zetterstedt, [1838])	Nationally Scarce	1	4
Tipulidae			
<i>Nephrotoma analis</i> (Schummel, 1833)	Local	16	48
<i>Nephrotoma dorsalis</i> (Fabricius, 1782)	Notable	8	16
<i>Nephrotoma lunulicornis</i> (Schummel, 1833)	Notable	10	25
Hemiptera			
Dipsocoridae			
<i>Cryptostemma alienum</i> Herrich-Schaeffer, 1835	Local	4	7
Saldidae			
<i>Macrosaldula scotica</i> (Curtis, 1835)	Local	5	14
<i>Saldula c-album</i> (Fieber, 1859)	Common	13	22
Total No. Records of ERS species			2467

- 1 'Common', 'Local' and 'Very Local' designations are taken from Bates (2006) and Hewitt (2017). Other designations are specified by JNCC as represented on the RECORDER 2000 software: Version 6.26.2.286, Dictionary Version 0000004S, Database Version 000000C3. Some species that had a national designation in Bates (2006) have subsequently been re-appraised and removed from the lists of designated species. These species are here given the status of 'Very Local'.
- 2 Species are included in Fowles (2003) list of High Fidelity ERS beetles, but not included in Bates (2006) list. These species have been omitted from some subsequent analysis of ERS value.
- 3 *Thinobius newberyi* records are considered doubtful and have not been included in subsequent analysis of ERS value – see page 14.
- 4 Species that have been added to the British list in recent years as a result of surveys of exposed riverine sediments and not included in recent Status Reviews have been given a designation of 'Data Deficient' in this report.
- 5 During the final stages of completing this report, Boyce (2022) published a review of the status of some sub-families of Staphylinidae. Where the revised status is different to that previously given to a species, it is listed here after the previous status. The analyses in this report are based on the previous status and no attempt has been made to adjust them in the light of the Boyce review.

Accounts of ERS species designated as nationally rare

Accounts of those high fidelity ERS invertebrates recorded from Lancashire and Cheshire with a national designation of Nationally Rare, Near Threatened or Data Deficient are presented below. Species with the historical 'equivalent' to these designations (Red Data Book categories RDB1, RDB2, RDB3, RDBI, RDBK) which have not been subject to recent taxon status reviews are also included. Species are listed in descending order by designation status. Text in italics is taken from the RECORDER 3.3 species accounts (1997).

Thinobius newberyi **Coleoptera** **Staphylinidae** **RDB Indet.**

Tiny translucent yellow rove beetle, living deep within riparian shingle. Known only from Lancs, Cumbria, Easternness and Cardiganshire. Rare, but very likely to be under-recorded owing to its secretive habits.

Thinobius newberyi records were part of the dataset supplied by Cheshire LRC. There are four records from four different sites on the river Dane, attributed to an anonymous recorder at the Environment Agency on different dates in April 1999. *T. newberyi* has only been reported from a handful of sites in Wales, Cumbria and Scotland (Hewitt, 2017b; Cooter, 2017). Unlike some other species of *Thinobius*, it is not a spring species and the adult only occurs in the summer and autumn. The records from the R. Dane in April are therefore considered doubtful and have not been included in subsequent analysis of ERS value. It is curious that the RECORDER 3.3 account (which pre-dates the EA 1999 records) mentions an occurrence in "Lancs", but no evidence in support of that statement has been encountered in the compilation of this report.

Stenus fossulatus **Coleoptera** **Staphylinidae** **RDB1**

Small rove beetle found in wet moss by fast streams. Very rare, only recorded in county Durham.

The rove beetle *Stenus fossulatus* was known only from Castle Eden Dene near Hartlepool before it was discovered on riparian landslips on the Irthing in Cumbria in 1999 (Hewitt, 2000) and subsequently on further riparian landslips in the county. It has otherwise apparently only been reported in Britain from near Hawick (Sinclair, 2003; Lott & Anderson, 2011).



The Manchester Museum record cards carry an interesting record of this species at Stoneyhurst [SD6939] found by Stan Bowstead on 18 May 1968, which appears not to have been previously published. Given the requirement of this species for riparian landslips, this record is likely to relate the banks of a nearby river. The River Hodder seems likely, although it could alternatively have been on the Dean Brook on the west side of the college or even on the Ribble which also flows nearby*.

* Gary Hedges has subsequently spoken to Stan Bowstead about this record and although Stan does not recall collecting the species, he does remember finding *Stenus* beetles on the banks of the Hodder at Stoneyhurst. Dmitri Logunov has confirmed that there is a specimen labelled *S. fossulatus* collected by Stan Bowstead from 'Stoneyhurst' in the collection of Manchester Museum and Gary Hedges has now examined the specimen and confirmed the determination (Gary Hedges, pers. comm.).

Rhaphium gravipes

Diptera

Dolichopodidae

Vulnerable

The known distribution is in very localised clusters in Scotland and northern England, but it is rarely recorded elsewhere. Probably associated with exposed sediments of stony rivers. The very clumped distribution suggests a rare species which may be susceptible to decline in its preferred ERS habit (Drake, 2018).

There is a single record from Bowdon [R. Bollin] found by Benjamin Cooke in 1880 (Kidd & Brindle, 1959) and it may be that this may have been a misidentification of the closely similar *R. suave* recently added to the British list from specimens collected in Cheshire (Drake, 2007).



Rhaphium patulum

Diptera

Dolichopodidae

Vulnerable

Found mainly in Scotland with scattered records in England and Wales, some of which may be errors as the habitats do not fit with those for Scotland. The associations are unclear but the species may depend on fine sediments (sand, mud) by rivers and pits, although also recorded from reed-dominated fen (Drake, 2018).

The only record of this species is of one collected at Wallsuches Works (SD658114) on 14 June 1982 by G. Hancock, supplied by MCU. This site is not ERS or riparian in nature. Geoff Hancock was curator at Bolton museum and there may be a voucher specimen for this record in the collection there.



Tachydromia edenensis

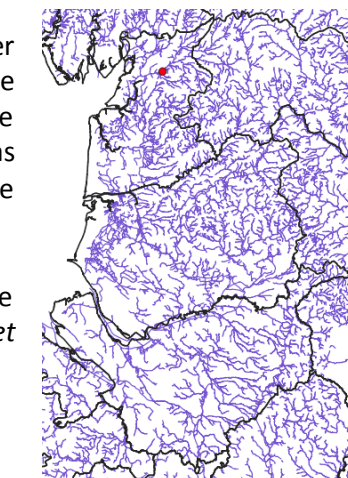
Diptera

Hybotidae

Data Deficient

A small predatory fly which pursues its prey by sight by running over bare surfaces, *T. edenensis* is restricted to bare, sandy sediment on the tops of ERS deposits. First described from specimens collected on the River Eden in Cumbria in 2000 (Hewitt & Chvala, 2002), the species has subsequently been found on the Rivers Tay and Nith in Scotland; the Coquet, Till, Swale and Lune in England; and on one river in Wales.

The only record for Lancashire and Cheshire is that for the Lune where Andy Godfrey found it on ERS at Caton (SD53866531) in 2006 (Drake *et al.* 2007).

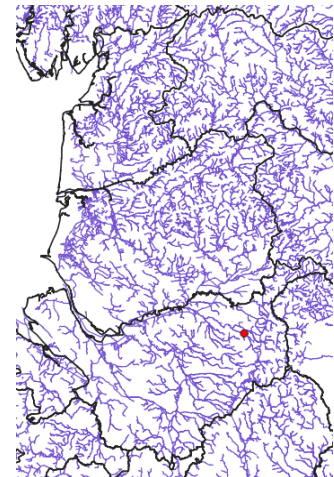


Platypalpus ochrocera**Diptera****Hybotidae****Data Deficient**

Small fly recorded from damp broad-leaved woodland. Biology unknown. Only one confirmed British record from Herefordshire, though there is also an unconfirmed record from Norfolk.

The only confirmed British record was from 1911 at Mains Wood, Herefordshire (Collin, 1961). Then in 2005 it was recorded by Andy Godfrey on the R. Ure, Yorkshire. Subsequently, several specimens have been reared from soil emergence traps set on sand deposits on river banks on the King Water in Cumbria and the Tummel in Perthshire.

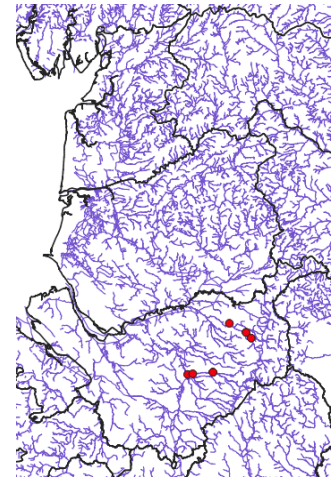
The only record for Lancashire and Cheshire is from sandy deposits on the R. Bollin at Newton Hall (SJ877805), where five specimens were swept on 31 July 2007 (Hewitt & Parker, 2008; Hewitt, 2016).

***Hoplolabis yezoana*****Diptera****Limoniidae****Data Deficient**

A pale brown crane-fly found on lowland rivers with exposed shoals of sandy sediment (Stubbs, 2021).

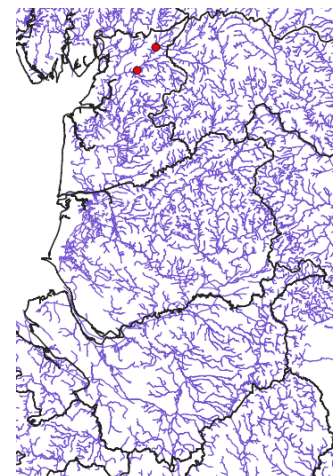
Hoplolabis yezoana was first discovered in Ireland in 1987 (Stubbs, 2021) and found new to Great Britain by John Parker in 2004 from the rivers Irthing and King Water in Cumbria (Hewitt *et al.*, 2005; Parker, 2006). The species was subsequently recorded from sandy ERS on other rivers in the Eden catchment in Cumbria and on the Usk in south Wales and the Tay in Scotland (Drake *et al.*, 2007).

The sandy lowland rivers of Cheshire provide ideal habitat for this species and it was first recorded for Lancashire & Cheshire on the Dane at Middlewich in 2005 (Bates *et al.*, 2006). Survey of Cheshire rivers by Hewitt and Parker (2008) found additional locations for the species on the Dane at Saltersford (SJ772678), Bostock House (SJ692671) and Holmes Chapel (SJ772678); and on the Bollin at Newton Hall (SJ877805), Prestbury (SJ893787) and Styal Park (SJ824834).

***Rhegmoclemina lunensis*****Diptera****Scatopsidae****Data Deficient**

This tiny fly was described from specimens collected on the River Lune (Haenni & Godfrey, 2009). It has subsequently been found in soil emergence traps set on sandy ERS on the King Water in Cumbria and the Tummel in Perthshire.

The only records for the area of the present study are those from the type locality on the Lune at Bromfield (SD5972) where it occurred in four different sample locations within the monad, and at Caton (SD5365) where it was found at two separate locations within the monad (Drake *et al.* (2007).



Rhaphium penicillatum

Diptera

Dolichopodidae

Nationally Rare

Recorded mainly in western England and Wales, with outlying records from south-east England and Perthshire in the 1980s, and a very old one from Kent. Associated mainly with the margins and exposed sediments of stony and sandy rivers, with a probable preference for sandy deposits. More records have been obtained recently so that the species appears to be expanding its range but this is due to targeting its habitat (ERS) so this change is illusory (Drake, 2018). It has been reared from a larva collected in a sandy backwater channel of a river shingle bank in Cumbria.

There are just two records of *R. penicillatum* in Lancashire and Cheshire, both from ERS on the River Weaver, at Batherton Hall (SJ65714998) and Coole Hall Farm (SJ65964596) in July 2006 (Drake *et al.*, 2007).



Thalassophilus longicornis

Coleoptera

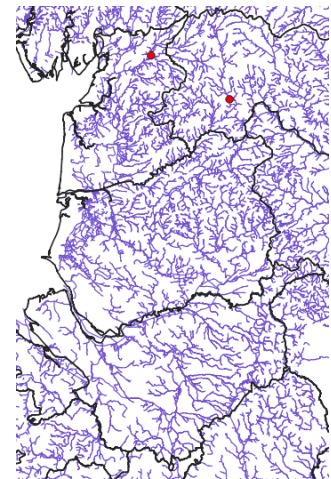
Carabidae

Nationally Rare

Small (3.5-4mm) flattened red/brown ground beetle living among riverine shingle. North western species. Wales and Marches, Cumbria and W Scotland. Rare.

Other than a record from the coast of Kent, the only other recent records for England are from the rivers Coquet and Beamish in Northumberland. There is a 19th century record for the R. Irthing in Cumbria. There are several recent records for Wales and a few for Scotland.

Fowler (1887-91, 1913) reported the species from Lancashire (this record is given the grid ref SD8355 on the Manchester Museum record cards, placing it on the River Ribble near Long Preston) and it was recorded by S. Williams from the Lune at Gressingham in 1965 (MM record cards).



Rhaphium suave

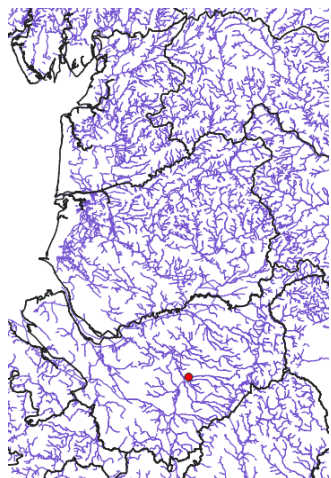
Diptera

Dolichopodidae

Nationally Rare

Rhaphium suave has a disjunct distribution, being known only from single sites in Gwent (VC35), Cheshire (VC58) and Northumberland (VC68). However, it was only found in Britain in 2005-6 so it is probably more widespread. The only British records are from the margins of large sandy rivers in their piedmont stage where there are exposed sediments and sparse or tall marginal herbaceous vegetation, or willow scrub. There appears to be a preference for wet sandy shores with silt with nearby taller vegetation providing some shade. The larvae may be aquatic. Its recent recognition and wide distribution suggests that *R. suave* is unlikely to be Vulnerable but the restricted habitat could lead to it being given a higher status in future (Drake, 2018).

The Cheshire record is based on 5 males collected by Martin Drake at Ravenscroft Bridge on the river Dane (SJ70836733) on 9 July 2005 (Drake, 2007).



Diaphorus hoffmanseggii

Diptera

Dolichopodidae

Nationally Rare

A riverine species of shaded sandy river margins, usually found on sand or pebbles, less often in dense bank vegetation, or in the shade of fringing trees. This fly is known only from the rivers Monnow, Dore, Dane and Rother, all of which have a large proportion of sandy sediments. Recorded in <15 post-1989 hectads, stable but very limited in distribution and habitat requirement (Drake, 2018).

The only record for the region is of 3 females swept by Martin Drake on the River Dane at Salterford Bridge (SJ77506775) on 9 July 2005 (Bates *et al.*, 2006)



Dryops nitidulus

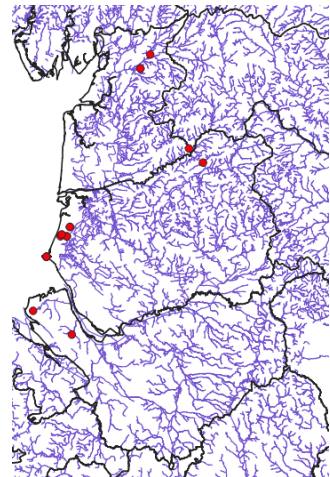
Coleoptera

Dryopidae

Near Threatened

Small grey beetle living among gravel at the side of northern and western rivers. Very rare species, few modern records.

14 records of this beetle have been collated for Lancashire and Cheshire, including finds by Colin Johnson on river shingle at Low Hodder Bridge (SD7039) in 1964 and the Lune at Gressingham (SD581694) in 1966. There are also several records from sand dune systems: from Birkdale (SD3214), by W.E. Sharp from around the turn of the 20th Century and G.W. Chaster in 1904. West Kirby Dunes (SJ207877) 1991, Don Stenhouse; Freshfield (SD20) 1957, W.D. Hincks; 1960 and 1963, Colin Johnson; Ainsdale (SD3111) 1963, Stan Bowstead and Merseyside (SD2911) 2000, Liverpool Museum. There is also a record from Bromborough Golf Course Pond (SJ33108015) in 2001.



Tachydromia costalis

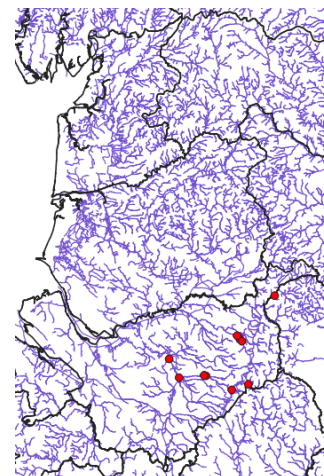
Diptera

Hybotidae

Near Threatened

A small, black predatory fly which pursues its prey by sight, chasing it down by running over bare surfaces, *T. costalis* occurs on sandy ERS deposits on riverbanks and in-channel deposits. It is widely scattered on rivers, primarily in western and northern Britain and with 'hotspots' in south Wales and Cheshire.

The sandy rivers of Cheshire provide optimal conditions for *T. costalis* and it has been reported from numerous locations along the rivers Dane and Bollin as well as on the Etherow at Broadbottom (Bates *et al.*, 2006; Hewitt & Parker, 2008b).



Tachydromia woodi

Diptera

Hybotidae

Near Threatened

Tiny predatory fly. Ecology uncertain. Found running over low vegetation.

A small, black predatory fly which pursues its prey by sight, chasing it down by running over bare surfaces. *T. woodi* is associated with flood-deposited, vegetated sand on riverbanks, from which situation individuals have been found in soil emergence traps set on rivers in Cumbria and Perthshire.

Individuals were collected in 2005 from the Dane at Saltersford Bridge (SJ7767) and Byley Hill (SJ7067) and from the Bollin at Prestbury (Bates *et al.*, 2006)



Platypalpus melancholicus

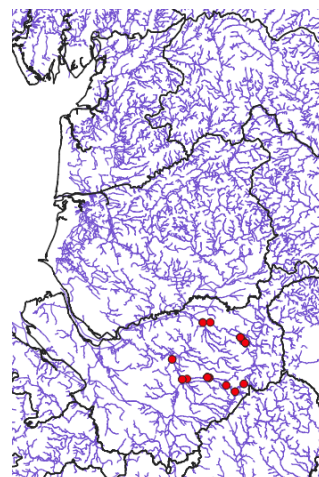
Diptera

Hybotidae

Near Threatened

A small, dark predatory fly which hunts its prey by sight among the foliage of trees, particularly willows, growing on ERS. Its larvae develop in the ERS. Adults have been found in soil emergence traps set on ERS in Cumbria. It is widely scattered on rivers, mostly in western Britain, with strongholds in south Wales and Cheshire.

The species was found widely along the Dane and the Bollin in surveys conducted in 2005 and 2007 (Bates *et al.*, 2006; Hewitt & Parker, 2008b).



Caviphantes saxetorum

Araneae

Linyphiidae

Near Threatened

A small money spider found under stones on the sandy banks of rivers on the Tyne at Haltwhistle, the confluence of the E and W Allen (Northumberland), Abernethy Forest, Glen Feshie (Easternness), Gleann Beag (Perth) and Landoverly (Carmarthen).

This spider is recorded from just 6 hectads since 1990, two in Scotland, two in Wales and two in England. The English locations are on the King Water in Cumbria (Hewitt *et al.*, 2007) and the River Lune at Arkholme (Newton, 2002-03) where a male and female were found in pitfall traps at SD586713 on 23 June 2002 and a further male was found at SD58197088 on the same date with another 3 males here on 12 July 2002. There is some evidence that *C saxetorum* may spend the winter in cavities beneath deeply embedded boulders and the summer under smaller stones on drier banks (britishspiders.org.uk, 2021).

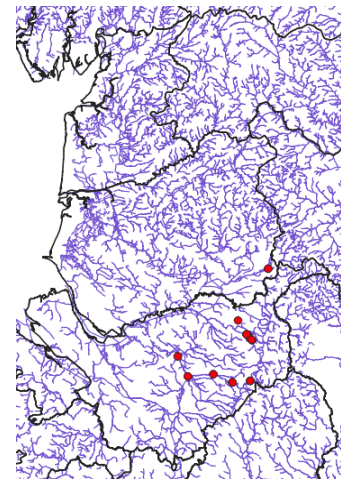


Arctocnopa melampodia**Diptera****Tipulidae****Near Threatened**

A cranefly usually found on sandy river banks, although 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.

A. melampodia is widely but thinly scattered in Britain along rivers with a good sand fraction within the sediment. Large numbers were caught in a soil emergence trap set on sandy ERS on the River Irthing in Cumbria (Hewitt, in prep). It is also known from coastal landslips in Dorset where it is associated with permanent puddles with sandy margins (Stubbs, 2021).

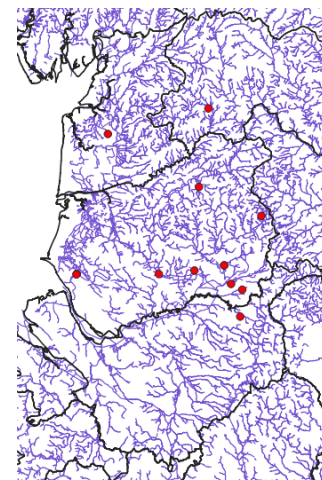
A. melampodia was first reported from the region by Kidd (1953) who found a single male among Butterbur at Holden Clough (SD9401) on 20th May 1952. Harry Britten also recorded this cranefly from the Bollin valley, Cheshire (Kydd and Brindle, 1959). Sandy sections of the Rivers Dane and Bollin in Cheshire are now known to support several populations of this species. Bates *et al.* (2006) found *A. melampodia* on the River Bollin at Prestbury (SJ89277886) and at Mottram Hall (SJ88557976). Hewitt and Parker (2008) also reported it from the Bollin, at Newton Hall (SJ877805) and at Prestbury (SJ893787), and also on the Dane at North Rhode (SJ888657), Radnor Bridge (SJ832652), Saltersford Bridge (SJ772678), Bostock Bridge (SJ692671) and Northwich (SJ660735).

**Coccinella quinquepunctata****Coleoptera****Coccinellidae****RDB3**

Ladybird found in wet moss by streams, sometimes in moss in stream itself. Very rare, recorded only from single site in Devon and on West coast of Scotland.

The Five-spot Ladybird is now known to be more widespread on river shingle bars in areas of high summer sunshine. It has a disjunct distribution in the UK, occurring on ERS on several rivers in north eastern Scotland and in south Wales.

All records of this species in Lancashire and Cheshire are in datasets supplied by the local records centres. The first report came in 1998 and there are 12 further reports from scattered locations up to 2015. No attempt has been made to investigate the validity of these records in this study but, given the number of records, it is curious that the species has not been encountered by any of the experienced Coleopterists in the region, or on any of the high quality ERS deposits. The apparent lack of association with rivers of any of the records for this ERS specialist species, suggests that the increase in records may be a reflection of the popularity of ladybirds with the wider public and that these records are likely to be mis-identifications by inexperienced recorders. It could conceivably be argued that these recent records may be of dispersing individuals in the wider landscape, possibly as a result of the species expanding its range in response to climate change. However, Roy *et al.* (2011) do not report any records of this species from northwest England and, in the absence of photographs or a report from an experienced Coleopterist, these records must be considered dubious. Analysis of ERS species by hectad (tables 3, 4 and 5) does include these 5-spot Ladybird records when perhaps they should have been omitted, and the reader should be aware of this in considering those tables. Analysis by river (tables 6 and 7) is not influenced by these records, since none are associated with rivers.



Rhabdomastix japonica

Diptera

Tipulidae

RDB3

A crane fly 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.

Recorded from Hapsford (SJ4573) in 1980, the River Dane at Radnor Bridge (SJ8365) in 2007 and Moston (SJ3970) in 2009.



Symplecta meigeni

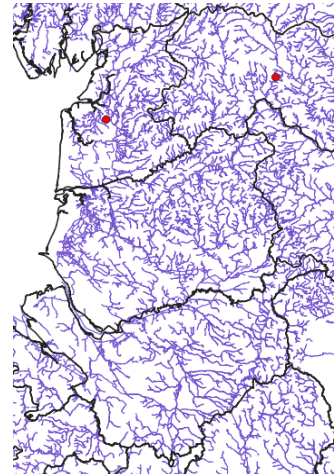
Diptera

Tipulidae

RDB3

A crane fly of sandy, upland river banks, often found in the shade of alders. Deltas and ox-bows are especially favoured. Larvae probably develop in damp sand beside rivers. Only post-1960 records are from Inverness-shire and Yorkshire.

The only record for the area is for West Lancashire (VC60) at Winmarleigh moss (SD4448) where it was found by Peter Chandler on 14 June 1999.



Bledius erraticus

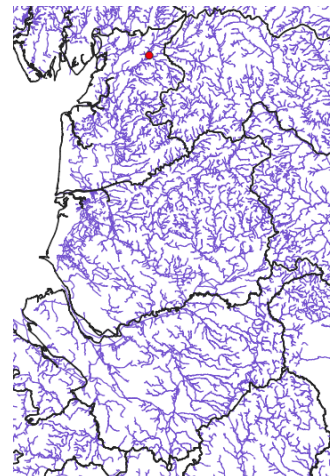
Coleoptera

Staphylinidae

RDB-I

Small red and black fossorial beetle living in burrows in sandy banks at the side of streams. Northern species. Very rare.

The only record for the region is from the River Lune at Gressingham (SD5869), found by Colin Johnson on 24 August 1979.



Bledius terebrans**Coleoptera****Staphylinidae****RDB-I**

This small rove beetle burrows in sandy riverbanks and landslips. It is a rare species but widely scattered, from Sussex to Islay.

The most recent reports for Lancashire and Cheshire are from Birkdale Dunes (SD3015) where it was found in 1973 by an anonymous recorder and Freshfield (SD20) where it was reported in 1962 and '63 by Colin Johnson. There are also two 19th/early 20th century records for 'Birkdale' and 'Merseyside'.

***Neobisnius prolixus*****Coleoptera****Staphylinidae****RDB-I**

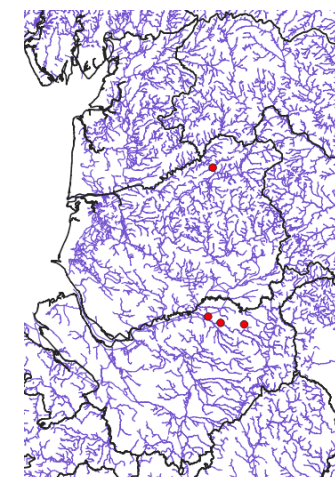
Recorded from river shingle, on damp sand and mud beside ponds or streams, and under stones. This species has a scattered distribution and has been recorded from Middlesex to the Solway district in Scotland. Recently recorded from only three vice-counties. This species is difficult to identify and may be confused with other members of the genus. The very similar *N. lathrobioides* was also not separated as a species at the time many records were made. Published records for West Kent are known to be incorrect.

The only record of this rove beetle in the region is from the River Lune at Gressingham (SD5869), where it was found in 1971 by Colin Johnson.

***Ischnopoda scitula*****Coleoptera****Staphylinidae****RDB-I**

Small black rove beetle living on open sand on river banks. Widespread but rare.

There are four records of this species in the region. Historically it was reported by Fowler (1860-1913) from Whalley (SD73) and the River Bollin at Ashley (SJ78) by W.E. Sharp. Harry Britten again found the species in the Bollin Valley in 1938, with the most recent report coming from Colin Johnson, who found it on the Bollin at Dunham Park (SJ7387) in 1971.



Hydrosmecta delicatissima **Coleoptera** **Staphylinidae**

A rove beetle frequenting parkland and woodland. Has been found in leaf litter and sandy soils. Known from Devon, South Lancashire and an unspecified point on the River Wye.

Found on several occasions in Clarke Gardens, Allerton (SJ4285) by Tom Eccles and Stan Bowstead in 1987. There is also an anonymous record from the same area in 1984.

RDB-I



Biblopectus minutissimus **Coleoptera** **Pselaphidae**

Rare and very local found under stones, in grass tussocks and in shingle.

Recorded anonymously from SD4185 (Allerton) in 1984 and additionally by Tom Eccles in 1987 from Liverpool (SJ3490) and Stockton's Wood, Speke Hall (SJ4282). Bates *et al.* (2006) reported it from the River Bollin at Prestbury (SJ8978).

RDB-I

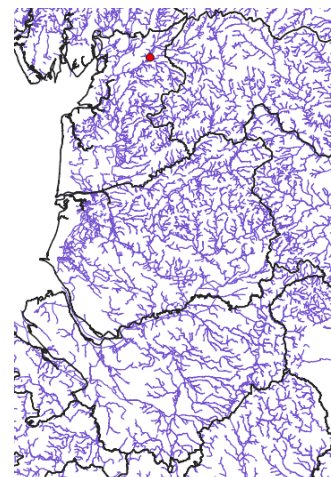


Brachygluta pandellei **Coleoptera** **Pselaphidae**

No species account available

The only two records of this species come from the River Lune at Gressingham (SD5869) where it was found by Colin Johnson on 5 September 1966 and again on 17 August 1971.

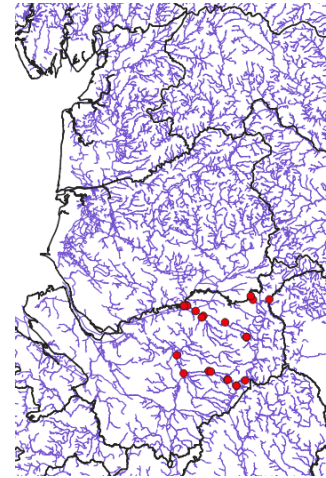
RDB-I



Clorismia rustica**Diptera****Therevidae****Nationally Scarce**

Stiletto fly. Larvae probable develop in damp sand where the feed on vegetable matter. Apparently a rare species recorded mainly from the Welsh border counties.

Formerly designated RDB3, *C. rustica* was included as a BAP species in 2007, prompting several studies of the species in various parts of the country. The larvae of this species are active predators in loose sand on riverbanks (Skidmore, 2001; Drake, 2004; Hewitt & Parker, 2008a). Drake (2017) downgraded the species to Nationally Scarce on the basis of it being recorded from 29 hectads since 1990. Although showing an apparent expansion in range, Drake considers this to be entirely due to targeted survey through the BAP process.



The sandy Cheshire rivers provide a stronghold for this species in Britain and it was first found in this area when B. Cooke found the species new to Britain at Bowdon (SJ78, presumably on the River Bollin) in 1875 (Cooke, 1878). The species was reared from ERS on the River Etherow at Broadbottom (SJ9993) in 1962 (Stubbs & Drake, 2014). In Bates *et al.* (2006) found it on the Bollin at Prestbury (SJ8978) and on the Dane at Saltersford Bridge (SJ7767). Hewitt and Parker (2008b) reported additional sites on the Bollin at Styal Park (SJ8283), Heatley (SJ7088) and at Dunham Park (SJ7387); and on the Dane at Radnor Bridge (SJ8365), Congleton Weir (SJ8365), Bostock House (SJ6967), Rudheath (SJ6772) and Reddish (SJ6988). They also found the species on the River Goyt at Woodbank Park (SJ9190), The River Tame at Portwood (SJ9091) and the River Etherow at Compstall (SJ9690).

Spiriverpva lunulata**Diptera****Therevidae****Nationally Scarce**

Rare stiletto fly. Found on gravelly stream banks. Northern and western species.

Initially included as a BAP species, *S. lunulata* was dropped from the 2007 BAP list when it became apparent that it was more widespread than previously thought and Drake (2017) consequently reduced its designation from RDB3 to Nationally Scarce. This species is nonetheless a good indicator of high quality ERS deposits. This is because of its preference for open sand and shingle deposits on the tops of in-channel bars, which also provide a wide variety of niches for other ERS species. The larvae are active predators within the loose sand and gravel in this situation.



The only record of this species in Lancashire and Cheshire is from the River Lune at Lower Broomfield (SD5972) in 2006 (Drake *et al.*, 2007). Although some apparently suitable habitat was noted on the Dane and Bollin in Cheshire (Hewitt & Parker, 2008b), the fly was not found, possibly because the areas of suitable habitat were too small and isolated. It is interesting to note that there are two 19th Century records of the very similar Coastal Silver-stiletto (*Acrosathe annulata*), at Bowdon (SJ78) and Delamere (SJ56), recorded by B. Cooke. *A. annulata* is almost exclusively found on coastal dunes although there are a few records from ERS on the rivers Spey and Tummel in Scotland and there are also historical records on inland sand in East Anglia and Worcestershire (Stubbs & Drake, 2014).

Evaluation of high fidelity ERS invertebrates by hectad

Much of the data collated and analysed in this report is historical and without geospatial coordinates. These have been attributed at monad level where a place name could be tightly localised or at hectad level when it could not. All these attributed grid references carry a level of uncertainty and more so with the monad level attributions. Thus hectad level analysis provides the most inclusive and accurate (if not the most useful) presentation of the results.

Table 3 lists all the hectads in Lancashire and Cheshire from which high fidelity ERS species have been reported. And Table 4 presents the species occurrences in hectads within Lancashire and Cheshire from which more than 10 high fidelity ERS species have been recorded. Figures 4 to 8 present data on high fidelity ERS species in map form at various resolutions.

Table 3

Hectads within Lancashire and Cheshire from which more than 10 High fidelity ERS species have been recorded.

Hectad	Hectad Name	V.C.	River(s)	No. ERS Spp	No. ERS recs
SJ76	Holmes Chapel	58	Dane	66	298
SJ86	Congleton	58	Dane	57	195
SJ88	Wilmslow	58	Bollin, Dean	56	226
SJ87	Prestbury	58	Bollin	51	293
SD56	Caton	60	Lune	40	71
SD57	Arkholme	60	Lune, Keer	33	161
SJ64	Hankelow	58	Weaver	32	102
SJ78	Hale	58	Bollin	31	72
SJ99	Hyde	58	Tame, Goyt, Etherow	27	53
SD73	Whalley	59	Ribble, Hodder	25	55
SJ96	Bosley	58	Dane	19	35
SJ66	Winsford	58	Dane, Weaver, Wheelock	18	41
SJ98	Marple	58	Goyt	18	56
SD47	Carnforth	60	Keer	15	33
SJ97	Macclesfield	58	Bollin	15	20
SD74	Clitheroe	59	Ribble	14	28
SD83	Burnley	59	Calder, Pendle, Colne, Brun, Don	14	28
SJ89	Manchester	59	Mersey	14	21
SD20	Formby	59	Alt	13	22
SD31	Southport	59		13	22
SJ79	Stretford	59	Mersey	13	17
SD72	Haslingden	59	Irwell	12	20
SJ48	Speke	59	Mersey	12	55
SD54	Calder Vale	60	Brock, Calder	11	15
SD21	Ainsdale	59		10	18
SJ67	Northwich	58	Weaver, Dane	10	18

Table 3 continued

Hectads within Lancashire and Cheshire from which fewer than 10 High fidelity ERS species have been recorded

Hectad	No. ERS spp/Hectad	No. recds ERS spp/Hectad
SD44	9	10
SD64	9	44
SD90	9	19
SJ56	9	12
SJ58	9	18
SD61	8	11
SJ38	8	16
SJ57	8	15
SD63	7	14
SJ39	7	9
SJ46	7	8
SJ65	7	18
SD41	6	6
SJ28	6	7
SJ29	6	11
SJ49	6	11
SK07	6	6
SD62	5	8
SD71	5	12
SD80	5	8
SJ37	5	9
SJ68	5	7
SD42	4	4
SD46	4	5
SD51	4	6
SD55	4	4
SD60	4	7
SD67	4	6
SD70	4	4
SD75	4	11
SJ41	4	4
SJ69	4	9
SD30	3	5
SD50	3	3

Hectad	No. ERS spp/Hectad	No. recds ERS spp/Hectad
SD65	3	5
SD95	3	3
SD96	3	3
SE14	3	4
SE46	3	5
SE55	3	6
SJ36	3	3
SJ47	3	6
SJ60	3	3
SK09	3	3
SD32	2	2
SD40	2	2
SD53	2	2
SD84	2	9
SD85	2	3
SD87	2	3
SD92	2	2
SD98	2	2
SE05	2	2
SE24	2	3
SE27	2	3
SE29	2	3
SE68	2	7
SE99	2	2
SJ59	2	3
SK19	2	3
SD34	1	1
SD52	1	1
SD69	1	1
SD77	1	1
SD78	1	1
SD81	1	1
SD82	1	2
SD86	1	1
SD91	1	1

Hectad	No. ERS spp/Hectad	No. recds ERS spp/Hectad
SD94	1	2
SD97	1	1
SE00	1	1
SE08	1	1
SE26	1	1
SE34	1	1
SE35	1	1
SE36	1	1
SE37	1	3
SE45	1	1
SE54	1	1
SE60	1	3
SE66	1	1
SE71	1	2
SE76	1	2
SE77	1	1
SE78	1	1
SE82	1	1
SE88	1	1
SH55	1	1
SH87	1	1
SJ17	1	1
SJ18	1	1
SJ27	1	1
SJ45	1	1
SJ74	1	3
SJ75	1	5
SJ77	1	2
SK04	1	1
SK06	1	1
SK08	1	2
SK14	1	1
SK15	1	1
SK69	1	1

Taxon	Designation																				No. Hectads																
		SJ76 (R. Dane)	SJ86 (R. Dane)	SJ88 (R. Bollin)	SJ87 (R. Bollin)	SD56 (R. Lune)	SD57 (R. Lune)	SJ64 (R. Weaver)	SJ78 (R. Bollin)	SJ99 (R. Tame/Bollin/Goyt)	SD73 (R. Ribble/Hodder)	SJ96 (R. Dane)	SJ66 (R. Dane/Weaver/Wheelock)	SJ98 (R. Goyt)	SD47 (R. Keer)	SJ97 (R. Bollin)	SD74 (R. Ribble)	SD83 (R. Calder/Pendle/Colne/etc)	SJ89 (R. Mersey)	SD20 (R. Alt)		SD31	SJ79 (R. Mersey)	SD72 (R. Irwell)	SJ48 (R. Mersey)	SD54 (R. Brock/Catder)	SD21	SJ67 (R. Dane/Weaver)									
<i>Gnypeta carbonaria</i>	Local	*		*				*	*	*				*		*		*																			8
* <i>Gnypeta rubrior</i>			*		*			*	*																												3
<i>Hydrosmeeta delicatissima</i>	RDB-I																								*												1
<i>Hydrosmeeta eximia</i>			*																																		2
<i>Hydrosmeeta fragilis</i>	N																																				0
<i>Hydrosmeeta longula</i>	N	*	*	*																																	3
<i>Hydrosmeeta subtilissima</i>	N	*	*	*	*	*	*							*													*										8
<i>Ischnopoda scitula</i>	RDB-I			*										*		*																					3
<i>Ischnopoda umbratica</i>																																					0
<i>Lathrobium angusticolle</i>	N-b					*	*																														2
<i>Lathrobium pallidipenne</i>	N		*	*	*					*	*					*	*		*								*										9
<i>Meotica anglica</i>	N	*	*		*																																3
<i>Neobisnius prolixus</i>	RDB-I					*																															1
<i>Ocalea latipennis</i>																																		*			1
<i>Ochtheophilus andalusiacus</i>	N	*	*		*																																3
<i>Ochtheophilus angustior</i>		*			*	*																															3
<i>Ochtheophilus aureus</i>			*			*										*																					4
<i>Ochtheophilus omalinus</i>	Local	*	*		*	*		*			*	*					*																				8
<i>Oxypoda exoleta</i>	N	*						*		*																								*			5
<i>Philhygra debilis</i>		*						*																													2
<i>Philhygra scotica</i>	N			*						*																											2
<i>Stenus comma</i>	Local	*	*	*	*					*						*																	*				7
<i>Stenus fossulatus</i>	RDB1																																				0
<i>Stenus guttula</i>		*	*	*	*	*		*	*		*				*				*	*																	11
<i>Tachyusa coarctata</i>	N	*	*	*	*						*																										5
<i>Tachyusa constricta</i>	Local	*	*	*	*	*		*	*	*					*																						9
<i>Tetralaucopora longitarsis</i>	Local	*	*	*							*				*									*		*											8

Taxon	Designation																					No. Hectads						
		SJ76 (R. Dane)	SJ86 (R. Dane)	SJ88 (R. Bollin)	SJ87 (R. Bollin)	SD56 (R. Lune)	SD57 (R. Lune)	SJ64 (R. Weaver)	SJ78 (R. Bollin)	SJ99 (R. Tame/Bollin/Goyt)	SD73 (R. Ribble/Hodder)	SJ96 (R. Dane)	SJ66 (R. Dane/Weaver/Wheelock)	SJ98 (R. Goyt)	SD47 (R. Keer)	SJ97 (R. Bollin)	SD74 (R. Ribble)	SD83 (R. Calder/Pendle/Colne/etc)	SJ89 (R. Mersey)	SD20 (R. Alt)	SD31		SJ79 (R. Mersey)	SD72 (R. Irwell)	SJ48 (R. Mersey)	SD54 (R. Brock/Catder)	SD21	SJ67 (R. Dane/Weaver)
<i>Tetralaucopora rubicunda</i>	N			*		*				*																		3
<i>Thinobius bicolor</i>	N-a		*																									1
<i>Thinobius crinifer</i>	N					*																						1
<i>Thinodromus arcuatus</i>	Local	*	*		*	*	*									*												6
<i>Thinonoma atra</i>		*	*	*														*		*								5
DIPTERA																												
Anthomyiidae																												
<i>Myopina myopina</i>								*			*																	2
Athericidae																												
<i>Ibisia marginata</i>	Local	*						*																				2
Dolichopodidae																												
<i>Diaphorus hoffmanseggii</i>	NR	*																										1
<i>Dolichopus longicornis</i>	Local	*		*	*	*	*	*		*		*						*	*	*			*		*	*	*	14
<i>Rhaphium gravipes</i>	VU								*																			1
<i>Rhaphium nasutum</i>	NS	*																										1
<i>Rhaphium patulum</i>	VU																											0
<i>Rhaphium penicillatum</i>	NR							*																				1
<i>Rhaphium riparium</i>	NS	*	*	*	*						*		*		*													7
<i>Rhaphium suave</i>	NR	*																										1
Empididae																												
<i>Hilara albiventris</i>	NS	*		*		*	*				*																	5
<i>Hilara biseta</i>	NS	*					*				*																	2
<i>Hilara pseudochorica</i>	NS	*			*		*				*																	4
Ephydriidae																												
<i>Athyroglossa glabra</i>	Local	*		*	*	*	*	*																				6
<i>Ditrichophora palliditarsis</i>	Local	*		*	*		*		*			*														*		7

Taxon	Designation																					No. Hectads						
		SJ76 (R. Dane)	SJ86 (R. Dane)	SJ88 (R. Bollin)	SJ87 (R. Bollin)	SD56 (R. Lune)	SD57 (R. Lune)	SJ64 (R. Weaver)	SJ78 (R. Bollin)	SJ99 (R. Tame/Bollin/Goyt)	SD73 (R. Ribble/Hodder)	SJ96 (R. Dane)	SJ66 (R. Dane/Weaver/Wheelock)	SJ98 (R. Goyt)	SD47 (R. Keer)	SJ97 (R. Bollin)	SD74 (R. Ribble)	SD83 (R. Calder/Pendle/Colne/etc)	SJ89 (R. Mersey)	SD20 (R. Alt)	SD31		SJ79 (R. Mersey)	SD72 (R. Irwell)	SJ48 (R. Mersey)	SD54 (R. Brock/Catder)	SD21	SJ67 (R. Dane/Weaver)
Hybotidae																												
<i>Platypalpus melancholicus</i>	NT	*	*	*	*					*			*														*	7
<i>Platypalpus ochrocera</i>	DD			*																								1
<i>Platypalpus subtilis</i>	NS																											0
<i>Symbalophthalmus pictipes</i>	NS				*																							1
<i>Tachydromia costalis</i>	NT	*	*	*	*					*		*	*														*	8
<i>Tachydromia edenensis</i>	DD					*																						1
<i>Tachydromia halidayi</i>	NS					*	*																					2
<i>Tachydromia morio</i>			*	*	*						*																	4
<i>Tachydromia woodi</i>	NT	*			*																							2
Limoniidae																												
<i>Arctoconopa melampodia</i>	NT	*	*	*	*							*															*	6
<i>Hexatoma bicolor</i>																												0
<i>Hexatoma fuscipennis</i>																												0
<i>Hoplolabis areolata</i>	Local	*	*	*	*	*		*	*			*	*														*	10
<i>Hoplolabis vicina</i>	Local	*	*	*	*				*		*	*									*							9
<i>Hoplolabis yezoana</i>	DD	*		*	*							*																4
<i>Rhabdomastix edwardsi</i>			*				*				*																	3
<i>Rhabdomastix eugeni</i>	DD					*																						1
<i>Rhabdomastix japonica</i>	RDB3		*																									1
<i>Symplecta meigeni</i>	RDB3																											0
Lonchopteridae																												
<i>Lonchoptera nigrociliata</i>	NS	*	*	*	*			*				*	*				*											8
Pediciidae																												
<i>Dicranota guerini</i>	N									*		*													*			3
<i>Dicranota robusta</i>	N									*		*			*	*												4
<i>Dicranota subtilis</i>			*			*	*	*	*	*	*	*	*		*	*							*	*	*			13

Taxon	Designation																					No. Hectads						
		SJ76 (R. Dane)	SJ86 (R. Dane)	SJ88 (R. Bollin)	SJ87 (R. Bollin)	SD56 (R. Lune)	SD57 (R. Lune)	SJ64 (R. Weaver)	SJ78 (R. Bollin)	SJ99 (R. Tame/Bollin/Goyt)	SD73 (R. Ribble/Hodder)	SJ96 (R. Dane)	SJ66 (R. Dane/Weaver/Wheelock)	SJ98 (R. Goyt)	SD47 (R. Keer)	SJ97 (R. Bollin)	SD74 (R. Ribble)	SD83 (R. Calder/Pendle/Colne/etc)	SJ89 (R. Mersey)	SD20 (R. Alt)	SD31		SJ79 (R. Mersey)	SD72 (R. Irwell)	SJ48 (R. Mersey)	SD54 (R. Brock/Catder)	SD21	SJ67 (R. Dane/Weaver)
Scatopsidae																												
<i>Anapausis talpae</i>						*	*																					2
<i>Rhegmoclemina lunensis</i>	DD					*	*																					2
Therevidae																												
<i>Clorismia rustica</i>	NS	*	*	*	*				*	*		*															*	8
<i>Spiriverpa lunulata</i>	NS						*																					1
Tipulidae																												
<i>Nephrotoma analis</i>					*	*		*			*			*		*		*		*		*		*	*	*	*	10
<i>Nephrotoma dorsalis</i>	N	*									*		*		*		*		*		*		*	*	*	*	*	4
<i>Nephrotoma lunulicornis</i>	N		*	*														*		*		*		*	*	*	*	4
HEMIPTERA																												
Dipsocoridae																												
<i>Cryptostemma alienum</i>						*	*		*																*			4
Saldidae																												
<i>Macrosaldula scotica</i>						*	*				*						*		*		*		*		*	*	*	4
<i>Saldula c-album</i>			*	*					*		*					*		*		*		*		*	*	*	*	6
Total ERS spp/hectad		66	57	56	51	41	34	32	31	27	25	19	18	18	15	15	14	14	14	13	13	13	12	12	11	10	10	

* Species are included in Fowles (2003) list of High Fidelity ERS beetles, but not included in Bates (2006) list. These species have been omitted from some subsequent analysis of ERS value.

Figure 4. All high fidelity ERS species records by grid square.

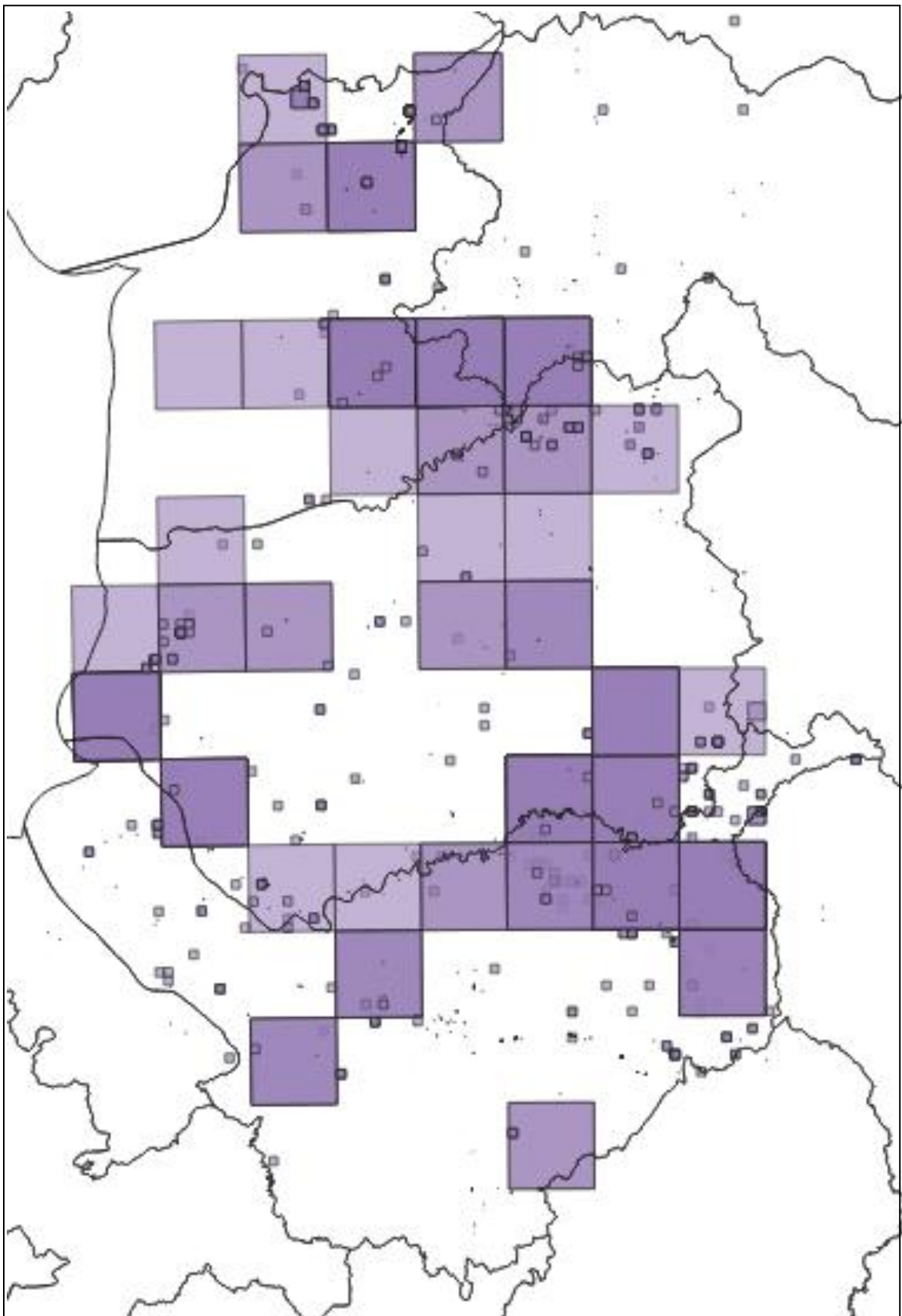


Figure 5. Hectad heat map of all high fidelity ERS species records by number of records.
Data classes from yellow to red: 1-12, 12-37, 37-102, 102-226, 226-299

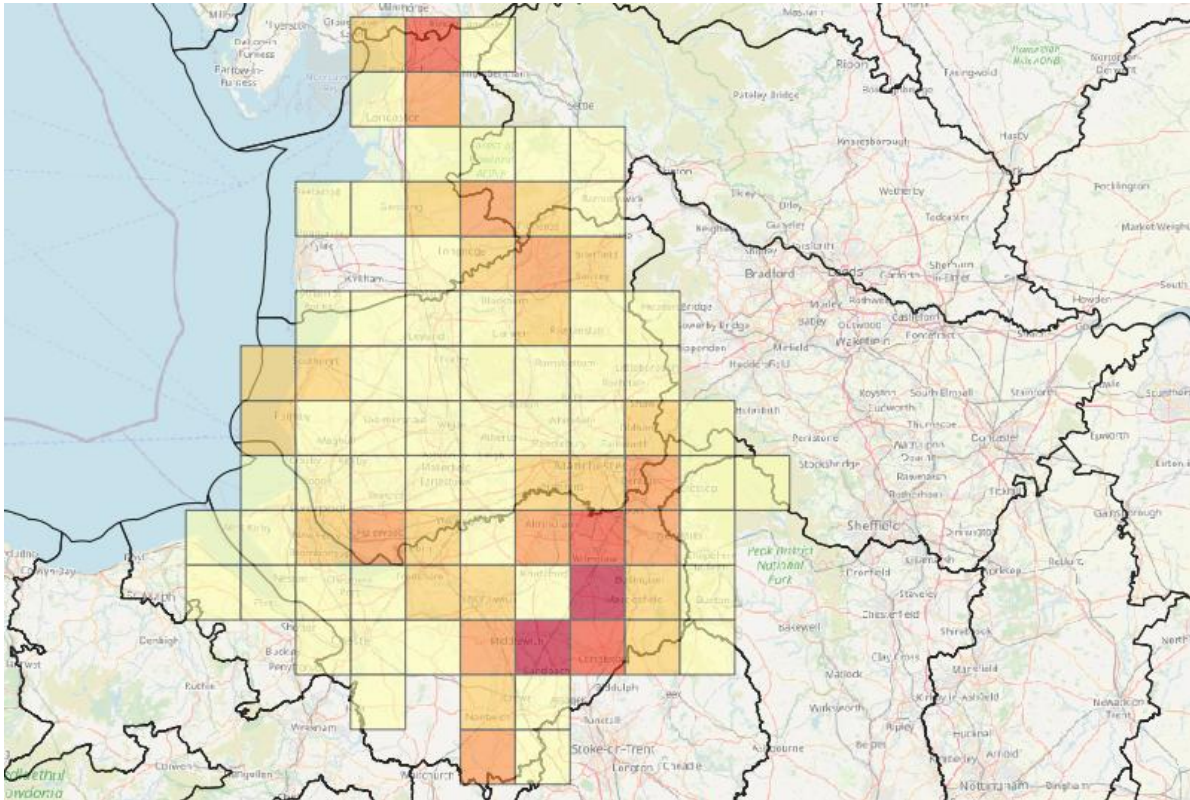
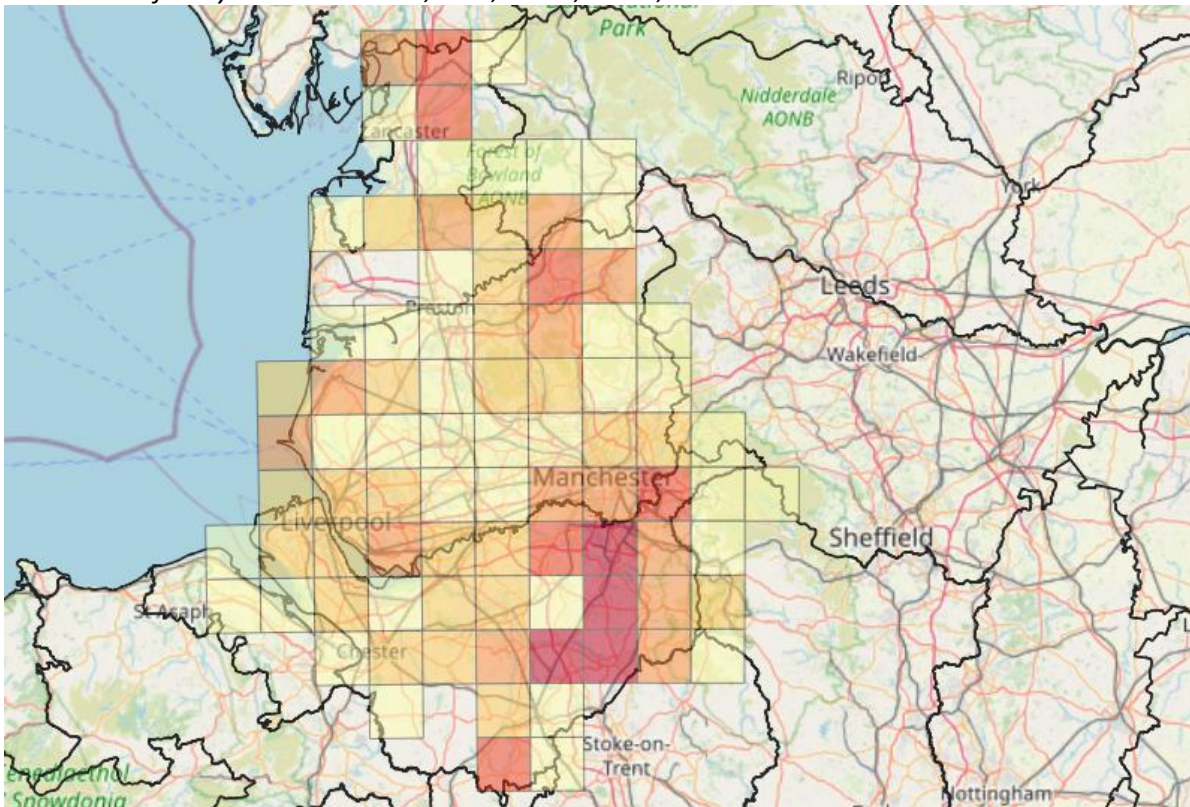


Figure 6. Hectad heat map of all ERS species records by number of species.
Data classes from yellow to red: 1-4, 4-10, 10-20, 20-41, 41-67.



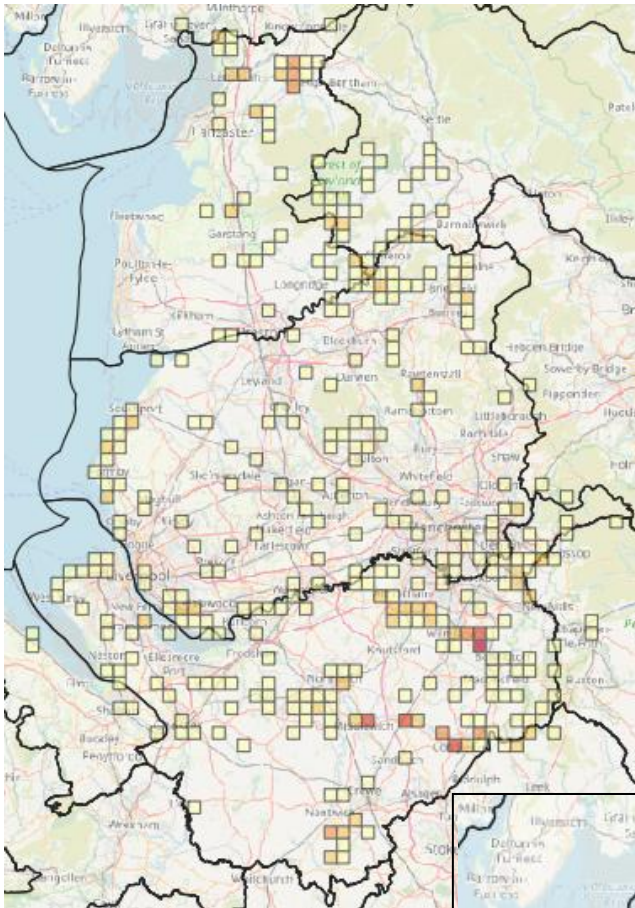
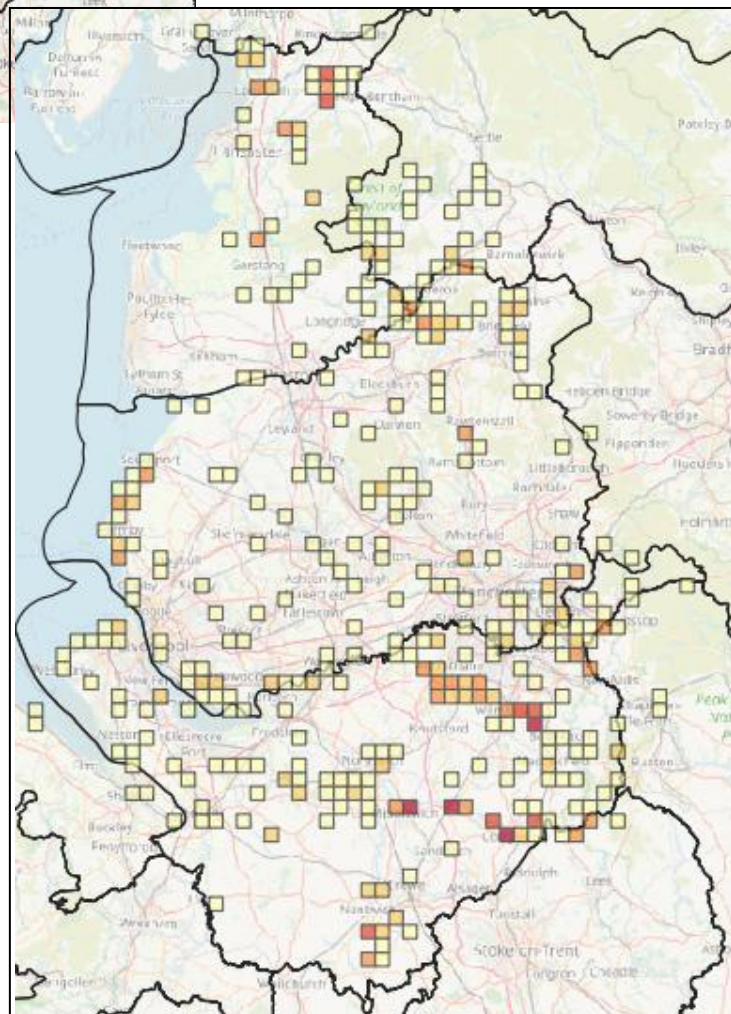


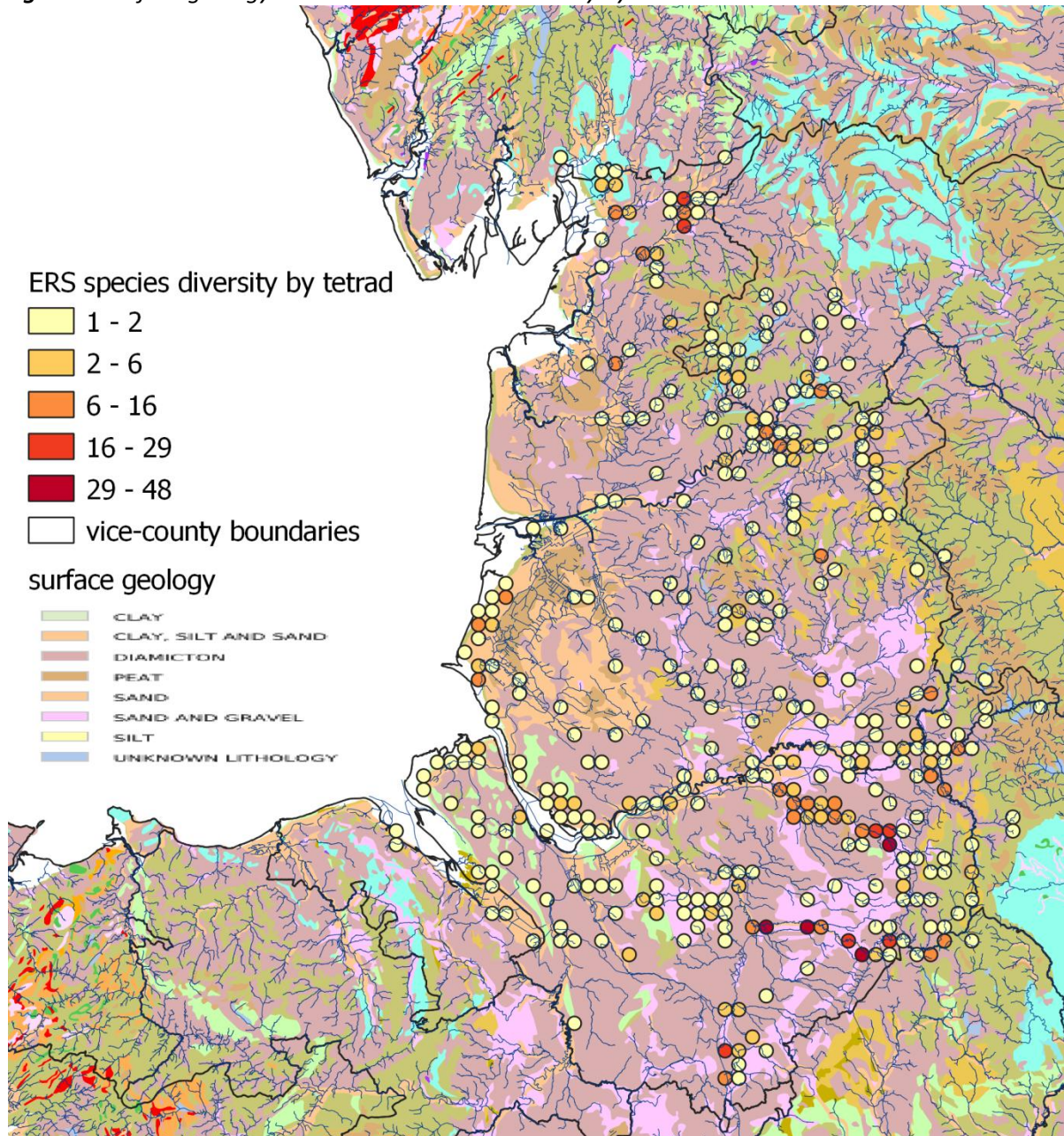
Figure 7. Tetrad heat map of all high fidelity ERS species data by number of records

Figure 8. Tetrad temperature map of all high fidelity ERS species data by number of species



The concentrations of high ERS invertebrate diversity in Cheshire correlate with the extensive surface deposits of sand and gravel seen in Figure 9. Tetrads in the north of Lancashire, on the course of the River Lune also have a rich ERS invertebrate fauna.

Figure 9. Surface geology with ERS invertebrate diversity by tetrad



Analysis of ERS data by hectad

Tables 5a to 5c present high fidelity ERS species data by hectad, with hectads ranked by number of ERS species, ERS Quality Score and ERS Quality Index respectively.

Table 5a. Hectads ranked left to right by number of ERS species

Designation	Hectads (R. Dane, R. Bollin, R. Lune, R. Weaver, etc.)														
	SJ76	SJ86	SJ88	SJ87	SD56	SD57	SJ64	SJ78	SJ99	SD73	SJ96	SJ66	SJ98	SD47	SJ97
Common	16	14	11	10	10	10	6	9	9	9	5	1	5	6	5
Data Deficient	1		2	1	2	1						1			
Local	17	18	14	17	11	10	13	12	9	9	8	6	8	4	5
Nationally Scarce	8	4	6	5	1	3	6	2	1			5	1		
Notable	9	10	9	7	3	1	3	1	4	2	3	1	2	2	1
Notable-A		1			2	1									
Notable-B	6	4	7	5	4	4	2	5	2	3	2	1	2	3	3
NT	4	3	3	3	2	2	1	1	1	1	1	2			
RDB2/VU	1	1	1	1				1				1			
RDB3/NR	2	1	1												
RDB-I			1	1	4			1		1					
Very Local	2	1	1	1	2	2	1		1						1
Total ERS spp.	66	57	56	51	41	34	32	32	27	25	19	18	18	15	15
ERS QS	442	342	419	336	328	190	148	177	111	115	85	173	61	54	51
ERS QI	670	600	748	659	800	559	463	553	411	460	447	961	339	360	340

Table 5b. Hectads ranked left to right by ERS Quality Score (ERS QS)

Designation	Hectads (SJ76, SJ88, SJ86, SJ87, SD56, SD57, SJ78, SJ66, SJ64, SD73, SJ99, SJ96, SJ98, SD47, SJ97)														
	SJ76	SJ88	SJ86	SJ87	SD56	SD57	SJ78	SJ66	SJ64	SD73	SJ99	SJ96	SJ98	SD47	SJ97
Common	16	11	14	10	10	10	9	1	6	9	9	5	5	6	5
Data Deficient	1	2		1	2	1		1							
Local	17	14	18	17	11	10	12	6	13	9	9	8	8	4	5
Nationally Scarce	8	6	4	5	1	3	2	5	6		1		1		
Notable	9	9	10	7	3	1	1	1	3	2	4	3	2	2	1
Notable-A			1		2	1									
Notable-B	6	7	4	5	4	4	5	1	2	3	2	2	2	3	3
NT	4	3	3	3	2	2	1	2	1	1	1	1			
RDB2/VU	1	1	1	1			1	1							
RDB3/NR	2	1	1												
RDB-I		1		1	4		1			1					
Very Local	2	1	1	1	2	2			1		1				1
Total ERS spp.	66	56	57	51	41	34	32	18	32	25	27	19	18	15	15
ERS QS	442	419	342	336	328	190	177	173	148	115	111	85	61	54	51
ERS QI	670	748	600	659	800	559	553	961	463	460	411	447	339	360	340

Table 5c. Hectads ranked left to right by ERS Quality Index (ERS QI)

Designation	Hectads (SJ66, SD56, SJ88, SJ76, SJ87, SJ86, SD57, SJ78, SJ64, SD73, SJ96, SJ99, SD47, SJ97, SJ98)														
	SJ66	SD56	SJ88	SJ76	SJ87	SJ86	SD57	SJ78	SJ64	SD73	SJ96	SJ99	SD47	SJ97	SJ98
Common	1	10	11	16	10	14	10	9	6	9	5	9	6	5	5
Data Deficient	1	2	2	1	1		1								
Local	6	11	14	17	17	18	10	12	13	9	8	9	4	5	8
Nationally Scarce	5	1	6	8	5	4	3	2	6			1			1
Notable	1	3	9	9	7	10	1	1	3	2	3	4	2	1	2
Notable-A		2				1	1								
Notable-B	1	4	7	6	5	4	4	5	2	3	2	2	3	3	2
NT	2	2	3	4	3	3	2	1	1	1	1	1			
RDB2/VU	1		1	1	1	1		1							
RDB3/NR			1	2		1									
RDB-I		4	1		1			1		1					
Very Local		2	1	2	1	1	2		1		1			1	
Total ERS spp.	18	41	56	66	51	57	34	32	32	25	19	27	15	15	18
ERS QS	173	328	419	442	336	342	190	177	148	115	85	111	54	51	61
ERS QI	961	800	748	670	659	600	559	553	463	460	447	411	360	340	339

Evaluation of high fidelity ERS invertebrates by river

It is useful to analyse data by different rivers, since ecological factors are likely to vary between catchments. However, a significant number of the collated records are not explicitly identified to a specific river. An effort has been made to ascribe records with no or vague grid-references to specific rivers where the location name allows this to be done with a reasonable level of confidence. This process means that some records cannot be attributed to any particular river and a few may have been erroneously ascribed. Thus the accuracy and comprehensiveness of the data analysis for rivers is lower than for hectads. For example the RDB1 rove beetle, *Stenus fossulatus* was recorded by Stan Bowstead from "Stoneyhurst" in 1968, but although it is likely that this riparian species was found on either the River Hodder or the Dean Brook which flow either side of Stoneyhurst College, there is insufficient information to ascribe the record to either watercourse.

River stretches identified as historically supporting ERS invertebrates have been virtually surveyed using Google Earth to identify any contemporary ERS deposits of potential value to ERS invertebrates and these have been mapped for each river below. Whilst it is possible to recognise in-channel ERS deposits from Google Earth, sandy deposits on riverbanks are much harder to detect as they are often covered in vegetation in the summer months. Even when ERS deposits are identified it is not possible to say whether they are in suitable condition to support ERS invertebrates without a site visit. Adjacent land use can give a clue to the likely condition of a deposit; in pastureland, unless the riverbank is fenced to exclude stock, trampling and dunging from grazing stock is likely to greatly reduce invertebrate interest and in built up areas heavy trampling from people will have an equally harmful impact. These local impacts can change from year to year if for example the field adjacent to an ERS deposit is given over to arable rather than grazed pasture. Thus much of the ERS deposits identified by remote survey will be revealed to be of limited value to ERS invertebrates when inspected on the ground. A few of the ERS deposits identified by remote survey were considered more likely to be of ERS invertebrate value and these have been highlighted with a yellow fill in the maps of individual rivers below.

Table 6 presents the high fidelity ERS species against the rivers from which they have been recorded. With 71 ERS species, the River Dane shows the highest diversity of specialist ERS species, closely followed by the River Bollin with 68 species, whilst the Lune ranks third with 42 species and the Weaver fourth with 28 ERS species. These rankings are altered when the ERSQI is calculated for rivers from which more than 15 high fidelity ERS species have been reported (Table 7). The Lune achieves the highest ERSQI, followed in descending order by the Bollin, Dane, Hodder, Weaver and Goyt.

The Rivers Dane, Bollin, Weaver and Lune have been subject to detailed surveys of ERS invertebrates and so it is perhaps unsurprising that they rank highly for their ERS communities. It is also likely that these rivers were chosen for survey because of their known ERS invertebrate interest, so their position at the top of the rankings is probably fully justified.

It is interesting to see which rivers without recent, targeted surveys feature near the top of the rankings, as these rivers may well reward further targeted survey. The River Hodder and the Calder catchment (comprising records from the R. Calder, Pendle, Colne, Don, Brun, Sabden Brook and Ogden clough) both score very well with 21 and 23 ERS species respectively and ERS QI values of 510 and 517 respectively, higher than that for the R. Weaver. The ERS QI value for the Hodder would be considerably higher if the record of *Stenus fossulatus* from Stoneyhurst were included in the calculation and a search of riparian landslips along the Hodder could prove fruitful for this species.

Table 6. ERS species recorded from different rivers in Lancashire and Cheshire

Taxon	Taxon Status	R. Dane	R. Bollin	R. Lune	R. Weaver	R. Hodder	R. Goyt	R. Etherow	R. Irwell	R. Tame	R. Alt	R. Brock	R. Ribble	R. Keer	R. Mersey	R. Gowy	R. Pendle	R. Wheelock	Total rivers
ARANEAE																			
Linyphiidae																			
<i>Caviphantes saxetorum</i>	N.T.			*															1
Lycosidae																			
<i>Arctosa cinerea</i>	V Local			*															1
<i>Pardosa agricola</i>	Local			*					*										2
COLEOPTERA																			
Aegialiidae																			
<i>Aegialia insularis</i>	N-b	*	*					*	*						*				5
Carabidae																			
<i>Agonum micans</i>	Common	*													*				2
<i>Amara fulva</i>	N-b		*	*															2
<i>Asaphidion flavipes</i>	Common		*							*				*					3
<i>Asaphidion pallipes</i>	N-b		*																1
<i>Bembidion articulatum</i>	V Local		*		*														2
<i>Bembidion atrocaeruleum</i>	Common	*	*	*		*	*		*			*							7
<i>Bembidion bipunctatum</i>	N-b			*							*								2
<i>Bembidion decorum</i>	Common	*	*	*		*	*					*							6
<i>Bembidion dentellum</i>	Local				*			*											2
<i>Bembidion femoratum</i>	Common	*	*	*		*	*		*	*									5
<i>Bembidion fluviatile</i>	N.T.			*											*				2
<i>Bembidion geniculatum</i>	V Local	*						*								*			3
<i>Bembidion lunatum</i>	N-b	*	*								*		*						4
<i>Bembidion monticola</i>	N-b	*	*	*		*	*												5
<i>Bembidion punctulatum</i>	Common	*	*	*		*						*							5
<i>Bembidion stomoides</i>	N-b		*			*	*				*		*						5
<i>Bembidion tibiiale</i>	Common	*	*	*		*	*	*	*			*							8
<i>Bracteon litorale</i>	N-b	*	*		*														3
<i>Clivina collaris</i>	Common	*	*	*	*		*		*										6
<i>Dyschirius aeneus</i>	V Local	*																	1
<i>Elaphropus parvulus</i>	N-b	*	*						*										3
<i>Thalassophilus longicornis</i>	N-a			*															1
Dryopidae																			
<i>Dryops nitidulus</i>	N.T.			*		*													2
Elateridae																			
<i>Fleutiauxellus maritimus</i>	N-a			*															1
<i>Zorochores minimus</i>	Common	*	*	*				*	*			*							6
Heteroceridae																			
<i>Heterocerus marginatus</i>	NS	*	*		*						*								4
Hydraenidae																			
<i>Hydraena gracilis</i>	Common						*												1
<i>Hydraena nigrita</i>	Local		*																1
<i>Ochthebius bicolon</i>	Common	*			*							*	*						4
Hydrophilidae																			
<i>Georissus crenulatus</i>	NS		*		*														2
<i>Helophorus arvernicus</i>	Common	*	*		*				*	*									5
Ptiliidae																			
<i>Ptenidium brenskei</i>	Notable	*																	1
Staphylinidae																			
<i>Aloconota cambrica</i>	Local	*		*			*												3
<i>Aloconota currax</i>	Local	*					*												2
<i>Aloconota eichhoffi</i>	Notable		*																1

Taxon	Taxon Status	R. Dane	R. Bollin	R. Lune	R. Weaver	R. Hodder	R. Goyt	R. Etherow	R. Irwell	R. Tame	R. Alt	R. Brock	R. Ribble	R. Keer	R. Mersey	R. Goway	R. Pendle	R. Wheelock	Total rivers
<i>Aloconota insecta</i>	Local	*	*	*	*	*	*			*	*								8
<i>Aloconota sulcifrons</i>	Local	*	*	*	*		*		*	*									7
<i>Biblopectus minutissimus</i>	RDBI		*																1
<i>Bledius annae</i>	V Local		*																1
<i>Bledius erraticus</i>	RDBI			*															1
<i>Bledius subterraneus</i>	Local	*	*		*							*							4
<i>Brachygluta pandellei</i>	RDBI			*															1
<i>Carpelimus similis</i>	Notable	*	*		*														3
<i>C. manchuricus subtilicornis</i>	V Local	*																	1
<i>Carpelimus subtilis</i>	Notable	*	*																2
<i>Deleaster dichrous</i>	N-B	*	*						*										3
<i>Erichsonius signaticornis</i>	N-B										*								1
<i>Gnypeta carbonaria</i>	Local						*			*									2
<i>Hydrosmeeta eximia</i>	V Local	*																	1
<i>Hydrosmeeta longula</i>	Notable	*	*																2
<i>Hydrosmeeta subtilissima</i>	Notable	*	*	*															3
<i>Ischnopoda scitula</i>	RDBI		*																1
<i>Lathrobium angusticolle</i>	N-B			*															1
<i>Lathrobium pallidipenne</i>	Notable	*	*											*					3
<i>Meotica anglica</i>	Notable	*	*																2
<i>Ocalea latipennis</i>	V Local														*				1
<i>Ochtheophilus andalusiacus</i>	Notable	*	*																2
<i>Ochtheophilus angustior</i>	V Local	*																	1
<i>Ochtheophilus aureus</i>	Common	*																	1
<i>Ochtheophilus omalinus</i>	Local	*	*		*	*						*							5
<i>Oxypoda exoleta</i>	Notable				*			*											2
<i>Philhygra debilis</i>	V Local	*			*														2
<i>Philhygra scotica</i>	Notable		*							*									2
<i>Stenus comma</i>	Local	*	*																2
<i>Stenus guttula</i>	Common	*	*	*	*	*					*								6
<i>Stenus fossulatus</i>	RDB1-EN					*													1
<i>Tachyusa coarctata</i>	Notable	*	*																2
<i>Tachyusa constricta</i>	Local	*	*	*	*					*									5
<i>Tetralaucopora longitarsis</i>	Local	*	*								*								3
<i>Tetralaucopora rubicunda</i>	Notable		*	*						*									3
<i>Thinobius bicolor</i>	N-A	*																	1
<i>Thinodromus arcuatus</i>	Local	*		*															2
<i>Thinonoma atra</i>	V Local								*										1
DIPTERA																			
Anthomyiidae																			
<i>Myopina myopina</i>	Local		*																1
Athericidae																			
<i>Ibisia marginata</i>	Local		*			*													2
Dolichopodidae																			
<i>Diaphorus hoffmanseggii</i>	NR	*																	1
<i>Dolichopus longicornis</i>	Local	*	*	*	*														4
<i>Rhaphium gravipes</i>	NS		*																1
<i>Rhaphium nasutum</i>	Local	*																	1
<i>Rhaphium penicillatum</i>	NR				*														1
<i>Rhaphium riparium</i>	Local	*	*			*													3
<i>Rhaphium suave</i>	DD	*																	1

Taxon	Taxon Status	R. Dane	R. Bollin	R. Lune	R. Weaver	R. Hodder	R. Goyt	R. Etherow	R. Irwell	R. Tame	R. Alt	R. Brock	R. Ribble	R. Keer	R. Mersey	R. Gowy	R. Pendle	R. Wheelock	Total rivers
Empididae																			
<i>Hilara albiventris</i>	NS	*	*	*	*														4
<i>Hilara biseta</i>	NS	*			*														2
<i>Hilara pseudochorica</i>	NS	*	*	*	*														4
Ephydriidae																			
<i>Athyroglossa glabra</i>	Local	*	*	*	*														4
<i>Ditrichophora palliditarsis</i>	Local	*	*	*	*														4
Hybotidae																			
<i>Platypalpus melancholicus</i>	NT	*	*																2
<i>Platypalpus ochrocera</i>	DD		*																1
<i>Symballopthalmus pictipes</i>	NS		*																1
<i>Tachydromia costalis</i>	NT	*	*					*											3
<i>Tachydromia edenensis</i>	DD			*															1
<i>Tachydromia halidayi</i>	NS			*															1
<i>Tachydromia morio</i>	Local	*	*			*													3
<i>Tachydromia woodi</i>	NT	*	*																2
Limoniidae																			
<i>Arctoconopa melampodia</i>	NT	*	*																2
<i>Hexatoma bicolor</i>	Local					*													1
<i>Hexatoma fuscipennis</i>	Local					*													1
<i>Hoplolabis areolata</i>	Local	*	*	*	*														4
<i>Hoplolabis vicina</i>	Local	*	*		*	*													4
<i>Hoplolabis yezoana</i>	DD	*	*																2
<i>Rhabdomastix edwardsi</i>	Local	*				*													2
<i>Rhabdomastix eugeni</i>	DD			*															1
<i>Rhabdomastix japonica</i>	RDB3	*																	
Lonchopteridae																			
<i>Lonchoptera nigrociliata</i>	NS	*	*		*		*											*	5
Pediciidae																			
<i>Dicranota guerini</i>	Notable						*					*							2
<i>Dicranota robusta</i>	Notable					*	*										*		3
<i>Dicranota subtilis</i>	Local	*					*	*											3
Scatopsidae																			
<i>Anapausis talpae</i>	Local			*															1
<i>Rhegmoclemina lunensis</i>	DD			*															1
Therevidae																			
<i>Clorismia rustica</i>	NS	*	*				*	*		*									5
<i>Spiriverpa lunulata</i>	NS			*															1
Tipulidae																			
<i>Nephrotoma analis</i>	Local		*		*	*							*						4
<i>Nephrotoma dorsalis</i>	Notable	*																	1
<i>Nephrotoma lunulicornis</i>	Notable	*	*																2
HEMIPTERA																			
Dipsocoridae																			
<i>Cryptostemma alienum</i>	Local			*			*												2
Saldidae																			
<i>Macrosaldula scotica</i>	Local			*		*							*						3
<i>Saldula c-album</i>	Common	*	*																2
Total species		71	68	42	28	21	18	10	10	10	9	7	6	3	4	1	1	1	

Table 7.

Number of ERS species in each designation category for rivers in Lancashire and Cheshire, ranked left to right by ERS Quality Index for those rivers with 15 or more qualifying species and by number of ERS species for the remainder.

(ERSQI scores in red are invalidated by the low number of qualifying species reported on those rivers)

Designation	Score	Rivers																		
		R. Lune	R. Bollin	R. Dane	R. Calder catchment*	R. Hodder	R. Weaver	R. Goyt	R. Etherow	R. Irwell	R. Tame	R. Alt	R. Brock	R. Wyre	R. Ribble	R. Tonge catchment	Holden Clough	R. Keer	R. Mersey	
Common	1	9	11	11	7	5	4	5	3	5	3	2	5	5	1	2	0	2	1	
Local	2	13	17	18	8	11	12	7	2	1	4	2	1	2	3	2	3	0	0	
Very Local	4	0	2	6	0	0	2	0	1	1	0	0	0	0	0	0	0	0	1	
NS/N/Nb	8	10	29	25	6	3	10	6	3	3	3	5	1	0	2	2	1	1	1	
Notable-A	16	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
RDB3/RDBI/NT/DD	24	8	7	9	2	1	1	0	1	0	0	0	0	0	0	0	0	0	1	
RDB1-EN/RDB2-VU	32	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	
No. ERS species		42	68	71	23	21	29	18	10	10	10	9	7	7	6	6	5	3	4	
ERSQS		339	517	535	119	107	140	67	59	35	35	46	15	9	23	22	46	10	37	
ERSQI		807	760	754	517	510	483	372	590	350	350	511	214	129	383	367	920	333	925	

* The Calder catchment includes the R. Calder, Pendle, Colne, Don, Brun, Sabden Beck, Ogden Clough

With historical records of 10 ERS species each; the Rivers Goyt, Etherow and Tame also deserve attention. The Irwell also has 10 ERS species reported, but this total is bolstered by an ongoing targeted survey of ERS invertebrates (Hewitt, in prep), which suggests that it may not be of very great interest for ERS invertebrates.

With 9 ERS species the River Alt at Hightown, Formby appears to have potential, but it may be that several of these records relate to the dunes rather than the river itself.

The River Wyre and its tributary, the Brock each have 7 ERS species reported. Taken together the combined total for these is 10 ERS species. Virtual survey via Google Earth reveals some areas of ERS with apparently good potential for ERS invertebrates, which would merit checking on the ground.

With just 6 ERS species reported, the River Ribble ranks surprisingly poorly. The Hodder empties into the Ribble and, given the apparent high quality of the Hodder, one might expect that the Ribble would therefore produce some high value ERS deposits, at least downstream of the confluence with the Hodder. However, it may be that land use along the Ribble is not conducive to maintaining ERS deposits in favourable condition for specialised invertebrates. Google Earth remote survey does pick up some potentially valuable ERS deposits, which merit survey visits.

Holden Clough, near Ashton-under-Lyne, has historical records of 5 ERS species and Google Earth survey suggests that the River Medlock, into which the beck flows, may also provide ERS invertebrate habitat.

The catchment of the River Tonge above Bolton has records of 6 ERS invertebrate species, although remote survey using Google Earth indicates only small deposits of ERS which seem unlikely to be of high value to ERS specialist communities.

Colin Johnson reported 3 species of ERS beetles from the River Keer at Carnforth. Remote survey using Google Earth did not detect any significant ERS deposits along this stretch of the river.

Distribution of ERS deposits and high fidelity ERS species on rivers in Lancashire and Cheshire

Information is presented below for rivers with significant numbers of ERS invertebrates. The rivers are addressed in descending order by number of ERS invertebrates recorded. The maps show ERS species diversity, represented by symbols shaded yellow to red with increasing number of species present.

For tetrad symbols the data categories represent the following numbers of species:

1-2, 2-6, 6-16, 16-29, 29-48.

For monad symbols the data categories represent the following numbers of species:

1-2, 2-7, 7-16, 16-29, 29-44.

For 100m² symbols the data categories represent the following numbers of species:

1-2, 2-7, 7-15, 15-25, 25-38.

Each river has been virtually surveyed for areas of ERS using Google Earth. Deposits of potentially valuable ERS thus identified are outlined in red on the maps. This type of remote survey is a valuable tool to identify areas of ERS but it should be noted that many other factors, such as disturbance and compaction, that may affect ERS invertebrates cannot be detected remote survey. Other information, such as adjacent land use can be used to inform remote assessment but ultimately physical survey is the only definitive method.

River Lune

Vice County: 60 West Lancashire

Hectads: SD56, 57, 67

Nearest town: Lancaster

42 ERS species**ERSQI = 807****ERS Species reported from the River Lune****ARACHNIDA****Araneae****Linyphiidae***Caviphantes saxetorum* RLGB -NT**Lycosidae***Arctosa cinerea**Pardosa agricola***INSECTA****Coleoptera****Carabidae***Amara fulva* Notable-B*Bembidion atrocaeruleum**Bembidion bipunctatum* Notable-B*Bembidion decorum**Bembidion femoratum**Bembidion fluviatile* RLGB -NT*Bembidion monticola* Notable-B*Bembidion punctulatum**Bembidion tibiale**Clivina collaris**Thalassophilus longicornis* Notable-A**Dryopidae***Dryops nitidulus* RLGB -NT**Elateridae***Fleutiauxellus maritimus* Notable-A*Zoroachros minimus***Staphylinidae***Aloconota cambrica**Aloconota insecta**Aloconota sulcifrons**Bledius erraticus* RLGB_Pre94-I*Brachygluta pandellei* RLGB_Pre94-I*Hydrosmeeta subtilissima*

Notable

Lathrobium angusticolle

Notable-B

*Stenus guttula**Tachyusa constricta**Tetralaucopora rubicunda*

Notable

*Thinodromus arcuatus***Diptera****Dolichopodidae***Dolichopus longicornis***Empididae***Hilara albiventris*

NS-excludes

Hilara pseudochorica

NS-excludes

Ephydriidae*Athyroglossa glabra**Ditrichophora palliditarsis***Hybotidae***Tachydromia edenensis**Tachydromia halidayi*

NS-excludes

Limoniidae*Hoplolabis areolata**Rhabdomastix eugeni*

Data Deficient

Scatopsidae*Rhegmoclemina lunensis*

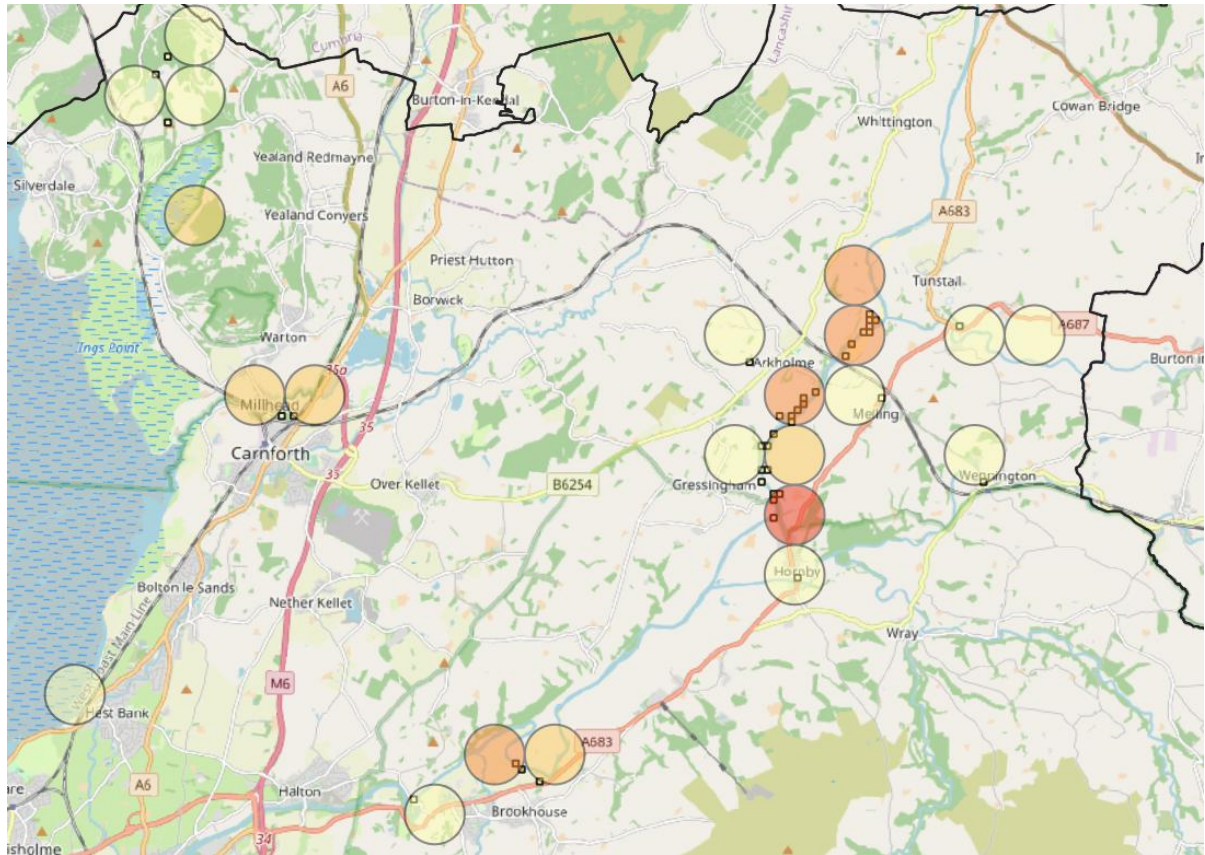
Data Deficient

*Anapausis talpae***Therevidae***Spiriverpa lunulata*

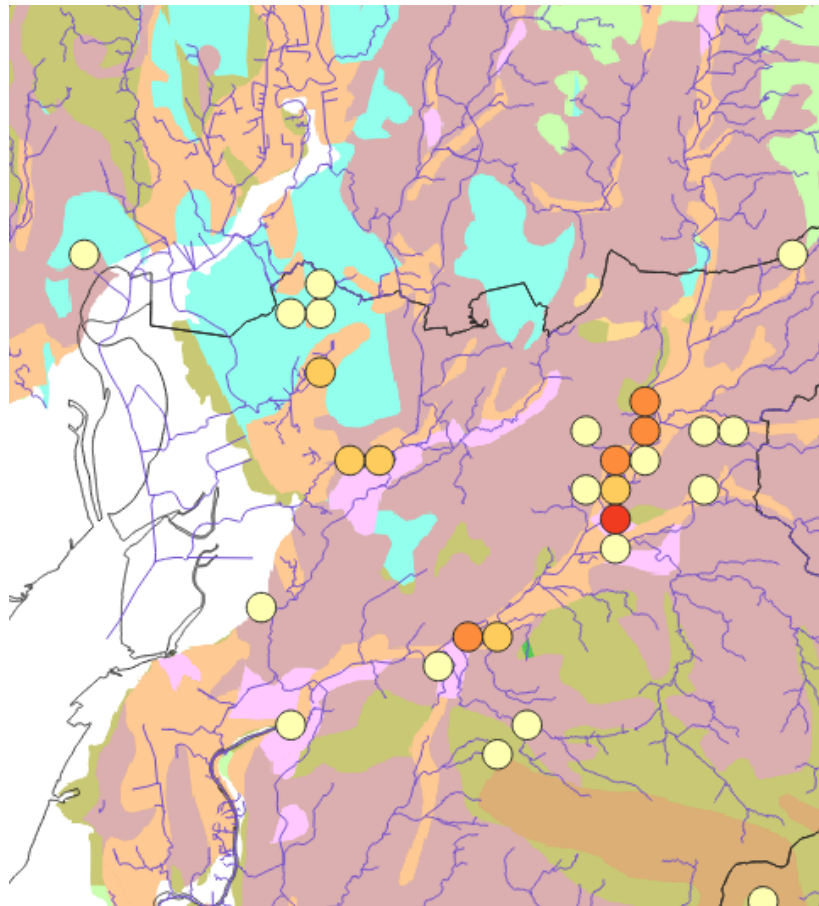
RLGB_Pre94-R

Hemiptera**Dipsocoridae***Cryptostemma alienum***Saldidae***Macrosaldula scotica*

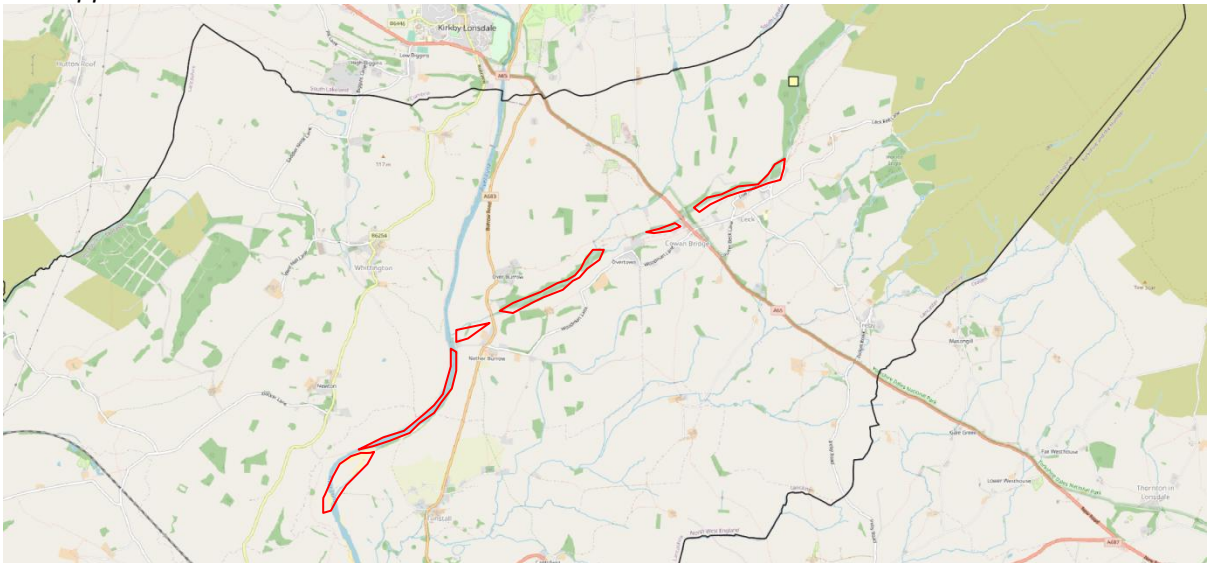
Heat map of ERS species diversity on the River Lune, presented at monad and 100m² resolutions with areas of potential ERS deposited outlined in red.



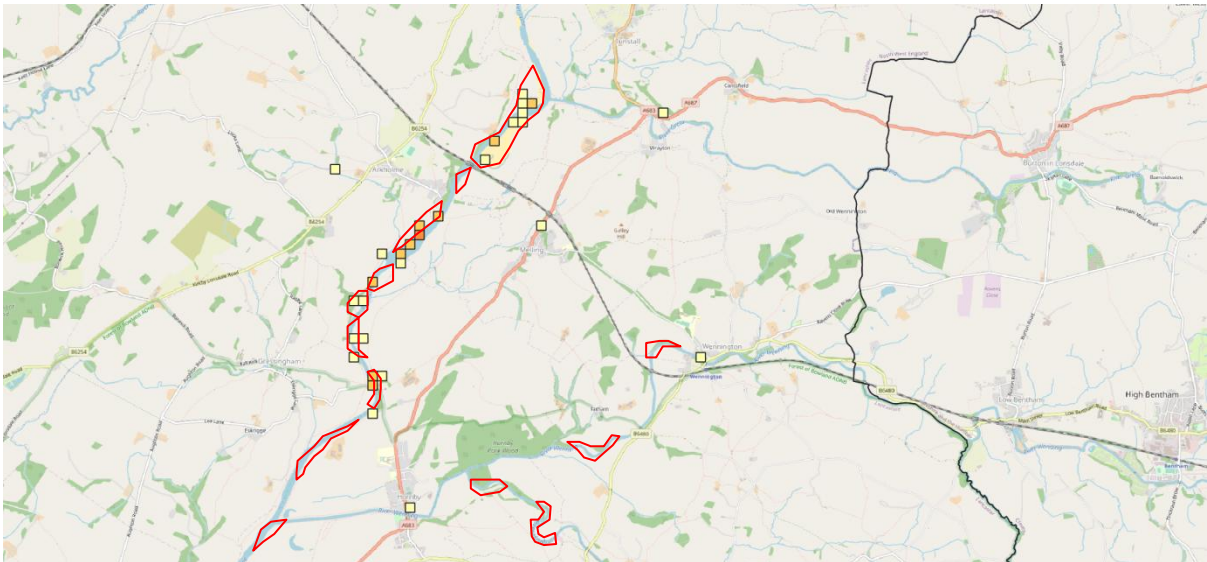
Heat map of ERS species diversity on the River Lune, presented at monad resolution over a base map of surface geology.



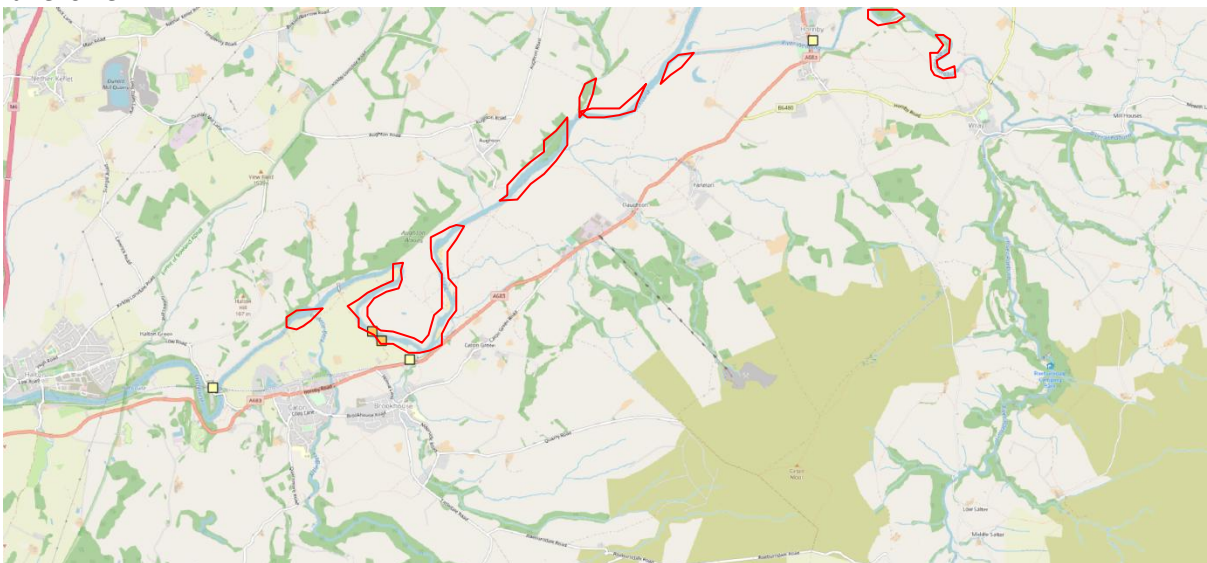
ERS species diversity on the River Lune at 100m² resolution, with areas of ERS outlined in red
Lune upper



Lune middle

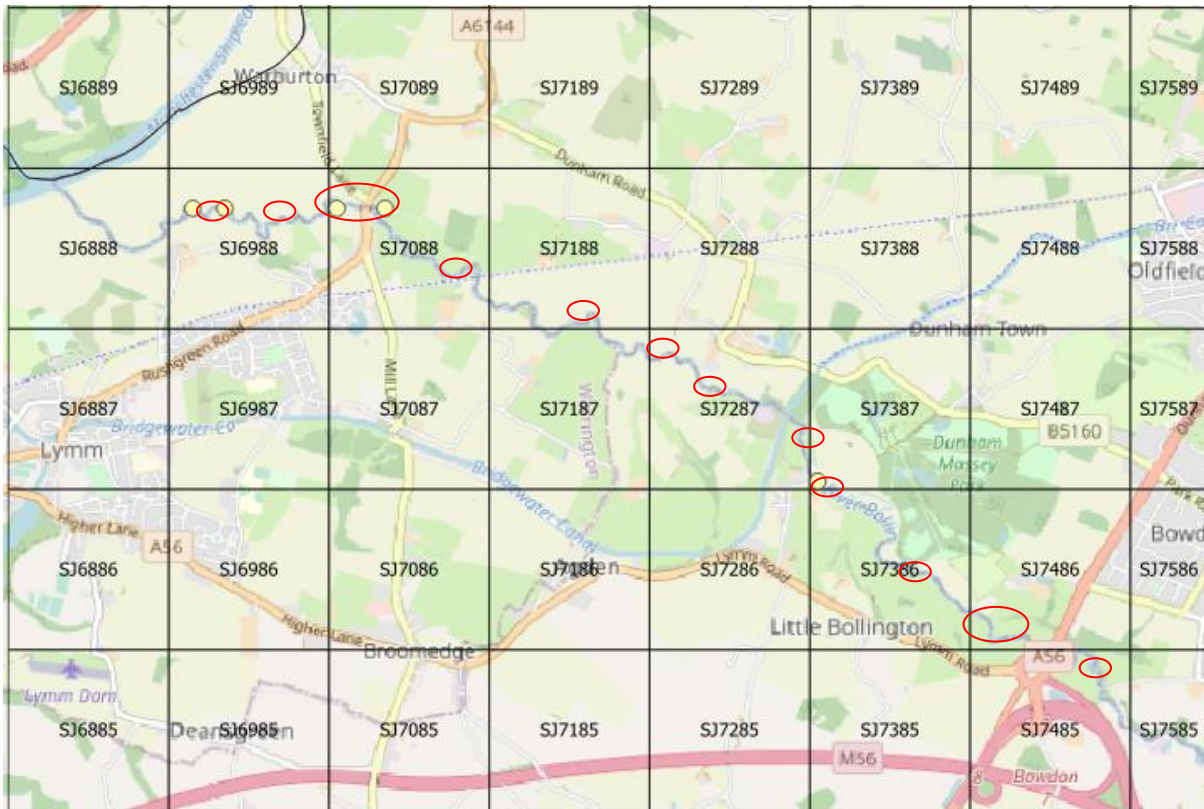


Lune lower

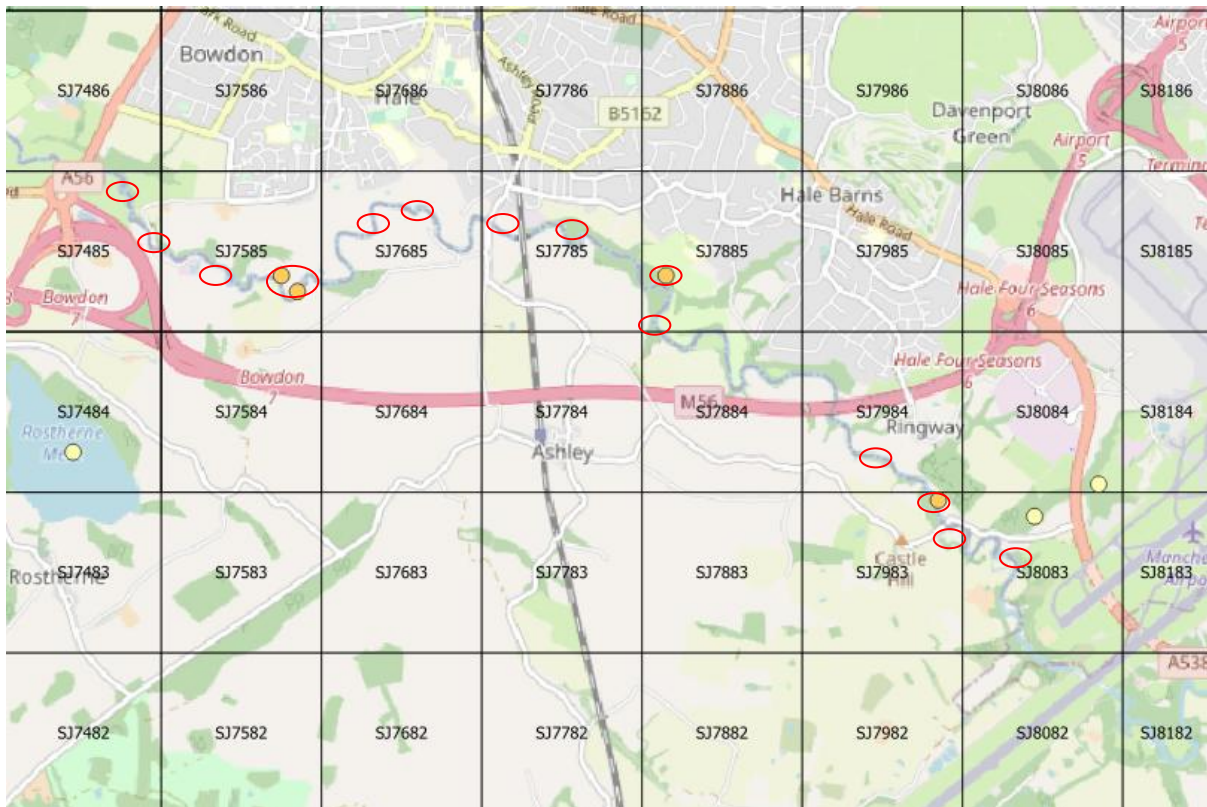


River Bollin**68 ERS species****ERSQI = 760****Vice County:** 58 Cheshire**Hectads:** SJ97, 87, 88, 78**Nearest town:** Macclesfield**ERS Species reported from the River Bollin****Coleoptera****Aegialiidae***Aegialia insularis***Carabidae***Amara fulva**Asaphidion flavipes**Asaphidion pallipes**Bembidion articulatum**Bembidion atrocaeruleum**Bembidion decorum**Bembidion femoratum**Bembidion lunatum**Bembidion monticola**Bembidion punctulatum**Bembidion stomoides**Bembidion tibiale**Bracteon litorale**Clivina collaris**Elaphropus parvulus***Elatерidae***Zoroehros minimus***Heteroceridae***Heterocerus marginatus***Hydraenidae***Hydraena nigrita***Hydrophilidae***Georissus crenulatus**Helophorus arvernicus***Staphylinidae***Aloconota eichhoffi**Aloconota insecta**Aloconota sulcifrons**Biblopectus minutissimus* RLBGB.IK*Bledius annae**Bledius longulus**Bledius subterraneus**Carpelimus similis**Carpelimus subtilis**Deleaster dichrous**Gnypeta rubrior**Hydrosmeeta longula**Hydrosmeeta subtilissima**Ischnopoda scitula* RLBGB.IK*Lathrobium pallidipenne**Meotica anglica**Ochtheophilus andalusiacus**Ochtheophilus omalinus**Philhygra scotica**Stenus comma**Stenus guttula**Tachyusa coarctata**Tachyusa constricta**Tetralaucopora longitarsis**Tetralaucopora rubicunda***Diptera****Dolichopodidae***Dolichopus longicornis**Rhaphium riparium***Empididae***Hilara albiventris**Hilara pseudochorica***Ephydriidae***Athyroglossa glabra**Ditrichophora palliditarsis***Hybotidae***Platypalpus melancholicus* RLBGB.Lr(NT)*Platypalpus ochrocera* RLBGB.DD*Symballophthalmus pictipes**Tachydromia costalis* RLBGB.Lr(NT)*Tachydromia morio**Tachydromia woodi* RLBGB.Lr(NT)**Limoniidae***Arctoconopa melampodia* RLBGB.Lr(NT)*Hoplolabis areolata**Hoplolabis vicina**Hoplolabis yezoana***Lonchopteridae***Lonchoptera nigrociliata***Therevidae***Clorismia rustica* RLBGB.R**Tipulidae***Nephrotoma analis**Nephrotoma lunulicornis***Hemiptera****Saldidae***Saldula c-album*

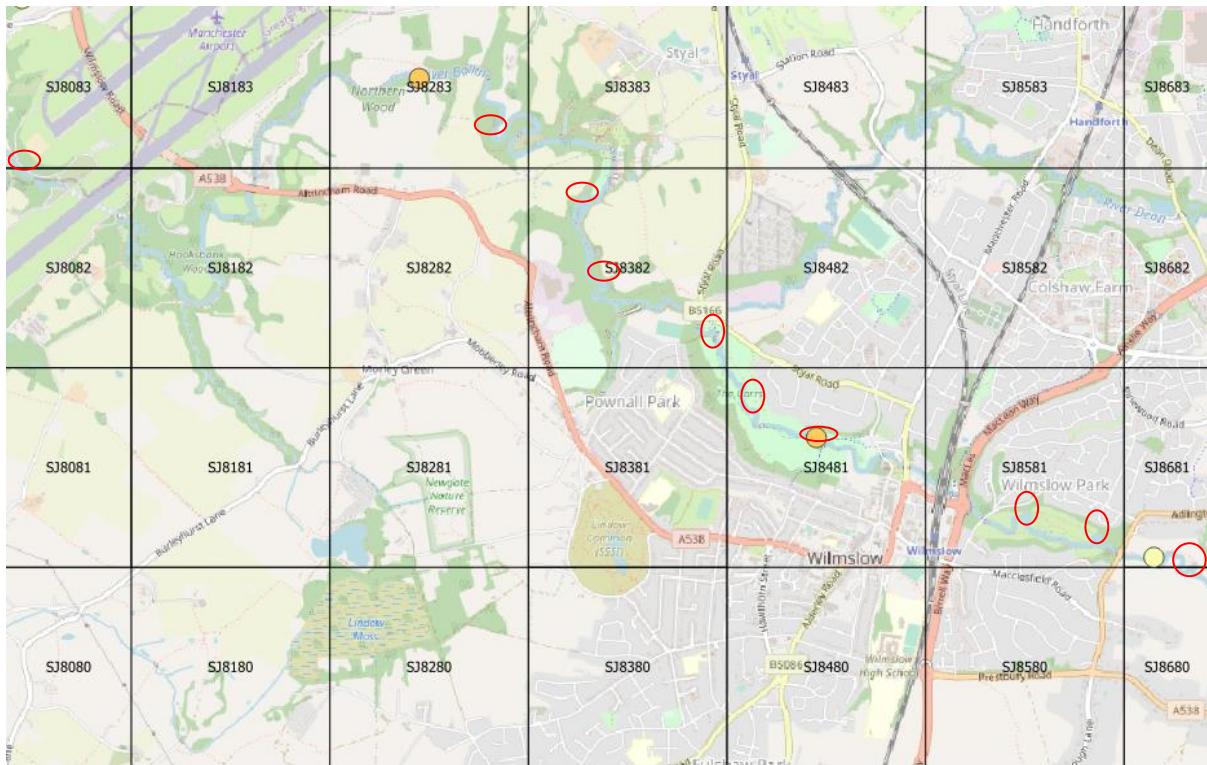
River Bollin, lower reaches. Many of these ERS deposits appear to be of sand deposited on the riverbanks, suitable for species such as *Clorismia rustica*.



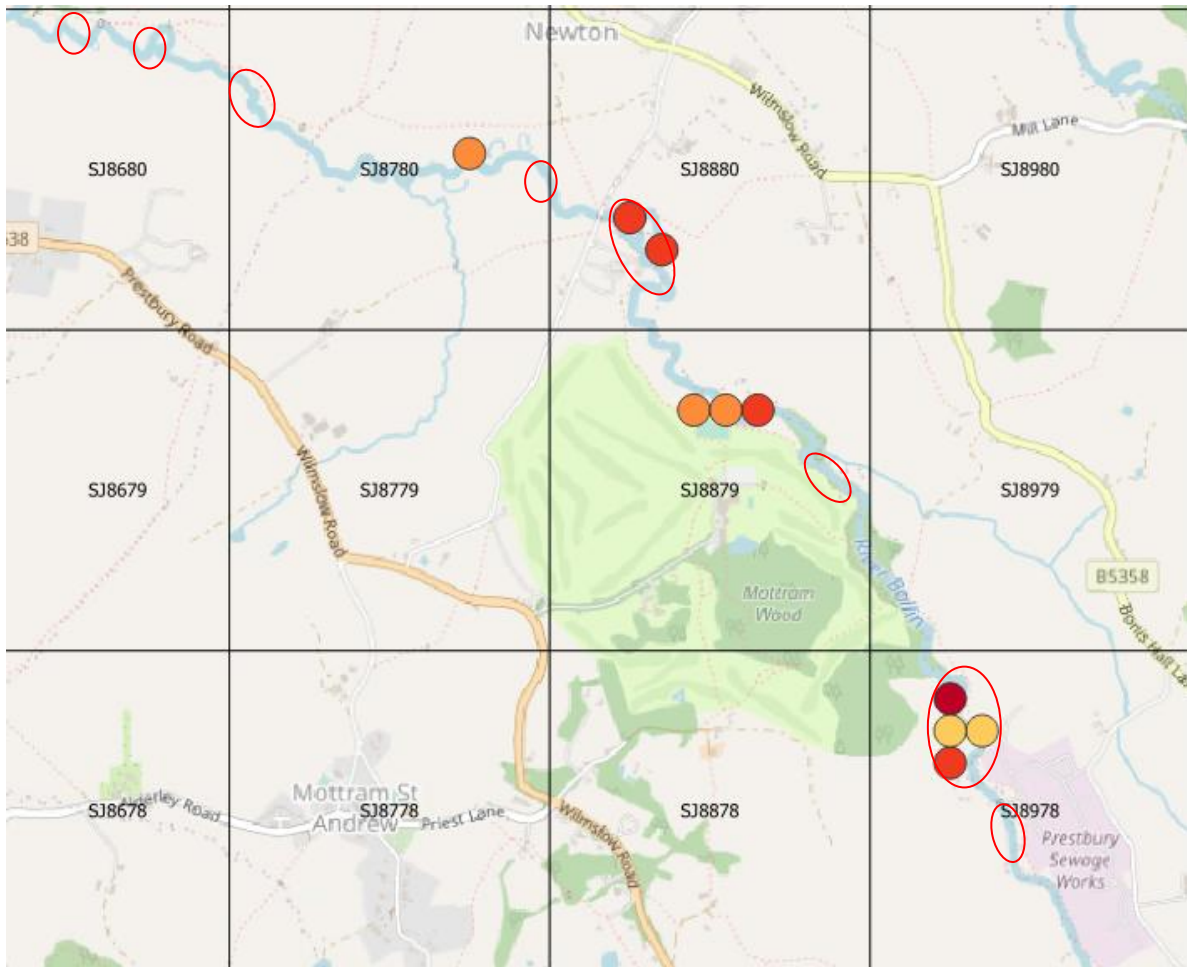
River Bollin, lower middle reaches.



River Bollin, upper middle reaches

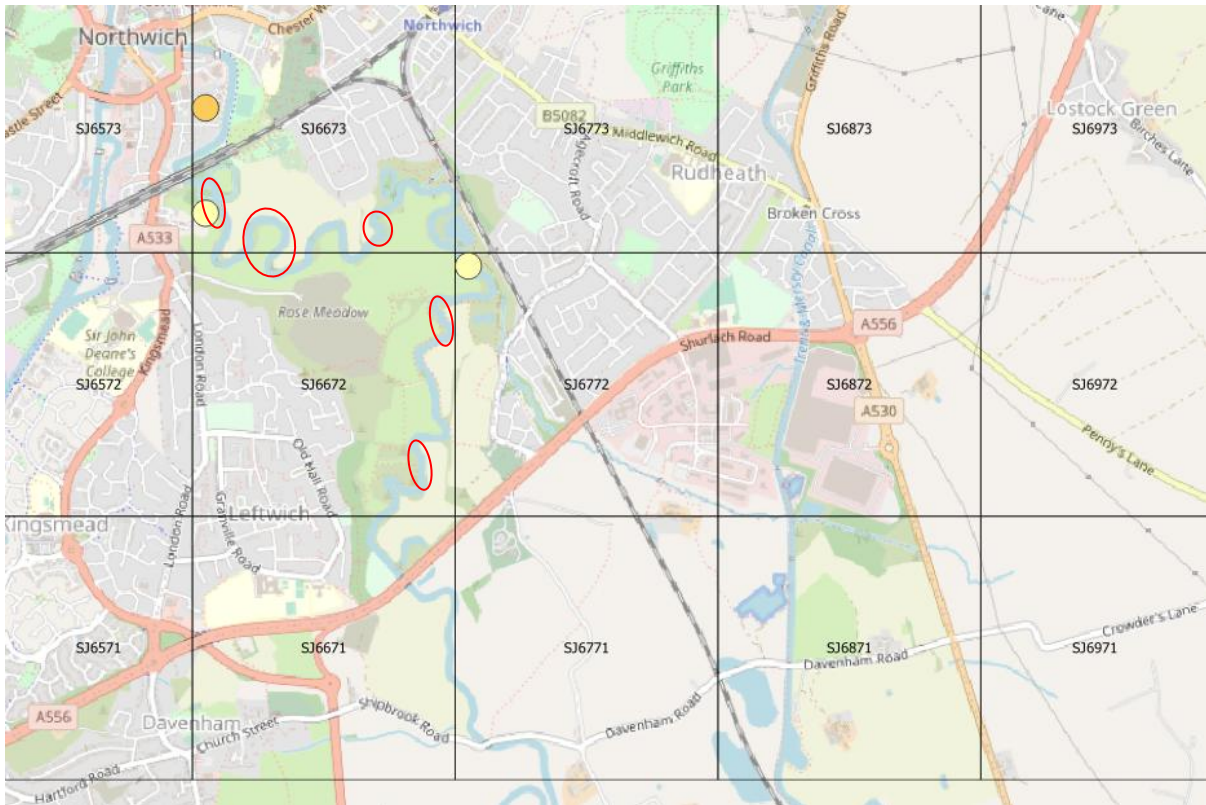


River Bollin, upper reaches

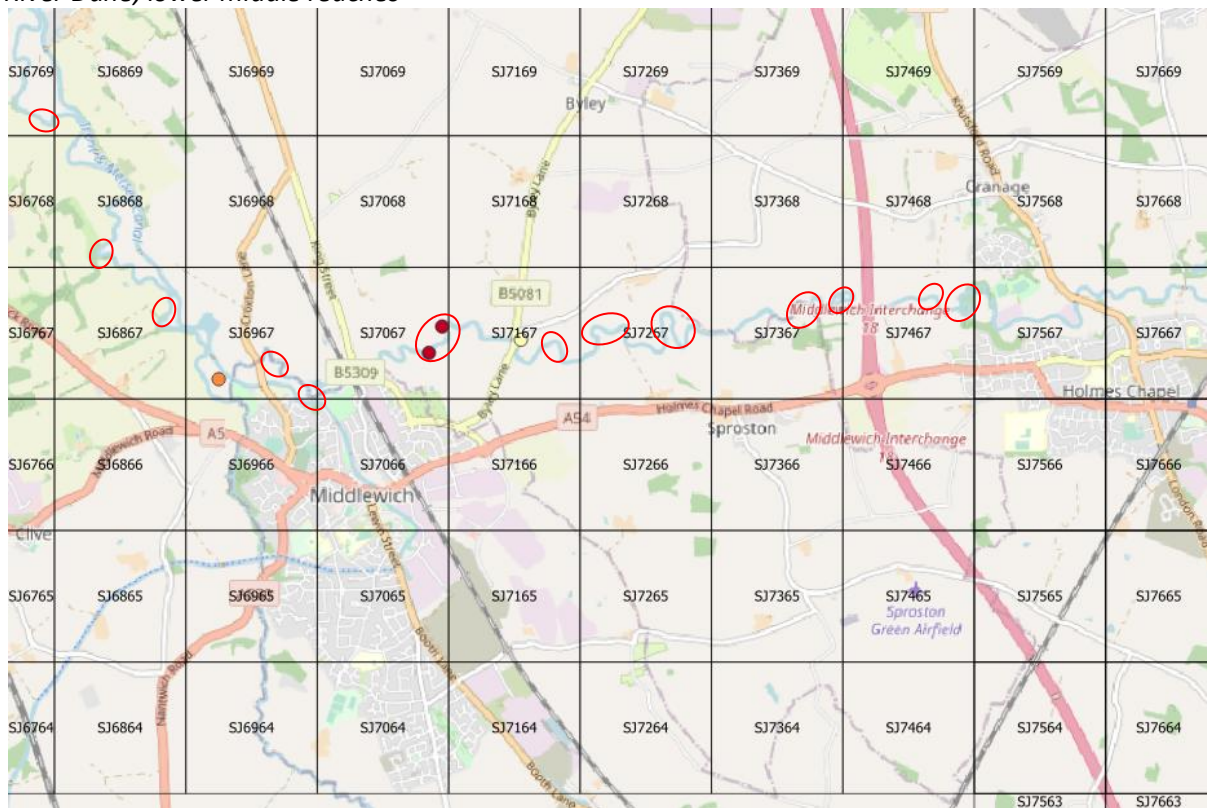


River Dane**71 ERS spp.****ERSQI = 754****Vice County:** 58 Cheshire**Hectads:** SJ86, 76, 66, 67**Nearest towns:** Congleton, Holmes Chapel, Middlewich, Northwich**ERS species reported from the River Dane****INSECTA****Coleoptera****Aegialiidae***Aegialia insularis* Notable-B**Carabidae***Agonum micans**Bembidion atrocaeruleum**Bembidion decorum**Bembidion femoratum**Bembidion geniculatum**Bembidion lunatum* Notable-B*Bembidion monticola* Notable-B*Bembidion punctulatum**Bembidion tibiale**Bracteon litorale* Notable-B*Clivina collaris**Dyschirius aeneus**Elaphropus parvulus* Notable-B**Elateridae***Zoroachros minimus***Heteroceridae***Heterocerus marginatus* NS**Hydraenidae***Ochthebius bicolon***Hydrophilidae***Helophorus arvernicus***Ptiliidae***Ptenidium brenskei* Notable**Staphylinidae***Aloconota cambrica**Aloconota currax**Aloconota insecta**Aloconota sulcifrons**Bledius subterraneus**Carpelimus manchuricus subsp. subtilicornis**Carpelimus similis* Notable*Carpelimus subtilis* Notable*Deleaster dichrous* Notable-B*Hydrosmecta eximia**Hydrosmecta longula* Notable*Hydrosmecta subtilissima* Notable*Lathrobium pallidipenne* Notable*Meotica anglica* BAP-2007, Notable*Ochtheophilus andalusiacus* Notable*Ochtheophilus angustior**Ochtheophilus aureus**Ochtheophilus omalinus**Philhygra debilis**Stenus comma**Stenus guttula**Tachyusa coarctata* Notable*Tachyusa constricta**Tetralaucopora longitarsis**Thinobius bicolor* Notable-A*Thinodromus arcuatus***Diptera****Dolichopodidae***Diaphorus hoffmanseggi* NR*Dolichopus longicornis**Rhaphium nasutum**Rhaphium riparium**Rhaphium suave* Data Deficient**Empididae***Hilara albiventris* NS*Hilara biseta* NS*Hilara pseudochorica* NS**Ephydriidae***Athyroglossa glabra**Ditrichophora palliditarsis***Hybotidae***Platypalpus melancholicus* RLGB-NT*Tachydromia costalis* RLGB-NT*Tachydromia morio**Tachydromia woodi* RLGB-NT**Limoniidae***Arctoconopa melampodia* RLGB.Lr(NT)*Hoplolabis areolata**Hoplolabis vicina**Hoplolabis yezoana**Rhabdomastix edwardsi**Rhabdomastix japonica* RLGB-Rare**Lonchopteridae***Lonchoptera nigrociliata* NS**Pediciidae***Dicranota subtilis***Therevidae***Cliorismia rustica* BAP-2007, RLGB-Rare**Tipulidae***Nephrotoma dorsalis* Notable*Nephrotoma lunulicornis* Notable**Hemiptera****Saldidae***Saldula c-album*

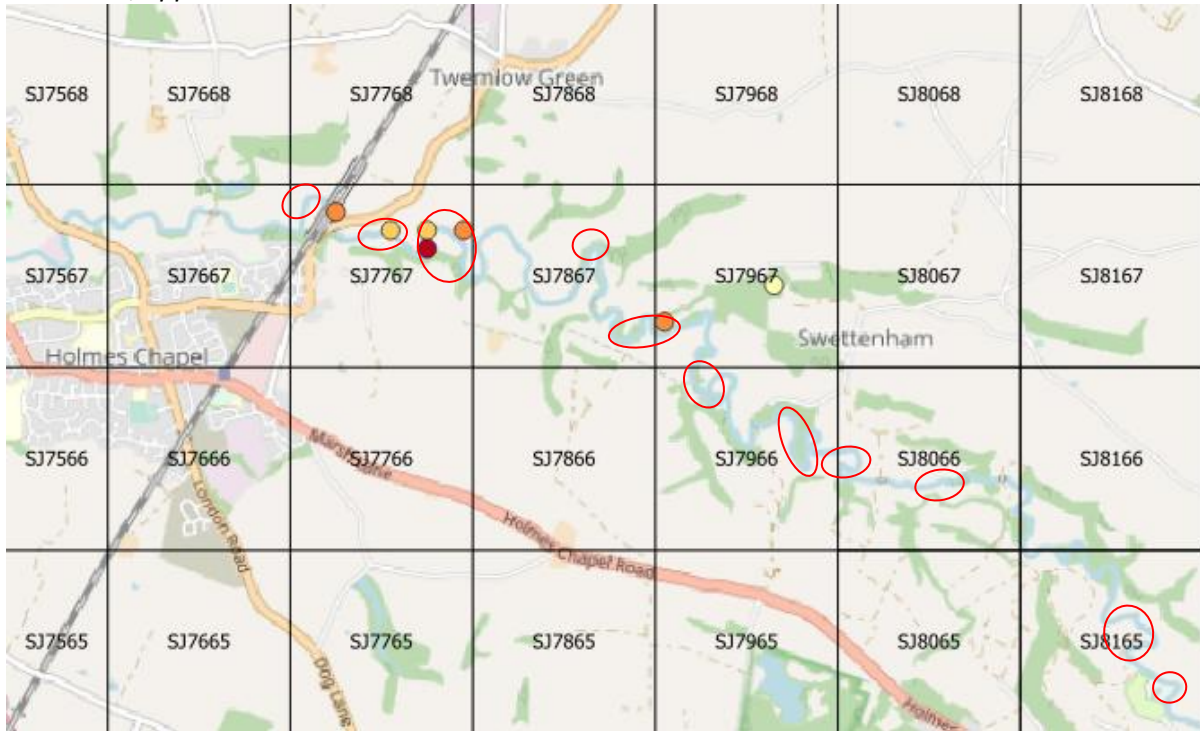
River Dane, lower reaches



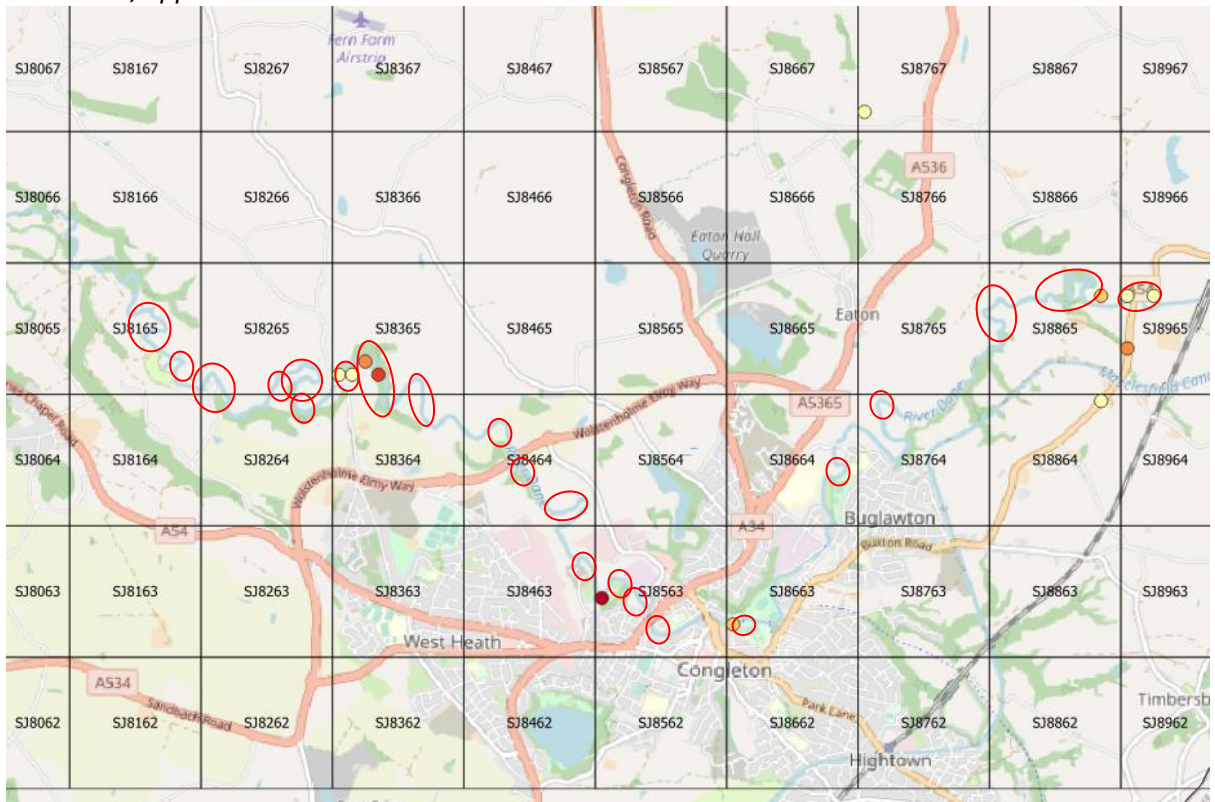
River Dane, lower middle reaches



River Dane, upper middle reaches



River Dane, upper reaches



River Hodder

Vice-county: 60 West Lancashire

Hectad: SD64, 73

Nearest town: Great Mitton

21 ERS species

ERSQI = 510

ERS species reported from the River Dane

INSECTA

Hemiptera

Saldidae

Macrosaldula scotica

Coleoptera

Carabidae

Bembidion atrocaeruleum

Bembidion decorum

Bembidion monticola Notable-B

Bembidion punctulatum

Bembidion stomoides Notable-B

Bembidion tibiale

Dryopidae

Dryops nitidulus RLGB -NT

Staphylinidae

Aloconota insecta

Ochtheophilus omalinus

Stenus fossulatus

Stenus guttula

Diptera

Athericidae

Ibisia marginata

Dolichopodidae

Rhaphium riparium

Hybotidae

Tachydromia morio

Limoniidae

Hexatoma bicolor

Hexatoma fuscipennis

Hoplolabis vicina

Rhabdomastix edwardsi

Pediciidae

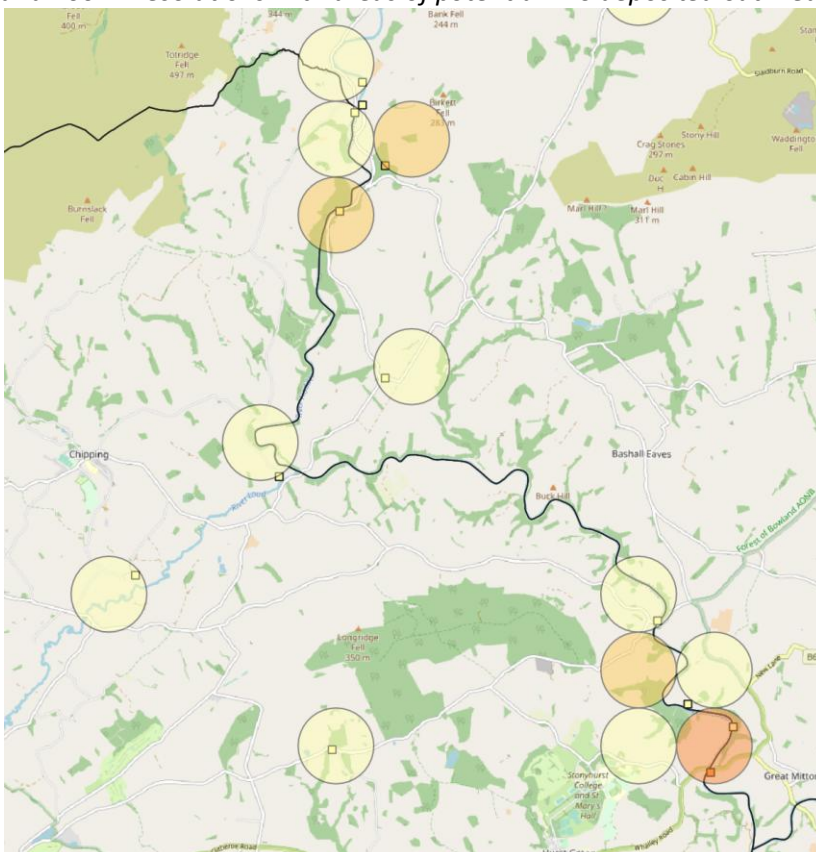
Dicranota robusta

Notable

Tipulidae

Nephrotoma analis

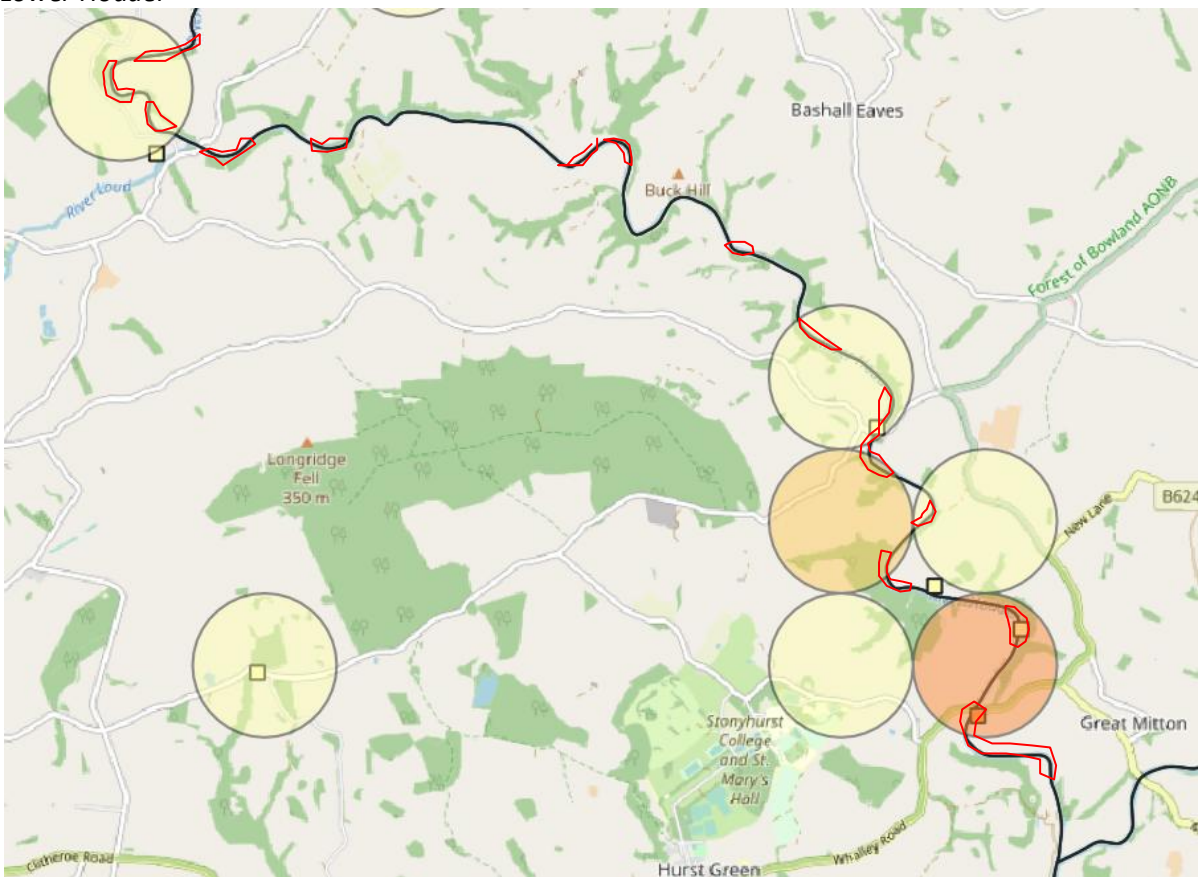
Heat map of ERS species diversity on the River Hodder, presented at monad and 100m² resolutions with areas of potential ERS deposited outlined in red.



Upper Hodder



Lower Hodder



River Weaver

Vice County: 58 Cheshire

Hectads: SJ64, 65, 67

Nearest towns: Northwich, Winsford, Nantwich

29 ERS species

ERSQI = 483

ERS species reported from the River Weaver

INSECTA

Coleoptera

Carabidae

Bembidion articulatum

Bembidion dentellum

Bracteon litorale

Clivina collaris

Notable-B

Heteroceridae

Heterocerus marginatus

NS

Hydraenidae

Ochthebius bicolon

Hydrophilidae

Georissus crenulatus

NS

Helophorus arvernicus

Staphylinidae

Aloconota insecta

Aloconota sulcifrons

Bledius subterraneus

Carpelimus similis

Ochtheophilus omalinus

Oxypoda exoleta

Philhygra debilis

Stenus guttula

Tachyusa constricta

Notable

Notable

Diptera

Dolichopodidae

Dolichopus longicornis

Rhaphium penicillatum

RLGB-NT

Empididae

Hilara albiventris

NS

Hilara biseta

NS

Hilara pseudochorica

NS

Ephydriidae

Athyroglossa glabra

Ditrichophora palliditarsis

Limoniidae

Hoplolabis areolata

Hoplolabis vicina

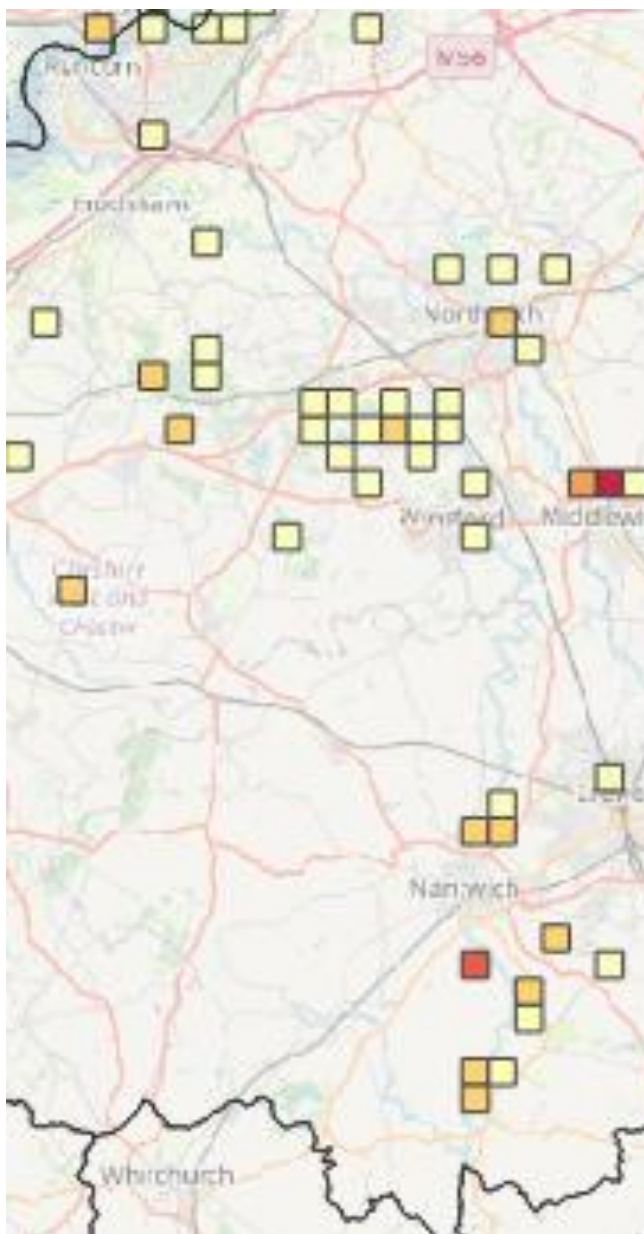
Lonchopteridae

Lonchoptera nigrociliata

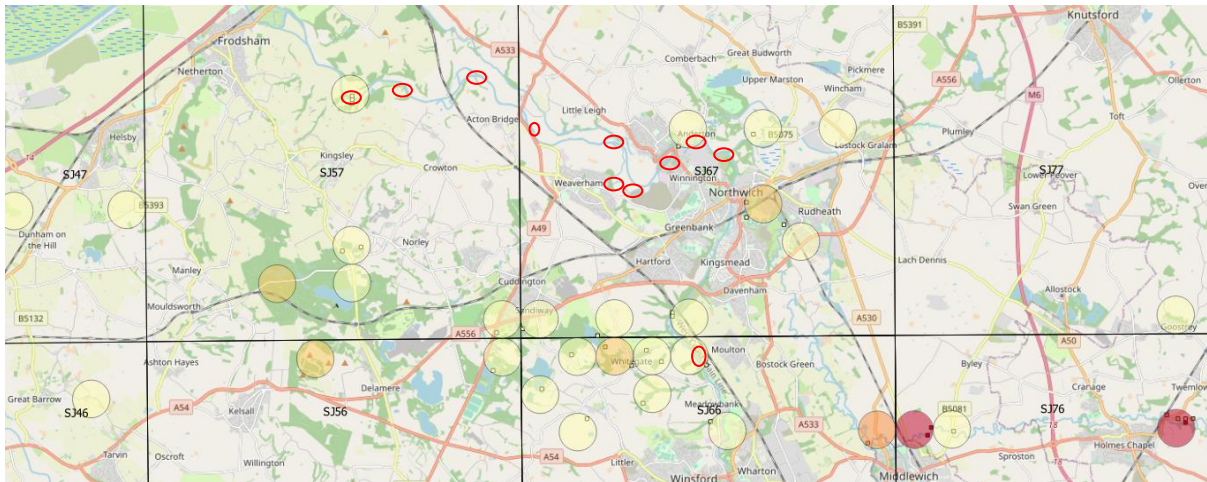
NS

Tipulidae

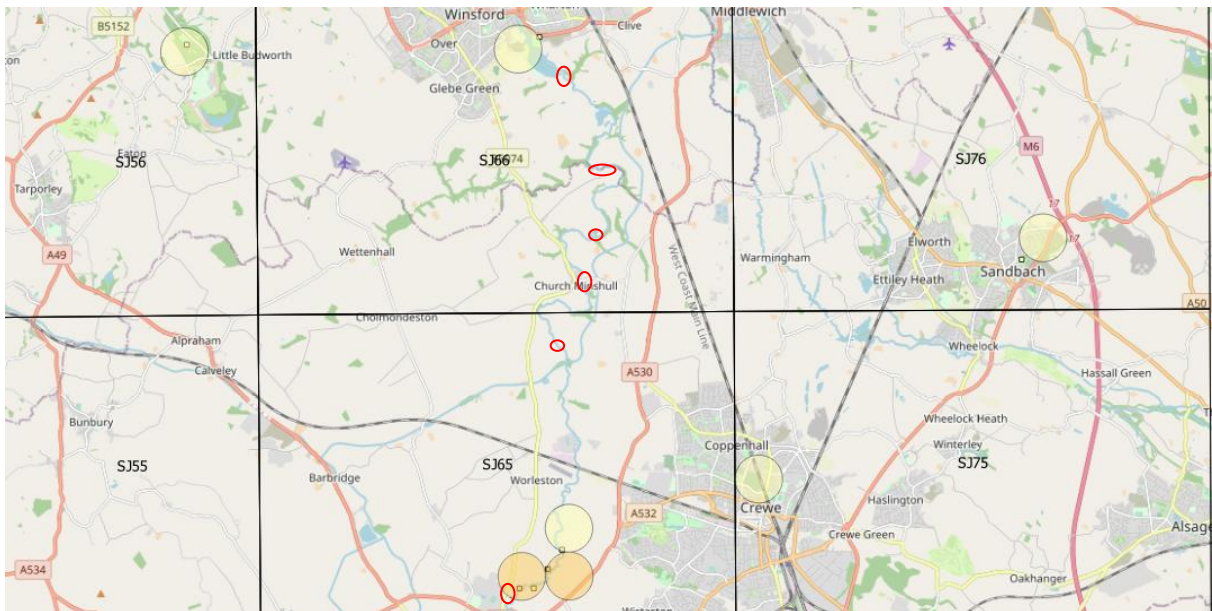
Nephrotoma analis



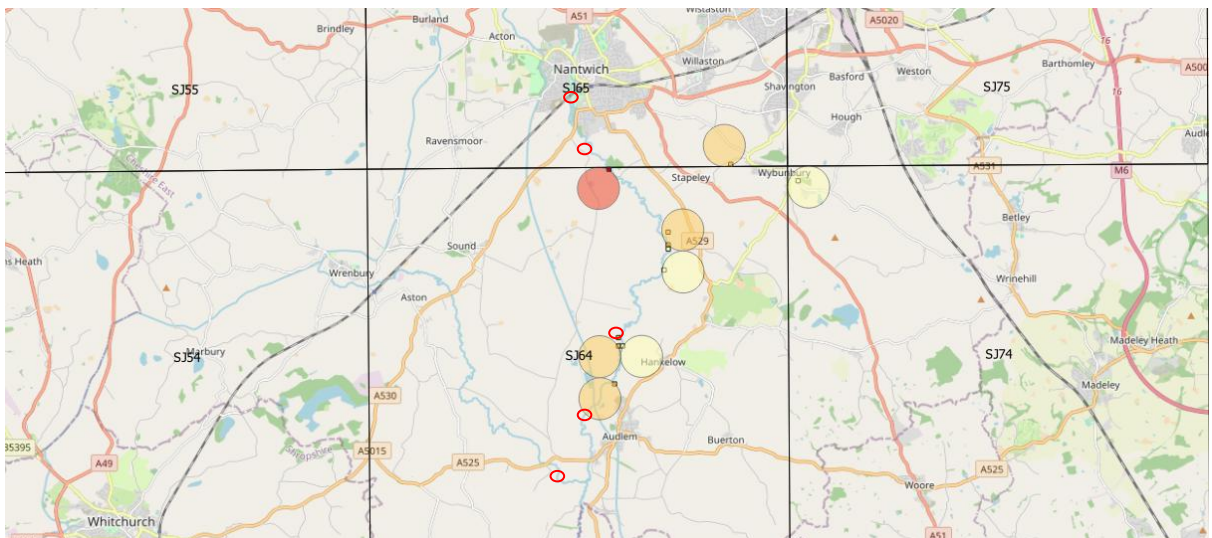
River Weaver bottom



River Weaver middle



River Weaver top



Calder catchment

23 ERS species

ERSQI = 517

(R. Calder, Pendle, Colne, Don, Brun, Sabden Beck, Ogden Clough)

Vice-county: 59 South Lancashire

Hectads: SD73, 83, 94

Nearest towns: Colne, Burnley, Padiham

ERS species reported from the River Calder catchment

INSECTA

Coleoptera

Carabidae

<i>Amara fulva</i>	Notable-B
<i>Asaphidion flavipes</i>	Common
<i>Bembidion atrocaeruleum</i>	Common
<i>Bembidion decorum</i>	Common
<i>Bembidion dentellum</i>	Local
<i>Bembidion stomoides</i>	Notable-B
<i>Bembidion tibiale</i>	Common

Dryopidae

<i>Dryops nitidulus</i>	NT
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Elateridae

<i>Zorochros minimus</i>	Common
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Hydraenidae

<i>Hydraena gracilis</i>	Common
--------------------------	--------

Hydrophilidae

<i>Helophorus arvernicus</i>	Common
------------------------------	--------

Staphylinidae

<i>Aloconota cambrica</i>	Local
<i>Aloconota currax</i>	Local
<i>Aloconota sulcifrons</i>	Local
<i>Gnypeta carbonaria</i>	Local
<i>Ischnopoda scitula</i>	RDB-I
<i>Lathrobium pallidipenne</i>	Notable

Diptera

Dolichopodidae

<i>Dolichopus longicornis</i>	Local
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Lonchopteridae

<i>Lonchoptera nigrociliata</i>	NS
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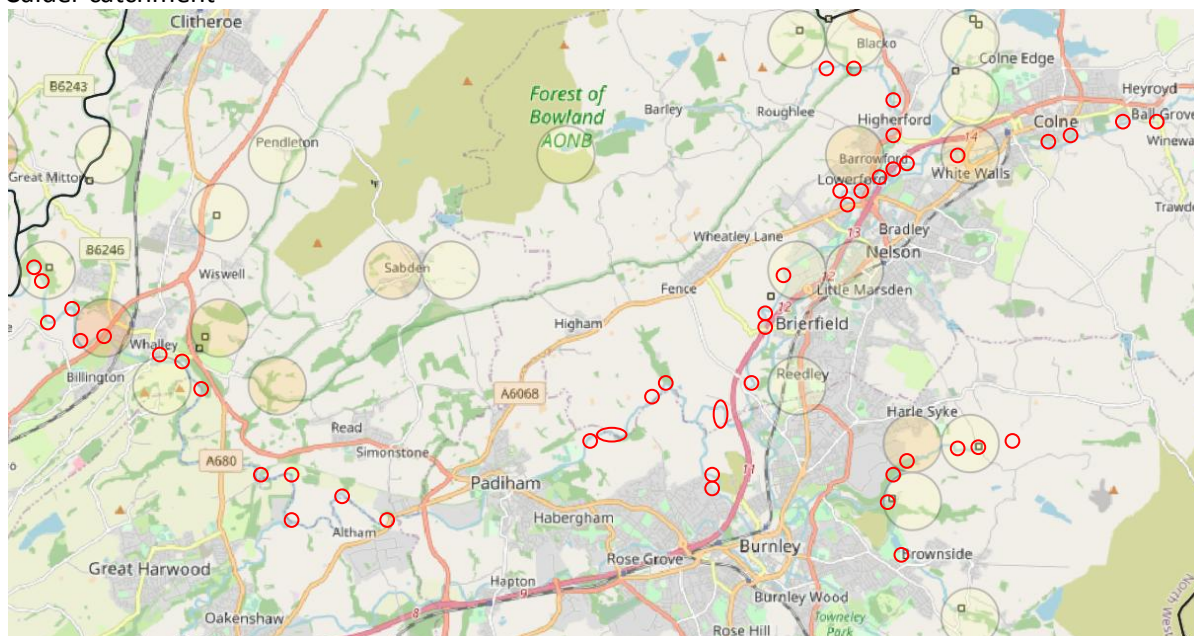
Pediciidae

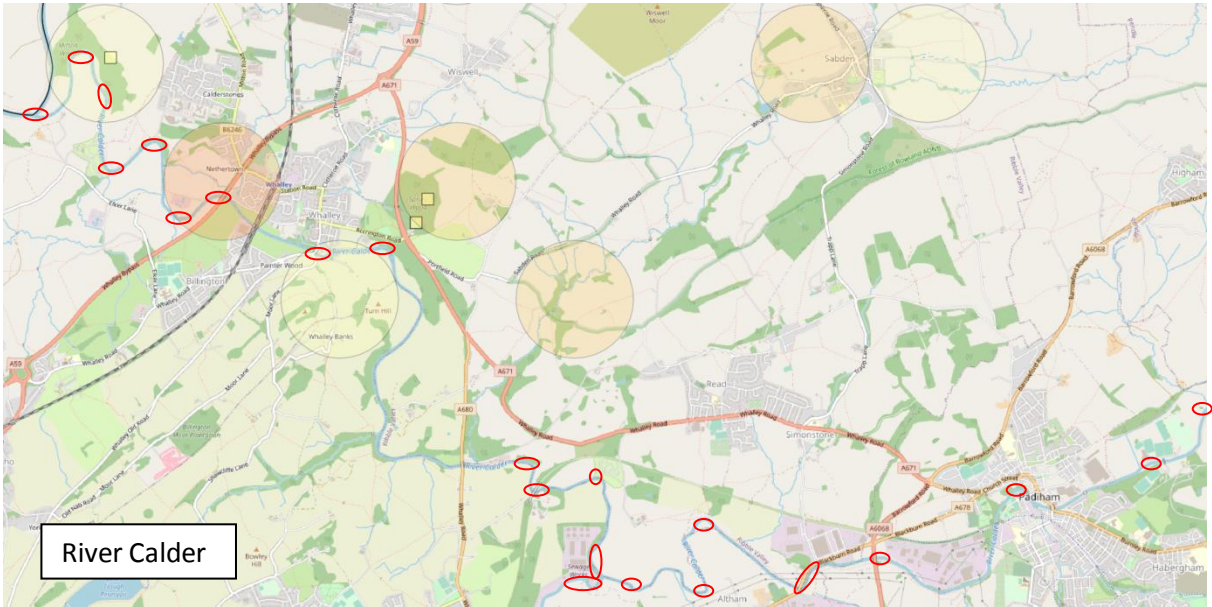
<i>Dicranota guerini</i>	Notable
<i>Dicranota robusta</i>	Notable
<i>Dicranota subtilis</i>	Local

Tipulidae

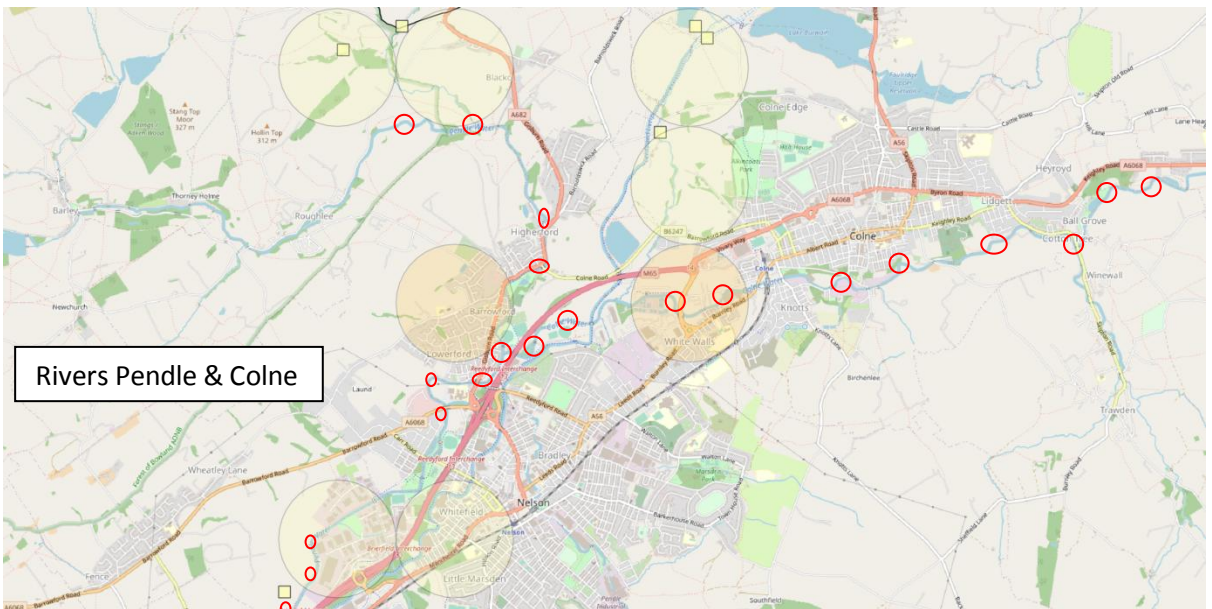
<i>Nephrotoma analis</i>	Local
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Calder catchment





River Calder



Rivers Pendle & Colne



Rivers Don & Brun

River Goyt VC: 58 Cheshire Hectads: SJ98, 99, SK07 18 ERS spp. ERSQI = 372

ERS species reported from the River Goyt

INSECTA

Coleoptera

Carabidae

Bembidion atrocaeruleum

Bembidion decorum

Bembidion monticola

Notable-B

Bembidion stomoides

Notable-B

Bembidion tibiale

Clivina collaris

Hydraenidae

Hydraena gracilis

Staphylinidae

Aloconota cambrica

Aloconota currax

Aloconota insecta

Aloconota sulcifrons

Gnypeta carbonaria

Diptera

Lonchopteridae

Lonchoptera nigrociliata

NS

Pediciidae

Dicranota guerini

Notable

Dicranota robusta

Notable

Dicranota subtilis

Therevidae

Clorismia rustica

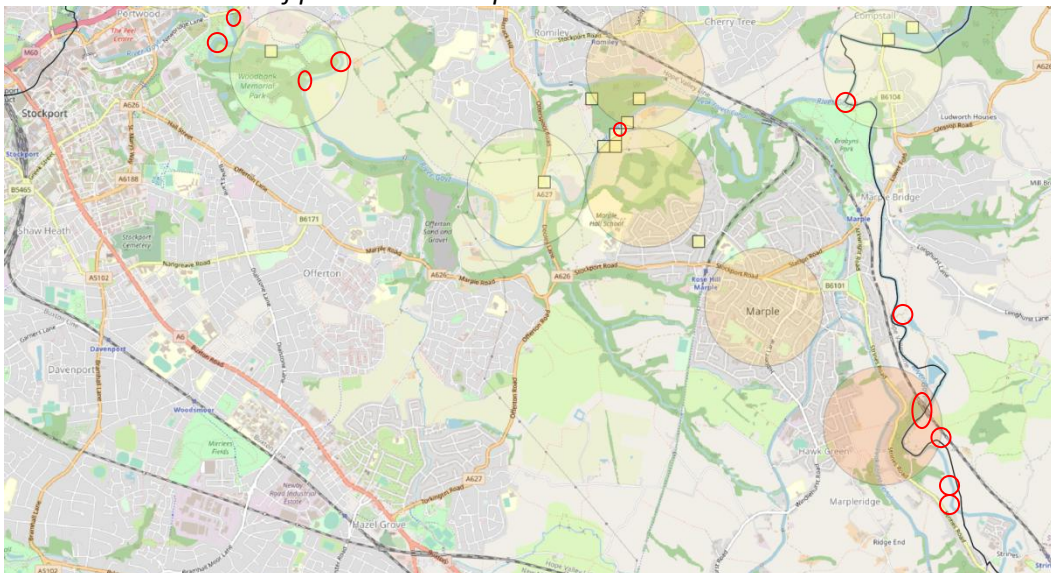
BAP-2007, NS

Hemiptera

Dipsocoridae

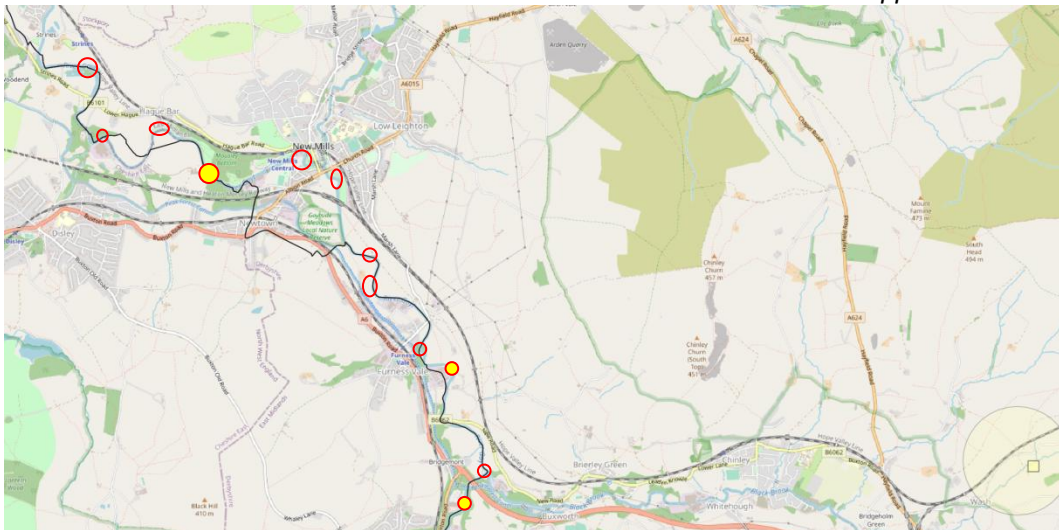
Cryptostemma alienum

Heat map of ERS species diversity on the River Goyt, presented at monad and 100m² resolutions with areas of potential ERS deposited outlined in red.



▲ Lower reaches

▼ Upper reaches



River Etherow

Vice-county: 58 Cheshire

Hectads: SJ99

Nearest towns: Broadbottom

10 ERS spp.

ERS species reported from the River Etherow

INSECTA

Coleoptera

Aegialiidae

Aegialia insularis Notable-B

Carabidae

Bembidion dentellum

Bembidion femoratum

Bembidion geniculatum

Bembidion tibiale

Elateridae

Zorochros minimus

Staphylinidae

Oxypoda exoleta Notable

Diptera

Hybotidae

Tachydromia costalis RLGB-NT

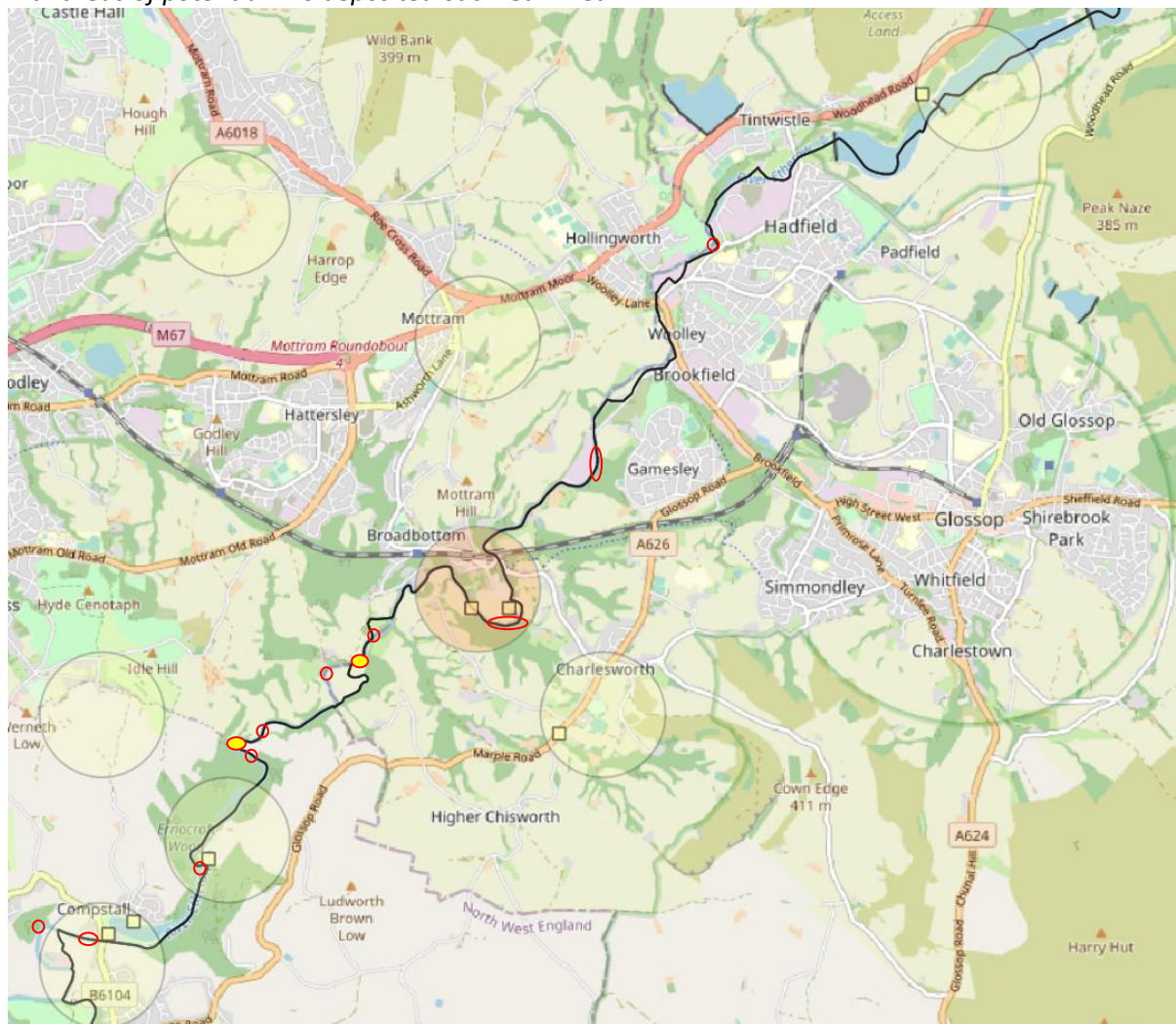
Pediciidae

Dicranota subtilis

Therevidae

Clorismia rustica BAP-2007, NS

Heat map of ERS species diversity on the River Etherow, presented at monad and 100m² resolutions with areas of potential ERS deposited outlined in red.



River Tame

Vice-county: 58/59 Cheshire/South Lancashire

10 ERS spp.

Hectads: SJ99

ERS species reported from the River Tame

ARACHNIDA

Araneae

Lycosidae

Pardosa agricola

INSECTA

Coleoptera

Carabidae

Asaphidion flavipes

Hydrophilidae

Helophorus arvernicus

Staphylinidae

Aloconota insecta

Aloconota sulcifrons

Gnypeta carbonaria

Philhygra scotica Notable

Tachyusa constricta

Tetralaucopora rubicunda

Notable

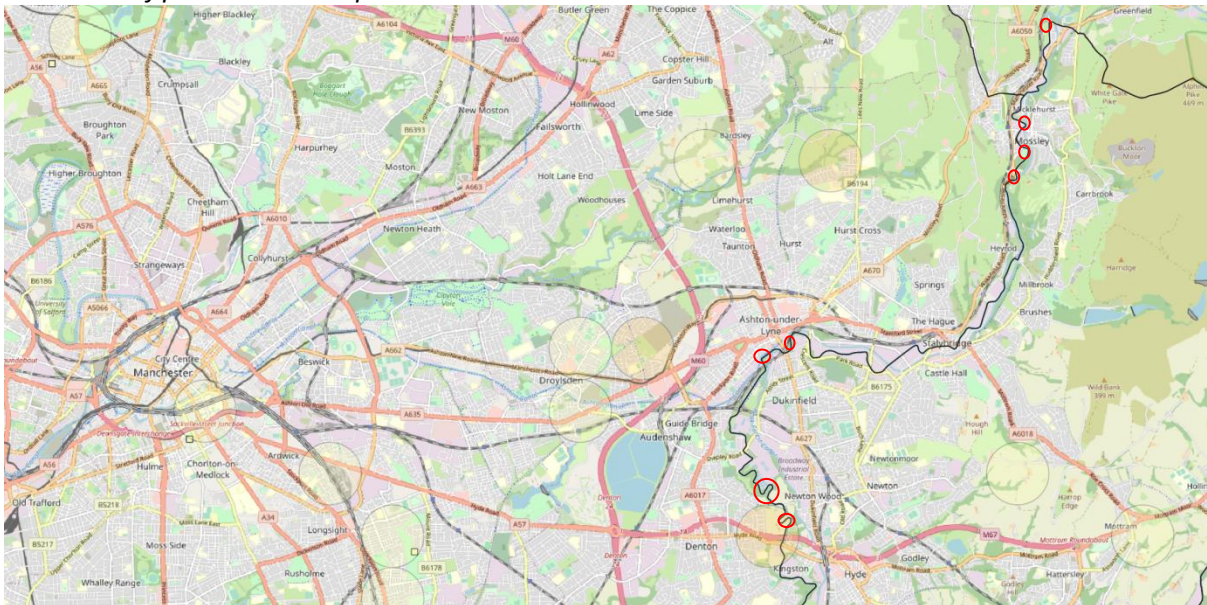
Diptera

Therevidae

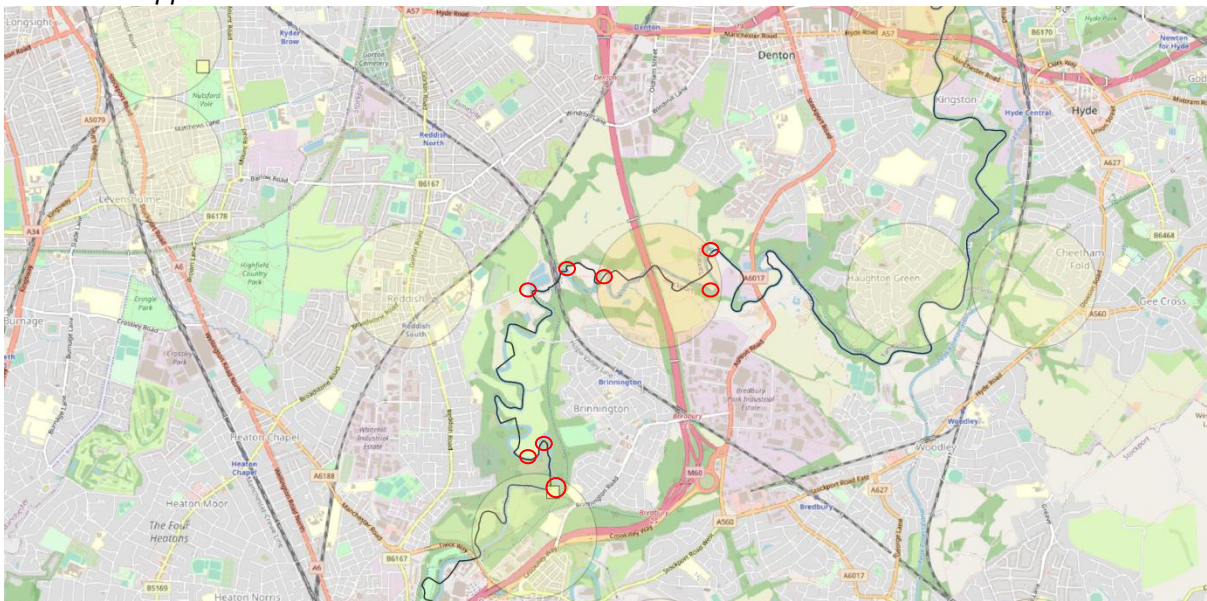
Clorismia rustica

BAP-2007, NS

Heat map of ERS species diversity on the River Etherow, presented at monad and 100m² resolutions with areas of potential ERS deposited outlined in red.



River Tame upper ▲ and lower ▼



River Irwell **10 ERS spp.**

Vice County: 59 - South Lancashire

Hectads: SD70, 71, 82

Nearest towns: Rawtenstall, Ramsbottom, Bury, Pendlebury

ERS species reported from the River Irwell

INSECTA

Coleoptera

Aegialiidae

Aegialia insularis Notable-B

Carabidae

Bembidion atrocaeruleum

Bembidion femoratum

Bembidion tibiale

Clivina collaris

Elaphropus parvulus Notable-B

Elateridae

Zorochores minimus

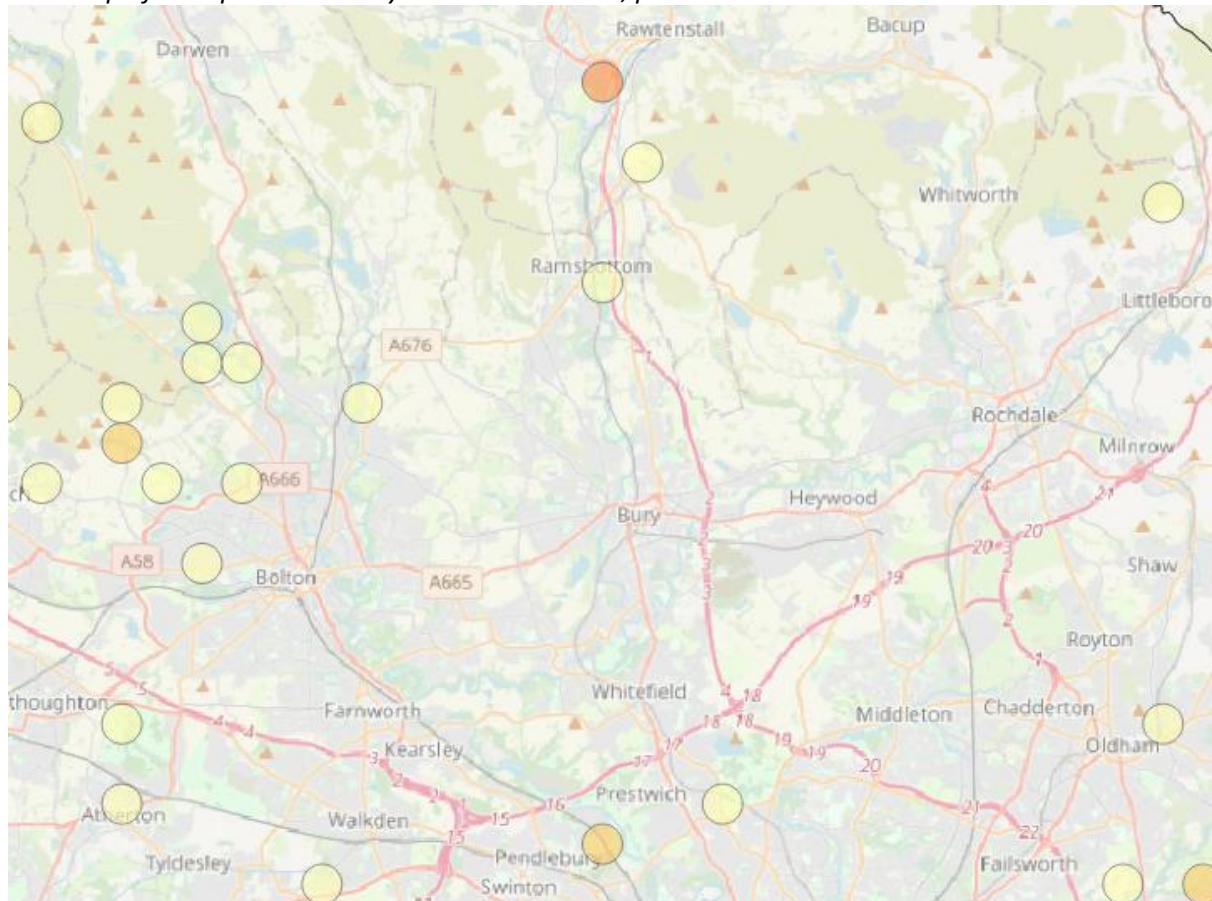
Staphylinidae

Aloconota sulcifrons

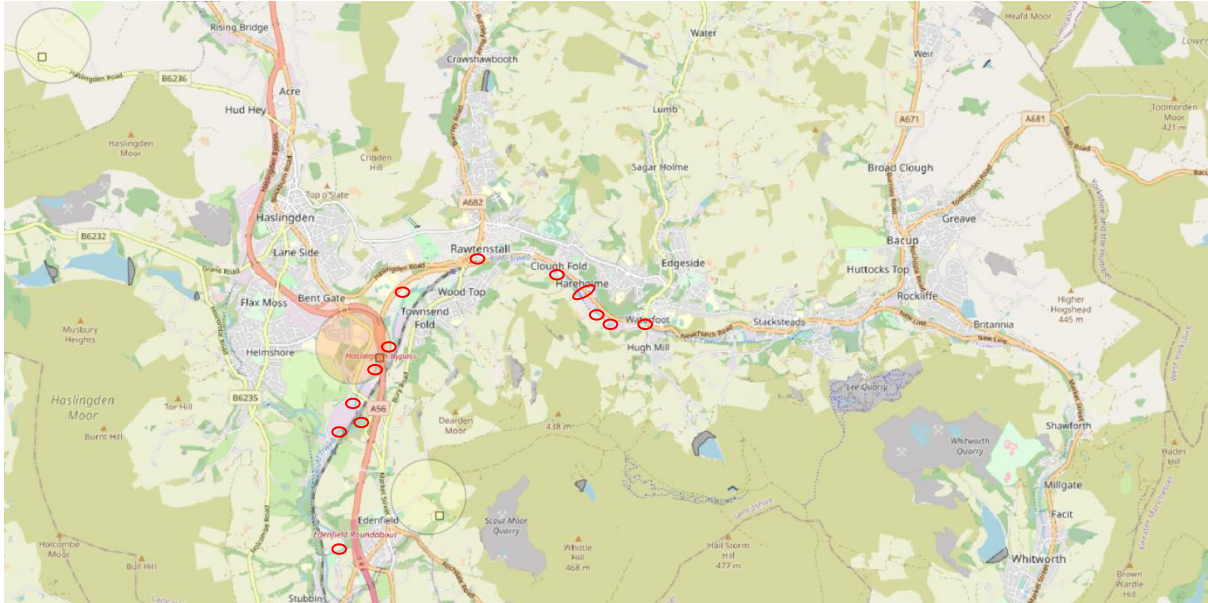
Deleaster dichrous Notable-B

Thinonoma atra

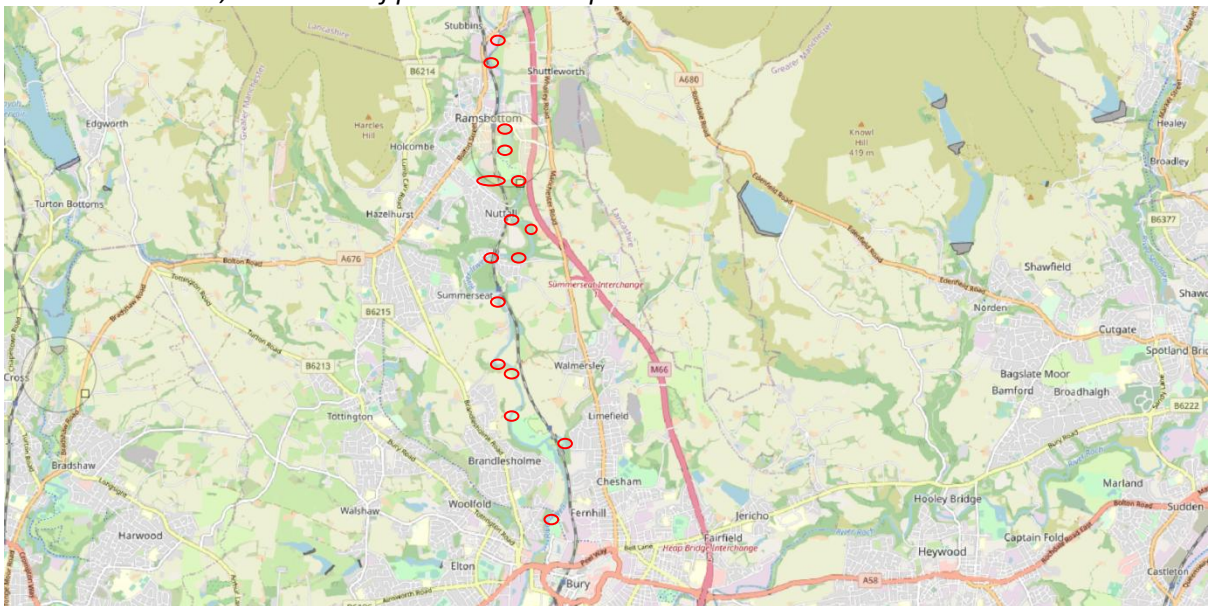
Heat map of ERS species diversity on the River Irwell, presented at monad resolution



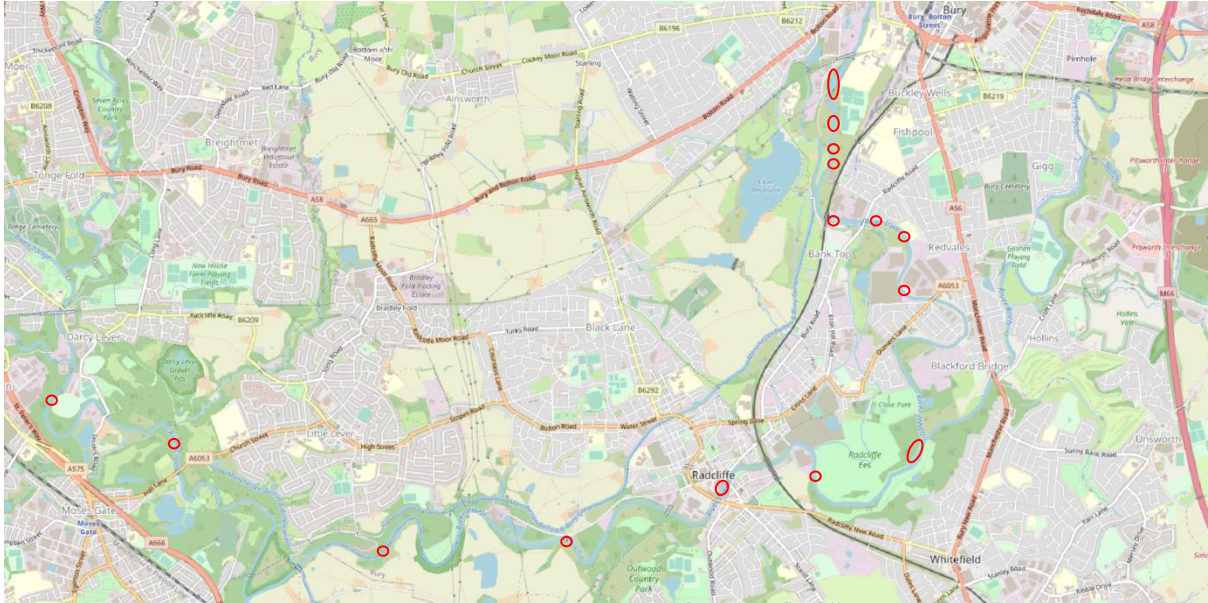
River Irwell upper, with areas of potential ERS deposited outlined in red.



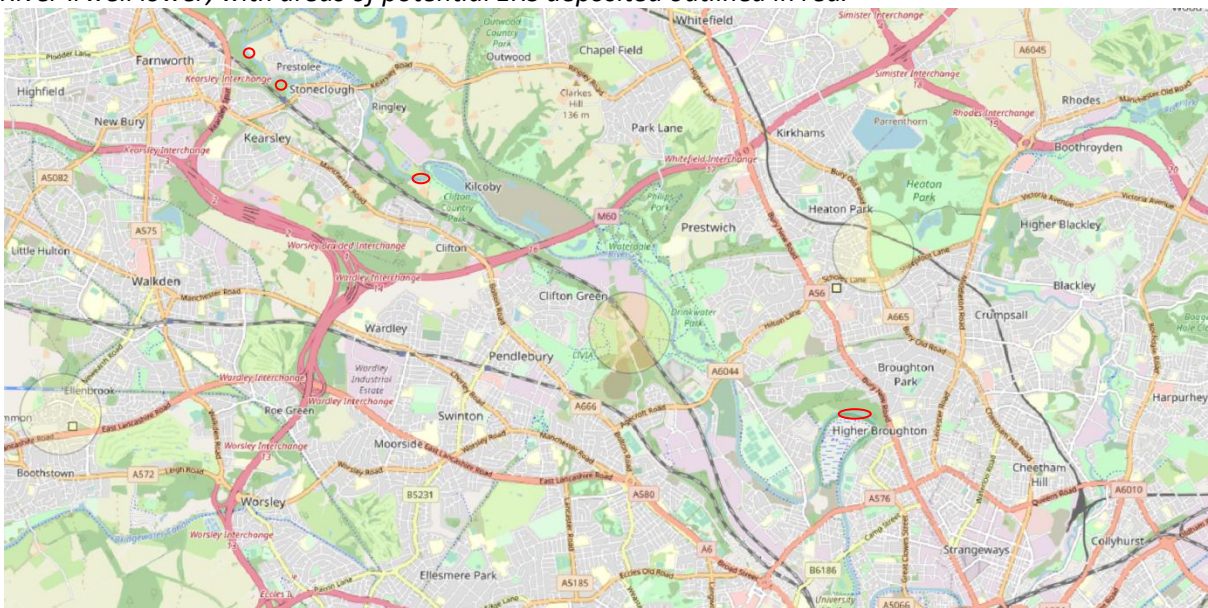
River Irwell middle, with areas of potential ERS deposited outlined in red.



River Irwell lower middle, with areas of potential ERS deposited outlined in red.



River Irwell lower, with areas of potential ERS deposited outlined in red.



River Alt (& Formby Dunes)
Vice County: 59 - South Lancashire
Hectad: SD20
Nearest town: Hightown

9 ERS spp.

ERS species reported from the River Alt & Hightown Dunes, Formby

INSECTA

Coleoptera

Carabidae

Bembidion bipunctatum Notable-B
Bembidion lunatum Notable-B
Bembidion stomoides Notable-B

Heteroceridae

Heterocerus marginatus NS-excludes

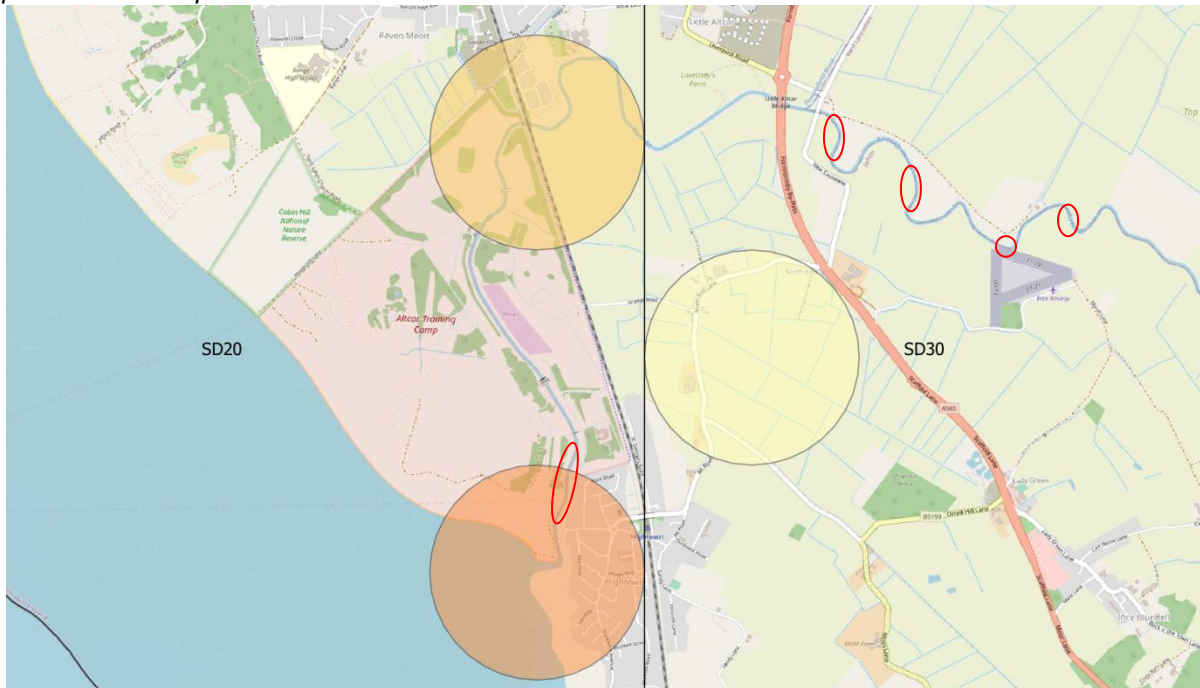
Hydrophilidae

Helophorus arvernicus

Staphylinidae

Aloconota insecta
Erichsonius signaticornis Notable-B
Stenus guttula
Tetralaucopora longitarsis

Heat map of ERS species diversity on the River Alt, presented at monad resolution with areas of potential ERS deposited outlined in red.



River Wyre

Vice-county: 60 - West Lancashire

Hectads: SD44

Nearest town: Garstang

8 ERS species

ERS species reported from the River Wyre

INSECTA

Coleoptera

Carabidae

Bembidion atrocaeruleum

Bembidion decorum

Bembidion femoratum

Bembidion punctulatum

Bembidion tibiale

Clivina collaris

Staphylinidae

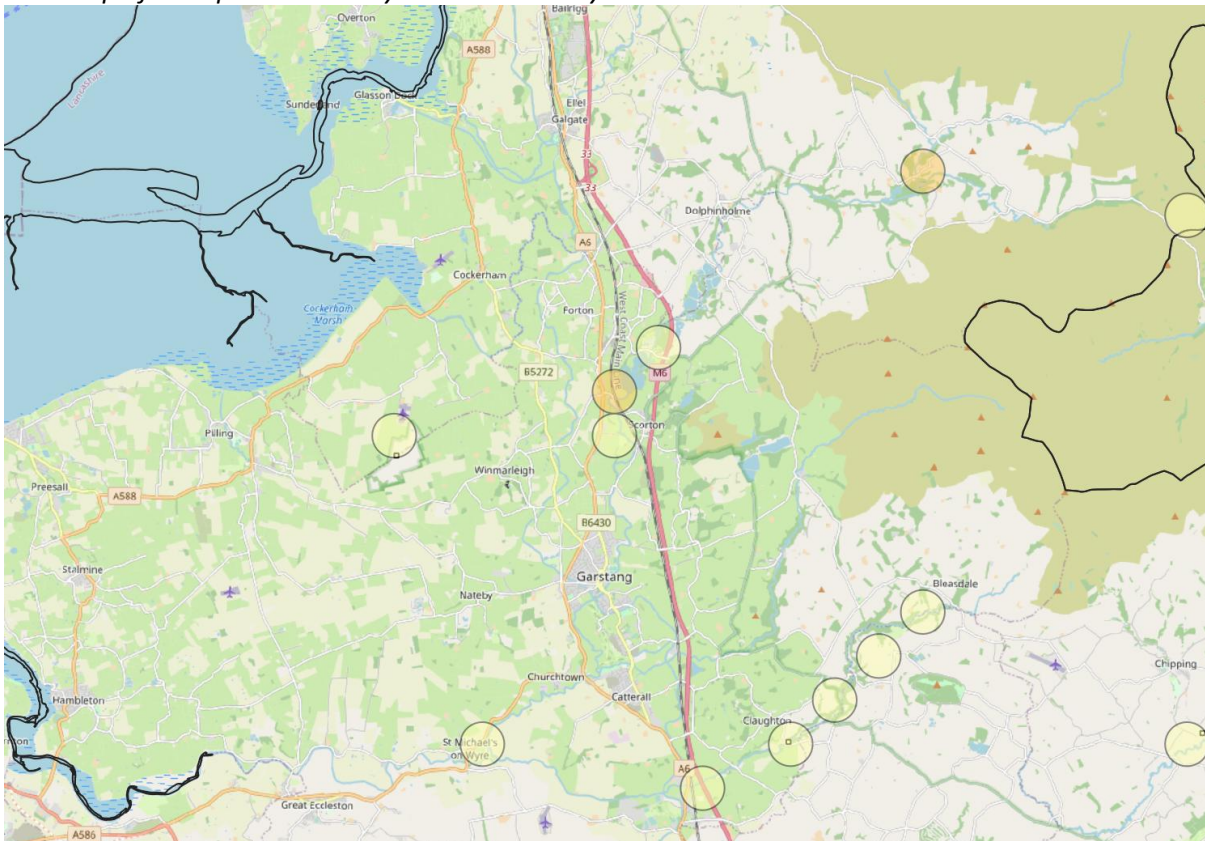
Bledius subterraneus

Diptera

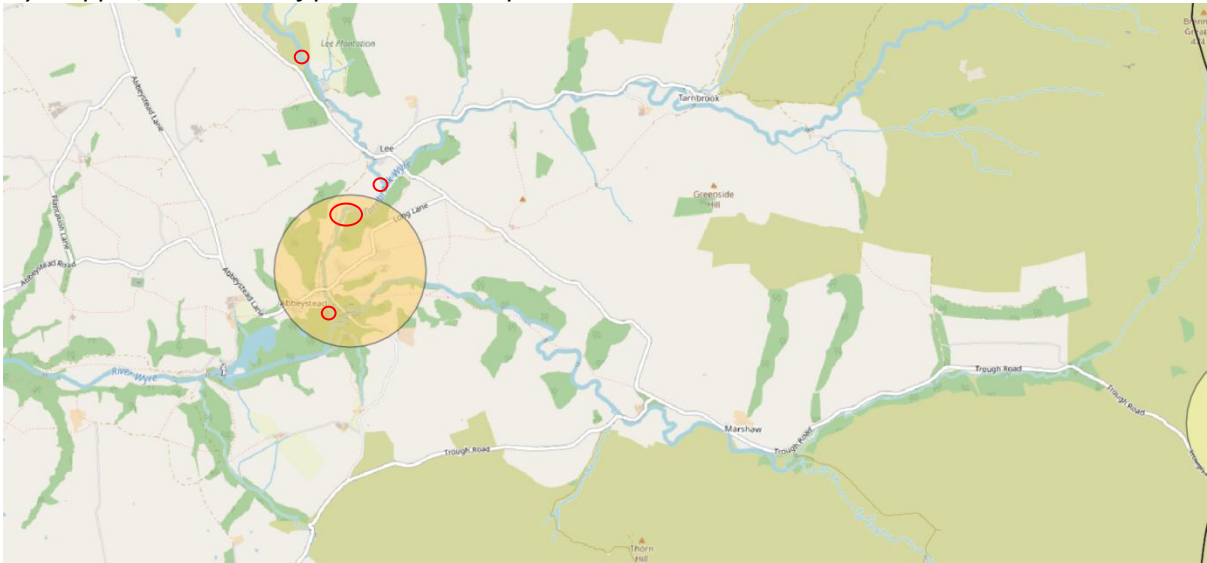
Dolichopodidae

Dolichopus longicornis

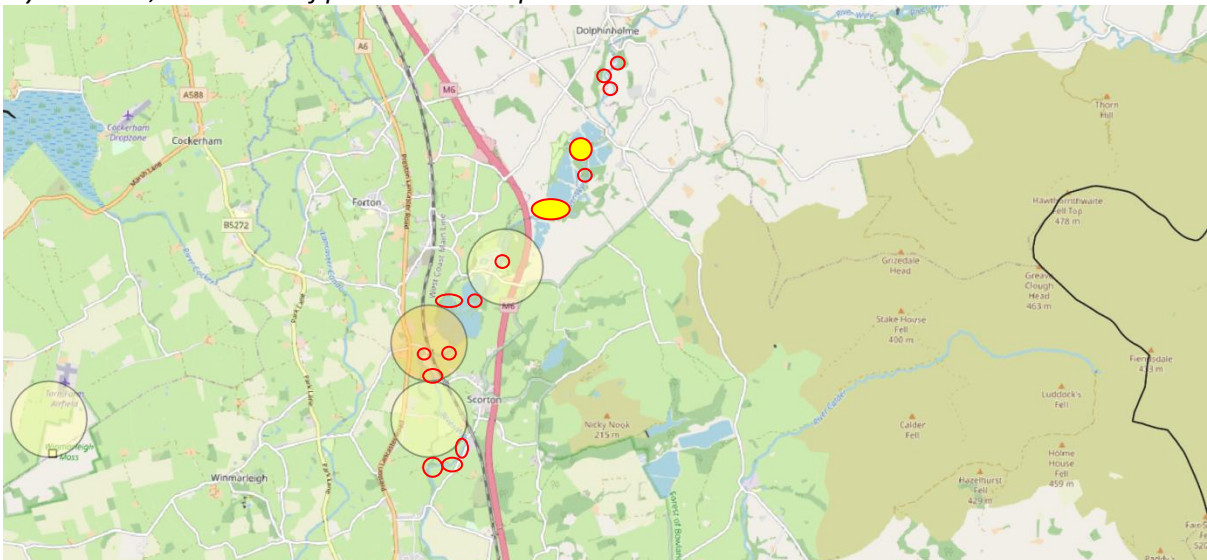
Heat map of ERS species diversity on the Rivers Wyre and Brock



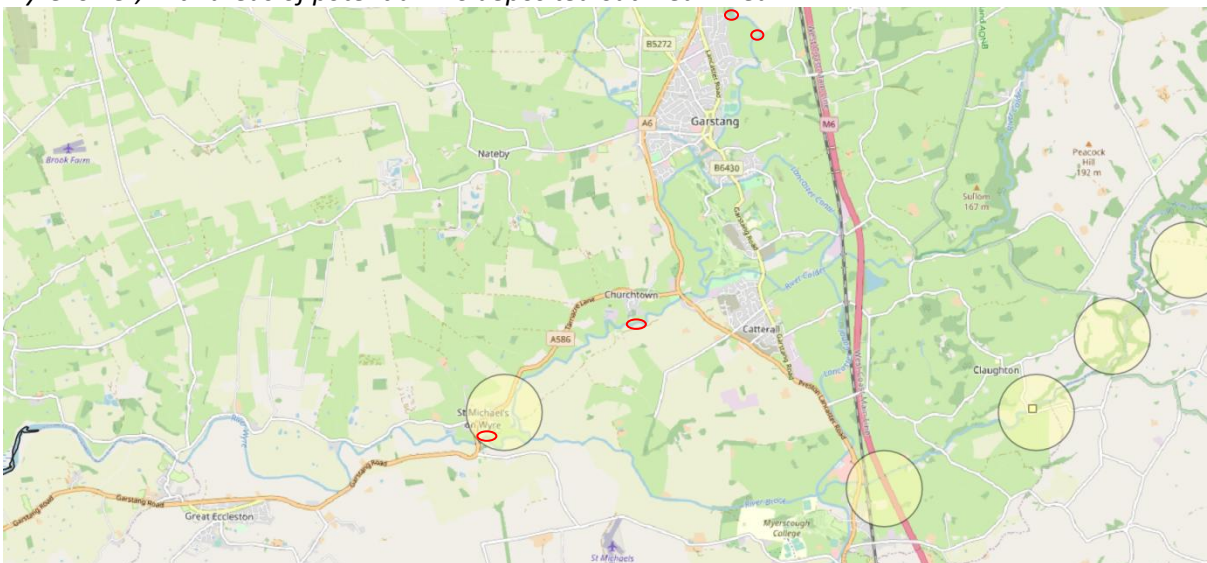
Wyre upper, with areas of potential ERS deposited outlined in red.



Wyre middle, with areas of potential ERS deposited outlined in red.



Wyre lower, with areas of potential ERS deposited outlined in red.



River Brock

7 ERS species

Vice-county: 60 - West Lancashire

Hectads: SD45

Nearest town: Bilborrow

ERS species reported from the River Brock

INSECTA

Coleoptera

Carabidae

Bembidion atrocaeruleum

Bembidion decorum

Bembidion punctulatum

Bembidion tibiale

Elateridae

Zoroachros minimus

Staphylinidae

Bledius longulus

Bledius subterraneus

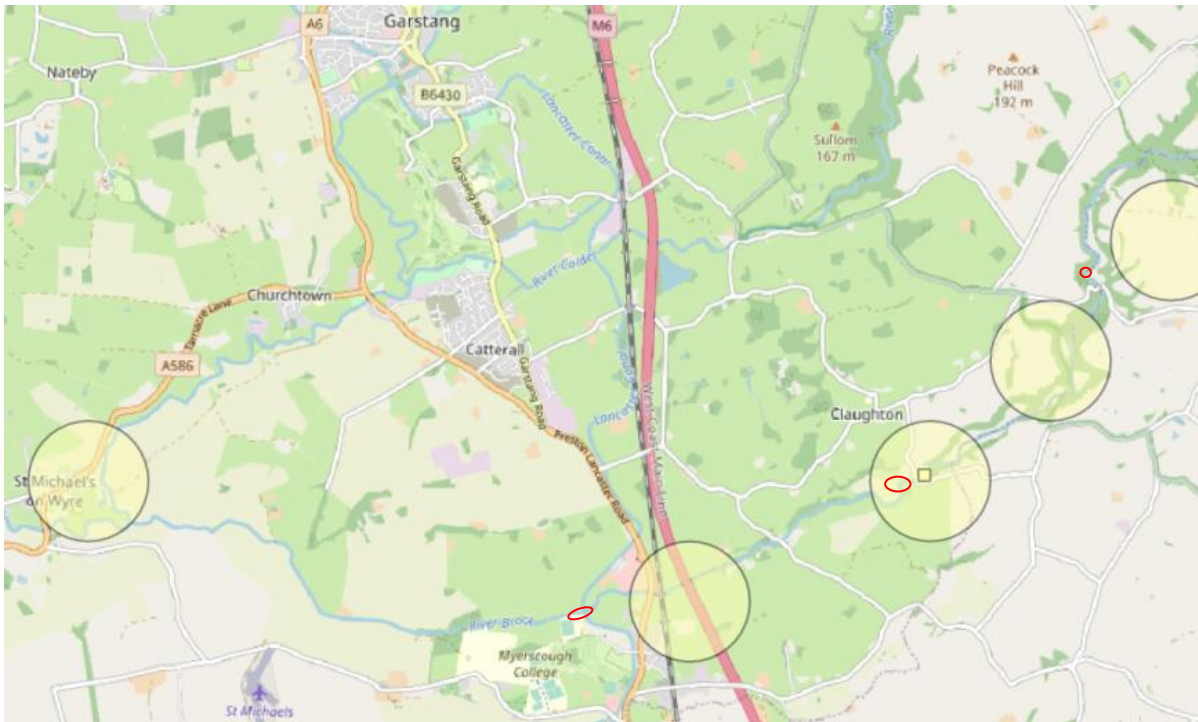
Diptera

Pediciidae

Dicranota guerini

Notable

Heat map of ERS species diversity on the River Brock with areas of potential ERS deposited outlined in red.



Holden Clough (& River Medlock)

Vice County: 59 - South Lancashire

Hectads: SD90

Nearest town: Ashton-under-Lyne

7 ERS species

ERS species reported from Holden Clough

INSECTA

Coleoptera

Staphylinidae

Aloconota insecta

Diptera

Empididae

Hilara albiventris Nationally Scarce

Limoniidae

Arctoconopa melampodia RDB2-VU

Hoplolabis areolata

Hoplolabis vicina (

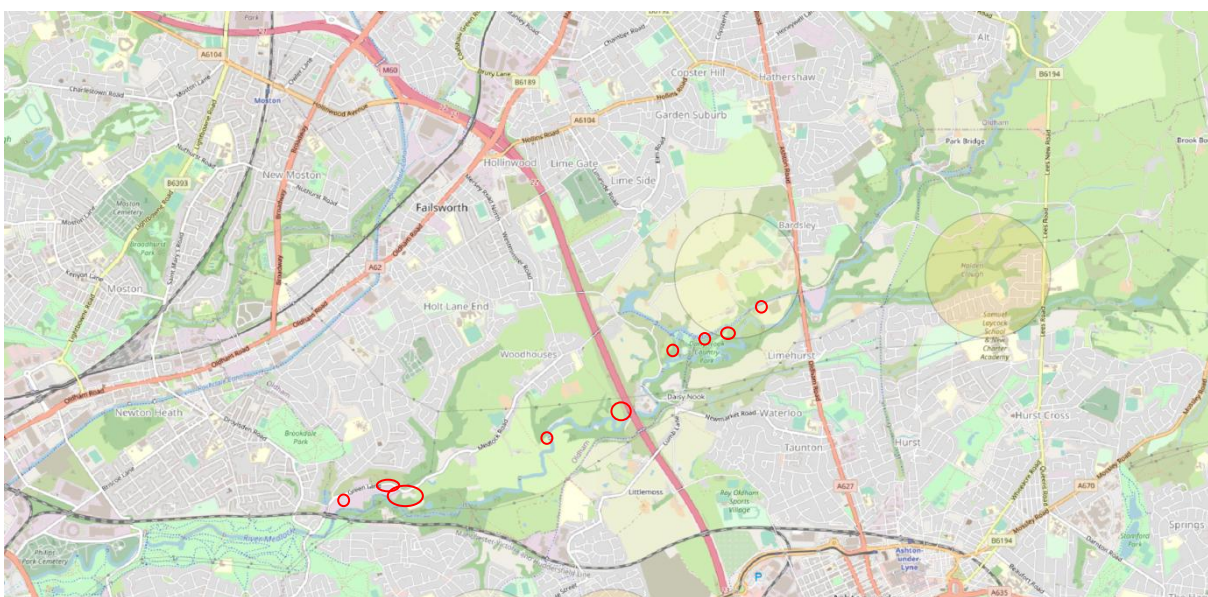
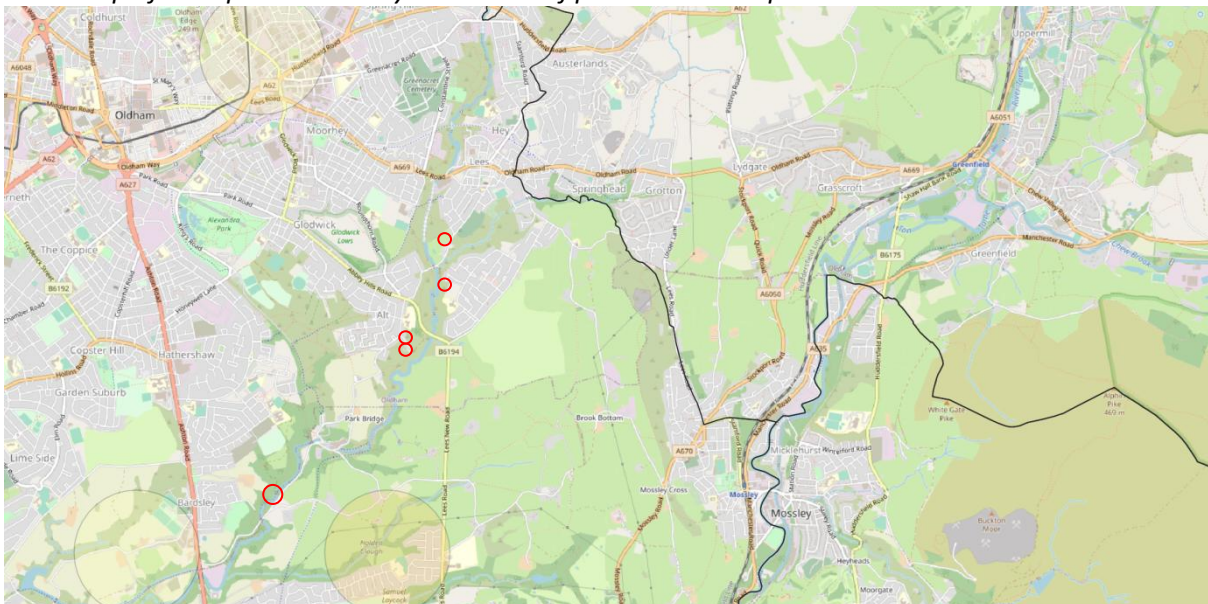
Pediciidae

Dicranota guerini Zetterstedt, [1838] Notable

Tipulidae

Nephrotoma analis (Schummel, 1833)

Heat map of ERS species diversity with areas of potential ERS deposited outlined in red.



River Ribble Vice-county: 59-South Lancashire Hectads: SD63, 73, 74 **6 ERS species**

ERS species reported from the River Ribble

INSECTA

Coleoptera

Carabidae

Bembidion lunatum Notable-B

Bembidion stomoides Notable-B

Hydraenidae

Ochthebius bicolon

Staphylinidae

Ochtheophilus omalinus

Diptera

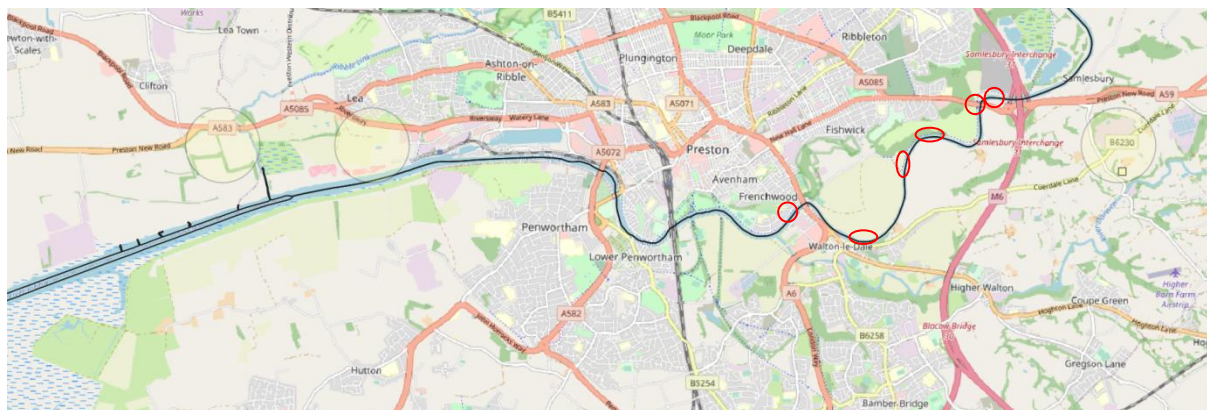
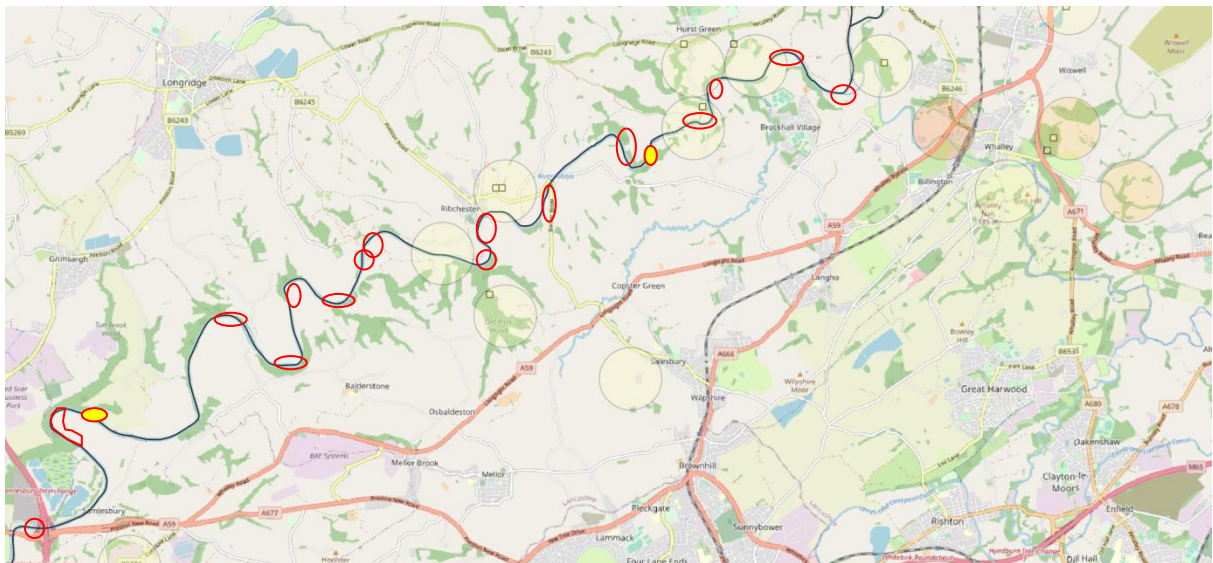
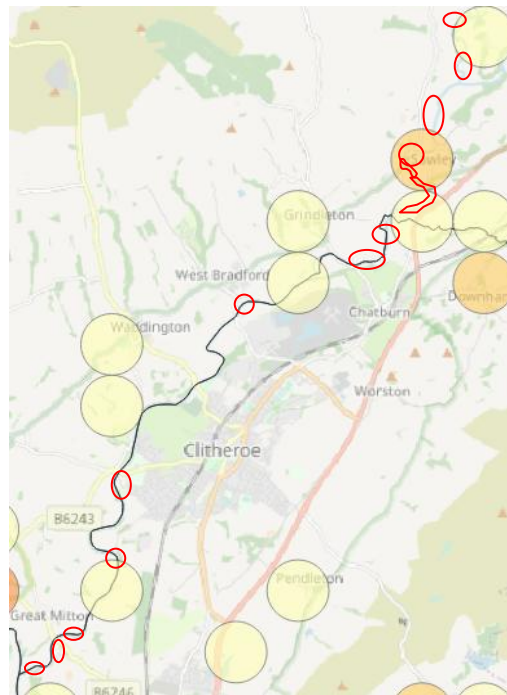
Tipulidae

Nephrotoma analis

Hemiptera

Saldidae

Macrosaldula scotica



Heat map of ERS species diversity with areas of potential ERS deposited outlined in red

River Tonge catchment

(Dean Brook, Astley Brook, Eagely Brook, Bradshaw Brook etc)

Vice-county: 59 - South Lancashire

Hectads: SD61

Nearest town: Bolton

6 ERS species

ERS species reported from the River Tonge catchment

INSECTA

Coleoptera

Carabidae

Bembidion prasinum

Bembidion tibiiale

Staphylinidae

Stenus guttula

Diptera

Pediciidae

Dicranota guerini

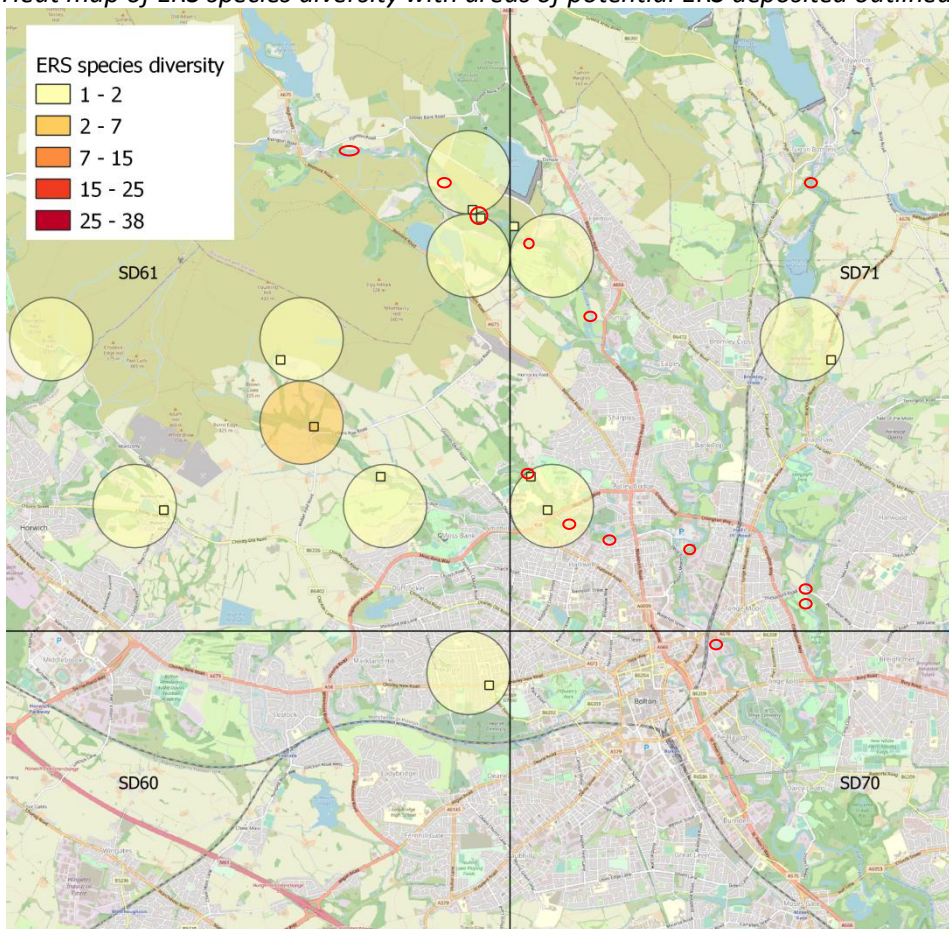
Notable

Dicranota robusta

Notable

Dicranota subtilis

Heat map of ERS species diversity with areas of potential ERS deposited outlined in red



River Keer

Vice-county: 60 - West Lancashire

Hectads: SD47

Nearest town: Carnforth

4 ERS species

INSECTA

Coleoptera

Carabidae

Asaphidion flavipes

Blemus discus

Notable-B

Hydraenidae

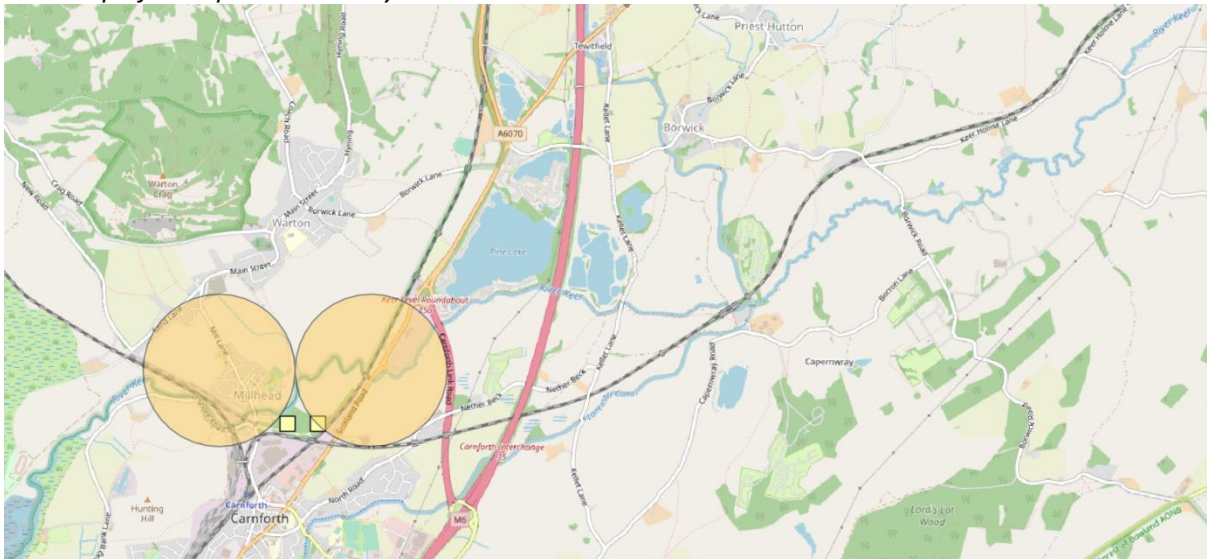
Ochthebius bicolon

Staphylinidae

Lathrobium pallidipenne

Notable

Heat map of ERS species diversity



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Appendix 1

List of UK invertebrate with high or total fidelity to Exposed Riverine Sediments

The list is derived from lists prepared by Sadler and Bell (2002), Bates (2006), Hewitt et al. (2007) and Hewitt (2017).

SPECIES	STATUS	SCORE
ARANEAE		
<i>LINYPHIDAE</i>		
<i>Caviphantes saxetorum</i> (Hull, 1916)	NT	24
<i>Diplocephalus connatus</i> Bertkau, 1889	RDB2-VU	32
<i>LYCOSIDAE</i>		
<i>Arctosa cinerea</i> (Fabricius, 1777)	Very Local	4
<i>Pardosa agricola</i> (Thorell, 1856)	Local	2
<i>AEGIALIDAE</i>		
<i>Aegialia sabuleti</i> (Panzer)= <i>insularis</i> Pittino, 2006	Notable B	8
COLEOPTERA		
<i>CARABIDAE</i>		
<i>Acupalpus flavicollis</i> (Sturm.)	RDB3	24
<i>Agonum micans</i> Nicolai	Common	1
<i>Amara fulva</i> (Mueller)	Notable B	8
<i>Amara quenseli</i> (Schoenherr)	RDB3	24
<i>Asaphidion flavipes</i> (L.)	Common	1
<i>Asaphidion pallipes</i> (Duft.)	Notable B	8
<i>Bembidion andreae</i> (F.)	Local	2
<i>Bembidion articulatum</i> (Panz.)	Very Local	4
<i>Bembidion atrocoeruleum</i> Steph.	Common	1
<i>Bembidion bipunctatum</i> (L.)	Notable B	8
<i>Bembidion decorum</i> (Zenk.)	Common	1
<i>Bembidion dentellum</i> (Thun.)	Local	2
<i>Bembidion femoratum</i> Sturm	Common	1
<i>Bembidion fluviatile</i> Dejean	Notable B	8
<i>Bembidion geniculatum</i> Heer	Notable B	8
<i>Bembidion litorale</i> (Ol.)	Notable B	8
<i>Bembidion lunatum</i> (Duft.)	Notable B	8
<i>Bembidion monticola</i> Strm.	Notable B	8
<i>Bembidion prasinum</i> (Duft.)	Local	2
<i>Bembidion punctulatum</i> Drap.	Common	1
<i>Bembidion quadripustulatum</i> Serville	Notable B	8
<i>Bembidion saxatile</i> Gyll.	Notable B	8
<i>Bembidion schueppeli</i>	Notable B	8
<i>Bembidion semipunctatum</i>	RDB3	24
<i>Bembidion stomoides</i> Dej.	Notable B	8
<i>Bembidion testaceum</i>	RDB2	32
<i>Bembidion tibiale</i> (Duft.)	Common	1
<i>Bembidion virens</i>	RDB3	24
<i>Chlaenius vestitus</i> (Payk.)	Local	2
<i>Clivina collaris</i> (Hbst.)	Common	1
<i>Dyschirius aeneus</i> (Dejean)	Notable B	8
<i>Dyschirius angustatus</i> (Ahrens)	RDB3	24
<i>Lionychus quadrum</i> (Duft.)	RDB3	24
<i>Pelophilus borealis</i> (Payk.)	RDB3	24

Perileptus areolatus (Creutz.)	Notable B	8
Tachys bistriatus (Duft.)	Notable B	8
Tachys parvulus Dej.	Notable B	8
Blemus discus (Fabricius, 1792)	Notable B	8
Thalassophilus longicornis	Notable A	16
COCCINELLIDAE		
Coccinella quinquepunctata L.	Notable B	8
CURCULIONIDAE		
Baris lepidii Germ.	Notable A	16
DYTISCIDAE		
Bidessus minutissimus (Germ.)	RDB3	24
DRYOPIDAE		
Dryops nitidulus (Heer)	RDB3	24
ELATERIDAE		
Fleutiauxellus maritimus (Curt.)	Notable B	8
Negastrius arenicola (Boheman)	RDB2	32
Negastrius pulchellus (L.)	RDBI	24
Negastrius sabulicola (Boh.)	RDB3	24
Zorochros minimus (Bois.& Lac)	Common	1
GEORISSIDAE		
Georissus crenulatus (Rossi)	Notable B	8
HELOPHORIDAE		
Helophorus arvernicus Muls.	Common	1
HETEROCERIDAE		
Heterocerus marginatus (F.)	NS	8
HYDROCHIDAE		
Hydrochus nitidicollis Muls.	RDB3	24
HYDRAENIDAE		
Hydraena gracilis Germar	Common	1
Hydraena nigrita Germar	Local	2
Hydraena rufipes Curt.	Notable B	8
Ochthebius bicolor Germar	Common	1
PTILIDAE		
Actidium aterrimum (Motschulsky)	RDBK	16
Ptenidium brenskei Flach	Notable	8
Ptenidium longicorne Fuss	Local	2
STAPHYLINIDAE		
Acrotona exigua (Erichson)	RDBK	16
Aloconota (s.str.) cambrica (Woll.)	Local	2
Aloconota (s.str.) currax (Kr.)	Local	2
Aloconota eichhoffi (Scriba)	Notable A	16
Aloconota (s.str.) insecta (Thomson)	Local	2
Aloconota planifrons Waterhouse	RDBI	24
Aloconota (s.str.) sulcifrons (Steph.)	Local	2
Biblopectus minutissimus (Aube)	RDBK	16
Bledius annae Sharp	Notable B	8
Bledius arcticus Sahlberg	Notable	8
Bledius defensus Fauvel	Notable	8
Bledius erraticus Erichson	RDBK	16
Bledius longulus Erichson, 1839	Local	2
Bledius subterraneus Erichson	Local	2
Bledius terebrans (Schiodte)	RDBK	16

<i>Bledius pallipes</i> (Gravenhorst)	Common	1
<i>Brachygluta pandellei</i> (Saulcy)	Notable A	16
<i>Carpelimus gracilis</i> (Mannerheim, 1830)	Local	2
<i>Carpelimus obesus</i> (Kiesenwetter)	Notable	8
<i>Carpelimus similis</i> (Smetana)	Notable B	8
<i>Carpelimus subtilicornis</i> (Erichson)	Notable B	8
<i>Carpelimus subtilis</i> (Erichson)	Notable	8
<i>Deleaster dichrous</i> (Grav.)	Common	1
<i>Erichsonius signaticornis</i> Muls. & Rey	Notable	8
<i>Gabrius astutoides</i> Strand	RDB3	24
<i>Gnypeta carbonaria</i> (Mann.)	Local	2
<i>Gnypeta rubrior</i> Tottenham, 1939	Local	2
<i>Gnypeta velata</i> (Erichson)	Notable	8
<i>Hydrosmecta delicatula</i> (Sharp)	Notable A	16
<i>Hydrosmecta eximia</i> (Sharp)	Notable B	8
<i>Hydrosmecta fragilis</i> (Kr.)	Notable B	8
<i>Hydrosmecta thinobioides</i> (Kr.)= <i>longula</i> (Heer, 1839)	Very Local	4
<i>Hydrosmectina delicatissima</i> Bernhauer	RDBK	16
<i>Hydrosmectina septentrionum</i> Benick = <i>subtillissima</i> (Kraatz, 1854)	Notable B	8
<i>Ilyobates bennetti</i> Donisthorpe	Notable	8
<i>Ilyobates propinquus</i> (Aube)	Notable	8
<i>Lathrobium angusticolle</i> Bois.	Notable B	8
<i>Lathrobium dilutum</i> Erichson	RDB3	24
<i>Lathrobium ripicola</i> Czwal.= <i>pallidipenne</i> Hochhuth, 1851	Notable B	8
<i>Medon ripicola</i> (Kraatz)	Notable A	16
<i>Meotica anglica</i> Benick	Notable A	16
<i>Neobisnius prolixus</i> Er.	Notable A	16
<i>Ocalea latipennis</i> Sharp	Notable	8
<i>Ochtheophilus andalusiacus</i> (Fagel)	Notable B	8
<i>Ochtheophilus angustior</i> (=venustus) (Bernhauer)	Notable	8
<i>Ochtheophilus aureus</i> (Fauv.)	Common	1
<i>Ochtheophilus omalinus</i> (Er.)	Local	2
<i>Oxyoda exoleta</i> Erichson	Notable B	8
<i>Philhygra debilis</i> (Erichson)	Notable	8
<i>Philhygra scotica</i> (Elliman)	Notable	8
<i>Philonthus rubripennis</i> Steph.	Very Local	4
<i>Quedius planicus</i> Erichson	Notable A	16
<i>Scopaeus gracilis</i> (Sperk)	RDB3	24
<i>Stenus biguttatus</i>	Notable B	8
<i>Stenus comma</i> LeConte	Local	2
<i>Stenus fossulatus</i>	RDB3	24
<i>Stenus guttula</i> Mueller	Common	1
<i>Stenus incanus</i> Erichson	RDB3	24
<i>Tachyusa coarctata</i> Erichson	Notable B	8
<i>Tachyusa constricta</i> Erichson	Local	2
<i>Tachyusa leucopus</i> (Marshall)	Local	2
<i>Tachyusa scitula</i> Erichson	RDBK	16
<i>Tachyusa umbratica</i> Erichson	RDBK	16
<i>Tetralaucopora</i> (=Chiloporata) <i>longitarsis</i> (Erichson)	Local	2
<i>Tetralaucopora</i> (=Chiloporata) <i>rubicunda</i> (Erichson)	Notable	8
<i>Thinobius bicolor</i> Joy	Notable A	16
<i>Thinobius ciliatus</i> (=praetor) Keisenwetter	Notable A	16

Thinobius longipennis (Heer)	RDBK	16
Thinobius major Kraatz	RDB3	24
Thinobius newberyi Scheerpeltz	RDB2	32
Thinobius strandi (=crinifer) Smetana	Notable A	16
Thinodromus arcuatus (Stephens)	Local	2
Thinonoma (=Tachyusa) atra (Gravenhorst)	Very Local	4
DIPTERA		
<i>ANTHOMYIDE</i>		
Myopina myopina	Local	2
<i>ASILIDAE</i>		
Rhadiurgus variabilis	pRDB3	24
<i>ATHERICIDAE</i>		
Ibisia marginata	Local	2
<i>DOLICHOPODIDAE</i>		
Asyndetus latifrons	Data Difficient	24
Diaphorus hoffmannseggii	LR(nt)	24
Dolichopus longicornis	Local	2
Rhaphium fractum	LR(ns)	8
Rhaphium gravipes	LR(ns)	8
Rhaphium nasutum	Local	2
Rhaphium patulum	LR(ns)	8
Rhaphium penicillatum	LR(nt)	24
Rhaphium riparium	Local	2
Rhaphium suavis	Data Difficient	24
Sciapus basilicus	Data Difficient	24
<i>EMPIDIDAE</i>		
Hilara albiventris	Notable/Nb	8
Hilara aartseni	Data Difficient	24
Hilara biseta	Notable	8
Hilara pseudochorica	Notable/Nb	8
<i>EPHYDRIDAE</i>		
Athyroglossa glabra	Local	2
Athyroglossa ordinata	pRDB1	32
Ditrichophora palliditarsis	Local	2
Hecamedoides unispinosus	pRDB2	32
Scatella obsoleta (=callosicosta)	pRDB2	32
<i>HYBOTIDAE</i>		
Platypalpus aliterolamellatus	Data Difficient	24
Platypalpus melancholicus	pRDB3	24
Platypalpus ochrocera	Data Difficient	24
Platypalpus subtilis	RDB3	24
Tachydromia acklandi	Na	16
Tachydromia calcarata	Data Deficient	24
Tachydromia costalis	LR(nt)	24
Tachydromia edenensis	Data Deficient	24
Tachydromia halidayi	Nb	8
Tachydromia morio	Local	2
Tachydromia rhyacophila	pRDB I	24
Tachydromia woodi	RDB I	24
Symballophthalamus pictipes	LR(ns)	8
<i>LIMONIIDAE</i>		
Arctoconopa melampodia	LR(nt)	24

Dicranomyia omissinervis	LR(nt)	24
Gonomyia edwardsi	pRDBK	24
Hexatoma bicolor	Local	2
Hexatoma fuscipennis	Local	2
Hoplolabis areolata	Local	2
Hoplolabis vicina	Local	2
Hoplolabis yezoana	pRDBK	16
Rhabdomastix edwardsi	Local	2
Rhabdomastix eugeni	RDBI	24
Rhabdomastix inclinata	RDB2	32
Rhabdomastix laeta	RDBI	24
Rhabdomastix japonica	RDB3	24
Symplecta meigeni	RDB3	24
Symplecta pusilla	RDB1	32
LONCHOPTERIDAE		
Lonchoptera nigrociliata	Notable/Nb	8
PEDICIIDAE		
Dicranota gracilipes	Notable/Nb	8
Dicranota guerini	Notable	8
Dicranota robusta	Notable/Nb	8
Dicranota simulans	RDB3	24
Dicranota subtilis	Local	2
SCATOPSIDAE		
Anapausis talpae	Local	2
Rhegmoclemina lunensis	Data Deficient	24
STRATIOMYIDAE		
Oxycera terminata	RDB2	32
TABANIDAE		
Tabanus cordiger	Notable/Nb	8
THEREVIDAE		
Clorismia rustica	LR(ns)a	16
Spiriverpa lunulata	LR(ns)b	8
TIPULIDAE		
Nephrotoma aculeata	pRDB2	32
Nephrotoma analis	Local	2
Nephrotoma dorsalis	LR(ns)b	8
Nephrotoma lunulicornis	LR(ns)b	8
Tipula bistilata	RDB2	32
Tipula laetabilis	RDB2	32
Tipula nodicornis	RDB3	24
HEMIPTERA		
DIPSOCORIDAE		
Cryptostemma alienum	Local	2
SALDIDAE		
Macrosaldula scotica	Local	2
Saldula c-album	Common	1
Saldula fucicola	Nationally scarce	8
Saldula melanoscela	VU	32

Appendix 2

Accounts of all high fidelity ERS species recorded from Lancashire and Cheshire

These species accounts are taken from the RECORDER 3.3 software of 1997. Some of these accounts are now out of data as a result of additional data from recent studies of ERS on different rivers throughout the UK. Some accounts have been edited to reflect these new insights. Species are listed in taxonomic order.

- Cryptostemma alienum*** **Hemiptera** **Dipsocoridae** **Local**
A river-shingle species, commonest in the north and west. Probably under-recorded, and frequent in at least some parts of its range.
- Saldula scotica*** **Hemiptera** **Saldidae** **Common**
A northern and upland shorebug, found amongst shingle and rocks at the margins of streams and rivers. Predacious.
- Saldula c-album*** **Hemiptera** **Saldidae** **Common**
A northern and western shorebug, found on shingle at the margins of streams and rivers. Predacious.
- Dyschirius aeneus*** **Coleoptera** **Carabidae** **Local**
Small (3.5mm) shiny bronze black fossorial ground beetle. Lives on bare wet ground by water - riverbanks, peatlands, edges of sandpits etc. Widely distributed but local, much rarer in the north.
- Clivina collaris*** **Coleoptera** **Carabidae** **Local**
Small reddish brown fossorial ground beetle of shingle or fine sandy or muddy river banks. Occasionally on humus rich soils and gardens. Widespread throughout GB but very local.
- Thalassophilus longicornis*** **Coleoptera** **Carabidae** **Na**
Small (3.5-4mm) flattened red/brown ground beetle living among riverine shingle. North western species. Wales and Marches, Cumbria and W Scotland. Rare.
- Blemus discus*** **Coleoptera** **Carabidae** **Notable/Nb**
4.5-5.5mm red and black ground beetle found in crevices and among vegetation at the side of slow flowing rivers, streams and ditches. England (except S W) N to Cumbria.
- Asaphidion flavipes*** **Coleoptera** **Carabidae** **Common**
4-5mm long bronze ground beetle with very prominent eyes. Usually among grass tussocks, leaf litter etc. or on open moist ground. Apparently common. Recently split into 3 species, at least two of which appear to be common. Pre 1985 records need to be redetermined.
- Asaphidion pallipes*** **Coleoptera** **Carabidae** **Notable/Nb**
5-6mm long bronze ground beetle, very local on sandy soil near water, usually by streams or rivers or on the coast. Patchy distribution extending from the south coast of England to north west Scotland but mainly northern and western.
- Bembidion litorale*** **Coleoptera** **Carabidae** **Notable/Nb**
5.5-6.5mm yellowish bronze ground beetle with conspicuous shiny spots on elytra. Rapidly running diurnal species, living on sparsely vegetated fine sands on river banks. Northern and western species, extremely local.

- Bembidion punctulatum*** **Coleoptera** **Carabidae** **Local**
4.5-5.5mm long bronze ground beetle, living among shingle and on wet sand at the side of small rivers, particularly in the uplands. Locally common in appropriate habitats throughout northern and western Britain, less common in the south.
- Bembidion bipunctatum*** **Coleoptera** **Carabidae** **Notable/Nb**
3.5-4.5mm long bronze ground beetle on sandy river banks with sparse vegetation. Also on the coast. Northern and western species, very local.
- Bembidion stomoides*** **Coleoptera** **Carabidae** **Notable/Nb**
5.5-6mm reddish black ground beetle of river banks. Mainly northern and western but a few records in the south. Nowhere common.
- Bembidion dentellum*** **Coleoptera** **Carabidae** **Local**
5-6mm long bronze ground beetle of wet places. Marshes, fens, riverbanks, often on bare mud but also among dense vegetation. Widespread but local. Abundant where found.
- Bembidion prasinum*** **Coleoptera** **Carabidae** **Nr**
4-5.5mm long metallic black ground beetle found on gravel/shingle beds by running water. Northern and western species, although also recorded from Sussex. Very local but abundant where found.
- Bembidion atrocoeruleum*** **Coleoptera** **Carabidae** **Local**
4.5-5.5mm long metallic blue black ground beetle typical of gravel beds along rivers. Locally abundant at the side of gravelly rivers throughout Britain.
- Bembidion geniculatum*** **Coleoptera** **Carabidae** **very local**
4.5-5.5mm long metallic black ground beetle usually found in gravel or shingle banks by rivers, sometimes on the coast. Northern species, S to Yorks.
- Bembidion tibiale*** **Coleoptera** **Carabidae** **Common**
5.5-6.5mm long metallic blue or green black ground beetle living among shingle at the side of rivers. Widely distributed and fairly common, abundant where found.
- Bembidion decorum*** **Coleoptera** **Carabidae** **Common**
5-6mm long metallic black ground beetle living among river gravels. Mainly northern species, though also present in the south. Locally common.
- Bembidion femoratum*** **Coleoptera** **Carabidae** **Local**
4.2-5.2mm long red spotted black ground beetle. Open country, usually in moist situations although not necessarily by water. Fairly easily confused with other species. Generally fairly common.
- Bembidion fluviatile*** **Coleoptera** **Carabidae** **Notable/Nb**
5.5-6.5mm long black ground beetle with 4 orange spots, living on fine sands and mud by northern and western rivers. Wales, N England and Scotland. Always very local.
- Bembidion lunatum*** **Coleoptera** **Carabidae** **Notable/Nb**
5.5-6.2mm black and yellowish ground beetle found on mud at the side of rivers, also among reeds and on muddy foreshores in estuaries. Found in Scotland, N England and N Wales.

<i>Bembidion monticola</i>	Coleoptera	Carabidae	very local
<i>4.5-5mm long black ground beetle found at the sides of running water in shaded conditions. Scotland, N England and Wales. Local but abundant where found.</i>			
<i>Bembidion quadripustulatum</i>	Coleoptera	Carabidae	Notable/Nb
<i>3.5-4mm long shiny black ground beetle with 4 reddish spots. Lives on damp bare clay and sandy mud, usually by water. Southern species, nowhere common.</i>			
<i>Bembidion gilvipes</i>	Coleoptera	Carabidae	Notable/Nb
<i>2.5-3mm long shiny black ground beetle of moss and litter in marshes and on riverbanks. England and Wales north to Yorks. Possibly declining, although an error in the standard identification literature means that the species is likely to be recorded as <i>B.doris</i>.</i>			
<i>Bembidion articulatum</i>	Coleoptera	Carabidae	Local
<i>3-4mm long black ground beetle with numerous paler markings, found on bare sandy mud or firm clay by fresh water. Uncommon but locally abundant.</i>			
<i>Tachys parvulus</i>	Coleoptera	Carabidae	Notable/Nb
<i>Tiny (1.5-2mm) brown ground beetle living among open shingle and gravel, often near the shore but also in river shingles. Very local. SW peninsula and mid Wales - doubtful old records from Lancs/Cheshire.</i>			
<i>Agonum micans</i>	Coleoptera	Carabidae	Local
<i>6-7.5mm long black predatory ground beetle of open muddy areas on river banks or in willow carr. Widespread but local in England and Wales.</i>			
<i>Amara fulva</i>	Coleoptera	Carabidae	Notable/Nb
<i>8-10mm long dull orange brown ground beetle restricted to dry, open, sandy places. Phytophagous, feeding mainly on seeds, the adults living under stones, under leaf rosettes or often burrowing in sandy soil in the daytime. Widespread but very local and declining.</i>			
<i>Georissus crenulatus</i>	Coleoptera	Hydrophilidae	Na
<i>Small water beetle found in trickles and flushes in muddy conditions. Widespread but very local.</i>			
<i>Helophorus arvernicus</i>	Coleoptera	Hydrophilidae	very local
<i>Small water beetle of slow flowing rivers where it can be found in wet silt at the margins. Locally distributed, mainly in the west and the Scottish borders.</i>			
<i>Ochthebius bicolon</i>	Coleoptera	Hydraenidae	Notable/Nb
<i>Water beetle found in the muddy margins of sluggish rivers and ponds.</i>			
<i>Hydraena gracilis</i>	Coleoptera	Hydraenidae	Local
<i>Riffle beetle found in fast flowing water.</i>			
<i>Hydraena nigrita</i>	Coleoptera	Hydraenidae	Notable/Nb
<i>Water beetle found in sluggish muddy streams, usually in the lowlands.</i>			
<i>Hydraena rufipes</i>	Coleoptera	Hydraenidae	Notable/Nb
<i>A small black water beetle, most often recorded from amongst moss and on stones in swift-flowing rivers; also known from fen conditions in the north.</i>			

<i>Ptenidium brenskei</i>	Coleoptera	Ptiliidae	Notable/Nb
<i>Tiny beetle found among silty shingle on riverbanks. Very local and rare.</i>			
<i>Deleaster dichrous</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>Long legged brick red rove beetle living at the edges of streams, under stones and among dead vegetation in damp places. Widely distributed but very local.</i>			
<i>Bledius annae</i>	Coleoptera	Staphylinidae	Local
<i>Small black fossorial rove beetle. Locally common on sandy patches on riverbanks. Widespread and common in southern Britain, more local in north England and Scotland.</i>			
<i>Bledius defensus</i>	Coleoptera	Staphylinidae	pRDBK
<i>Small rove beetle living in burrows in sandy or clay cliffs on river banks. Tottenham (1954) refers to it as confined to Yorks.</i>			
<i>Bledius erraticus</i>	Coleoptera	Staphylinidae	pRDBK
<i>Small red and black fossorial beetle living in burrows in sandy banks at the side of streams. Northern species. Very rare.</i>			
<i>Bledius longulus</i>	Coleoptera	Staphylinidae	Local
<i>2.5-3.5mm long black rove beetle with red elytra. Burrows into sandy clifflets by rivers and in sandpits. Widespread but very local.</i>			
<i>Bledius subterraneus</i>	Coleoptera	Staphylinidae	Local
<i>Small black fossorial rove beetle. Local but sometimes common on sandy patches on riverbanks north of the midlands.</i>			
<i>Bledius terebrans</i>	Coleoptera	Staphylinidae	pRDBK
<i><No species account available></i>			
<i>Ochtheophilus andalusiacus</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>Rove beetle found in wet moss on the banks of rivers. Northern and western species. Local.</i>			
<i>Ochtheophilus aureus</i>	Coleoptera	Staphylinidae	Unknown
<i><No species account available></i>			
<i>Ochtheophilus omalinus</i>	Coleoptera	Staphylinidae	Unknown
<i>Small rove beetle found in wet moss on the banks of rivers and streams. Northern and western species, widespread but local.</i>			
<i>Ochtheophilus venustulus</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>Small rove beetle found in wet moss on the banks of rivers. Northern and western species. Local.</i>			
<i>Thinodromus arcuatus</i>	Coleoptera	Staphylinidae	Local
<i>A small black rove beetle, often with yellowish legs, typically found in damp places at the margins of water, etc. Widely distributed but local.</i>			
<i>Carpelimus gracilis</i>	Coleoptera	Staphylinidae	Local
<i>Small rove beetle - ecology apparently unknown but seems to be very local. Few scattered records.</i>			

<i>Carpelimus similis</i> <No species account available>	Coleoptera	Staphylinidae	Notable/Nb
<i>Carpelimus subtilicornis</i> <No species account available>	Coleoptera	Staphylinidae	very local
<i>Carpelimus subtilis</i> Small rove beetle living on wet sand by ponds and rivers. Mainly southern species. Very local.	Coleoptera	Staphylinidae	Notable/Nb
<i>Thinobius bicolour</i> Tiny brown rove beetle living under stones and shingle by rivers. Northern species. Very local. The only records of this species are three unattributed records from different sites on the River Dane, all on 16 April 2003: Colleymill Bridge (SJ8965), Forge Lane (SJ8563) and Radnor Bridge (SJ8365).	Coleoptera	Staphylinidae	Na
<i>Thinobius strandi</i> <No species account available>	Coleoptera	Staphylinidae	Notable/Nb
<i>Stenus comma</i> Small rove beetle of wet mud of river and occasionally pond margins.	Coleoptera	Staphylinidae	Unknown
<i>Stenus fossulatus</i> Small rove beetle found in wet moss by fast streams. Very rare, only recorded in county Durham.	Coleoptera	Staphylinidae	RDB1
<i>Stenus guttula</i> 4.5mm long black rove beetle with large, bulbous eyes and an orange spot on each elytron. Predatory, mainly on springtails. Lives in wet places, especially where there is bare open sand or mud. Marshes, river and lake margins and on sea cliffs by trickles, Widespread and locally common.	Coleoptera	Staphylinidae	Local
<i>Lathrobium angusticolle</i> 8mm long red and black rove beetle. Specific ecology uncertain, other members of the genus live in grass tussocks and in dead vegetation. Has been recorded from river gravels in mid Wales. Widespread but very local.	Coleoptera	Staphylinidae	Notable/Nb
<i>Lathrobium ripicola</i> Black and red rove beetle living under stones, in moss, grass tussocks etc. Mainly southern. Local	Coleoptera	Staphylinidae	Notable/Nb
<i>Neobisnius prolixus</i> Recorded from river shingle, on damp sand and mud beside ponds or streams, and under stones. This species has a scattered distribution and has been recorded from Middlesex to the Solway district in Scotland. Recently recorded from only three vice-counties. This species is difficult to identify and may be confused with other members of the genus. The very similar <i>N. lathrobioides</i> was also not separated as a species at the time many records were made. Published records for West Kent are known to be incorrect.	Coleoptera	Staphylinidae	pRDBK
<i>Erichsonius signaticornis</i> Small (3.8-4.2mm) black rove beetle living in moss in marshy places - often in Sphagnum. Widespread but very local.	Coleoptera	Staphylinidae	Notable/Nb

<i>Tachyusa atra</i>	Coleoptera	Staphylinidae	Local
<i>3mm long black rove beetle. Lives mainly on sandy riverbanks, running rapidly over bare sand in the sun. Local throughout Britain.</i>			
<i>Tachyusa coarctata</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>A small black rove beetle found on sandy river banks in the south-east of England.</i>			
<i>Tachyusa constricta</i>	Coleoptera	Staphylinidae	Unknown
<No species account available>			
<i>Tachyusa scitula</i>	Coleoptera	Staphylinidae	pRDBK
<i>Small black rove beetle living on open sand on river banks. Widespread but rare.</i>			
<i>Tachyusa umbratica</i>	Coleoptera	Staphylinidae	Unknown
<No species account available>			
<i>Gnypeta carbonaria</i>	Coleoptera	Staphylinidae	Local
<i>2.6-3.2mm long black rove beetle living on muddy banks of rivers. Widespread but local.</i>			
<i>Gnypeta rubrior</i>	Coleoptera	Staphylinidae	Local
<i>2.6-3.2mm long black rove beetle living on muddy banks of rivers. Widespread but local.</i>			
<i>Gnypeta velata</i>	Coleoptera	Staphylinidae	Notable/Nb
<No species account available>			
<i>Hydrosmecta eximia</i>	Coleoptera	Staphylinidae	Nr
<No species account available>			
<i>Hydrosmecta fragilis</i>	Coleoptera	Staphylinidae	Notable/Nb
<No species account available>			
<i>Hydrosmecta thinobioides</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>A small black rove beetle found amongst river shingle. Widely distributed but local.</i>			
<i>Hydrosmectina delicatissima</i>	Coleoptera	Staphylinidae	pRDBK
<i>A rove beetle frequenting parkland and woodland. Has been found in leaf litter and sandy soils. Known from Devon, South Lancashire and an unspecified point on the River Wye.</i>			
<i>Hydrosmectina septentrionum</i>	Coleoptera	Staphylinidae	Notable/Nb
<i>Tiny (1.5mm) black rove beetle living on wet mud and gravel by rivers. Northern and western species. Apparently very local but perhaps under-recorded.</i>			
<i>Aloconota cambrica</i>	Coleoptera	Staphylinidae	Unknown
<No species account available>			
<i>Aloconota currax</i>	Coleoptera	Staphylinidae	Unknown
<No species account available>			
<i>Aloconota eichhoffi</i>	Coleoptera	Staphylinidae	Notable/Nb
<No species account available>			

<i>Aloconota insecta</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Common</i>
<i>A small dark rove beetle, up to 4mm. long, of obscure ecology. Widely distributed and often common.</i>			
<i>Aloconota sulcifrons</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Unknown</i>
<i><No species account available></i>			
<i>Atheta debilis</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Local</i>
<i>A small rove beetle of obscure ecology.</i>			
<i>Atheta scotica</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Notable/Nb</i>
<i><No species account available></i>			
<i>Atheta exigua</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Unknown</i>
<i><No species account available></i>			
<i>Chiloporata longitarsis</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Common</i>
<i>3-3.8mm long black rove beetle with yellow feet. Lives on mud at the side of water, especially rivers, running rapidly in sunshine. Widespread and generally common.</i>			
<i>Chiloporata rubicunda</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Notable/Nb</i>
<i>Small reddish yellow rove beetle living on sand or shingle on banks of rivers. Northern and western species. Rare.</i>			
<i>Ocalea latipennis</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Local</i>
<i>Small dark red rove beetle living in sand and shingle on banks of rivers. Widespread but very local.</i>			
<i>Meotica anglica</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Notable/Nb</i>
<i><No species account available></i>			
<i>Oxypoda exoleta</i>	<i>Coleoptera</i>	<i>Staphylinidae</i>	<i>Notable/Nb</i>
<i>Small black rove beetle living in rabbit burrows. Widespread, perhaps under-recorded.</i>			
<i>Biblopectus minutissimus</i>	<i>Coleoptera</i>	<i>Pselaphidae</i>	<i>pRDBK</i>
<i>Rare and very local found under stones, in grass tussocks and in shingle.</i>			
<i>Brachygluta pandellei</i>	<i>Coleoptera</i>	<i>Pselaphidae</i>	<i>pRDBK</i>
<i><No species account available></i>			
<i>Aegialia sabuleti</i>	<i>Coleoptera</i>	<i>Scarabaeidae</i>	<i>Notable/Nb</i>
<i>Small scarab beetle found on riverside sand and shingle and on coastal sand dunes.</i>			
<i>Heterocerus marginatus</i>	<i>Coleoptera</i>	<i>Heteroceridae</i>	<i>Common</i>
<i>Small, slow moving beetle burrowing into mud and sand by rivers, streams and ponds. Common in S England, becoming more local in Scotland.</i>			
<i>Dryops nitidulus</i>	<i>Coleoptera</i>	<i>Dryopidae</i>	<i>pRDB3</i>
<i>Small grey beetle living among gravel at the side of northern and western rivers. Very rare species, few modern records.</i>			

- Fleutiauxellus maritimus*** **Coleoptera** **Elateridae** **Na**
Small black click beetle living among shingle on river banks (not coastal as the name would suggest). Northern and western species. Very local.
A species of coarser, shingle ERS, there are old records for Heysham and Lancaster in Fowler (1887-91, 1913) and from shingle on the River Lune (SD5871) in 2002 (Newton, 2002-03).
- Zorochros minimus*** **Coleoptera** **Elateridae** **Local**
A local click beetle very typical of upland river gravels.
- Coccinella quinquepunctata*** **Coleoptera** **Coccinellidae** **RDB3**
Ladybird found in wet moss by streams, sometimes in moss in stream itself. Very rare, recorded only from single site in Devon and on West coast of Scotland.
- Nephrotoma analis*** **Diptera** **Tipulidae** **Local**
Crane fly found on shady river banks, especially where the soil is sandy. Scarce.
- Nephrotoma dorsalis*** **Diptera** **Tipulidae** **Notable/Nb**
Crane fly found on sandy, wooded river banks. Biology unknown. Widespread but very local with most records from the Scottish Highlands.
- Nephrotoma lunulicornis*** **Diptera** **Tipulidae** **Notable/Nb**
A crane fly of sandy river banks in western and northern districts. Very few known sites and apparently highly localised in distribution.
- Dicranota guerini*** **Diptera** **Tipulidae** **Notable/Nb**
Crane fly found in springs and boggy areas in the upland with records up to 2900ft. Larvae are aquatic and develop in sandy or gravelly streams. Northern and western distribution with most records from Scotland, but also England south to Cheshire.
- Dicranota (Paradicranota) robusta*** **Diptera** **Tipulidae** **Notable/Nb**
A crane fly, usually found by sandy streams and small rivers. The larvae develop in sand and gravel beside streams. A secretive species, noted from north-west England, Herefordshire, Devon and Inverness.
- Dicranota (Paradicranota) subtilis*** **Diptera** **Tipulidae** **Local**
A crane fly with aquatic larvae in both open and wooded situations. Mainly a northern and western species.
- Hexatoma bicolor*** **Diptera** **Tipulidae** **Local**
A crane fly with aquatic larvae in rivers, especially where the bed consists of sand and boulders. Rivers draining granite areas provide some of the best sites. A northern species.
- Hexatoma fuscipennis*** **Diptera** **Tipulidae** **Local**
A crane fly with aquatic larvae in sandy rivers. Mainly northern and western.
- Rhabdomastix edwardsi*** **Diptera** **Tipulidae** **Local**
A small black crane fly of river banks in upland areas, especially where there are sandy sediments. Larvae probably aquatic.

<i>Rhabdomastix hilaris</i>	<i>Diptera</i>	<i>Tipulidae</i>	<i>RDB3</i>
<i>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.</i>			
<i>Hoplolabis areolata</i>	<i>Diptera</i>	<i>Tipulidae</i>	<i>Local</i>
<i>A cranefly confined to lowland rivers. Larvae presumably aquatic or semi-aquatic.</i>			
<i>Hoplolabis vicina</i>	<i>Diptera</i>	<i>Tipulidae</i>	<i>Local</i>
<i>A cranefly of northern and western rivers in their middle and lower reaches. Larvae presumed to be aquatic.</i>			
<i>Hoplolabis yezoana</i>			
<i>A cranefly found on sandy riverine deposits on northern and western rivers. first recognised in the UK in 2004.</i>			
<i>Erioptera (Psiloconopa) meigeni</i>	<i>Diptera</i>	<i>Tipulidae</i>	<i>RDB3</i>
<i>A cranefly of sandy, upland river banks, often found in the shade of alders. Deltas and ox-bows are especially favoured. Larvae probably develop in damp sand beside rivers. Only post-1960 records are from Inverness-shire and Yorkshire.</i>			
<i>Arctoconopa melampodia</i>	<i>Diptera</i>	<i>Tipulidae</i>	<i>Near Threatened</i>
<i>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.</i>			
<i>Anapausis talpae</i>	<i>Diptera</i>	<i>Scatopsidae</i>	<i>Unknown</i>
<i><No species account available></i>			
<i>Atherix marginata</i>	<i>Diptera</i>	<i>Rhagionidae</i>	<i>Unknown</i>
<i><No species account available></i>			
<i>Clorismia rustica</i>	<i>Diptera</i>	<i>Therevidae</i>	<i>Nationally Scarce</i>
<i>Stiletto fly. Larvae probable develop in damp sand where the feed on vegetable matter. Apparently a rare species recorded mainly from the Welsh border counties.</i>			
<i>Spiriverpva lunulata</i>	<i>Diptera</i>	<i>Therevidae</i>	<i>Nationally Scarce</i>
<i>Rare stiletto fly. Found on gravelly stream banks. Northern and western species.</i>			
<i>Tachydromia costalis</i>	<i>Diptera</i>	<i>Empididae</i>	<i>pRDB3</i>
<i><No species account available></i>			
<i>Tachydromia edenensis</i>	<i>Diptera</i>	<i>Empididae</i>	<i>Data Deficient</i>
<i>A hybotid fly restricted to sandy shingle banks on the River Eden in Cumbria. Also known from a single specimen in Berlin Museum with indecipherable locality data.</i>			
<i>Tachydromia halidayi</i>	<i>Diptera</i>	<i>Empididae</i>	<i>Nationally Scarce</i>
<i><No species account available></i>			
<i>Tachydromia morio</i>	<i>Diptera</i>	<i>Empididae</i>	<i>Local</i>
<i><No species account available></i>			

<i>Tachydromia woodi</i>	Diptera	Empididae	Nationally Scarce
<i>Tiny predatory fly. Ecology uncertain. Found running over low vegetation.</i>			
<i>Platypalpus melancholicus</i>	Diptera	Empididae	Near Threatened
<No species account available>			
<i>Platypalpus ochrocera</i>	Diptera	Empididae	Data Deficient
<i>Small fly recorded from damp broad-leaved woodland. Biology unknown. Only one confirmed British record from Herefordshire, though there is also an unconfirmed record from Norfolk.</i>			
<i>Platypalpus subtilis</i>	Diptera	Empididae	Nationally Scarce
<i>Small predatory empidid which Collin only records from the Monnow Valley (Hereford).</i>			
<i>Symbalophthalmus pictipes</i>	Diptera	Empididae	Nationally Scarce
<i>A small predatory fly, rare but very widely distributed, probably particularly associated with riversides.</i>			
<i>Hilara albiventris</i>	Diptera	Empididae	Notable/Nb
<i>Small empidid likely to be found flying over water. Collin records it from Monnow Valley (Hereford) and Brecknock (Wales).</i>			
<i>Hilara biseta</i>	Diptera	Empididae	Notable/Nb
<No species account available>			
<i>Dolichopus longicornis</i>	Diptera	Dolichopodidae	Local
<i>A metallic green fly, larval biology unknown. Adults found in wetlands throughout Britain.</i>			
<i>Rhaphium gravipes</i>	Diptera	Dolichopodidae	Vulnerable
<No species account available>			
<i>Rhaphium nasutum</i>	Diptera	Dolichopodidae	Local
<i>Medium sized metallic fly. Widespread but uncommon.</i>			
<i>Rhaphium patulum</i>	Diptera	Dolichopodidae	Notable/Nb
<No species account available>			
<i>Rhaphium penicillatum</i>	Diptera	Dolichopodidae	pRDB3
<No species account available>			
<i>Rhaphium riparium</i>	Diptera	Dolichopodidae	Nationally Scarce
<i>A shining metallic fly found in damp places such as wooded stream and river banks. Larvae unknown, but related species have been found in soil. Widespread and fairly common.</i>			
<i>Rhaphium suave</i>	Diptera	Dolichopodidae	Nationally Rare
<i>Lonchoptera nigrociliata</i>	Diptera	Lonchopteridae	Notable/Nb
<i>Small fly found beside streams in woods. Has been recorded mainly from north-west England, the Welsh border counties and South Wales. Very local, but can be abundant where it occurs.</i>			
<i>Athyroglossa glabra</i>	Diptera	Ephydriidae	Unknown
<No species account available>			

Ditrichophora palliditarsis **Diptera** **Ephydriidae** **Unknown**
 <No species account available>

Myopina myopina **Diptera** **Anthomyiidae** **Local**
 A fly found on sandy river banks.

Pardosa agricola/arenicola s.l. **Araneae** **Lycosidae** **Unknown**
 <No species account available>

Pardosa agricola **Araneae** **Lycosidae** **Local**
 A wolf spider. The typical form is northern, being found on sandy and gravelly banks of fast flowing streams. Form *arenicola* (regarded by some as a separate species) is southern and coastal, being found on sand and shingle beaches. An intermediate form (*var. maritima*) has been found where fast flowing rivers enter estuaries. Locally abundant in the north, rare in the south, especially inland.

Arctosa cinerea **Araneae** **Lycosidae** **Notable/Nb**
 A northern wolf spider found amongst stones beside lakes and rivers where it builds a silken tube beneath a stone. The spider appears to stay in this tube throughout the winter, even when it is covered by water. Very local in Scotland, northern England and North Wales

Caviphantes saxetorum **Araneae** **Linyphiidae** **Na**
 A small money spider found under stones on the sandy banks of rivers on the Tyne at Haltwhistle, the confluence of the E and W Allen (Northumberland), Abernethy Forest, Glen Feshie (Easternness), Gleann Beag (Perth) and Landoverly (Carmarthen).