Invertebrates of Exposed Riverine Sediments (Phase 2) – Additional Information

R&D Project Record W1/011/01

Invertebrates of Exposed Riverine Sediments (Phase 2) – Additional Information

R&D Project Record W1/011/01

J P Sadler and G E Petts

Research Contractor:
School of Geography and Environmental Science
The University of Birmingham

Further copies of this report are available from:
Environment Agency R&D Dissemination Centre, c/o
WRc, Frankland Road, Swindon, Wilts SN5 8YF

tel: 01793-865000 fax: 01793-514562 e-mail: publications@wrcplc.co.uk

Publishing Organisation:
Environment Agency
Rio House
Waterside Drive
Aztec West
Almondsbury
Bristol BS32 4UD

Tel: 01454 624400 Fax: 01454 624409

ISBN: 1 85705 200 5

Environment Agency R&D Project W1-011 was carried out collaboratively with English Nature and the Countryside Council for Wales.

Dissemination status
Internal: Released to Regions
External: Released to Public Domain

Statement of use
This document provides a record of the work and includes use of the RHS database for predicting Exposed Riverine Sediments and all of the raw data from the project.

Keywords/Geiriau Allweddol
Exposed Riverine Sediments (ERS); invertebrates; Coleoptera; Diptera; Araneae; site assessment; sampling.
Gwaddodion Noeth Afonydd (GNA); Creaduriaid Di-asgwrn-cefn; Coleoptera; Diptera; Aranae; Asesu Safleoedd; Samplo.

Research contractor
This document was produced under R&D Project W1-011 by:

School of Geography and Environmental Science
University of Birmingham
Edgbaston
Birmingham
B15 2TT
Tel: 0121 4145518 Fax: 0121 4145528

Environment Agency's Project Manager
The Environment Agency's Project Manager for R&D Project W1-011 was:
Viki Hirst, North East Region.

R&D Project Record W1/011/01

LIST OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

This document provides a record of the work undertaken during the project. The first section illustrates how River Habitat Survey (RHS) data were used to create an index that can be used to predict the presence of Exposed Riverine Sediments in rivers. The second half of the document provides an appendix comprising all the raw data generated during the project.

KEYWORDS

Exposed Riverine Sediments (ERS); Invertebrates; Coleoptera; Diptera; Araneae; RHS

1. REPORT STRUCTURE

This document provides a record of the data collected while this R & D project was undertaken and should be read in association with the technical report. It is organized into two main sections. The first provides a fuller and detailed account of the results of the RHS analyses and the second includes all the raw data tables generated by this project. The latter is placed in three appendices. Appendix A includes the raw invertebrate data organized alphabetically by site name. Appendix B documents the species of Coleoptera captured by the various trapping Information techniques. Appendix C includes the environmental data collected at each site.

2. RHS ANALYSES

The River Habitat Survey (RHS) database contains a wealth of information on British rivers. The aim of this component of the study was to use information in the RHS database to identify about 300 potential sites for possible further investigation of exposed riverine sediments, and the dissemination of information to local conservation officers and river managers. These potential sites should have the following properties:

- each site should contain a significant area of exposed sediment.
- the sample of sites should include sediment across a range of particle sizes.
- the sites should be semi-natural, with a minimum of anthropogenic impact.
- the sample of sites should preferably give good spatial coverage across the Environment Agency regions.

2.1 The RHS database

Information was provided on 2926 sites selected from the full RHS database. The sites were selected because they included at least one point bar and there was no evidence of dredging. For each of these sites, information was supplied on 108 data fields. Of these fields, the following were used to select and prioritise potential sites for further study.

2.1.1 Information on exposed sediment

Spot checks (at ten sections within each 500m surveyed sites) provided observed frequencies for the dominant channel substrate and for selected channel and bank features. In the case of channel substrate, observations were recorded in relation to the following classes: bare rock (BE), boulder (BO), cobble (CO), gravel/pebble (GP), sand (SA), silt (SI), clay (CL), peat (PE) and artificial (AR). For the purposes of the present study, it was important to avoid sites with an artificial substrate and also to select sites with a varying sediment calibre. Since, the categories of substrate recorded are compatible with the Wentworth scale. A sediment calibre (SEDCAL) index was devised which integrated the frequency data for the different particle size ranges:

$$SEDCAL = (-8*BO + -7*CO + -3.5*GP + 1.5*SA + 1.5*SI + 9*CL)/(BO + CO + GP + SA + SI + CL)$$

The value of SEDCAL approximates an average particle size for the stretch in phi units.

The frequency of unvegetated mid-channel bar (MB) was potentially the most useful of the channel features for the present study, although vegetated mid-channel bars (VB) and mature islands (MI) are also indicative of in-channel storage. Of the bank features, the frequency of

unvegetated side bars and point bars (SB, PB) provide further indicators of exposed sediment, but vegetated point and side bars (VP, VS) are also important indicators of sediment storage.

500m sweep up data includes a count of the number of unvegetated and vegetated point bars, and the extent (0=none, P=present, E=>33% cover) of unvegetated and vegetated mid-channel and side bars. All of these are potentially very relevant to the present study. Indeed an Exposed Sediment Index was devised using the extent of unvegetated mid-channel and side bars as follows (Table 2.1):

Table 2.1: Exposed sediment index

	Unvegetated Side Bars		
Unvegetated Mid-Channel bars	**0**	**P**	**E**
0	0	1	2
P	1	2	3
E	2	3	4

2.1.2 Information on channel modification and hydrogeomorphology

The RHS database contains many data fields that represent different types of anthropogenic impact on the river corridor, ranging from general floodplain land use to local in-channel structures. The Habitat Modification Index (HMI) integrates factors representing direct modification of the channel and banks. Since the aim of the present study was to isolate semi-natural channels, rather than to differentiate between different types of impact, the HMI was used to aid site selection in preference to any of the other variables.

Although the RHS database contains numerous data fields that are relevant to hydrogeomorphology, only a few variables were selected to represent the overall character of the channels surveyed. The character of river channels is primarily controlled by the discharge regime or stream power and the sediment transport regime. Secondary factors include the type or size of the bed and bank materials and the character of the bank vegetation as it impacts, for example, on flow resistance and root tensile strength. Thus data fields were selected to represent as many of these properties as was possible:

- The discharge regime was represented by the bankfull channel width (Btop wid), as this has been shown to highly correlated with the magnitude of floods with a return periods of approximately 2 to 5 years.
- As stream power is the product of discharge and channel slope, Slope was included as a second variable.
- Although there was no direct information on the sediment transport regime, SEDCAL provided a bed material sediment calibre index which is related both to sediment transport

and to the character of the channel bed.

- There is no information on channel bank materials, but bankface vegetation structure (bare (B), uniform (U), simple (S) and complex (C)) provides useful information on the structure and thus potential flow resistance of bank vegetation. Since B, U, S and C are recorded as frequencies within the spot check surveys of 10 channel cross sections or 20 bank profiles, an index BANKVEG was devised to represent the entire 500m stretch:

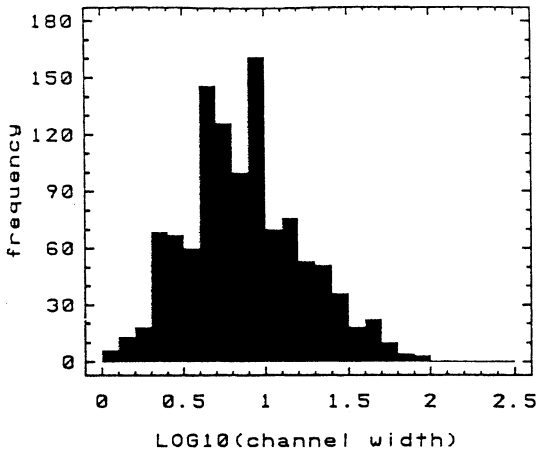
$$BANKVEG = (U + 2*S + 3*C) / (B + U + S + C)$$

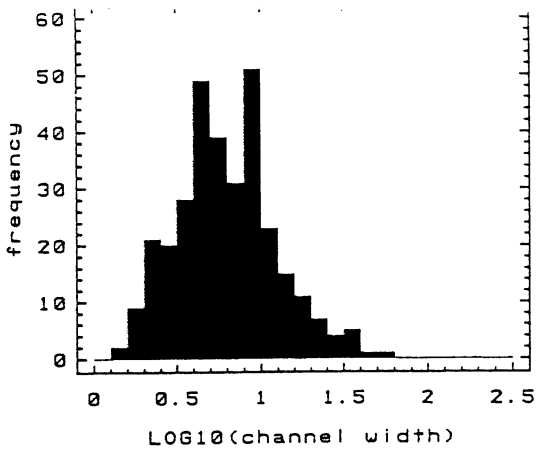
2.2 Dimensions of the semi-natural river channel environment

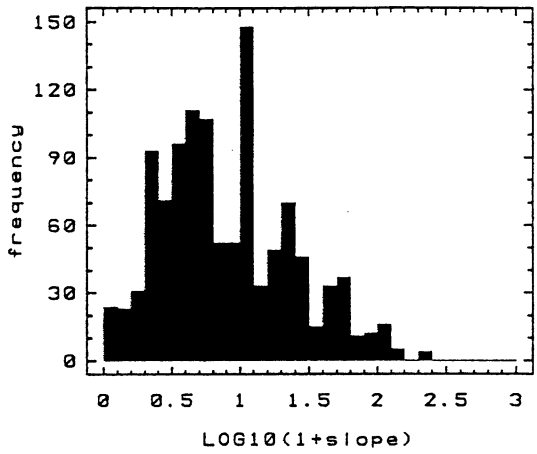
Semi-natural sites were selected from the 2926 sites that were provided by the Environment Agency using the HMI. All sites with a HMI < 3 were selected, giving a total of 1132. For this subset of semi-natural sites, the frequency distributions of four variables were calculated: Btop wid, Slope, SEDCAL and BANKVEG. Apart from BANKVEG, the frequency distributions were markedly skewed and so they were log-transformed (Figure 2.1). In order to remove zero or negative numbers prior to transformation, 1 and 10 were added to Slope and SEDCAL, respectively. The four transformed variables were then subject to ordination by Principal Components Analysis, resulting in the following component weights (Table 2.2):

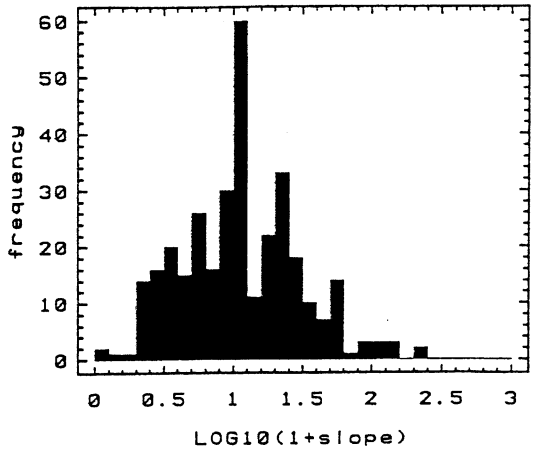
Table 2.2: Principal components derived from four river channel variables

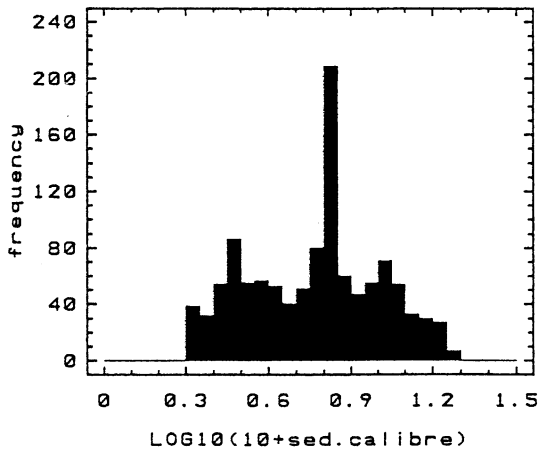
	COMPONENT			
VARIABLE	1	2	3	4
log10(Btop wid)	0.458	**-0.608**	-0.378	0.526
log10(1+Slope)	**-0.754**	-0.008	0.013	**0.657**
log10(10+SEDCAL)	0.469	0.616	0.329	0.540
BANKVEG	0.033	-0.499	**0.866**	0.015
% Variance	39.4	31.9	22.7	6.1
Cum. % Variance	39.4	71.2	93.9	100.0











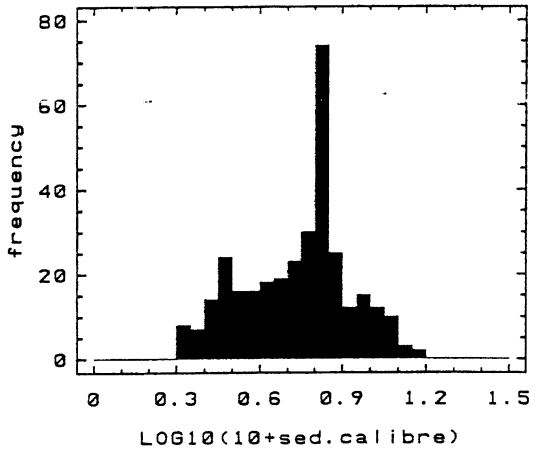
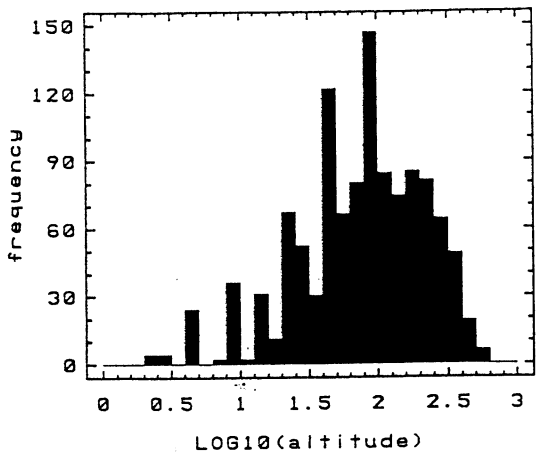
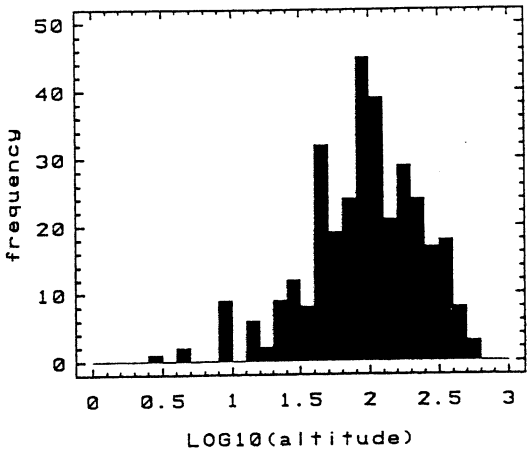
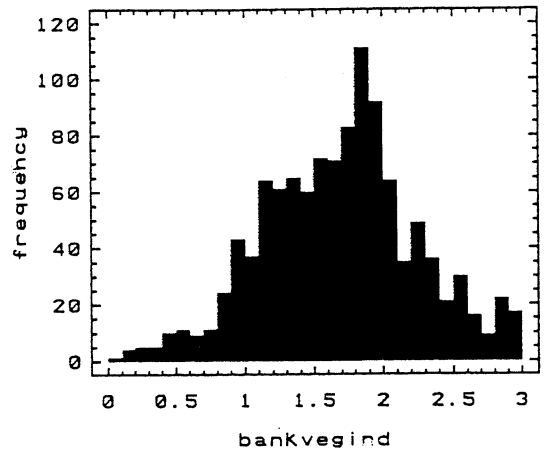


Figure 2.1: log-transformed frequency distributions of the four key variables







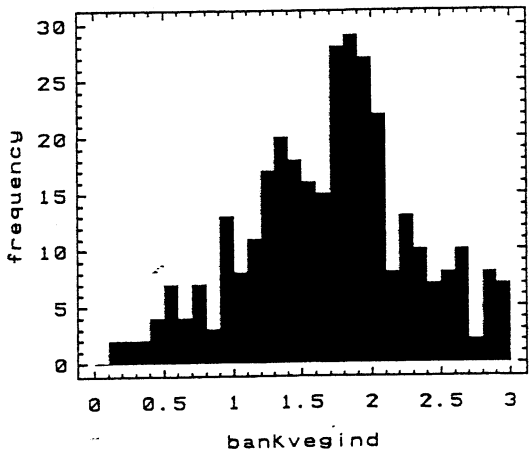


Figure 2.1 con'd

The first three components account for 93.9% of the total variance, and sediment regime, and are surrogate indices for discharge and sediment transport regimes as well as the bed material. The third component, which accounts for 22.7% of the total variance, is very strongly related to BANKVEG, a surrogate index for bank vegetation roughness or resistance. Thus the three principal components represent the three key dimensions of topographic slope, flow and sediment regime, and bank vegetation roughness.

A discriminant analysis was also undertaken to establish the degree to which the extent of exposed riverine sediment might be related to the above four river channel variables. The discriminant analysis was applied to the transformed variables to assess the degree to which they could discriminate between the extent of exposed sediment as described by the Exposed Sediment Index. Table 2.3 summarises the results of the analysis.

Table 2.3: Discriminant analysis

	Discriminant Function			
	1	2	3	4
Standardised Coefficients				
Log10(Btop wid)	-0.259	1.116	-0.188	0.603
Log10(1+Slope)	0.502	1.105	-0.696	-0.169
Log10(10+SEDCAL)	-0.580	0.647	-0.913	-0.302
BANKVEG	0.221	-0.429	-0.721	0.519
Relative %	91.02	5.63	3.31	0.04
Canonical Correlation	0.345	0.091	0.070	0.007
Group Centroids				
Group 0	-0.649	0.047	-0.034	-0.003
Group 1	0.025	-0.080	0.053	0.001
Group 2	0.261	0.058	-0.050	0.006
Group 3	0.634	0.031	-0.050	-0.024
Group 4	0.322	1.073	0.832	-0.004

Table 2.3 illustrates the overriding importance of the first discriminant function in differentiating between the sites according to the Exposed Sediment Index. Discriminant function 1 mainly reflects the slope and the sediment calibre of the sites. Sites with a smaller SEDCAL (i.e. larger grain size) and greater slope are likely to have a greater exposed sediment index. The level of such differences is reflected in the mean values of the transformed variables within each of the exposed sediment index groups. Table 2.4 back-transforms these mean values to illustrate the absolute nature of the differences.

Table 2.4: Back-transformed means of exposed sediment index groups

Exposed Sediment Index	0	1	2	3	4
n	232	468	349	73	4
Sediment Calibre (phi)	-2.34	-4.29	-4.67	-5.38	-5.96
Slope (m/km)	3.61	6.87	9.40	13.49	12.40

2.3 Defining potential sites with exposed riverine sediments

Having identified 1132 semi-natural sites, it was then necessary to identify those characterised by exposed riverine sediments. The following cross-tabulates sites according to the extent of unvegetated mid-channel and side bars:

Table 2.5: Cross-tabulation of unvegetated mid-channel and side bars

	unvegetated side bars		
Unvegetated mid-channel bars	**0**	**P**	**E**
0	237	432	46
P	38	305	71
E	0	0	3

The heavily bounded area in Table 2.5 includes 425 sites where either unvegetated mid-channel or side bars are extensive (0E, PE or EE) or both types of bar are present (PP). These sites have an Exposed Sediment Index >1. Unfortunately, a very large proportion of the sites fall into the latter category (PP), where the area of exposed sediment may be relatively small.

A number of methods of increasing the selectivity of sites with exposed sediments were explored. Finally, the number of sites was reduced to 322 by only selecting those where a mid channel bar (MB) was identified at least one of the ten spot checks or where there was a count of at least one unvegetated point bar within the site. Any further reduction of the sites using the RHS information alone is difficult because the remaining 322 sites are extremely sensitive to any slight increase in the thresholds used as indicators of exposed sediment. This may imply that there are very few sites within the RHS database that have sufficient exposed sediment to be ideal for the present purpose. However, it is more likely that the indicators that can be used to identify sites are too insensitive for the present purpose and that there is a danger that suitable sites will be rejected. A second problem is that as the criteria for identifying exposed sediment extent are more heavily weighted, the sites that are lost tend to be mainly those with a finer a finer substrate and yet, as is shown in the next section, virtually all of the 322 sites have substrate that is predominantly of sand size or coarser. Thus, the most profitable way forward is probably for regional experts within the Environment Agency to prioritise sites within the list of 322, which is appended. In this way, the number of high quality sites can be maximised and the

fullest range of substrate calibre can be retained.

2.4 Representativeness of the selected sites

Figure 2.2a plots the scatter of the 1132 semi-natural sites within the biplot of the first and second principal components. The four lines represent the original variables (the length of each vector is proportional to its contribution to the two principal components). Figure 2.2b locates the 322 selected sites in relation to the same principal component axes as Figure 2.2a. Although the 322 sites spread well across the range of the 1132 semi-natural sites, positive loadings on component 1 (ie low slope, high channel width, fine sediment calibre) seem to be under-represented. Figure 2.3 plots frequency distributions for the two sets of sites against the four transformed variables and also log10 (altitude). In each case the frequency distribution for the full set of semi-natural sites is plotted on the left, whereas that for the 322 selected sites is plotted on the right. These frequency histograms confirm that the selected sites under-represent the lowest slope angles and altitudes, the widest channels and the finest sediments (i.e. the higher values for sediment calibre on the plots).

Figure 2.4 compares the abundance (frequency of spot checks) of bare rock (BE - maximum possible value is 10) and of mid channel bars and islands (MI+VB+MB) in relation to SEDCAL for all the semi-natural sites (left) and for the 322 selected sites (right). The selected sites clearly under-represent the finest sediment classes (ie. the higher values of SEDCAL). They also appear to have a lower abundance of bare rock substrate, but as expected, a greater abundance of mid channel bar/islands than the full sample of semi-natural sites. However, there are still a large number of selected sites with no spot check occurrence of mid-channel bar/islands. Figure 2.5 uses a similar layout to Figure 4 to assess the degree to which the 322 sites are representative of marginal bar abundance (SB+PB+VP+VS) and exposed sediment abundance (MB+SB+PB) in relation to the calibre of sediment. Again the under-representation of fine sediment is clear but also the selected sites, as required, exhibit a greater abundance of marginal bars and exposed sediment.

Under-representation of fine sediment sites is scarcely surprising given the results of the discriminant analysis of the entire set of semi-natural sites (Table 2.6). Sites with exposed sediment tend to be sites with a coarser substrate. It seems that in inspecting the 322 potential sites for further study, those with the highest values of SEDCAL require particularly careful scrutiny so that the final selection of sites retains a few that have at least a fine sand substrate. The 322 potential sites are listed in full in Appendix A of the Technical Report.

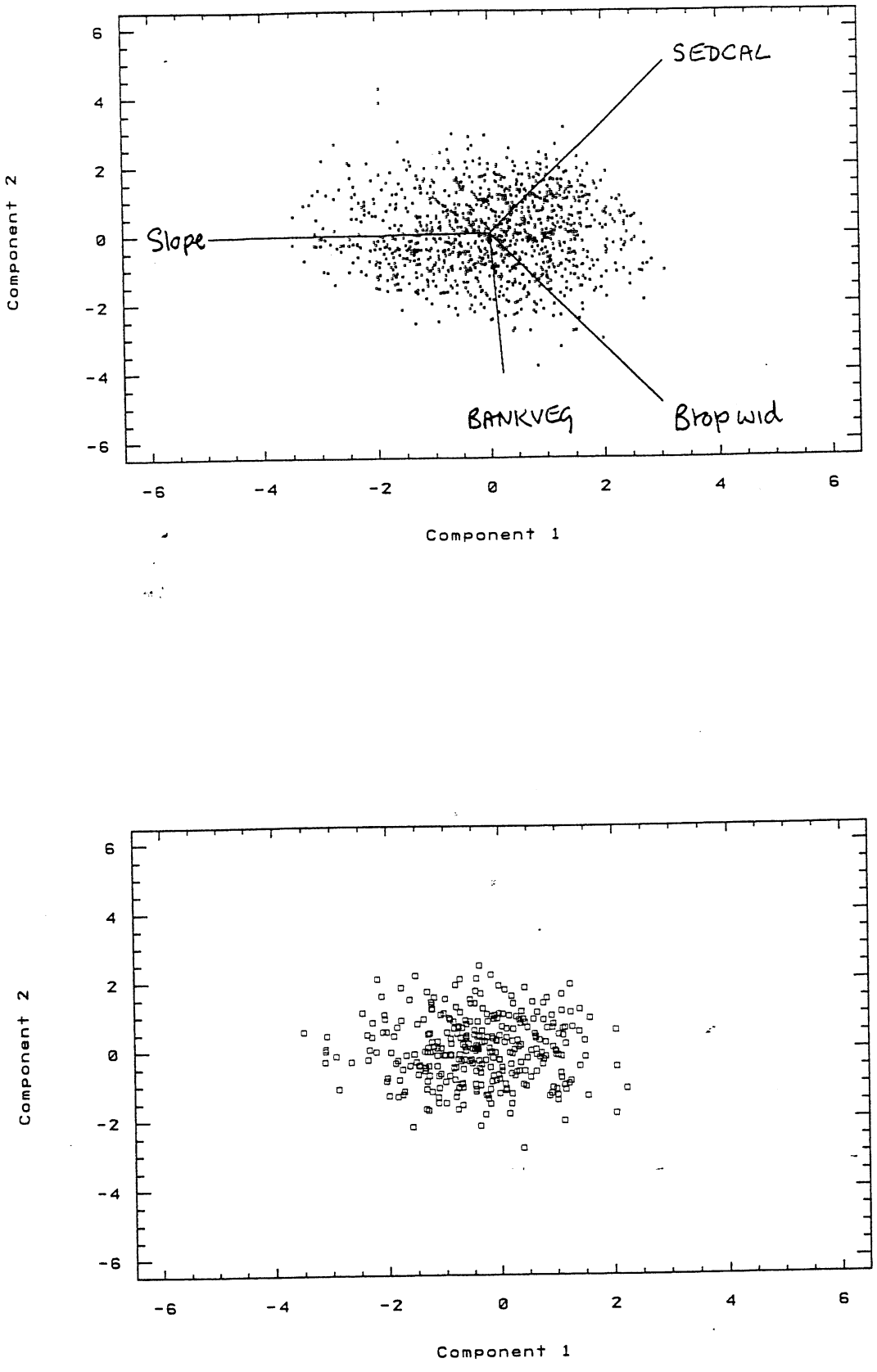


Figure 2.2: Biplots of the first and second principal components. (a) shows the 1132 semi-natural sites, and (b) the 322 selected sites

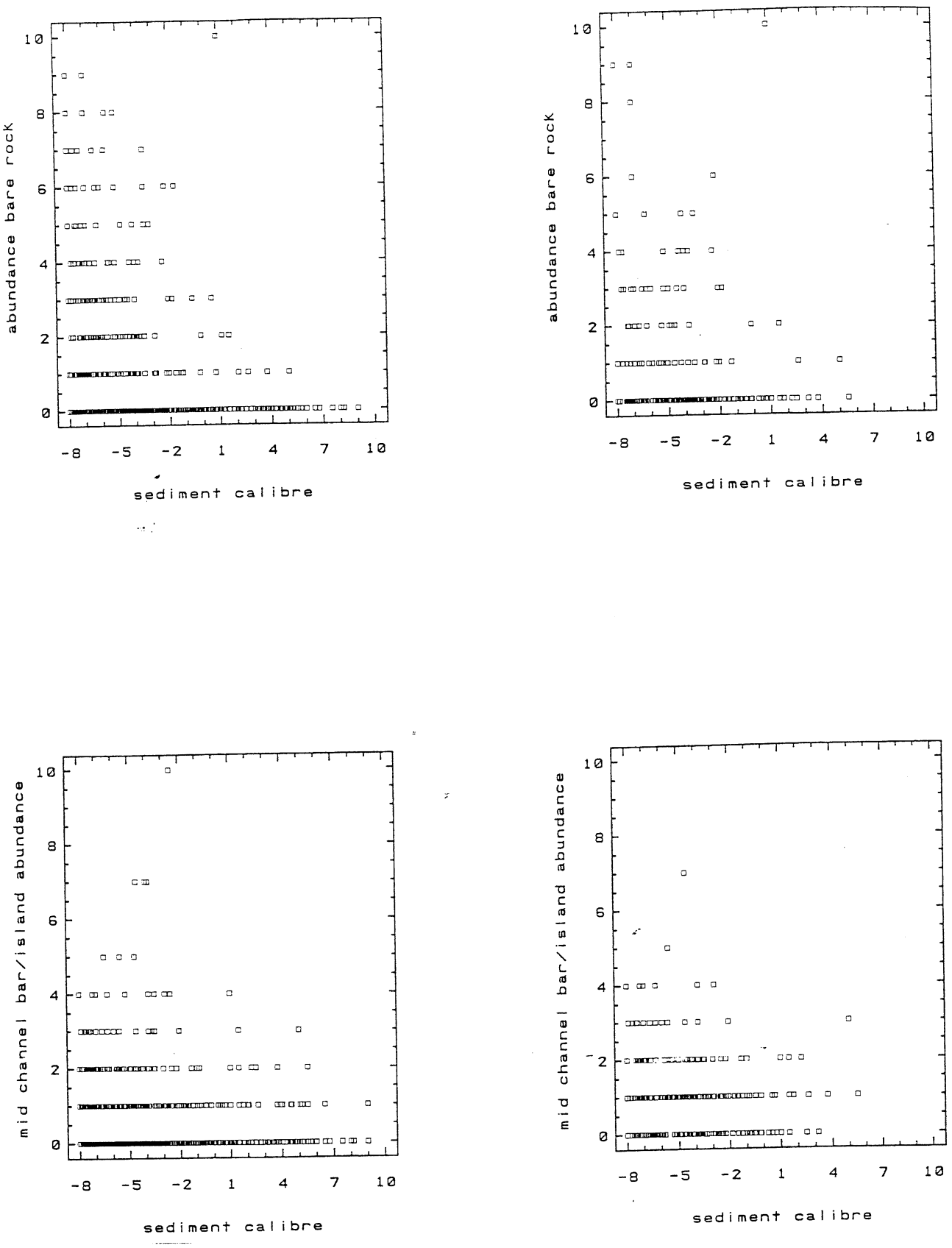
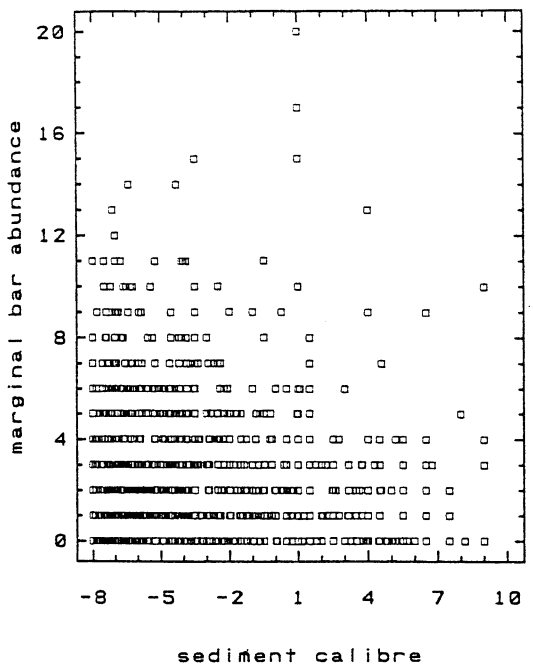
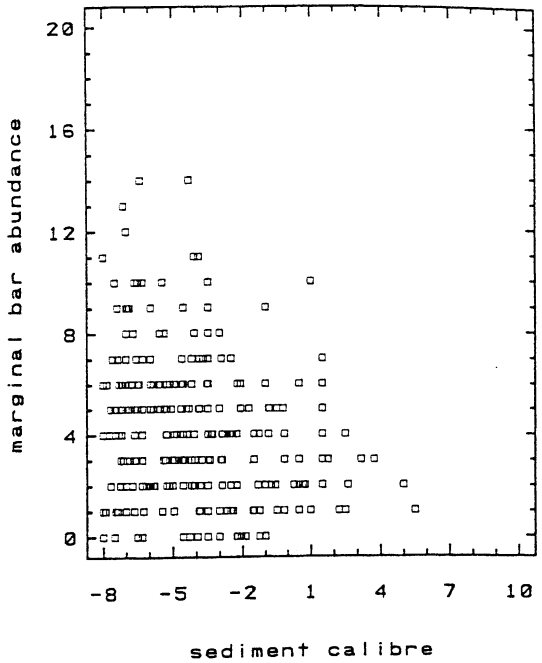
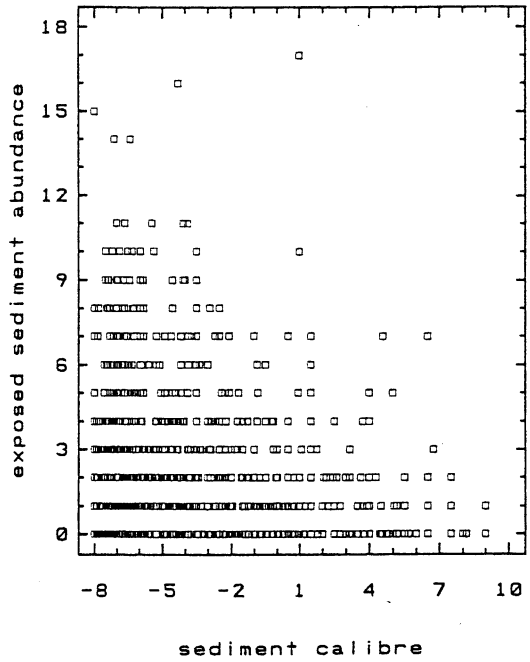


Figure 2.3: frequency distributions for the two sets of sites against the four transformed variables and also log10(altitude)







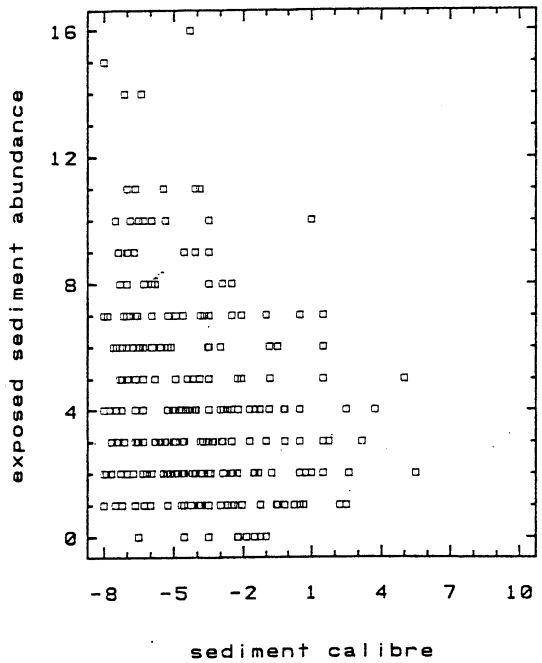


Figure 2.4: the abundance of bare rock and of mid-channel bars and islands in relation to SEDCAL

Appendix A: Site data - invertebrates

Table A1: River Alport (Lower) - Species of Coleoptera captured in pitfall traps (listed by replicate) (Collection 11.6.97 and 28.8.97)

	Replicates		
Taxa	**R1**	**R2**	**R3**
Cicindela campestris		2	
Carabus problematicus	1	3	
Nebria brevicollis	2	38	3
Nebria gyllenhali	78	36	
Nebria salina		2	
Notiophilus aquaticus	1		1
Notiophilus bigutattus	1		1
Dyschirius globosus			1
Clivina fossor		1	
Bembidion lampros			4
Bembidion dentellum	1		
Bembidion tibiale	244	37	
Bembidion andreae		1	2
Bembidion bruxellense	3		
Bembidion tetracolum	1		1
Bembidion quadrimaculatum			2
Bembidion harpaloides	1		
Pterostichus diligens		1	
Pterostichus madidus	13	28	12
Pterostichus melanarius	1		
Pterostichus niger		1	
Pterostichus rhaeticus	4	1	
Abax parallelepipedus	2		
Calathus fuscipes	3	1	
Agonum albipes	119	10	
Agonum assimile	41	1	
Amara communis			1
Oreodytes sanmarki	1		
Helophorus brevipalpis		1	
Anacaena globosus	13	1	
Stenichnus collaris			1
Proteinus crenulatus	1		
Lesteva pubescens	1		
Geodromicus nigrita	1		
Anotylus tetracarinatus		1	
Lathrobium brunnipes	1		
Xantholinus longivestris	1		
Quedius curtipennis	1		
Aloconota (s.str.) cambrica	73	11	
Aloconota (s.str) currax	9		
Aloconota (s.str) insecta	3		
Geostiba circellaris			2
Atheta (Mocyta) amplicollis	1		
Atheta (s.str.) brunneipennis	1		

Pselaphus heisei		5	5
Geotrupes stercorarius	1	1	
Aphodius prodromus	7	1	
Cyphon palustris		1	
Byrrhus pitula	1	1	
Dryops ernesti	3	1	1
Elmis aenea	27		
Limnius volckmari	15	2	
Oulimnius tuberculatus	6		
Hypnoidus riparius	9	18	5
Zorochros minimus	3	113	71
Ctenicera cuprea	3	3	
Agroites obscurus	1	1	1
Cantharis nigricornis	1	1	
Rhagonycha femoralis		1	
Enicmus histrio	1		
Longitarsis gracilis	1		
Chaetocnema hortensis			1
Phyllobius glaucus	1		
Phyllobius pyri	2	1	
Leiosoma deflexum		1	1
Rhinoncus pericarpius			1
Totals	**705**	**328**	**117**

Table A2: River Alport (Lower) - Species of Araneae captured in the pitfall traps (listed by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	Replicates R1	R2	Total
Haplodrassus signifer	0	5	5
Micaria pulicaria	0	2	2
Xysticus cristatus	0	1	1
Pardosa palustris	0	9	9
Pardosa pullata	0	38	38
Pardosa amentata	8	60	68
Alopecosa pulverulenta	0	2	2
Trochosa terricola	0	3	3
Pirata piraticus	3	0	3
Agelena labyrinthica	0	0	0
Antistea elegans	3	0	3
Pachygnatha clercki	1	0	1
Pachygnatha degeeri	0	3	3
Walckenaeria nudipalpis	1	0	1
Walckenaeria acuminata	2	0	2
Pocadicnemis pumila	0	1	1
Oedothorax fuscus	2	2	4
Oedothorax agrestis	70	12	82
Oedothorax retusus	3	6	9
Silometopus elegans	0	2	2
Tiso vagans	0	1	1
Gongylidiellum vivum	1	0	1
Diplocephalus protuberans	2	0	2
Erigone dentipalpis	3	1	4
Erigone atra	3	2	5
Leptorhoptrum robustum	1	0	1
Porrhomma pygmaeum	1	0	1
Porrhomma convexum	1	0	1
Agyneta decora	0	1	1
Meioneta rurestris	0	2	2
Centromerita concinna	0	1	1
Saaristoa abnormis	2	0	2
Microlinyphia pusilla	0	1	1
Total			262

Table A3: River Alport (Lower) - Coleoptera collected during hand searching (incl. data on excavation and quadrats) (Collection 11.6.97 and 28.8.97)

Taxa	Hand search			Quadrat			Excavation			Total
	R1	R2	R3	R1	R2	R3	R1	R2	R3	
Nebria brevicollis		1	1							2
Nebria gyllenhali	2		1							3
Bembidion tibiale	3	4	1							8
Agonum albipes	7	1	2							10
Geodromicus nigrita	1	2	1							4
Aloconota (s.str.) cambrica			1				2			3
Aloconota (s.str.) currax	1						2	3		6
Dryops ernesti	1	2								3
Elmis aenea	3	2	3							8
Limnius volckmari	2	3	1							6
Hypnoidus riparius	1									1
Zorochros minimus	3	4	5							12
										66

Table A4: River Alport (Lower) - Coleoptera and Araneae captured in the Window and Water traps (Collection 11.6.97 and 28.8.97)

Taxa	26.6.97 Window			Water			28.8.97 Window	Water	Total
	R1	R2	R3	R1	R2	R3	R1	R1	
Coleoptera									
Catops sp.								1	1
Aloconota (s.str.) cambrica								1	1
Oulimnius tuberculatus								2	2
Antherophagus nigricornis								1	1
Longitarsis gracilis								1	1
									6
Araneae									
Oedothorax agrestis							7	3	10
O. fuscus								1	1
Erigone atra								1	1
Lynphiidae (Imm.)								1	1
									13

Table A5: River Alport (Upper) – Coleoptera captured in pitfall traps (by replicates) (Collection 11.6.97 and 28.8.97)

Taxa	Replicates R1	R2	R3
Cicindela campestris	41	7	7
Carabus arvensis	1	0	0
Carabus problematicus	3	0	4
Nebria brevicollis	6	3	9
Nebria gyllenhali	3	3	6
Nebria salina	9	5	32
Notiophilus aquaticus	2	1	1
Notiophilus biguttatus	0	2	1
Notiophilus palustris	1	0	1
Dyschirius globosus	15	0	0
Clivina fossor	2	0	1
Miscodera arctica	0	1	0
Patrobus atrorufus	0	0	1
Trechus quadristriatus	0	0	1
Bembidion lampros	8	3	18
Bembidion properans	2	0	1
Bembidion atrocoeruleum	0	0	2
Bembidion tibiale	1	133	53
Bembidion andreae	187	245	465
Bembidion bruxellense	13	4	6
Bembidion femoratum	1	6	5
Bembidion tetracolum	1	0	0
Bembidion quadrimaculatum	0	1	1
Bembidion guttula	1	0	0
Tachys parvulus	1	1	1
Pterostichus adstrictus	10	1	3
Pterostichus diligens	6	0	1
Pterostichus madidus	4	0	7
Pterostichus melanarius	0	0	1
Pterostichus rhaeticus	0	1	0
Calathus erratus	39	18	47
Calathus fuscipes	47	1	37
Calathus melanocephalus	0	0	1
Olisthopus rotundatus	0	4	1
Agonum albipes	10	5	5
Agonum assimile	0	0	1
Agonum fuliginosus	1	0	0
Amara lunicollis	1	0	0
Harpalus latus	0	0	1

Acupalpus dorsalis	0	0	1
Anacaena globosus	2	1	0
Nicrophorus vespilloides	13	0	0
Thanatophilus rugosus	1	0	0
Geodromicus nigrita	0	1	3
Deleaster dichrous	0	0	1
Carpelimus rivularis	1	1	1
Anotylus rugosus	0	0	1
Anotylus tetracarinatus	0	2	0
Lathrobium brunnipes	2	0	0
Lathrobium fulvipenne	2	1	6
Othius angustus	0	1	0
Xantholinus linearis	0	0	2
Philonthus cognatus	1	0	0
Philonthus decorus	1	0	0
Philonthus varius	1	0	0
Gabrius trossulus	1	0	0
Quedius molochinus	1	0	0
Quedius nitipennis	1	0	0
Quedius tristis	0	1	0
Trichophya pilicornis	0	1	0
Bolitobius cingulatus	1	0	0
Tachyporus chrysomelinus	1	0	1
Tachyporus nitidulus	0	1	0
Boreophilia islandica	0	0	1
Hydrosmecta eximia	0	1	
Aloconota (s.str.) cambrica	0	12	14
Aloconota (s.str.) gregaria	0	1	1
Amischa analis	1	0	0
Amischa nigrofusca	3	0	2
Geostiba circellaris	1	0	0
Atheta (Philhygra) hygrotopora	0	1	0
Atheta (Mocyta) amplicollis	1	0	0
Drusilla canaliculata	4	1	0
Aleochara bipulstulata	1	0	1
Pselaphus heisei	4	0	1
Aphodius prodromus	0	0	2
Cyphon palustris	0	0	8
Byrrhus pitula	1	1	2
Dryops ernesti	0	0	1
Elmis aenea	1	0	0
Hypnoidus riparius	74	3	15
Zorochros minimus	853	1837	1735
Ctenicera cuprea	17	3	2
Agriotes obscurus	2	0	5
Longitarsis gracilis	0	1	0

Altica lythri	0	0	1
Chaetocnema hortensis	4	1	7
Strophosoma sus	0	0	1
Sitona lepidus	1	0	2
Total	1413	2317	2538

Table A6: River Alport (Upper) – Araneae captured in pitfall traps (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	R1	R2	R3
Drassodes cupreus	4	3	2
Haplodrassus signifer	1	0	2
Micaria pulicaria	1	0	0
Clubiona diversa	1	0	0
Xysticus cristatus	2	0	4
Pardosa palustris	124	18	27
Pardosa pullata	17	0	2
Pardosa amentata	114	45	58
Pardosa nigriceps	1	0	1
Alopecosa pulverulenta	1	4	1
Trochosa terricola	0	1	2
Pirata piraticus	8	0	0
Antistea elegans	8	0	0
Hahnia nava	0	0	2
Robertus lividus	7	2	1
Pachygnatha degeeri	8	1	2
Walckenaeria dysderoides	0	2	1
Walckenaeria nudipalpis	0	0	3
Walckenaeria vigilax	3	0	1
Walckenaeria acuminata	4	1	0
Dicymbium nigrum	2	0	0
Dismodicus bifrons	3	0	0
Hypomma bituberculatum	1	0	1
Peponocranium ludicrum	2	0	1
Pocadicnemis pumila	1	0	0
Oedothorax fuscus	15	1	11
Oedothorax agrestis	3	0	7
Oedothorax retusus	62	0	4
Silometopus elegans	6	0	0
Evansia merens	1	0	0
Tiso vagans	1	2	1
Monocephalus fuscipes	0	0	1
Gongylidiellum vivum	0	0	1
Micrargus apertus	1	1	0
Micrargus herbigradus	0	0	2
Savignia frontata	0	0	1
Diplocephalus cristatus	1	0	0
Diplocephalus permixtus	0	0	1
Diplocephalus protuberans	0	0	2
Milleriana inerrans	0	1	0

Erigone dentipalpis	4	2	5
Erigone promiscua	5	3	7
Erigone atra	5	4	8
Drepanotylus uncatus	1	0	0
Porrhomma pygmaeum	0	6	0
Agyneta cauta	1	0	0
Meioneta rurestris	3	6	6
Meioneta gulosa	7	7	4
Meioneta saxatilis	2	0	0
Centromerita concinna	5	1	0
Tapinopa longidens	0	0	0
Lepthyphantes tenuis	0	0	1
Lepthyphantes ericaeus	1	1	0
Total	437	112	173

Table A7: River Alport (Upper) – Coleoptera collected during hand searching (incl. data from excavations and quadrats) (Collection 11.6.97 and 28.8.97)

Taxa	Hand search			Quadrat			Excavation			Total
	R1	R2	R3	R1	R2	R3	R1	R2	R3	
Nebria brevicollis	1									1
Nebria gyllenhali		2								2
Bembidion tibiale		3	2							5
Bembidion andreae		4	4							8
Bembidion bruxellense		1								1
Tachys parvulus					1		2	1	2	6
Geodromicus nigrita	1		1							2
Lathrobium fulvipenne			1			1	1		1	4
Hydrosmecta eximia					2				1	3
Aloconota (s.str.) cambrica			1					3	3	7
Atheta (Philhygra) elongatula							1			1
Atheta (Philhygra) gyllenhali					1			3		4
Dryops ernesti		1	1							2
Hypnoidus riparius										0
Zorochros minimus		4	5					4	2	15
Chaetocnema hortensis		2	1							3
Total										64

Table A8: River Alport (Upper) – Coleoptera and Araneae captured in window and water traps (Collection 11.6.97 and 28.8.97)

Taxa	Window			Water			Window			Water			
	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	Total
Coleoptera													
Calathus erratus									1				1
Calathus fuscipes										3			3
Nicrophorus vespilliodes										1	3		1
Lathrobium fulvipenne				1									1
Meligethes aeneus				1									1
Apion frumentarium				1									1
Araneae													
Clubiona diversa	1			1									1
Pardosa armentata				1									1
Walckenaria vigilax				1									1
Tapinopa longidens										1			1
Lycosidae (Imm)							1			2			3

Table A9: River Ashop (Lower) – Coleoptera captured in pitfalls (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	R1	R2
Nebria brevicollis	1	0
Elaphrus riparius	86	11
Bembidion dentellum	2	4
Bembidion obliquum	59	51
Bembidion quadrimaculatum	0	1
Pterostichus madidus	2	1
Pterostichus niger	2	2
Calathus fuscipes	0	1
Agonum marginatum	11	0
Agonum obscurum	1	6
Nebrioporus depressus elegans	8	3
Stictotarsus duodecimpustulatus	26	72
Ilybius fuliginosus	2	15
Helophorus brevipalpis	1	1
Nicrophorus vespilloides	1	0
Anotylus rugosus	0	1
Stenus guynemeri	1	0
Gynpeta rubrior	1	0
Atheta (Philhygra) melanocera	1	0
Limnius volckmari	1	0
Caenoscelis ferruginea	1	0
Longitarsus sp.	1	0
Grypus equiseti	0	4
Total	208	173

Table A10: River Ashop (Lower) – Coleoptera captured in window and water traps (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	Window R1	Water R1
Bembidion obliquum	1	
Catops morio	1	
Anotylus rugosus	1	
Geotrupes stercorosus	2	
Aphodius rufipes	1	
Crepidodera ferruginea		1
Total		

Table A11: River Ashop (Lower) – Coleoptera captured as a result of hand searching (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	R1	R2	Total
Loricera pilicornis	1		
Elaphrus riparius	1		
Bembidion dentellum	4	7	
Bembidion obliquum	8	10	
Agonum marginatum	2		
Stenus biguttatus	1		
Gynpeta rubrior	3	5	
Total	**20**	**22**	**42**

NB: Neither excavation nor quadrats were effective

Table A12: River Ashop (Upper) – Coleoptera recovered from pitfall traps (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	R1	R2	R3	Total
Cicindela campestris	21	0	2	23
Carabus problematicus	20	0	0	20
Nebria brevicollis	100	38	20	158
Nebria gyllenhali	3	2	3	8
Nebria salina	8	7	5	20
Notiophilus aquaticus	1	2	0	3
Notiophilus palustris	1	0	0	1
Loricera pilicornis	1	0	1	2
Trechus quadristriatus	2	2	0	4
Bembidion lampros	1	3	23	27
Bembidion atrocoeruleum	0	0	1	1
Bembidion tibiale	18	19	74	111
Bembidion andreae	198	355	44	597
Bembidion bruxellense	1	0	10	11
Bembidion femoratum	1	0	6	7
Bembidion tetracolum	1	0	13	14
Bembidion quadrimaculatum	1	3	2	6
Bembidion genei	0	0	2	2
Tachys parvulus	4	3	1	8
Pterostichus adstrictus	3	0	0	3
Pterostichus diligens	1	0	0	1
Pterostichus madidus	3	7	5	15
Pterostichus melanarius	0	2	0	2
Pterostichus niger	1	0	0	1
Pterostichus nigrita	0	0	1	1
Pterostichus rhaeticus	1	0	0	1
Calathus ambiguus	1	0	0	1
Calathus erratus	134	14	0	148
Calathus fuscipes	85	60	6	151
Calathus melanocephalus	1	3	2	6
Olisthopus rotundatus	5	0	0	5
Agonum albipes	16	1	98	115
Agonum assimile	0	0	2	2
Agonum muelleri	0	0	13	13
Amara apricaria	1	0	0	1
Amara aulica	1	1	0	2
Amara plebja	1	0	0	1
Harpalus rufipes	0	1	0	1
Harpalus affinis(=aeneus)	1	0	0	1
Oreodytes septentrionalis	0	1	1	2

Helophorus arvernicus	0	1	7	8
Cercyon unipunctatus	1	0	0	1
Anacaena globosus	0	0	4	4
Thanatophilus rugosus	0	0	1	1
Lesteva longoelytrata	0	0	1	1
Carpelimus rivularis	0	2	0	2
Anotylus rugosus	1	1	0	2
Anotylus sculpturatus	0	1	0	1
Stenus clavicormis	1	0	0	1
Othius angustus	1	0	0	1
Xantholinus linearis	2	0	1	3
Philonthus varius	0	1	0	1
Platydracus stercorarius	1	0	0	1
Ocypus aeneocephalus	2	0	0	2
Tachyporus hypnorum	1	0	0	1
Hydrosmectina septentrionum	0	0	2	2
Aloconota (s.str.) cambrica	7	11	6	24
Aloconota (s.str.) gregaria	0	0	2	2
Amischa nigrofusca	2	0	0	2
Atheta (Chaetida) longicornis	0	0	1	1
Zyras humeralis	0	1	0	1
Aleochara bipustulata	0	0	1	1
Aleochara verna	1	2	0	3
Pselaphus heisei	1	0	0	1
Aphodius prodromus	2	5	3	10
Aphodius rufipes	1	0	0	1
Cyphon palustris	0	0	3	3
Byrrhus fasciatus	1	0	0	1
Byrrhus pilula	2	0	1	3
Byrrhus pustulatus	1	1	0	2
Dryops ernesti	0	1	2	3
Limnius volckmari	0	0	2	2
Hypnoidus riparius	2	0	38	40
Zorochros minimus	2616	2507	382	5505
Ctenicera cuprea	8	2	3	13
Agroites acuminatus	0	2	0	2
Agroites obscurus	1	1	2	4
Cantharis rufa	1	1	0	2
Altica lythri	1	0	0	1
Crepidodera ferruginea	1	0	0	1
Hippuriphila modeeri	0	0	1	1
Apion haematodes	1	2	0	3
Phyllobius roboretanus	0	1	0	1
Phyllobius viridiaeris	0	1	0	1
Strophosomus sus	3	0	0	3
Sitona lepidus	3	6	4	13

Rhinoncus castor	11	2	1	14
Rhinoncus pericarpius	8	0	0	8
Total	3321	3076	803	7200

Table A13: River Ashop (Upper) – Araneae recovered from the pitfall traps (by replicate) (Collection 11.6.97 and 28.8.97)

Taxa	R1	R2	R3	Total
Drassodes cupreus	1	0	1	2
Clubiona reclusa	0	0	0	0
Clubiona lutescens	0	0	0	0
Clubiona diversa	0	0	0	0
Xysticus cristatus	2	0	2	4
Pardosa agricola	1	0	0	1
Pardosa palustris	26	15	15	56
Pardosa pullata	1	1	3	5
Pardosa amentata	59	35	107	201
Alopecosa pulverulenta	0	1	0	1
Trochosa terricola	1	0	2	3
Arctosa perita	73	50	0	123
Pirata piraticus	1	0	3	4
Coelotes atropos	0	0	1	1
Robertus lividus	0	1	0	1
Pachygnatha clercki	0	0	1	1
Pachygnatha degeeri	1	1	1	3
Larinoides cornutus	0	0	0	0
Walckenaeria vigilax	2	1	0	3
Walckenaeria acuminata	0	0	0	0
Dicymbium nigrum	2	0	0	2
Gongylidium rufipes	0	0	0	0
Hypomma bituberculatum	0	0	1	1
Oedothorax gibbosus	1	0	1	2
Oedothorax fuscus	4	0	24	28
Oedothorax agrestis	1	0	40	41
Oedothorax retusus	1	1	10	12
Silometopus elegans	1	0	0	1
Silometopus reussi	0	2	0	2
Tiso vagans	3	0	0	3
Micrargus apertus	1	0	0	1
Micrargus herbigradus	2	0	0	2
Diplocephalus cristatus	0	1	0	1
Diplocephalus permixtus	0	0	1	1
Araeoncus humilis	0	0	1	1
Milleriana inerrans	0	0	1	1
Erigone vagans	0	0	1	1
Erigone dentipalpis	7	1	22	30
Erigone promiscua	6	1	10	17
Erigone atra	4	5	50	59

Caviphantes saxetorum	1	3	0	4
Jacksonella falconeri	3	0	0	3
Porrhomma pallidum	0	1	0	1
Porrhomma microphthalmum	1	0	0	1
Meioneta rurestris	2	2	0	4
Microlinyphia pusilla	0	0	0	0
Total				628

Table A14: River Ashop (Upper) – Coleoptera and Araneae captured in window and water traps (Collection 11.6.97 and 28.8.97)

Taxa	25.6.97						26.8.97						
	Window			Water			Window			Water			
	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3	Total
Coleoptera													
Carabus problematicus								6			4		10
Notiophilus aquaticus								1					1
Pterostichus madidus					1			2			2		5
Pterostichus niger					1			4			2		7
Calathus erratus							1						1
Calathus fuscipes								1			2		3
Sphaeridium scarabaeoides		1			1								2
Nicrophorus vespilloides								41			9		50
Catops sp.							1						1
Geotrupes stercorarius								2			1		3
Aphodius luridus		1			1								2
Hypnoidus riparius	1												1
Ctenicera cuprea		1											1
Agroites acuminatus		2			1								3
Agroites obscurus					1								1
Athous haemorrhoidalis					1								1
Selatosomus incanus		2											2
Cantharis rufa		1											1
Pria dulcamarae		1											1
Meligethes sp.		2											2
Crepidodera ferruginea		3					3				5		11
Crepidodera transversa		1											1
Cassida rubiginosa		1											1
Total													**111**
Araneae													
Clubiona reclusa		7			2			1				1	10
Clubiona lutescens		1											1
Clubiona diversa		3			4								7
Pardosa palustris		1			0								1
Pardosa pullata					9						1		10
Pardosa amentata		1						2					3
Trochosa terricola											2		2
Robertus lividus					1								1
Larinoides cornutus		1											1
Walckenaeria vigilax					2								2
Gongylidium rufipes		1											1
Hypomma bituberculatum		3			1								4
Oedothorax gibbosus					2								2
Oedothorax fuscus												1	
Oedothorax agrestis												3	
Microlinyphia pusilla					1								1
Total													**46**

Table A15: River Ashop (Upper) - Coleoptera captured during hand searching (incl data from excavations and quadrats) (by replicate) (Collection 11.6.97 and 28.8.97)

	Hand search			Quadrat			Excavation			
Taxa	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**Total**
Nebria brevicollis	1									1
Nebria gyllenhali		2	1							3
Bembidion tibiale	1									1
Bembidion andreae		2	3							5
Bembidion tetracolum	1	2								3
Tachys parvulus					1			6	1	8
Pterostichus diligens	1	1								2
Calathus erratus	1	2	3							6
Calathus fuscipes		3	2					1	2	8
Hydrosmectina septentrionum							1			1
Aloconota (s.str.) cambrica		1	2	1	2					6
Aloconota (s.str.) currax		1	1							2
Aloconota (s.str.) gregaria		1				1				2
Amischa nigrofusca			1							1
Aleochara verna								1	1	2
Byrrhus pilula	1									1
Hypnoidus riparius	3	1								4
Zorochros minimus		6	5	3	1	2				17
										73

Table A16: River Dee (Bangor-on-Dee) – Coleoptera recovered from the pitfall traps (listed by trap) (Collection 4.9.97)

Taxa	1	2	3	4	5	6	7	8	9	Total
Nebria brevicollis			4	5		3	1			**13**
Clivina collaris			1			1			2	**4**
Trechus secalis			1			1			2	**4**
Trechus micros			1						1	**2**
Bembidion dentellum			2						2	**4**
Bembidion tetracolum			29	17		11	8		65	**130**
Bembidion aeneum						1			1	**2**
Bembidion guttula						1			1	**2**
Pterostichus madidus				1					1	**2**
Pterostichus melanarius			4				1		5	**10**
Pterostichus niger				1					1	**2**
Pterostichus nigrita			2						2	**4**
Agonum albipes			4	1		4	1		10	**20**
Agonum assimile			22	12		6	10		50	**100**
Agonum moestum			3						3	**6**
Harpalus rufipes			3						3	**6**
Helophorus arvernicus							1		1	**2**
Catops sp.				2					2	**4**
Anotylus rugosus			1						1	**2**
Gyrohypnus fracticornis			1						1	**2**
Xantholinus longiventris			1						1	**2**
Philonthus tenuicornis				1					1	**2**
Oligota punctulata			1						1	**2**
Aloconota (s.str.) currax						1			1	**2**
Aloconota (s.str.) insecta			3						3	**6**
Amischa analis			1						1	**2**
Geostiba circellaris			1						1	**2**
Dinaraea aequata			1						1	**2**
Atheta (Philhygra) gyllenhali			1						1	**2**
Atheta (Mocyta) amplicollis			5						5	**10**
Atheta (Mocyta) fungi				2					2	**4**
Atheta (Acrotona) aterrima			4	1					5	**10**
Atheta (Datomicra) nigra			7	1					8	**16**
Oxypoda exoleta			30	25		3	2		60	**120**
Oxypoda umbrata			2						2	**4**
Atomaria (Anchicera) ruficornis				1					1	**2**
Enicmus transversus				1					1	**2**
Crepidodera ferruginea			1	1			1		3	**6**
Chalcoides plutus				2		1			3	**6**
Baris lepidii				1					1	**2**
										525

Table A17: River Dee (Bangor-on-Dee) – Araneae captured in the pitfall traps (listed by trap) (Collection 4.9.97)

Taxa	1	2	3	4	5	6	7	8	9	Total
Araneae										
Oxyptila praticola						1				1
Leptorhoptrum robustum						2				2
Neriene montana				1						1
										4

Table A18: River Wharfe (Buckden) – Coleoptera recorded in the pitfall traps (listed by replicates) (Collection 16.6.97-31.8.97)

Taxa	R1	R2	R3
Carabus problematicus	0	0	1
Nebria brevicollis	34	1	62
Nebria gyllenhali	2	0	29
Loricera pilicornis	3	0	6
Clivina collaris	13	2	7
Clinvina fossor	6	1	0
Patrobus atrorufus	1	1	0
Trechus secalis	0	0	2
Trechus micros	0	0	1
Bembidion lampros	0	0	1
Bembidion properans	0	0	1
Bembidion punctulatum	2	49	40
Bembidion prasinum	5	157	6
Bembidion atrocoeruleum	819	1014	239
Bembidion tibiale	2	3	53
Bembidion decorum	74	408	116
Bembidion tetracolum	22	1	55
Bembidion quadrimaculatum	0	0	2
Bembidion guttula	3	1	5
Tachys parvulus	1	0	1
Pterostichus diligens	1	0	5
Pterostichus madidus	58	1	12
Pterostichus melanarius	31	6	20
Pterostichus niger	5	1	3
Pterostichus nigrita	2	1	3
Pterostichus rhaeticus	0	0	1
Calathus fuscipes	2	0	3
Calathus melanocephalus	1	1	1
Synuchus nivalis	3	0	3
Agonum albipes	29	19	41
Agonum muelleri	7	1	34
Amara apricaria	1	0	0
Amara aulica	36	2	6
Amara communis	1	0	0
Brychius elevatus	1	0	0
Nebrioporus depressus elegans	0	0	2
Oreodytes septentrionalis	0	1	2
Helophorus arvenicus	1	0	25
Helophorus brevipalpis	0	0	1
Megasternum obscurum	0	0	2

Anacaena globosus	0	0	1
Hydraena gracilis	1	0	0
Leiodes ferruginea	0	0	9
Ptomaphagus subvillosus	0	0	1
Catops morio	0	0	1
Nicrophorus vespillo	6	0	7
Thanatophilus rugosus	1	1	0
Lesteva pubescens	2	0	0
Deleaster dichrous	10	22	0
Bledius erraticus	0	0	1
Ochthephilus aureus	1	7	0
Thinodromus arcuatus	0	0	2
Carpelimus corticinus	0	0	1
Thinobius strandi	0	0	2
Anotylus rugosus	2	1	1
Anotylus sculpturatus	1	0	0
Anotylus tetracarinatus	0	1	1
Stenus biguttatus	0	0	1
Stenus boops	0	0	3
Stenus guttula	1	1	3
Stenus pusillus	1	0	1
Lathrobium angusticolle	4	15	0
Lathrobium fulvipenne	1	0	1
Xantholinus linearis	1	0	0
Philonthus decorus	0	0	4
Philonthus laminatus	0	0	1
Philonthus politus	0	1	0
Philonthus varius	1	0	0
Philonthus sp.	1	0	0
Staphylinus predator	0	0	1
Quedius molochinus	1	0	0
Quedius tristis	0	0	3
Tachyporus chrysomelinus	2	1	3
Tachyporus obtusus	2	0	0
Tachinus signatus	0	0	2
Hydrosmecta fragilis	0	2	5
Hydrosmectina septentrionum	0	1	0
Aloconota (s.str.) cambrica	179	232	62
Aloconota (s.str.) currax	6	2	5
Aloconota (s.str.) gregaria	1	1	0
Amisha analis	0	0	1
Dinaraea angustula	1	0	0
Atheta (Lohse grp III & IV) divisa	0	1	0
Atheta (Mocyta) amplicollis	0	0	3
Atheta (Mocyta) fungi	0	0	1
Atheta (Lohse grp I) fungicola	1	0	0

Atheta (Dimetrota) macrocera	0	0	1
Atheta (Chaetida) longicornis	0	0	1
Oxypoda elongatula	0	0	2
Aleochara bipulstulata	4	7	2
Bryaxis bulbifer	1	0	0
Aphodius prodromus	2	0	0
Serica brunnea	5	0	2
Cyphon palustris	3	0	0
Dryops ernesti	83	3	121
Dryops nitidulus	10	1	54
Elmis aenea	2	1	1
Esolus parallelpepidus	1	1	1
Limnius volckmari	26	4	31
Oulimnius tuberculatus	17	1	26
Hypnoidus riparius	35	4	26
Fleutiauxellus maritimus	7	43	3
Zorochros minimus	2881	590	1451
Agroites obscurus	7	4	2
Agriotes acuminatus	6	0	4
Atomaria (s.str.) linearis	0	2	0
Coccinella septempunctata	0	0	1
Stephostethus lardarius	1	0	0
Enicmus transversus	0	0	1
Gastrophysa polygoni	1	0	0
Gastrophysa viridula	1	0	0
Phyllodecta vulgatissima	0	0	1
Phyllotreta flexuosa	0	1	0
Aphthona euphorbiae	0	1	0
Longitarsis gracilis	21	0	3
Crepidodera ferruginea	4	0	8
Crepidodera transversa	8	0	0
Hippuriphila modeeri	1	0	0
Chaetocnema hortensis	1	0	0
Phyllobius oblongus	0	1	0
Phyllobius viridicollis	2	0	0
Barypeithes araneiformis	0	0	5
Barynotus squamosus	0	1	0
Leiosoma deflexum	88	0	2
Hypera nigrirostris	0	0	1
Notaris acridulus	0	0	1
Gyrpus equisiti	2	1	1
Cidnorhinus quadrimaculatus	3	0	1
Rhinoncus pericarpius	12	0	0
Totals	4628	2626	2671

Table A19: River Wharfe (Buckden) – Araneae captured in the pitfall traps

(listed by replicate) (Collection 16.6.97-30.8.97)

Taxa	R1	R2	R3	Total
Segestria senoculata	0	1	0	1
Clubiona reclusa	0	0	1	1
Xysticus cristatus	0	0	2	2
Pardosa palustris	5	1	2	8
Pardosa pullata	1	1	5	7
Pardosa amentata	1129	115	373	1617
Alopecosa pulverulenta	1	0	1	2
Trochosa terricola	1	1	2	4
Pirata piraticus	0	0	1	1
Pachygnatha clercki	2	2	2	6
Pachygnatha degeeri	13	0	11	24
Ceratinella brevipes	4	0	0	4
Walckenaeria acuminata	1	0	0	1
Dismodicus bifrons	2	1	0	3
Hypomma bituberculatum	1	0	2	3
Baryphyma trifrons	0	1	0	1
Pocadicnemis pumila	4	1	2	7
Oedothorax gibbosus	2	1	0	3
Oedothorax fuscus	9	4	25	38
Oedothorax agrestis	20	3	62	85
Oedothorax retusus	16	3	15	34
Oedothorax apicatus	1	0	0	1
Silometopus elegans	1	0	3	4
Silometopus reussi	1	0	0	1
Troxochrus scabriculus	4	0	0	4
Savignia frontata	1	1	5	7
Diplocephalus cristatus	1	0	2	3
Diplocephalus latifrons	1	1	0	2
Erigone dentipalpis	6	14	71	91
Erigone promiscua	1	1	0	2
Erigone atra	6	11	93	110
Leptorhoptrum robustum	1	0	1	2
Caviphantes saxetorum	1	3	0	4
Porrhomma egeria	0	0	1	1
Meioneta saxatilis	1	1	1	3
Bathyphantes gracilis	3	1	2	6
Lepthyphantes mengei	1	0	0	1
Total				2094

Table A20: River Wharfe (Buckden) – Coleoptera collected by hand searching (incl. data from excavations) (31.8.97)

	Hand search			Excavations			
Taxa	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**Total**
Nebria gyllenhali	1						1
Bembidion punctulatum			3				3
Bembidion prasinum			1				1
Bembidion atrocoeruleum	19		11				30
Bembidion tibiale	1						1
Bembidion decorum	2	4					6
Bembidion tetracolum	1		1				2
Agonum albipes	1		2				3
Helophorus arvernicus			1				1
Geodromicus nigrita	1						1
Deleaster dichrous	1						1
Lathrobium angusticolle	1						1
Stenus biputtatus			1				1
Stenus guttula			1				1
Hydrosmecta fragilis		1	1		1	1	4
Aloconota (s.str.) cambrica	1	2	1		1	1	6
Aloconota (s.str.) currax	2	1					3
Dryops ernesti	1	1					2
Dryops nitidulus			1				1
Limnius volckmari	1		2				3
Fleutiauxellus maritimus		1					1
Zorochros minimus	3	3	2				8
Phyllodecta vulgatissima			1				1
Total							**82**

Note – no specimens were collected in the quadrats

Table A21: River Wharfe (Buckden) – Coleoptera and Araneae recorded in the window and water traps (by replicate) (16.6.97 and 28.8.97)

Taxa	16.6.97						28.8.97					
	Window			Water			Window			Water		
	R1	R2	R3	R1	R2	R3	R1	R2	R3	R1	R2	R3
Coleoptera												
Bembidion prasinum		1										
Aphodius prodromus												
Fleutiauxellus maritimus		2										
Coccinella septempunctata		1										
Crepidodera ferruginea									1	1		
Araneae												
Pardosa pullata								2				
Pardosa amentata										1	1	
Alopecosa pulverulenta												3
Walckenaeria acuminata							1					
Oedothorax gibbosus												2
Oedothorax fuscus							2		2			
Oedothorax agrestis		1						3				
Erigone atra		1							1			

Table A22: River Wharfe (Castley) – Coleoptera captured in the Pitfall traps (29.8.97-11.9.97)

Taxa	Total
Carabus arvensis	1
Nebria brevicollis	2
Loricera pilicornis	2
Clivina collaris	1
Trechus obtusus	52
Bembidion lampros	1
Bembidion tetracolum	51
Bembidion harpaloides	1
Pterostichus melanarius	3
Abax parallelepipedus	1
Calathus fuscipes	1
Agonum albipes	9
Agonum marginatum	1
Amara bifrons	4
Amara ovata	1
Bradycellus verbasci	1
Nebrioporus depressus elegans	8
Helophorus arvernicus	2
Anotylus rugosus	1
Philonthus cognatus	1
Quedius tristis	1
Tachyporus nitidulus	1
Aloconota (s.str.) insecta	1
Amischa analis	1
Atheta (Philhygra) debilis	1
Atheta (Mocyta) fungi	3
Oxypoda haemorrhoa	1
Aleochara bipustulata	1
Dryops ernesti	1
Esolus parallelepipedus	1
Limnius volckmari	39
Oulimnius tuberculatus	2
Hypnoidus riparius	1
Zorochros minimus	332
Agriotes acuminatus	1
Stephostethus lardarius	1
Aridius bifasciatus	1
Corticarina fuscula	1
Longitarsus gracilis	26
Crepidodera ferruginea	6

Crepidodera transversa	2
Sphaeroderma testaceum	1
Miccrotrogus picirostris	1
Total	**570**

Table A23: River Wharfe (Castley) – Araneae recovered from pitfall traps (trapping period 29.8.97-11.9.97)

Taxa	Total
Pardosa pullata	1
Pardosa amentata	5
Tegenaria agrestis	1
Oedothorax fuscus	3
Troxochrus scabriculus	2
Erigone dentipalpis	2
Erigone atra	3
Leptorhoptrum robustum	2
Bathyphantes gracilis	1
Total	**20**

Table A24: River Wharfe (Castley) – Coleoptera collected during hand searching (incl data from excavation and quadrats (28.8.97)

Taxa	Hand	Quadrats	Excavation	Total
Bembidion punctulatum	3	2		5
Bembidion atrocoeruluem	10	1	1	12
Bembidion decorum	2	1		3
Bembidion tetracolum	8			8
Agonum albipes	10			10
Agonum micans	1			1
Amara ovata	2			2
Aloconota (s.str.) cambrica	4		2	6
Limnius volckmari	2			2
Total				**49**

Note: 3 quadrat searches on the sand produced no invertebrates.

Table A25: River Severn (Dolydd Hafren) – Coleoptera recovered from the pitfall traps (by replicate) (2.9.97)

Taxa	R1	R2	R3
Nebria brevicollis	2	0	0
Loricera pilicornis	3	0	1
Patrobus atrorufus	0	0	1
Trechus quadristriatus	1	12	1
Bembidion lampros	0	1	0
Bembidion properans	0	1	0
Bembidion punctulatum	3	2	0
Bembidion atrocoeruluem	0	3	70
Bembidion decorum	0	0	1
Bembidion bruxellense	3	0	0
Bembidion tetracolum	2	5	5
Bembidion quadrimaculatum	0	2	0
Tachys parvulus	0	1	0
Pterostichus madidus	1	0	0
Pterostichus melanarius	5	1	0
Calathus s.s. melanocephalus	12	0	0
Agonum albipes	2	0	1
Agonum dorsale	1	0	0
Agonum moestum	0	1	0
Agonum muelleri	2	0	0
Amara aulica	8	10	0
Harpalus rufipes	13	7	1
Chlaenius nigricornis	0	2	0
Helophorus arvenicus	2	2	0
Aleochara brevipennis	1	0	0
Aleochara verna	0	1	0
Zorochros minimus	10	67	44
Coccinella unidecimpunctata	0	2	1
Cortinicara gibbosus	1	0	0
Crepidodera ferruginea	6	1	0
Totals	78	121	126

Table A26: River Severn (Dolydd Hafren) – Araneae captured in pitfall traps (by replicate) (2.9.97)

Taxa	R1	R2	R3
Pardosa agricola	11	1	3
Pardosa amentata	1	0	0
Trochosa ruricola	2	2	1
Arctosa cinerea	6	2	6
Pachygnatha degeeri	2	0	0
Oedothorax fuscus	47	3	4
Oedothorax retusus	5	2	0
Oedothorax apicatus	15	10	0
Erigone dentipalpis	29	25	6
Erigone atra	16	15	12
Lepthyphantes tenuis	1	1	0
Total	135	61	32

Table A27: River Severn (Dolydd Hafren) – Coleoptera captured during hand searching (incl. data from excavations and quadrats) (2.9.97)

	Hand search			Quadrat			Excavation			
Taxa	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**R1**	**R2**	**R3**	**Total**
Perileptus areolatus			2							**2**
Trechus quadristriatus			1							**1**
Bembidion lampros	1	1								**2**
Bembidion properans	1									**1**
Bembidion punctulatum	2	2	1				1			**6**
Bembidion prasinum		1								**1**
Bembidion atrocoeruleum	5	1	37			2	1		1	**47**
Bembidion tibiale			2							**2**
Bembidion decorum	4	5	1							**10**
Bembidion bruxellense		1								**1**
Bembidion tetracolum	2		1							**3**
Bembidion quadrimaculatum			1							**1**
Bembidion guttula	1									**1**
Tachys parvulus	1	9	5		1	2	2	9		**29**
Agonum albipes			1							**1**
Agonum assimile	1									**1**
Laccobius striatulus					2	1	1			**4**
Neobisinus prolixus						1	1			**2**
Philonthus rubripennis					1					**1**
Hydrosmecta delicatula									1	**1**
Hydrosmecta thinobioides				1		2	2		1	**6**
Coccinella unidecimpunctata		2								**2**
Totals	**18**	**22**	**52**	**1**	**4**	**8**	**8**	**9**	**3**	**125**

Table A28: River Ystwyth (Grogwynion) – Coleoptera recovered from the Pitfall traps (trapping periods 26.7.97 and 3.9.97)

Taxa	R1	R2
Bembidion atrocoeruleum	10	2
Bembidion andreae	4	0
Pterostichus cupreus	2	2
Pterostichus madidus	2	0
Pterostichus niger	1	0
Calathus fuscipes	0	2
Lathrobium ripicola	0	0
Aloconota cambrica	1	0
Zyras limbatus	1	0
Brachygluta pandellei	0	3
Zorochros minimus	58	34
Coccinella quinquepunctata	1	0
Lagria hirta	1	0
Crepidodera ferruginea	2	0
Chaetocnema hortensis	1	0
Totals	84	43

Table A29: River Ystwyth (Grogwynion) – Araneae captured in the pitfall traps (by replicate) (trapped 3.9.97)

Taxa	R1	R2
Zelotes apricorum	2	2
Xysticus cristatus	0	1
Pardosa agricola	8	0
Pardosa pullata	0	0
Trochosa ruricola	0	1
Arctosa cinerea	1	5
Agelena labyrinthica	0	0
Meta segmentata	0	0
Oedothorax fuscus	1	1
Oedothorax apicatus	3	2
Troxochrus scabriculus	3	0
Erigone atra	3	0
Linyphia triangularis	2	0

Table A30: River Ystwyth (Grogwynion) – Coleoptera captured by window and water traps (3.9.97)

Taxa	Window R1	Window R2	Water R1	Water R2	Total
Sciodrepoides watsoni				1	1
Nicrophorus sp.	17	26	1		44
Zorochros minimus	1				1
Agriotes lineatus			1		1
Adrastus pallens			1		1
Byturus tomentosus			1		1
Coccinella quinquepunctata	1				1
Coccinella unidecimpunctata			1		1
Chaetocnema hortensis				1	1
					52

Table A31: Araneae captured in window and water traps (by replicate) (26.6.97 and 3.9.97)

Taxa	R1 26.6.97 water	R1 26.6.97 window	R1 3.9.97 water	R1 3.9.97 window
Pardosa pullata	4	0	0	0
Agelena labyrinthica	1	0	0	0
Meta segmentata	0	0	1	0

Table A32: River Ystwyth (Grogwynion) – Coleoptera collected by hand searching (by replicate (3.9.97)

Taxa	R1	R2
Bembidion atrocoeruleum	3	5
Bembidion andreae		1
Bembidion tetracolum	2	2
Agonum albipes	2	
Pterostichus nigrita	1	
Brachygluta pandellei		1
Coccinella quinquepunctata		2
Totals	**8**	**11**

Note: both excavations and quadrats produced no invertebrates

Table A33: River Severn (Preston Montford) – Coleoptera recovered from pitfall traps (by replicate) (4.9.97)

Taxa	R1	R2
Notiophilus biguttatus	1	0
Notiophilus rufipes	1	0
Loricera pilicornis	1	0
Clivina collaris	0	3
Clivina fossor	4	0
Patrobus atrorufus	0	10
Trechus quadristriatus	10	0
Trechus discus	9	23
Asaphidion curtum	12	4
Asaphidion flavipes	3	0
Bembidion lampros	12	5
Bembidion biguttatum	4	3
Bembidion dentellum	1	4
Bembidion tetracolum	19	33
Bembidion gilvipes	1	6
Bembidion harpaloides	1	1
Bembidion guttula	1	5
Stomis pumicatus	1	0
Pterostichus cupreus	0	4
Pterostichus melanarius	4	10
Pterostichus niger	1	6
Pterostichus strenuus	15	19
Pterostichus vernalis	0	5
Abax parallelipipedus	1	1
Calathus melanocephalus	0	1
Calathus piceus	2	0
Laemostenus terricola	3	0
Agonum albipes	2	0
Agonum assimile	19	7
Agonum micans	7	0
Agonum moestum	1	5
Agonum obscurum	17	64
Harpalus rufipes	2	30
Badister bipustulatus	0	1
Helophorus arvernicus	0	1
Megasternum obscurum	2	0
Carpelimus corticinus	6	2
Anotylus rugosus	3	4
Anotylus sculpturatus	0	1
Stenus bimaculatus	1	0
Lathrobium brunnipes	1	0

Lathrobium geminum	1	0
Xantholinus longiventris	0	1
Philonthus laminatus	1	0
Staphylinus olens	5	0
Sepedophilus marshami	36	95
Tachyporus dispar	1	0
Tachyporus hypnorum	3	0
Tachinus pallidus	1	0
Tachinus signatus	1	1
Aloconata (s.str.) cambrica	0	1
Aloconota (s.str.) gregaria	0	1
Aloconota (s.str.) sulcifrons	0	2
Amischa analis	0	1
Geostiba circellaris	1	0
Liogluta longiuscula	3	0
Atheta (Philhygra) elongatula	1	2
Atheta (Philhygra) palustris	0	2
Atheta (Mocyta) amplicollis	1	1
Atheta (Mocyta) fungi	7	12
Atheta (Lohse grp I) laticollis	0	2
Aleochara curtula	1	0
Aphodius prodromus	2	0
Simplocaria maculosa	3	2
Macronychus quadrituberculatus	1	1
Hypnoidus riparius	1	0
Atomaria (Anchicera) berolensis	1	0
Aridius bifasciatus	1	0
Chrysolina polita	0	1
Phyllotreta ochripes	1	0
Apion (Kalapion) pallipes	1	0
Apion (s.str.) frumentarium	0	1
Barypeithes araneiformis	1	0
Barypeithes pellucidus	8	0
Rhinoncus inconspectus	1	0
Rhinoncus pericarpius	0	1
Totals	252	385

Table A34: - River Severn (Preston Montford) – Araneae recovered from the pitfall traps (by replicate) (4.9.97)

Taxa	R1	R2
Oxyptila praticola	1	0
Pardosa pullata	0	10
Pardosa amentata	1	157
Trochosa ruricola	0	1
Diplocephalus cristatus	4	0
Bathyphantes gracilis	0	3
Diplostyla concolor	33	12
Lepthyphantes tenuis	2	0
Totals	41	183

Table A35: River Severn (Preston Montford) – Coleoptera collected by hand searching (incl. data from quadrats) (by replicate) (4.9.97)

	Quadrats		Hand		
Taxa	**R1**	**R2**	**R1**	**R2**	**Total**
Loricera pilicornis				1	1
Asaphidion curtum				1	1
Bembidion dentellum		1	2		3
Bembidion tetracolum			4		4
Bembidion lunulatum	4		1		5
Trechus quadristriatus			1	2	3
Tachys parvulus		1			1
Pterostichus strenuus			1		1
Agonum micans	0		1	1	2
Agonum moestum			1		1
Agonum obscurum			5		5
Aloconota (s.str.) insecta	3	0			3
Aphodius sphacelatus	0	1			1
				Total	**31**

Table A36: River Ystwyth (Ty'n-yr-helyg) - Coleoptera and Araneae recorded in pitfall traps (by replicate) (4.9.97)

Taxa	R1	R2	R3
Coleoptera			
Loricera pilicornis	0	0	1
Bembidion atrocoeroleum	0	4	0
Bembidion decorum	0	2	0
Bembidion tetracolum	0	0	1
Pterostichus melanarius	1	0	0
Pterostichus niger	1	3	1
Harpalus rufipes	0	15	1
Lionychus quadrillum	1	9	0
Oreodytes septentrionalis	0	4	1
Brachygluta pandellei	0	4	0
Stenus clavicornis	0	1	0
Hydrosmecta eximia	0	2	0
Zorochros minimus	0	21	47
Subcoccinella 24-punctata	0	0	1
Apion violaceum	0	1	0
Total	3	66	53
Araneae			
Pardosa agricola	0	2	0
Pardosa pullata	0	2	0
Pardosa amentata	0	0	0
Trochosa terricola	0	1	0
Arctosa cinerea	0	4	0
Oedothorax fuscus	0	1	0
Erigone atra	0	1	0
Lepthyphantes pallidus	0	1	0
Total	0	12	0

Table A37: River Ystwyth (Ty'n-yr-helyg) – Coleoptera collected by hand searching (incl data from excavations and quadrats) (4.9.97) (listed by replicate)

Taxa	Hand			Quadrats			Excavation			
	R1	R2	R3	R1	R2	R3	R1	R2	R3	Total
Carabus granulatus	1	1	1							
Bembidion lampros		1	1							
Bembidion atrocoeruleum	11	2	1		1					
Bembidion decorum		7								
Bembidion tetracolum		3								
Tachys parvulus	2									
Agonum albipes	5	5								
Harpalus rufipes		1	2							
Bidessus minutissimus								6		
Silpha atrata			1							
Deleaster dichrous	1									
Stenus brunnipes	1									
Lathrobium angustatum	1	1								
Lathrobium angusticolle	1									
Gyrohypnus angustatus			1							
Neobisinus prolixus		1								
Philonthus cognatus	1									
Hydrosmecta eximia					1		1			
Hydrosmecta thinobioides							2	1	1	
Hydrosmectina septentrionum					1					
Brachygluta pandellei	1	1								
Zorochros minimus	2	2	1							
Coccidula rufa	1	1								
Coccinella quinquepunctata	1	1								
Totals	**29**	**27**	**8**	**0**	**3**	**0**	**3**	**7**	**1**	**77**

Table A38: River Wye (Sweet Farm) – Total species recovery (trapping period 2.9.97-17.9.97)

Taxa	Number
Araneae	
Pardosa agricola	9
Pardosa pullata	3
Coleoptera	
Leistus rufescens	1
Bembidion atrocoeruleum	2
Aloconota (s.str.) cambrica	1
Elmis aenea	1
Limnius volckmari	1

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Coleoptera											
Carabidae											
Cicindela campestris		4		+						Local	2
Carabus arvensis		4								Local	2
Carabus problematicus		4								Common	1
Leistus rufescens		4							+	Common	1
Nebria brevicollis		4	+	+	+	+	?+			Common	1
Nebria gyllenhali		1			++	++	+		++	Common	1
Nebria salina		4		+						Common	1
Notiophilus aquaticus		4								Local	2
Notiophilus biguttatus		4	+	+	+	+	+			Common	1
Notiophilus palustris		4							+	Local	2
Notiophilus rufipes		4								Reg Not.	4
Elaphrus riparius		4	+	+					++	Common	1
Loricera pilicornis		4	+	+	+	+	?+		+	Common	1
Dyschirius globosus		4							+	Common	1
Clivina collaris		2	+	++	+	+			++	Local	2
Clivina fossor		4	+						+	Common	1
Miscodera arctica	Nb	4								Nb	8
Patrobus atrorufus		4	+						+	Common	1
Trechus obtusus		4	+	+						Common	1
Trechus quadristriatus		4	+	+						Common	1
Trechus secalis		4							++	Local	2
Trechus discus	Nb	2	+	++	?+				++	Nb	8
Trechus micros		3	+	++	+					Local	2
Asaphidion curtum		4								Common	1
Asaphidion flavipes		3	+	+					+	Common	1
Bembidion aeneum		3	+	+	+				++	Common	1
Bembidion andreae		1	+	++	++?	+			++	Reg Not.	4
Bembidion atrocoeruleum		1			++	++	++		++	Local	2
Bembidion biguttatum		3	+						++	Common	1
Bembidion bruxellense		3		+	+	+			+	Local	2
Bembidion decorum		1			++	++	++		++	Common	1
Bembidion dentellum		3	+						++	Local	2
Bembidion femoratum		3			+	+			++	Local	2
Bembidion genei		3	+	+	+				++	Common	1
Bembidion gilvipes	Nb	1	++						++	Nb	8
Bembidion guttula		4	++	+					++	Common	1
Bembidion harpaloides		4							+	Common	1
Bembidion lampros		4	+	+	+	+				Common	1
Bembidion obliquum	Nb	3	++						++	Nb	8
Bembidion prasinum		1			++	++	++		++	Reg Not.	4
Bembidion properans		4								Common	1
Bembidion punctulatum		2		+	++	++	++		++	Local	2
Bembidion quadrimaculatum		4	+	+	+				+	Common	1
Bembidion tetracolum		3	+	+	+	+	+		+	Common	1
Bembidion tibiale		1			++	++	++		++	Common	1
Tachys parvulus	Nb	3	+	+	++	+	+		++	Nb	8
Stomis pumicatus		4								Local	2
Pterostichus adstrictus		4								Local	2
Pterostichus cupreus		4	+	+						Local	2
Pterostichus diligens		4							+	Common	1
Pterostichus madidus		4								Common	1
Pterostichus melanarius		4								Common	1
Pterostichus niger		3	+	+	+	+				Common	1
Pterostichus nigrita		4	+						+	Common	1
Pterostichus rhaeticus		4	+	+					+	Common	1
Pterostichus strenuus		4	+	+	+					Common	1
Pterostichus vernalis		4	+	+					+	Local	2
Abax parallelepipedus		4								Common	1
Calathus ambiguus	Nb	4								Nb	8
Calathus erratus		4								Common	1
Calathus fuscipes		4								Common	1
Calathus melanocephalus		4								Common	1
Calathus piceus		5								Common	1
Laemostenus terricola		4								Local	2
Synuchus nivalis		4								Local	2
Olisthopus rotundatus		4								Local	2

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Agonum albipes		3	+	+	+	+	+		++	Common	1
Agonum assimile		4	+	+	+	+				Common	1
Agonum dorsale		4	+	+						Common	1
Agonum fuliginosus		3	+						++	Common	1
Agonum marginatum		3	++						++	Local	2
Agonum micans		2	++	+					++	Reg No.	4
Agonum moestum		3							++	Reg No.	4
Agonum muelleri		3	+	+	+				+	Common	1
Agonum obscurum		3	+						+	Local	2
Amara apricaria		4								Common	1
Amara aulica		4								Common	1
Amara bifrons		4								Local	2
Amara communis		4								Local	2
Amara lunicollis		4								Local	2
Amara ovata		4	+	+						Common	1
Amara plebeja		4								Common	1
Harpalus affinis(=aeneus)		4								Common	1
Harpalus latus		4								Common	1
Harpalus rufipes		4								Common	1
Bradycellus verbasci		4								Common	1
Acupalpus dorsalis		3	++						++	Local	2
Badister bipustulatus		4								Common	1
Chlaenius nigricornis	Nb	2	++						++	Nb	8
Lionychus quadrillum	RDB3	2		+	++	+			+	RDB3	24
Haliplidae											
Brychius elevatus		2	+	+	++	++	++		++	Reg. Not	4
Dytiscidae											
Nebrioporus depressus elegans		2			++	++	++		++	Common	1
Stictotarsus duodecimpustulatus		2							++	Local	2
Oreodytes sanmarki		2			++	++	++		++	Common	1
Oreodytes septentrionalis		2			++	++	++		++	Local	2
Ilybius fuliginosus		3	+						++	Common	1
Hydrophilidae											
Helophorus arvernicus	Nb	4	+	+	+	+			++	Nb	8
Helophorus brevipalpis		4							++	Common	1
Cercyon unipustulatus		5							++	Local	2
Megasternum obscurum		4								Common	1
Anacaena globosus		4							++	Common	1
Hydraenidae											
Hydraena gracilis		3			+	+			++	Local	2
Leiodidae											
Leiodes ferruginea		5								Local	2
Ptomaphagus subvillosus		4								Common	1
Catops morio		5								Common	1
Catops sp.		5								Common	1
Silphidae											
Nicrophorus vespillo		5								Common	1
Nicrophorus vespilloides		5								Local	2
Thanatophilus rugosus		5								Common	1
Scydmaenidae											
Stenichnus collaris		4								Common	1
Staphylinidae											
Proteinus crenulatus	Nb	5								Nb	8
Lesteva longoelytrata		3	++						++	Common	1
Lesteva pubescens		2	+	+	+	+	+		++	Local	2
Geodromicus nigrita		2			+	+	+		++	Local	2
Deleaster dichrous	Nb	1	+	+	+	+	+		++	Nb	8
Bledius erraticus	RDBK	1		+					++	RDBK	16
Ochthephilus aureus		1	+	+	++	+	+		++	Unknown	2
Thinodromus arcuatus		1	+	+	+	+			++	Local	2

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Carpelimus corticinus		3	++	++					++	Common	1
Carpelimus rivularis		3	++	++	+				++	Common	1
Thinobius strandi	N	1		++	++				++	N	8
Anotylus rugosus		4							+	Common	1
Anotylus sculpturatus		4								Common	1
Anotylus tetracarinatus		4								Common	1
Stenus biguttatus		4	+						++	Local	2
Stenus bimaculatus		4	+						++	Common	1
Stenus boops		4	+						++	Common	1
Stenus brunnipes		4								Common	1
Stenus clavicornis		4								Common	1
Stenus guttula		3							++	Local	2
Stenus guynemeri		2			+	+	+	Moss	++	Local	2
Stenus pusillus		3	++	+					++	Common	1
Lathrobium angusticolle	Nb	1		+	++	+			++	Nb	8
Lathrobium brunnipes		4	+						+	Common	1
Lathrobium fulvipenne		4	+						+	Common	1
Lathrobium geminum		4	+						+	Common	1
Lathrobium ripicola	N	2	+	+	+				++	N	8
Othius angustus		4								Common	1
Gyrohypnus fracticornis		5								Unknown	2
Xantholinus linearis		4								Common	1
Xantholinus longiventris		4								Common	1
Philonthus cognatus		4								Common	1
Philonthus decorus		5								Common	1
Philonthus laminatus		4								Common	1
Philonthus politus		5								Common	1
Philonthus tenuicornis		5								Local	2
Philonthus varius		5								Common	1
Gabrius trossulus		4							++	Local	2
Platydracus stercorarius		5								Local	2
Ocypus aeneocephalus		4								Local	2
Ocypus olens		4								Common	1
Ocypus pedator	Na	4								Na	16
Quedius curtipennis		4								Common	1
Quedius molochinus		4								Common	1
Quedius nitipennis		4							+	Common	1
Quedius tristis		4								Common	1
Trichophya pilicornis	Nb	5								Nb	8
Bolitobius cingulatus		4								Local	2
Sepedophilus marshami		4								Common	1
Tachyporus chrysomelinus		4								Common	1
Tachyporus dispar		4								Common	1
Tachyporus hypnorum		4								Common	1
Tachyporus nitidulus		4								Common	1
Tachyporus obtusus		4								Common	1
Tachyporus pallidus		4								Local	2
Tachinus signatus		4								Common	1
Oligota punctulata		4								Unknown	2
Gynpeta rubrior		3	++	+	+				++	Local	2
Boreophilia islandica		4							+	Local	2
Hydrosmecta eximia		1		+	++	+			++	Local	2
Hydrosmecta fragilis	N	1			++	+			++	N	8
Hydrosmectina septentrionum	N	1			++	+			++	N	8
Aloconota (s.str.) cambrica		1			++	+	+		++	Unknown	2
Aloconota (s.str.) currax		1		+	++	+	+		++	Unknown	2
Aloconota (s.str.) gregaria		4							+	Common	1
Aloconota (s.str.) insecta		1	++	+					++	Common	1
Aloconota (s.str.) sulcifrons		3	++	+	+				++	Unknown	2
Amischa analis		4								Common	1
Amischa nigrofusca		4								Unknown	2
Geostiba circellaris		4								Common	1
Dinaraea aequata		5								Common	1
Dinaraea angustula		4							+	Local	2
Liogluta longiuscula		4							+	Common	1
Atheta (Philhygra) debilis		3	+	+	+				++	Local	2
Atheta (Philhygra) elongatula		3	++	+	+				++	Common	1
Atheta (Philhygra) gyllenhali		4	+						++	Common	1

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Atheta (Philhygra) hygrotopora		4	+	+	+				++	Unknown	2
Atheta (Philhygra) melanocera		4		+	+				++	Common	1
Atheta (Philhygra) palustris		4							+	Unknown	2
Atheta (Lohse grp III & IV) divisa		4								Unknown	2
Atheta (Mocyta) amplicollis		4								Unknown	2
Atheta (Mocyta) fungi		4								Common	1
Atheta (Acrotona) aterrima		5								Common	1
Atheta (Datomicra) nigra		5								Common	1
Atheta (s.str.) brunneipennis		4								Local	2
Atheta (Lohse grp I) fungicola		5								Common	1
Atheta (Lohse grp I) laticollis		5								Common	1
Atheta (Dimetrota) macrocera		5								Common	1
Atheta (Chaetida) longicornis		5								Common	1
Drusilla canaliculata		4								Common	1
Zyras humeralis		4								Local	2
Zyras limbatus		4								Local	2
Oxypoda elongatula		3	++	+					++	Common	1
Oxypoda exoleta	N	3	+	+	+					N	8
Oxypoda haemorrhoa		4								Unknown	2
Oxypoda umbrata		5								Local	2
Aleochara bipustulata		5								Common	1
Aleochara brevipennis	N	3		+	+					N	8
Aleochara curtula		5								Common	1
Aleochara verna	RDBK	5								RDBK	16
Pselaphidae											0 0
Bryaxis bulbifer		4								Common	1
Brachygluta pandellei	RDBK	1			++	++	+?		++	RDBK	16
Pselaphus heisei		4							+	Local	2
Geotrupidae											0 0
Geotrupes stercorarius		5								Common	1
Scarabaeidae											0 0
Aphodius prodromus		5								Common	1
Aphodius rufipes		5								Common	1
Serica brunnea		5								Local	2
Scirtidae											0 0
Cyphon palustris		4	++	+	+	+			++	Common	1
Byrrhidae											0 0
Simplocaria maculosa	RDBI	3	++	+				veg.	+	RDBI	24
Byrrhus fasciatus		4								Common	1
Byrrhus pilula		4								Common	1
Byrrhus pustulatus		4								Local	2
Dryopidae											
Dryops ernesti		3	+	+	+	+			++	Local	2
Dryops nitidulus	RDB3	3	0	+	+	+			++	RDB3	24
Elmidae											
Elmis aenea		1		+	++	+	+		++	Common	1
Esolus parallelepipedus		1		+	++	+	+		++	Common	1
Limnius volckmari		1		+	++	+	+		++	Common	1
Macronychus quadrituberculatus	RDB3	5						Wood	++	RDB3	24
Oulimnius tuberculatus		1		+	++	+	+		++	Common	1
Elateridae											
Hypnoidus riparius		3	+	+	+	+	+		++	Common	1
Fleutiauxellus maritimus	Na	1			++	+			++	Na	16
Zorochros minimus		1		+	+	+			++	Common	1
Ctenicera cuprea		4								Common	1
Agriotes acuminatus		4								Common	1
Agriotes obscurus		4								Common	1
Cantharidae											

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Cantharis nigricornis		4								Common	1
Cantharis rufa		4								Common	1
Rhagonycha femoralis		4								Common	1
Cryptophagidae											
Antherophagus nigricornis		4								Local	2
Caenoscelis ferruginea		4								Local	2
Atomaria (Anchicera) berolinensis		4								Common	1
Atomaria (Anchicera) ruficornis		4								Common	1
Atomaria (s.str) linearis		4								Common	1
Coccinellidae											
Subcoccinella 24-punctata		4								Common	1
Coccinella quinquepunctata	RDB3	2			++	+				RDB3	24
Coccinella septempunctata		4								Common	1
Coccinella unidecimpunctata		4								Local	2
Lathridiidae											
Stephostethus lardarius		4								Common	1
Aridius bifasciatus		4								Naturalised	0
Enicmus histrio											
Enicmus transversus		4								Common	1
Corticarina fuscula		4								Common	1
Cortinicara gibosus											
Tenebrionidae											
Lagria hirta		4								Common	1
Chrysomelidae											
Chrysolina polita		4								Common	1
Gastrophysa polygoni		4								Common	1
Gastrophysa viridula		4								Common	1
Phyllodecta vulgatissima		4								Local	2
Phyllotreta flexuosa		4								Local	2
Phyllotreta ochripes		4								Local	2
Aphthona euphorbiae		4								Local	2
Longitarsus gracilis		4								Common	1
Altica lythri		4								Common	1
Crepidodera ferruginea		4								Common	1
Crepidodera transversa		4								Common	1
Hippuriphila modeeri		3		+?	+?					Reg. Not	4
Chalcoides plutus		4								Local	2
Chaetocnema hortensis		4								Common	1
Sphaeroderma testaceum		4								Common	1
Apionidae											
Apion (Perapion) violaceum		4								Common	1
Apion (Kalapion) pallipes		4								Local	2
Apion (s.str.) frumentarium		4								Common	1
Apion (s.str.) haematodes		4								Common	1
Curculionidae											
Phyllobius glaucus		4								Common	1
Phyllobius oblongus		4								Common	1
Phyllobius pyri		4								Common	1
Phyllobius roboretanus		4								Common	1
Phyllobius viridiaeris		4								Local	2
Phyllobius viridicollis		4								Local	2
Barypeithes araneiformis		4								Common	1
Barypeithes pellucidus		4								Common	1
Strophosoma sus		4								Local	2
Barynotus squamosus	Nb	4								Nb	8
Sitona lepidus		4								Common	1
Hypera nigrirostris		4								Common	1
Leiosoma deflexum		4								Common	1
Notaris acridulus		3		+					++	Common	1
Grypus equiseti	Nb	4							+	Nb	8
Cidnorhinus quadrimaculatus		4								Common	1

Table B1: Coleoptera captured by pitfall trapping (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Rhinoncus castor		4								Common	1
Rhinoncus inconspectus		4								Local	2
Rhinoncus pericarpius		4								Local	2
Baris lepidii	Na	3	+	++					+	Na	16
Miccrotrogus picirostris		4								Common	1

Number of replicates (N) = 27

Table B2: Coleoptera captured by the window and water traps (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Coleoptera											
Carabidae											
Carabus problematicus		4								Common	1
Notiophilus aquaticus		4								Local	2
Loricera pilicornis		4	+	+	+	+	?+		+	Common	1
Bembidion obliquum	Nb	3	++						++	Nb	8
Bembidion prasinum		1			++	++	++		++	Reg Not.	
Pterostichus madidus		4								Common	1
Pterostichus niger		3	+	+	+	+				Common	1
Calathus erratus		4								Common	1
Calathus fuscipes		4								Common	1
Calathus melanocephalus		4								Common	
Calathus piceus		5								Common	1
Laemostenus terricola		4								Local	2
Hydrophilidae											
Sphaeridium scarabaeoides		5								Common	1
Leiodidae											
Sciodrepoides watsoni		5								Local	2
Catops sp.		5								Common	1
Silphidae											
Nicrophorus sp.		5								Common	1
Nicrophorus vespilloides		5								Local	2
Staphylinidae											
Anotylus rugosus		4							+	Common	1
Lathrobium fulvipenne		4	+						+	Local	2
Aloconota (s.str.) cambrica		1			++	+	+		++	Unknown	
										Common	1
Geotrupidae										Common	1
Geotrupes stercorarius		5								Local	2
Geotrupes stercorosus		5								Common	1
										Common	1
Scarabaeidae											
Aphodius luridus		5								Common	1
Aphodius prodromus		5								Common	1
Aphodius rufipes		5								Common	1
										Common	1
Elmidae											
Oulimnius tuberculatus		1		+	++	+	+		++	Common	1
Elateridae											
Hypnoidus riparius		3	+	+	+	+	+		++	Common	1
Fleutiauxellus maritimus	Na	1			++	+			++	Na	16
Zorochros minimus		1		+	+	+			++	Common	1
Athous haemorrhoidalis		4								Common	1
Ctenicera cuprea		4								Common	1
Selatosomus incanus		4								Common	1
Agriotes acuminatus		4								Common	1
Agriotes lineatus		4								Common	1
Agriotes obscurus		4								Common	1
Nitidulidae											
Pria dulcamarae		4								Local	2
Meligethes aeneus		5								Common	1
Cryptophagidae											
Antherophagus nigricornis		4								Local	2
Byturidae											
Byturus tomentosus		4								Common	1

Table B2: Coleoptera captured by the window and water traps (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Coccinellidae											
Subcoccinella 24-punctata		4								Common	1
Coccidula rufa		3	+	+	+				++	Common	1
Coccinella quinquepunctata	RDB3	2			++	+				RDB3	24
Coccinella septempunctata		4								Common	1
Coccinella unidecimpunctata		4								Local	2
Chrysomelidae										Common	1
Longitarsus gracilis		4								Common	
Crepidodera ferruginea		4								Common	1
Crepidodera transversa		4								Common	1
Chaetocnema hortensis		4								Common	1
Cassida rubiginosa		4								Local	2
										Common	1
Apionidae										Common	1
Apion (s.str.) frumentarium		4								Common	1

Table B3: Coleoptera captured by hand searching (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Coleoptera											
Carabidae											
Carabus granulatus		4	+	?+					+	Local	2
Nebria brevicollis		4	+	+	+	+	?+			Common	1
Nebria gyllenhali		1			++	++	+		++	Common	1
Elaphrus riparius		4	+	+					++	Common	1
Loricera pilicornis		4	+	+	+	+	?+		+	Common	1
Perileptus areolatus	Na	1			++				++	Na	16
Trechus quadristriatus		4	+	+						Common	1
Asaphidion curtum		4								Common	1
Bembidion andreae		1	+	++	++?	+			++	Reg Not.	2
Bembidion atrocoeruleum		1			++	++	++		++	Local	2
Bembidion bruxellense		3		+	+	+			+	Local	2
Bembidion decorum		1			++	++	++		++	Common	1
Bembidion dentellum		3	+						++	Local	2
Bembidion lampros		4	+	+	+	+				Common	1
Bembidion lunulatum		3	++	+	+					Common	1
Bembidion obliquum	Nb	3	++					standing wate	++	Nb	8
Bembidion prasinum		1			++	++	++		++	Reg Not.	2
Bembidion punctulatum		2		+	++	++	++		++	Local	2
Bembidion tetracolum		3	+	+	+	+	+		+	Common	1
Bembidion tibiale		1			++	++	++		++	Common	1
Tachys parvulus	Nb	3	+	+	++	+	+		++	Nb	8
Pterostichus diligens		4							+	Common	1
Pterostichus nigrita		4	+						+	Common	1
Pterostichus strenuus		4	+	+	+					Common	1
Calathus erratus		4								Common	1
Calathus fuscipes		4								Common	1
Agonum albipes		3	+	+	+	+	+		++	Common	1
Agonum assimile		4	+	+	+	+				Common	1
Agonum marginatum		3	++						++	Local	2
Agonum micans		2	++	+					++	Reg No.	2
Agonum moestum		3	+	+					++	Reg No.	2
Agonum obscurum		3	+						+	Local	2
Amara ovata		4	+	+						Common	1
Harpalus rufipes		4								Common	1
Hydrophilidae											
Helophorus arvernicus	Nb	4	+	+	+	+			++	Nb	8
Silphidae											
Silpha atrata		4								Common	1
Staphylinidae											
Geodromicus nigrita		2			+	+	+		++	Local	2
Deleaster dichrous	Nb	1	+	+	+	+	+		++	Nb	8
Stenus biguttatus		4	+						++	Local	2
Stenus brunnipes		4								Common	1
Stenus guttula		3							++	Local	2
Lathrobium angustatum	Nb	4							++	Nb	8
Lathrobium angusticolle	Nb	1		+	++	+			++	Nb	8
Lathrobium fulvipenne		4	+						+	Common	1
Gyrohypnus angustatus		5								Common	1
Neobisinus prolixus	RDBK	1		+	++	++	?+		++	RDBK	16
Philonthus cognatus		4								Common	1
Gynpeta rubrior		3	++	+	+				++	Local	2
Hydrosmecta fragilis	N	1			++	+			++	N	8
Hydrosmecta thinobioides	N	1			++	+			++	N	8
Hydrosmectina septentrionum	N	1			++	+			++	N	8
Aloconota (s.str.) cambrica		1			++	+	+		++	Unknown	2
Aloconota (s.str.) currax		1		+	++	+	+		++	Unknown	2
Aloconota (s.str.) gregaria		4							+	Common	1
Aloconota (s.str.) insecta		1	++	+					++	Common	1
Amischa nigrofusca		4								Unknown	2

Table B3: Coleoptera captured by hand searching (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Pselaphidae											
Brachygluta pandellei	RDBK	1			++	++	+?		++	RDBK	16
Scarabaeidae											
Aphodius sphacelatus		5								Common	1
Byrrhidae											
Byrrhus pilula		4								Common	1
Dryopidae											
Dryops ernesti		3	+	+	+	+			++	Local	2
Dryops nitidulus	RDB3	3		+	+	+			++	RDB3	24
Elmidae											
Elmis aenea		1		+	++	+	+		++	Common	1
Limnius volckmari		1		+	++	+	+		++	Common	1
Elateridae											
Hypnoidus riparius		3	+	+	+	+	+		++	Common	1
Fleutiauxellus maritimus	Na	1			++	+			++	Na	16
Zorochros minimus		1		+	+	+			++	Common	1
Coccinellidae											
Coccidula rufa		3		+	+				++	Common	1
Coccinella quinquepunctata	RDB3	2			++	+				RDB3	24
Coccinella unidecimpunctata		4								Local	2
Chrysomelidae											
Phyllodecta vulgatissima		4								Local	2
Chaetocnema hortensis		4								Common	1

Number of replicates (N) = 24 (A total of 540 minutes of hand searching)

Table B4: Coleoptera captured using excavations (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
			Silt	Sand	Shingle	Cobble	Boulder	other			
Coleoptera											
Carabidae											
Bembidion atrocoeruleum		1			++	++	++		++	Local	2
Bembidion punctulatum		2		+	++	++	++		++	Local	2
Tachys parvulus	Nb	3	+	+	++	+	+		++	Nb	8
Dytiscidae											
Bidessus minutissimus	RDB3	2			++	+			++	RDB3	24
Hydrophilidae											
Laccobius striatulus		3	+						++	Local	2
Staphylinidae											
Lathrobium fulvipenne		4	+						+	Common	1
Neobisinus prolixus	RDBK	1		+	++	++	?+		++	RDBK	16
Hydrosmecta delicatula	RDBK	1			++				++	RDBK	16
Hydrosmecta eximia		1		+	++	+			++	Local	2
Hydrosmecta fragilis	N	1			++	+			++	N	8
Hydrosmecta thinobioides	N	1			++	+			++	N	8
Hydrosmectina septentrionum	N	1			++	+			++	N	8
Aloconota (s.str.) cambrica		1			++	+	+		++	Unknown	2
Aloconota (s.str.) currax		1		+	++	+	+		++	Unknown	2
Atheta (Philhygra) elongatula		3	++	+	+				++	Common	1
Atheta (Philhygra) gyllenhali		4	+						++	Common	1
Aleochara verna	RDBK	5								RDBK	16
Elateridae											
Zorochros minimus		1		+	+	+			++	Common	1

Number of replicates (N) = 23

Table B5: Coleoptera recorded in quadrat searching (incl. data on conservation status, fidelity, substrate preference and wetness)

Taxa	Status	Fidelity	Substrate						Wetness	Recorder	Score
Coleoptera			Silt	Sand	Shingle	Cobble	Boulder	other			
Carabidae											
Bembidion atrocoeruleum		1			++	++	++		++	Local	2
Bembidion dentellum		3	+						++	Local	2
Tachys parvulus	Nb	3	+	+	++	+	+		++	Nb	8
Hydrophilidae											
Laccobius striatulus		3	+						++	Local	2
Staphylinidae											
Neobisinus prolixus	RDBK	1							++	RDBK	16
Philonthus rubripennis		2			++	+	+		++	Local	2
Hydrosmecta eximia		1		+	++	+			++	Local	2
Hydrosmecta thinobioides	N	1			++	+			++	N	8
Hydrosmectina septentrionum	N	1			++	+			++	N	8
Aloconota (s.str.) cambrica		1			++	+	+		++	Unknown	2
Amischa nigrofusca		4								Unknown	2
Atheta (Philhygra) gyllenhali		4	+						++	Common	1
Scarabaeidae											
Aphodius sphacelatus		5								Common	1
Elateridae											
Zorochros minimus		1		+	+	+			++	Common	1

Number of replicates (N) = 26

Appendix C: Environmental data by replicate

Table C1: River Alport (Lower) – Environmental data for the ERS (by replicate)

Variables		R1	R2
Navigation		N	N
Impoundment		Y	Y
Substrate	%		
	Boulder	10	1
	Cobble	70	1
	Pebble	15	60
	Gravel	4	30
	Sand	1	7
	Silt	0	1
	Org.	0	0
Vegetation		S	S
Veg. Cover %		0	10
ERS length (m)		20	10
ERS Width (m)		25	7
Land Use			
	Mixed wood	Y	Y
	Con. Plant.	N	N
	Moor/heath	N	N
	Scrub/rough	Y	Y
	Bog, marsh	N	N
	Grazed semi/improved grass	Y	Y
	Ungrazed semi/improved grass	N	N
	Arable	N	N
	Suburban/Urban	N	N
Grazed by cattle		N	N
Bank Profile			
	Natural/unmodified	Y	Y
	Artificial/modified	N	N
ERS profile			
	Flat	N	N
	Gentle	Y	Y
	Steep	N	N
ERS Topography			
	Simple	Y	Y
	Humped	N	N
	Complex	N	N
Extent of shade %		90	90
Hibernation potential			
Grass on ERS		0	0
Grass on bank		2	2

Dead Wood on ERS		0	0
Dead wood on bank		1	1
Bankfull height (m)		1	1
Bank height if diff. (m)			
Embanked height (m)			
Management			
Banks			
	None	Y	Y
	Resection	N	N
	Moved	N	N
	Enhancement	N	N
Channel			
	None	Y	Y
	Dredging	N	N
	Weed Cutting	N	N
	Enhancement	N	N
Recreation			
	Fishing	N	N
	Boating	N	N

Table C2: River Alport (Upper) – Environmental data for the ERS (by replicate)

Variables	R1	R2	R3
Navigation	N	N	N
Impoundment	N	N	N
Substrate %			
Boulder	1	1	1
Cobble	20	10	10
Pebble	25	34	30
Gravel	50	50	50
Sand	4	5	9
Silt	0	0	0
Org.	0	0	0
Vegetation	S	S	S
Veg. Cover %	5	10	30
ERS length (m)	70	40	60
ERS Width (m)	15	15	15
Land Use			
Mixed wood	N	N	N
Con. Plant.	N	N	N
Moor/heath	Y	Y	Y
Scrub/rough	Y	Y	Y
Bog, marsh	N	N	N
Grazed semi/improved grass	N	N	N
Ungrazed semi/improved grass	N	N	N
Arable	N	N	N
Suburban/Urban	N	N	N
Grazed by cattle	N	N	N
Bank Profile			
Natural/unmodified	Y	Y	Y
Artificial/modified	N	N	N
ERS profile			
Flat	N	N	N
Gentle	Y	Y	Y
Steep	N	N	N
ERS Topography			
Simple	Y	N	Y
Humped	N	Y	N
Complex	N	N	N
Extent of shade %	0	0	0
Hibernation potential			
Grass on ERS	1	1	1
Grass on bank	3	3	3
Dead Wood on ERS	0	0	0
Dead wood on bank	0	0	0
Bankfull height (m)	1	1	1
Bank height if diff. (m)			
Embanked height (m)			

Management				
Banks				
	None	Y	Y	Y
	Resection	N	N	N
	Moved	N	N	N
	Enhancement	N	N	N
Channel				
	None	Y	Y	Y
	Dredging	N	N	N
	Weed Cutting	N	N	N
	Enhancement	N	N	N
Recreation				
	Fishing	N	N	N
	Boating	N	N	N

Table C3: River Ashop (Lower) – Environmental data for the ERS (by replicate)

Variables	R1	R2
Navigation	N	N
Impoundment	N	N
Substrate %		
Boulder	0	0
Cobble	0	0
Pebble	0	0
Gravel	0	0
Sand	0	0
Silt	90	90
Org.	5	5
Vegetation	S	S
Veg. Cover %	50	50
ERS length (m)	100	100
ERS Width (m)	20	20
Land Use		
Mixed wood	N	N
Con. Plant.	N	N
Moor/heath	N	N
Scrub/rough	Y	Y
Bog, marsh	N	N
Grazed semi/improved grass	N	N
Ungrazed semi/improved grass	N	N
Arable	N	N
Suburban/Urban	N	N
Grazed by cattle	N	N
Bank Profile		
Natural/unmodified	Y	Y
Artificial/modified	N	N
ERS profile		
Flat	Y	Y
Gentle	N	N
Steep	N	N
ERS Topography		
Simple	Y	Y
Humped	N	N
Complex	N	N
Extent of shade %	0	0
Hibernation potential		
Grass on ERS	0	0
Grass on bank	3	3
Dead Wood on ERS	1	1
Dead wood on bank	1	1
Bankfull height (m)	0.4	0.4
Bank height if diff. (m)	6	6
Embanked height (m)	6	6

Management			
Banks			
	None	Y	Y
	Resection	N	N
	Moved	N	N
	Enhancement	N	N
Channel			
	None	Y	Y
	Dredging	N	N
	Weed Cutting	N	N
	Enhancement	N	N
Recreation			
	Fishing	Y	Y
	Boating	N	N

Table C4: River Ashop (Upper) – Environmental data for the ERS (by replicate)

Variables	R1	R2	R3
Navigation	N	N	N
Impoundment	N	N	N
Substrate %			
Boulder	0	5	1
Cobble	10	25	19
Pebble	30	20	30
Gravel	25	25	30
Sand	20	20	20
Silt	5	5	0
Org.	0	0	0
Vegetation	S	S	S
Veg. Cover %	30	5	10
ERS length (m)	25	100	120
ERS Width (m)	12	30	20
Land Use			
Mixed wood	N	N	N
Con. Plant.	N	N	N
Moor/heath	Y	Y	Y
Scrub/rough	N	N	N
Bog, marsh	N	N	N
Grazed semi/improved grass	Y	Y	Y
Ungrazed semi/improved grass	N	N	N
Arable	N	N	N
Suburban/Urban	N	N	N
Grazed by cattle	Y	Y	Y
Bank Profile			
Natural/unmodified	Y	Y	Y
Artificial/modified	N	N	N
ERS profile			
Flat	N	N	N
Gentle	Y	Y	Y
Steep	N	N	N
ERS Topography			
Simple	Y	Y	Y
Humped	N	N	N
Complex	N	N	N
Extent of shade %	0	0	0
Hibernation potential			
Grass on ERS	1	1	1
Grass on bank	3	2	3
Dead Wood on ERS	0	0	0
Dead wood on bank	0	0	0
Bankfull height (m)	1	1	1
Bank height if diff. (m)			
Embanked height (m)			

Management				
Banks				
	None	Y	Y	Y
	Resection	N	N	N
	Moved	N	N	N
	Enhancement	N	N	N
Channel				
	None	Y	Y	Y
	Dredging	N	N	N
	Weed Cutting	N	N	N
	Enhancement	N	N	N
Recreation				
	Fishing	N	N	N
	Boating	N	N	N

Table C5: River Dee (Bangor-on-Dee) – Environmental data for the ERS

Variables	R1
Navigation	N
Impoundment	N
Substrate %	
Boulder	0
Cobble	0
Pebble	0
Gravel	0
Sand	80
Silt	15
Org.	5
Vegetation	C
Veg. Cover %	80
ERS length (m)	9
ERS Width (m)	3
Land Use	
Mixed wood	Y
Con. Plant.	N
Moor/heath	N
Scrub/rough	N
Bog, marsh	N
Grazed semi/improved grass	Y
Ungrazed semi/improved grass	N
Arable	N
Suburban/Urban	N
Grazed by cattle	Y
Bank Profile	
Natural/unmodified	Y
Artificial/modified	N
ERS profile	
Flat	N
Gentle	N
Steep	Y
ERS Topography	
Simple	Y
Humped	N
Complex	N
Extent of shade %	100
Hibernation potential	
Grass on ERS	2
Grass on bank	3
Dead Wood on ERS	0
Dead wood on bank	2
Bankfull height (m)	0.9
Bank height if diff. (m)	
Embanked height (m)	

Management		
Banks		
	None	Y
	Resection	N
	Moved	N
	Enhancement	N
Channel		
	None	Y
	Dredging	N
	Weed Cutting	N
	Enhancement	N
Recreation		
	Fishing	Y
	Boating	N

Table C6: River Wharfe (Buckden) – Environmental data on ERS (by replicate)

Variables	R1	R2	R3
Navigation	N	N	N
Impoundment	N	N	N
Substrate %			
Boulder	0	1	0
Cobble	70	80	74
Pebble	5	10	5
Gravel	5	4	10
Sand	5	4	10
Silt	5	1	1
Org.	0	0	0
Vegetation	S	B	S
Veg. Cover %	60	0	25
ERS length (m)	17	55	50
ERS Width (m)	8	20	4
Land Use			
Mixed wood	N	N	N
Con. Plant.	N	N	N
Moor/heath	N	N	N
Scrub/rough	N	Y	N
Bog, marsh	N	N	N
Grazed semi/improved grass	Y	Y	Y
Ungrazed semi/improved grass	N	N	N
Arable	N	N	N
Suburban/Urban	N	N	N
Grazed by cattle	Y	Y	Y
Bank Profile			
Natural/unmodified	Y	Y	Y
Artificial/modified	N	N	N
ERS profile			
Flat	N	N	Y
Gentle	Y	Y	N
Steep	N	N	N
ERS Topography			
Simple	Y	N	Y
Humped	N	Y	N
Complex	N	N	N
Extent of shade %	25	0	0
Hibernation potential			
Grass on ERS	1	0	2
Grass on bank	2	3	3
Dead Wood on ERS	0	0	0
Dead wood on bank	1	1	0

Bankfull height (m)	1.5	2	2
Bank height if diff. (m)			
Embanked height (m)			
Management			
Banks			
None	N	Y	Y
Resection	Y	N	N
Moved	N	N	N
Enhancement	N	N	N
Channel			
None	Y	Y	Y
Dredging	N	N	N
Weed Cutting	N	N	N
Enhancement	N	N	N
Recreation			
Fishing	Y	Y	Y
Boating	N	N	N

Table C7: River Wharfe (Castley) – Environmental data on the ERS

Variables	R1
Navigation	N
Impoundment	N
Substrate %	
Boulder	0
Cobble	0
Pebble	2
Gravel	5
Sand	80
Silt	3
Org.	0
Vegetation	50
Veg. Cover %	50
ERS length (m)	70
ERS Width (m)	50
Land Use	
Mixed wood	Y
Con. Plant.	N
Moor/heath	N
Scrub/rough	N
Bog, marsh	N
Grazed semi/improved grass	N
Ungrazed semi/improved grass	N
Arable	Y
Suburban/Urban	N
Grazed by cattle	N
Bank Profile	
Natural/unmodified	Y
Artificial/modified	N
ERS profile	
Flat	N
Gentle	Y
Steep	N
ERS Topography	
Simple	Y
Humped	N
Complex	N
Extent of shade %	50
Hibernation potential	
Grass on ERS	2
Grass on bank	3
Dead Wood on ERS	1
Dead wood on bank	2
Bankfull height (m)	1.5
Bank height if diff. (m)	
Embanked height (m)	

Management		
Banks		
	None	Y
	Resection	N
	Moved	N
	Enhancement	N
Channel		
	None	Y
	Dredging	N
	Weed Cutting	N
	Enhancement	N
Recreation		
	Fishing	Y
	Boating	N

Table C8: River Severn (Dolydd Hafren) – Environmental data on the ERS (by replicate)

Variables	R1	R2	R3
Navigation	N	N	N
Impoundment	N	N	N
Substrate %			
Boulder	0	0	0
Cobble	5	5	5
Pebble	40	55	55
Gravel	50	20	20
Sand	5	20	15
Silt	0	0	3
Org.	0	0	2
Vegetation	S	C	S
Veg. Cover %	55	30	30
ERS length (m)	45	80	35
ERS Width (m)	7	35	15
Land Use			
Mixed wood	N	N	N
Con. Plant.	N	N	N
Moor/heath	N	N	N
Scrub/rough	N	N	N
Bog, marsh	N	N	N
Grazed semi/improved grass	Y	Y	Y
Ungrazed semi/improved grass	N	N	N
Arable	N	N	N
Suburban/Urban	N	N	N
Grazed by cattle	Y	Y	Y
Bank Profile			
Natural/unmodified	Y	Y	Y
Artificial/modified	N	N	N
ERS profile			
Flat	Y	N	N
Gentle	N	Y	Y
Steep	N	N	N
ERS Topography			
Simple	Y	N	Y
Humped	N	Y	N
Complex	N	N	N
Extent of shade %	0	0	0
Hibernation potential			
Grass on ERS	1	2	1
Grass on bank	1	1	1
Dead Wood on ERS	1	2	0
Dead wood on bank	1	1	0
Bankfull height (m)	0.5	1.5	0.6
Bank height if diff. (m)			
Embanked height (m)			

Management				
Banks				
	None	Y	Y	Y
	Resection	N	N	N
	Moved	N	N	N
	Enhancement	N	N	N
Channel				
	None	Y	Y	Y
	Dredging	N	N	N
	Weed Cutting	N	N	N
	Enhancement	N	N	N
Recreation				
	Fishing	N	N	N
	Boating	N	N	N

Table C9: River Ystwyth (Grogwynion) – Environmental data on the ERS (by replicate)

Variables		R1	R2
Navigation		N	N
Impoundment		N	N
Substrate	**%**		
	Boulder	2	2
	Cobble	30	30
	Pebble	48	48
	Gravel	15	15
	Sand	5	5
	Silt	0	0
	Org.	0	0
Vegetation		C	C
Veg. Cover %		70	70
ERS length (m)		70	70
ERS Width (m)		25	25
Land Use			
	Mixed wood	Y	Y
	Con. Plant.	N	N
	Moor/heath	N	N
	Scrub/rough	Y	Y
	Bog, marsh	N	N
	Grazed semi/improved grass	Y	Y
	Ungrazed semi/improved grass	N	N
	Arable	N	N
	Suburban/Urban	N	N
Grazed by cattle		N	N
Bank Profile			
	Natural/unmodified	Y	Y
	Artificial/modified	N	N
ERS profile			
	Flat	N	N
	Gentle	Y	Y
	Steep	Y	Y
ERS Topography			
	Simple	N	N
	Humped	Y	Y
	Complex	N	N
Extent of shade %		15	15
Hibernation potential			
Grass on ERS		3	3
Grass on bank		1	1
Dead Wood on ERS		1	1
Dead wood on bank		1	1
Bankfull height (m)		1	1
Bank height if diff. (m)			
Embanked height (m)			

Management			
Banks			
	None	Y	Y
	Resection	N	N
	Moved	N	N
	Enhancement	N	N
Channel			
	None	Y	Y
	Dredging	N	N
	Weed Cutting	N	N
	Enhancement	N	N
Recreation			
	Fishing	Y	Y
	Boating	N	N

Table C10: River Severn (Preston Montford) – Environmental data on the ERS (by replicate)

Variables		R1	R2
Navigation		N	N
Impoundment		N	N
Substrate	%		
	Boulder	0	0
	Cobble	0	0
	Pebble	0	0
	Gravel	0	0
	Sand	5	5
	Silt	90	90
	Org.	5	5
Vegetation		C	C
Veg. Cover %		100	100
ERS length (m)		4	2
ERS Width (m)		4	2
Land Use			
	Mixed wood	Y	Y
	Con. Plant.	N	N
	Moor/heath	N	N
	Scrub/rough	N	N
	Bog, marsh	N	N
	Grazed semi/improved grass	N	N
	Ungrazed semi/improved grass	N	N
	Arable	N	N
	Suburban/Urban	N	N
Grazed by cattle		N	N
Bank Profile			
	Natural/unmodified	Y	Y
	Artificial/modified	N	N
ERS profile			
	Flat	Y	Y
	Gentle	N	N
	Steep	N	N
ERS Topography			
	Simple	Y	Y
	Humped	N	N
	Complex	N	N
Extent of shade %			
Hibernation potential			
Grass on ERS		1	0
Grass on bank		2	2

Dead Wood on ERS		1	1
Dead wood on bank		3	3
Bankfull height (m)		0.5	0.4
Bank height if diff. (m)		10	10
Embanked height (m)			
Management			
Banks			
	None	Y	Y
	Resection	N	N
	Moved	N	N
	Enhancement	N	N
Channel			
	None	Y	Y
	Dredging	N	N
	Weed Cutting	N	N
	Enhancement	N	N
Recreation			
	Fishing	N	N
	Boating	N	N

Table C11: River Ystwth (Ty'n-yr-helyg) – Environmental data on the ERS (by replicate)

Variables	R1	R2	R3
Navigation	N	N	N
Impoundment	N	N	N
Substrate %			
Boulder	0	0	0
Cobble	5	5	15
Pebble	55	55	50
Gravel	25	25	20
Sand	15	15	10
Silt	0	0	5
Org.	0	0	0
Vegetation	S	S	C
Veg. Cover %	5	5	65
ERS length (m)	65	65	13
ERS Width (m)	12	12	4
Land Use			
Mixed wood	N	N	N
Con. Plant.	N	N	N
Moor/heath	N	N	N
Scrub/rough	Y	Y	Y
Bog, marsh	N	N	N
Grazed semi/improved grass	N	N	N
Ungrazed semi/improved grass	N	N	N
Arable	N	N	N
Suburban/Urban	N	N	N
Grazed by cattle	N	N	N
Bank Profile			
Natural/unmodified	Y	Y	Y
Artificial/modified	N	N	N
ERS profile			
Flat	N	N	N
Gentle	Y	Y	Y
Steep	N	N	N
ERS Topography			
Simple	Y	Y	Y
Humped	N	N	N
Complex	N	N	N
Extent of shade %	1	1	5
Hibernation potential			
Grass on ERS	1	1	2
Grass on bank	3	3	2
Dead Wood on ERS	0	0	0
Dead wood on bank	2	2	0
Bankfull height (m)	1.5	1.5	1
Bank height if diff. (m)			
Embanked height (m)			
Management			
Banks			
None	Y	Y	Y

	Resection	N	N	N
	Moved	N	N	N
	Enhancement	N	N	N
Channel				
	None	Y	Y	Y
	Dredging	N	N	N
	Weed Cutting	N	N	N
	Enhancement	N	N	N
Recreation				
	Fishing	Y	Y	Y
	Boating	N	N	N