Oxfordshire Highways

Cogges Link Road
Aquatic Invertebrates

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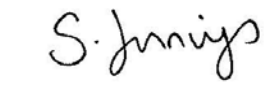
Prepared by	:	Sarah Jennings	
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This document was originally prepared in support of the 2004 Environmental Statement and as such, contains information relevant to the Shores Green Slip Roads option (referred to as the Additional Area). Only information pertaining to the Cogges Link Road (main survey area, sites 1-10) is relevant to this 2007 Environmental Statement.

For avoidance of doubt all references in this document to 'Witney-Cogges Link Road' relate to the Cogges Link Road.

WITNEY-COGGES LINK ROAD

SURVEYS OF AQUATIC INVERTEBRATES

FINAL REPORT

REPORT PREPARED FOR OXFORDSHIRE COUNTY COUNCIL
& BABTIE GROUP

BY

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1. EXECUTIVE SUMMARY

This reports examines existing and new data on aquatic invertebrates in the River Windrush and other aquatic habitats close to the preferred route of the proposed Witney-Cogges link. Existing data are from invertebrate surveys by the Environment Agency (EA). New data are from surveys by Aquatic Environmental Consultants (AEC) in May and September 2003. Potential impacts of the proposed Witney-Cogges Link Road are also examined.

Of the eleven sites sampled by AEC, eight were riverine (main River Windrush or channels of the Windrush), one was marshy and two were ditches. These different habitats were characterised by different assemblages of invertebrates, adapted to the physical, chemical and biological features of the habitat.

In addition to the invertebrate data, information on fish collected during surveys by AEC is also included. Of particular interest was the presence of brook lampreys at four sites. Brook lampreys have declined in several parts of Europe, and this species is now given some legal protection. It is listed in Annexes IIa and Va of the EU Habitats and Species Directive, Appendix III of the Bern Convention, and as a Long List Species in the UK Biodiversity Action Plan.

1.1 RIVERINE SITES - MAIN CHANNEL

The River Windrush is of high ecological quality, with a wide rage of aquatic invertebrates present. Of particular conservation interest were the following species that are considered Scarce [1] in the UK:

Riolus cupreus	Water Beetle	Nationally Scarce AEC & EA
Riolus subviolaceus	Water Beetle	Nationally Scarce AEC & EA
Gyrinus urinator	Water Beetle	Nationally Scarce AEC & EA
Anacaena bipustulata	Water Beetle	Nationally ScarceAEC only
Ylodes conspersus	Caddisfly	Nationally ScarceAEC only

Nationally Scarce species were recorded at every site on the main channel except site 4 (below the A40 road bridge).

BMWP (Biological Monitoring Working Party) mean scores for most AEC sites on the main River Windrush ranged from 199-221, somewhat higher than the mean scores of 166 to 180 obtained by the EA for upstream and downstream sites. The only exception was AEC site 4, which was deliberately placed under the A40 road bridge to determine the impact of shading by the bridge on aquatic invertebrates. At site 4 the mean BMWP score was 131, about 63% of the value at other AEC sites on the main river. The Average Score Per Taxon (ASPT[2]) was only slightly reduced under the bridge. This is because the bridge affected taxa[3] belonging to low, middle and high scoring families on the BMWP scoring system.

The number of taxa recorded under the A40 road bridge (AEC site 4) was 41 in May and 37 in September. This represents about 62% of the number recorded at other sites on the main River Windrush (May 62-69 taxa per site, September 59-62 taxa per site).

[1] A category of frequency, not threat, applied to any species occurring in 16-100 hectads (10 km squares) throughout Great Britain.
[2] Average Score Per Taxon is the total BMWP score divided by the number of Scoring Families used to calculate the total BMWP score.
[3] Taxa (singular taxon) is used to describe the number of different organisms present, when not all identifications were made to species level.

It is possible to predict the BMWP score and associated statistics for a river using software called RIVPACS[4]. This analysis could only be carried out on for sites in the main channel, as the software assumes there is a single river channel. The predicted BMWP score for the main channel sites was 133.4, with 24.6 scoring families and an ASPT of 5.42. The following comparisons with AEC data exclude Site 4 (under the A40 road bridge). The actual BMWP scores for AEC sites on the main river were therefore significantly higher than predicted. This indicates a high quality river, unaffected by pollution. The number of BMWP scoring families at AEC sites on the main river was 35-37 (May) and 32-39 (September). This is greater than the 25 scoring families predicted by RIVPACS. The predicted ASPT of 5.42 was lower than the ASPT scores at AEC sites on the main river (May 5.68 - 5.89; September 5.69 - 5.84).

1.2 RIVERINE SITES - MINOR CHANNELS

The only Nationally Scarce species recorded from the minor channels was *Riolus subviolaceus* at Site 8 in May 2003.

The smaller channels of the River Windrush also had a diverse invertebrate fauna, with 52-68 taxa in May and 43-47 taxa in September. BMWP scores in May 2003 ranged from 177-235, similar to AEC sites on the main river (203-216, excluding site 4). BMWP scores for sites on the smaller channels were lower in September (141-161). These values were lower than most AEC sites on the main river (187 - 225). AEC results were also compared with those for EA sites downstream, where the river Windrush is in two channels. In 2001-2002 these downstream sites had mean BMWP scores of 175 for the western arm and 180 for the eastern arm.

Mean ASPT on the smaller channels was 5.64 in May and 5.39 in September 2003. This was slightly below the mean ASPT of all 5 sites on the main channel (5.82 in May and 5.65 in September). The September values were also lower than the mean values for downstream EA sites (data for 2001/02) of 5.54 for the western arm and 5.67 for the eastern arm.

The reduced BMWP and ASPT scores at site 8 in September may have been due to low summer flows or pollution from the nearby industrial estate.

1.3 MARSHY SITE

A marshy area on the direct route of the proposed Witney-Cogges link road is understood to be a recent feature, resulting from ground investigations for the proposed road several years ago. The most obvious feature of the marshy area is the dominance by bulrush (*Typha latifolia*) and the shallow water with high concentrations of sulphides. The marshy area supported a reasonably diverse assemblage of invertebrates, adapted to the poor water quality conditions. Several species, mainly water beetles, were only recorded at this site:

Water bugs	*Nepa cinerea* (water scorpion)
Water beetles	*Anacaena limbata, Agabus sturmii, Noterus clavicornis, Hygrotus inequalis, Hydrochus brevis, Laccobius minutus, Laccobius bipunctatus & Coelostoma orbiculare*

The presence of the water beetle *Hydrochus brevis* is noteworthy, as it is a RDB3[5] species (Hyman, 1992).

[4] River InVertebrate Prediction and Classification System (Wright et al, 1989).

[5] RDB = Red Data Book. RDB3 species are classified as Rare. The definition of rare is species with small populations that are not at present Endangered (RDB1) or Vulnerable (RDB 2) but are at risk.

1.4 DITCHES

The ditches that were surveyed could only be affected if new slip roads are proposed in this area. Several species were only recorded from the two ditch sites:

Molluscs	*Lymnaea truncatula* & *Pisidium personatum*
Water beetles	*Agabus didymus, Helophorus minutus, Scirtes* sp. & *Hydroporus tessellatus*

Neither of the ditches was of conservation interest, and combined with the expected lack of impacts the ditches have not been considered in detail.

1.5 CONSTRUCTION IMPACTS AND MITIGATION

Many of the riverine species recorded in these surveys would be highly susceptible to pollution incidents involving suspended solids, oil, lubricants, cements, grouts and other chemicals that could enter the Windrush during construction. It is therefore important to minimise the possibility of pollutants entering the Windrush by good design and careful management of the construction team, especially when working close to watercourses.

The point where the proposed road would cross the river was sampled. It was of high ecological quality, but was similar to other sites on the main river. It is therefore unlikely that the new road would cause an overall loss of diversity in the Windrush.

Construction traffic can cause compaction of soils, which can have a deleterious impact on nearby watercourses. Where possible construction traffic should be kept away from watercourses.

The marshy area would presumably be lost during construction of the new road, and we recommend that this habitat could be re-created nearby, perhaps even improved upon by providing a greater range of micro-habitats. Amphibians could also be considered in the mitigation proposals. Surveys of amphibians in March-June 2003 only showed the presence of frogs at this site, with no great-crested newts or other newts present (Carter Ecological Limited, 2003).

Ditches would not be directly affected under the proposals that we have seen, but could possibly be affected if additional slip-roads are needed.

Impacts from new bridges and culverting are considered in Section 1.6.

1.6 OPERATIONAL IMPACTS AND MITIGATION

Operational impacts on water quality and ecology come from a range of sources (Environment Agency, 2002):

- metals (lead, cadmium, zinc etc), hydrocarbons (especially PAHs) and suspended solids from vehicles fuel, lubricants and tyres
- salt from de-icing operations
- spillages and fire-fighting water, as a result of accidents
- erosion of sediments and soils due to improperly located discharges from road run-off

Of these impacts, those due to accidents are most difficult to mitigate against and have the greatest potential for serious damage. The best solution would be to have all run-off directed

to constructed wetlands whose primary purpose was in flow balancing and retention of pollutants (ie their ecological function would be secondary).

It will be important to ensure that inputs of sediments to the Windrush are not increased, as this could cause siltation of the gravel beds and reduce suitability for fish spawning. If the Environment Agency permits any discharges of run-off to the Windrush the suspended solids content should be minimised by passage through a constructed wetland, which will also help to attenuate flows. Any discharge to the Windrush should be engineered so that there is no erosion of nearby bank sediments.

In addition there will be direct impacts from the new road over the three channels of the Windrush. The smallest channel, near to the existing roundabout, will presumably be culverted. This will have a severe deleterious impact on this channel; this impact may extend downstream for several metres. The other two channels will be bridged. This will produce a poorer quality habitat for aquatic invertebrates, but the length of river affected is likely to be only immediately below each bridge. Impacts from each bridge will be due to:

- Shading and resultant loss of higher plants and algae
- No suitable plants for those invertebrates that lay their eggs on plants (eg damselflies)
- Other impacts due to absence of plants (eg loss of source of detritus, loss of shelter and food for some invertebrates)
- Cooler daytime temperatures in summer due to shading. Possibly warmer temperatures on cold winter nights.
- Reduced direct input of plant matter, eg falling leaves, likely to result in less detritus on the river bed.
- Noise impacts on invertebrates are poorly understood, but are not considered likely to have a significant effect.

The study examined the effect of the existing A40 road bridge on the ecology of the River Windrush. These data were useful in predicting impacts from the two new road bridges.

There are likely to be local impacts on brook lampreys, which were recorded at both the sites where bridges are proposed (Sites 2 and 7). Although brook lampreys may be widely distributed on the Windrush, it would be advisable to discuss the implications with the Environment Agency and English Nature, as they have some legal protection.

2. INTRODUCTION

Aquatic Environmental Consultants (AEC) were appointed by Oxfordshire County Council and the Babtie Group to undertake surveys of aquatic invertebrates along the route of the proposed Witney-Cogges Link Road. The proposed route of the road is shown on Babtie Drawing 087206/Carter, available from the Babtie Group. The approximate route of the road is shown in Figure 1, overlaid on an aerial photograph. Figure 2 shows the road route in relation to the River Windrush.

2.1 AQUATIC INVERTEBRATE SURVEYS

Some aquatic invertebrates, eg molluscs, complete their whole life cycle in the river. Others, for example stoneflies, mayflies and dragonflies have a flying adult stage, but their eggs and larvae are aquatic.

Aquatic invertebrates are the single best indicator of water and habitat quality in rivers, and have been used for many years to assess water quality. It is possible to produce a BMWP score for each site, which helps to show whether a site is affected by organic pollution. The BMWP method assigns a score of 1-10 to most families of aquatic invertebrate, with low scores for families that are tolerant of organic pollution and high scores for those that are intolerant of organic pollution. BMWP scores for each family are shown in Tables 4A and 4B. The total BMWP score for a site is simply the sum of all scoring families.

The aquatic invertebrates that are likely to be found at a site can be predicted using RIVPACS software, using a few key physical and chemical parameters (Wright et al, 1989). These factors include distance from source, channel dimensions, flows, alkalinity and substrate. The RIVPACS software also predicts the BMWP score for a site.

2.2 SITE DESCRIPTION

The River Windrush originates on oolitic (Cotswold) limestone about 4km north of Temple Guiting in Gloucestershire (Environment Agency, 1996). The Windrush has several smaller tributaries such as the River Dikler and Sherborne Brook. Downstream from Witney the River Windrush flows over Oxfordshire Clay. In this section the river has two main channels. The Windrush joins the Thames at Newbridge (NGR SP402 013). The total distance of the main channel of the Windrush from its source to Witney is approximately 57km.

In the study area the River Windrush has either two or three channels. The main channel is the most easterly, and the most westerly (referred to in this report as the mill leat) is a diversion from the central channel (referred to in this report as the mill stream), controlled by a sluice just upstream from Farm Mill (now derelict). The westerly channel rejoins the central channel about 300 m downstream from the sluice. The two main channels of the Windrush are visible on the aerial photo as N-S lines of trees in Figure 2.

An electro-fishing survey of the two principal channels of the River Windrush was carried out in October 2002 (Pisces Conservation Ltd, 2002). This showed the presence of 10 fish species, including brown trout, minnow, bullhead, sticklebacks, perch, chub and barbel. Many of these species were seen or caught during the aquatic invertebrate surveys by AEC in May and September 2003. Only one barbel was caught by electro-fishing in October 2003, but a large number of barbel were noted at the most downstream site during the AEC survey in May 2003. The electro-fishing survey showed that the east channel was a typical trout stream whilst the west was a more lowland cyprinid/perch dominated habitat (Pisces Conservation Ltd, 2002).

2.3 CONSERVATION DESIGNATIONS

None of the Citation Sheets for Sites of Special Scientific Interest (SSSIs) in the vicinity of the study area mentions aquatic invertebrates. The nearest SSSI is at Ducklington Mead, about 1km south of Witney at SP363076. The SSSI citation for Ducklington Mead states that the site is unimproved meadow, between the two arms of the River Windrush. There is A mention of aquatic plants in some of the ditches on the site, but this is outside the scope of this report. There is no reason to believe that the proposed Witney-Cogges Link road will affect the Ducklington Mead SSSI, so no invertebrate samples were taken there.

3. METHODS

Discussions were held with the Environment Agency (Wallingford Office) regarding sampling methods and the EA were given the opportunity to comment on the number and location of sampling sites.

The EA advised that if samples were obtained in only two seasons they would prefer to avoid the summer. AEC agreed to obtain samples in spring (late May 2003) and autumn (early September 2003).

The EA sent advice on selection of sampling sites and other issues relating to biological survey techniques for RIVPACS. RIVPACS is a system for predicting the aquatic invertebrates that will be found in rivers and streams in the UK in the absence of pollution (Wright et al, 1989). AEC ensured that samples on the rivers met these requirements. The ditch and marshy area samples could not be expected to comply with the RIVPACS requirements. The only riverine site that did not comply with EA requirements was site 4. This site was deliberately chosen to be under the A40 road bridge, as this is expected to be a similar environment to that which will occur under the Witney Cogges Link road as it passes over the Windrush.

3.1 CHOICE OF SAMPLING SITES

Maps and aerial photographs were examined before the site visit to determine the likely number of sites that would be required to assess existing aquatic invertebrate habitats (rivers, ponds and ditches). The main aim was to obtain representative samples of all aquatic habitats on or near the road route. A secondary aim was to sample downstream sites on the main channel of the Windrush. These data will aid the assessment of impacts from construction or operation of the new road.

The spring survey took place on 28-29 May 2003. The first day was spent on a walk-over survey of the entire study area (including boundary ditches) to refine our initial ideas on sampling locations and to ensure sampling sites met EA requirements. Most field boundary and roadside ditches were dry in late May 2003 and therefore could not be sampled.

A pond marked at NGR SP 3644 0878 on the map provided by Babties (Drawing Number 087206/Carter) was examined on 28 May 2003. It was a temporary marshy area, apparently fed by road drainage from the A40. This area was dry and could not be sampled.

The main study area was defined by Babties as a corridor of 100metres either side of the outer limits of the proposed road. AEC were free to examine other sites outside this corridor if they could be impacted by the scheme or if data from them could assist impact prediction. AEC

therefore examined three sites on the Windrush downstream from the corridor (sites 3, 4 & 5 on Figure 2).

Babties also asked AEC to examine an Additional Area that may possibly be used for slip roads etc. This Additional Area extended the survey in a triangle eastwards, ending near the point where the B4022 passes under the A40. This Additional Area was found to have no streams or rivers. Only three additional sites were examined (sites 10-12 on Figure 3), all of them ditches with very little water present (see Photos 10-12). Ditches can contain a wide variety of aquatic life, including many rare and scarce species, so it was important not to ignore them

Twelve sites were sampled on 29 May 2003. Sampling at site 12 was abandoned due to the water depth of only 1 cm, which is too shallow to be effectively sampled using a hand net. Details of the 12 sampling sites are shown in Table 1. Sites 1-5 were located on the main channel of the Windrush (see Figure 2 and Photos 1-5). Site 2 was at the proposed crossing point on the main channel. Site 6 was on the most westerly channel, close to the roundabout where the new road will join the existing road network (see Figure 2 and Photo 6). Site 7 was on the central channel of the Windrush, downstream from a Farm Mill, which is derelict (see Figure 2 and Photo 7). Site 8 was downstream of the confluence of the westerly and central channels of the Windrush, ie downstream of sites 6 & 7 (see Figure 2 and Photo 8). Site 9 was the only marshy site that was sampled. This area of bulrush (also known as greater reedmace *Typha latifolia*) was about 40m long by 20m wide, with water depths of 2-3 cm. It is understood to be relatively recent, resulting from trial pits dug during early site investigations for the proposed road. Sites 10 -12 were ditches in the Additional Area (see Figure 3 and Photos 10-12).

The second survey took place on 5 September 2003, after an unusually hot and dry summer. None of the ditches that were sampled in May 2003 had any water in them and the survey was therefore restricted to 8 riverine and one marshy site (site 9).

3.2 WATER QUALITY MEASUREMENTS

Water quality (Dissolved oxygen, pH, temperature and conductivity) measurements were made in all the flowing water sites (sites 1-8) using meters. The marshy area (site 9) and ditches (sites 10-12) were unsuitable for water quality measurements using meters, due to the negligible flow.

Water quality analyses were carried out before any other procedures on site, to reduce the impact of disturbance. Meter readings were taken approximately 1/3 of the way across the river.

Dissolved oxygen (DO) was measured during the May 2003 survey using a pHOX 62 DO meter. The DO meter was calibrated in air, with the air saturation value set to 100%. This is not an exact calibration method and DO results should be treated with some caution. DO concentrations were recorded as mg/L and percentage saturation.

Conductivity, pH and temperature were measured in the watercourse. The conductivity meter was a Hanna Dist 3, and the pH meter was a Hanna pHep. The pH and conductivity meters had been calibrated the previous day using fresh standards.

Other water quality data for the project will be obtained by Babties from the Environment Agency.

3.3 SUBSTRATE, CHANNEL DIMENSIONS & OTHER RECORDING

AEC recorded the following data at each riverine site:

- Sampler, Date and Time
- Site Number and description
- National Grid Reference, using a GPS
- Weather conditions
- Appearance of the water
- Habitat type (eg run, glide, riffle)
- Substrate type - percentage of the river bed covered by cobbles, pebbles, gravel, sand, silt and clay.
- Substrate cover by algae and macrophytes (water plants).
- Water depth at 3 points across the channel (1/4, 1/2 and 3/4 of channel width)
- Mean width
- Estimated flow
- Shading
- Land use on each side
- Any other influences such as bank movement

All of the above were recorded on a proforma. Most of the results are contained in Tables 1A and 1B. Any other data recorded in the field is available from AEC.

3.4 INVERTEBRATE SAMPLING, SORTING AND IDENTIFICATION

3.4.1 Sampling

Invertebrate samples were obtained using the Environment Agency kick-sampling method. This uses a standard FBA pond-net with a mesh of 0.9mm (900µm). A three minute kick sample was obtained at each site (photos 1-11), followed by a 1 minute hand search of micro-habitats not adequately sampled with the kick sampling method. The combined sample was then placed in a labelled white bucket (5 or 10 litres). A small amount of water was added, then the snap-on lid was put on. Within 2 hours buffered formaldehyde was added to preserve the sample.

3.4.2 Presence of Fish in Samples

The invertebrate surveys also collect some of the smaller species of fish. If fish were seen in the sample whilst on site they we identified, counted and returned to the stream. Four species were recorded in the riverine samples in May and September 2003:

		May	September
Three-spined sticklebacks	*Gasterosteus aculeatus*	1 site	4 sites
Bullhead	*Cottus gobio*	8 sites	6 sites
Minnow	*Phoxinus phoxinus*	1 site	3 sites
Brook lamprey	*Lampetra planeri*	3 sites	1 site

Of these, only the brook lamprey was not recorded in the fish survey (Pisces Conservation Ltd, 2002). Single specimens of brook lamprey were recorded at sites 2, 7 & 8 in May and at

site 3 in September. The following information on brook lampreys is taken from the English Nature web site:

> The brook lamprey is a purely freshwater species occurring in streams, and occasionally lakes, in north west Europe, particularly in basins associated with the North and Baltic seas. It is the most common of the British lampreys and occurs over much of the British Isles. Because of a decline in several parts of Europe, the brook lamprey is now given some legal protection. It is listed in annexes IIa and Va of the EU Habitats and Species Directive, Appendix III of the Bern Convention, and as a Long List Species in the UK Biodiversity Action Plan.

The presence of brook lamprey at some sites should be notified to the fisheries consultants (Pisces Conservation Ltd) and brought to the attention of the Environment Agency and English Nature.

The presence of bullheads at so many sites will also be of interest to English Nature and the Environment Agency.

3.4.3 Invertebrate Sample Sorting and Identification

Invertebrate samples have been sorted by Julian Perrett and identified to species level where practicable. The main exceptions are oligochaete worms, chironomids and immature stages or damaged specimens not showing all the characteristics needed to identify them to species level. Identifications have been made using a range of taxonomic keys, produced by the Freshwater Biological Association, Field Studies Council and others. Identifications of all *Pisidium* species were made by a molluscan specialist (Ian Killeen) and some water beetles were identified by Jeff Robinson.

Standard abundance categories were used to record the number of invertebrates of each species:

0-9	A
10-99	B
100-999	C
1000-9999	D
10000-99999	E

4. RESULTS

Water quality and physical measurements at each site for are included in Table 1A (May 2003) and Table 1B (September 2003). Dissolved oxygen data are not available for the September survey.

4.1 WATER QUALITY

4.1.1 Conductivity

Conductivity at all riverine sites was very similar, ranging from 465-468 µS/cm in May and 479 - 493 µS/cm in September.

4.1.2 Temperature

Temperature at riverine sites ranged from 15.4 - 16.8 ^{o}C in May. The weather during the survey was warm and sunny, so temperatures increased during the course of the sampling. In the September survey the conditions were overcast and dry, and the temperature range at riverine sites was 14.4 - 15.4 ^{o}C.

4.1.3 Dissolved Oxygen (DO)

The percentage DO saturation ranged from 83 - 106%. DO values tend to be lowest around dawn and highest when insolation and water temperature are at their peak, usually in the late afternoon in warm weather. It is therefore difficult to compare sites if samples are obtained at different times of day. The only unexpected result was site 8, which at 83% was lower than expected for the time of day.

4.1.4 pH

The pH was very similar at all riverine sites, ranging from 8.1 to 8.2 in May and 7.9-8.3 in September. These relatively high values are likely to be due to the oolitic limestone geology that the Windrush traverses down to Witney.

4.2 SUBSTRATE, CHANNEL DIMENSIONS & OTHER RECORDING

4.2.1 Substrate

At riverine sites (sites 1-8), the substrate composition was estimated by the surveyor. No information was obtained at the marshy site (site 9) or at ditch sites, but the substrates at these sites were mainly silts.

Most riverine sites were had a large amount of gravel, with percentage cover by gravel ranging from 40 - 90% (May) and 30 - 85% (September). Site 6 had the largest sized substrate, with 25% pebbles and 10% cobbles in May and 40% pebbles with 20% cobbles in September. In May sites 6-8 had more silt than sites 1-5, but this difference was not observed in September.

4.2.2 Water depth

In May, sites 1-5 on the main channel of the River Windrush had a mean depth of 24 - 42 cm, with a maximum recorded depth of 53 cm. The shallowest was site 4, under the A40 road bridge. Site 6 was also shallow, with a mean depth of 25 cm. Sites 7 & 8 were deeper, with

mean depths of about 52 cm. Sites 9-11 were very shallow, with depths of about 3 cm at sites 9 & 10 and 7 cm at site 11.

In September, after a summer with unusually low rainfall, mean water depths at sites 1-5 were 15 - 40 cm, with a maximum recorded depth of 50 cm. The shallowest was site 4, under the A40 road bridge. Site 6 had a mean depth of only 20 cm, but sites 7 & 8 had mean depths of 40 cm and 47 cm respectively.

Some deeper pools were also present on the main channel of the Windrush, but these were outside the sampling sites and were not measured accurately. Water depths in these pools may have exceeded 1 metre in May.

4.2.3 Width

Site 6 was the narrowest, with a width of 1.85m (May) and 1.4 m (September). Site 7 had a width of 4.2m in May, this fell to 3.2 m in September. Other sites had widths ranging from 5.9 to 10.6 m (May) and 5.0 to 8.3 m (September). There were no consistent changes in width progressing down the main channel of the Windrush.

4.2.4 Algal and macrophyte cover

Algal cover of the substrate ranged from 1-25% in May and 2-15% in September. Site 4 had very low cover by algae, due to shading by the A40 road bridge. The highest algal cover was at site 2 in May and site 3 in September.

Cover of the substrate by macrophytes at sites on the main channel was 20 - 60% in May and 8 - 30% in September. The exception was site 4, which had no macrophytes due to shading by the A40 road bridge. Most of the macrophytes were stream water crowfoot, probably *Ranunculus penicillatus* subspecies *pseudofluitans.* Other submerged macrophytes were occasional branched bur-reed (*Sparganium erectum*) at some sites.

4.3 AQUATIC INVERTEBRATES

The results for the 11 sites where samples were obtained are shown in Table 2.

A comparison with data from the Environment Agency for nearby sites (2 upstream, 2 downstream) on the River Windrush in 2002/03 is included in Table 3. Note that Table 3 does not include species only recorded at sites 9-11.

The BMWP score, number of scoring families and ASPT values for the 8 riverine sites were calculated and the results are shown in Tables 4A (May 2003) and 4B (September 2003) and summarised in Table 5. Figure 4 shows BMWP scores down the main channel in May and September. Figure 5 shows ASPT values at the same sites. Figure 6 compares AEC data for mean BMWP and ASPT (shown as sites 3-7) with EA data for upstream sites (shown as numbers 1-2) and downstream sites (shown as numbers 8 & 9).

Table 5 summarises the family level data and BMWP and ASPT scores. It also shows the total number of specimens recorded in each riverine sample. In total over 52,000 specimens were recorded from the riverine samples in both surveys.

The EA used RIVPACS II and our survey data for channel dimensions, location etc to predict BMWP scores and ASPT for our five sites on the main channel of the River Windrush. The alkalinity value used was 195 mg/l $CaCO_3$ (from EA water quality surveys). The results were the same for all five sites:

BMWP	133.4
Number of scoring families	24.6
ASPT	5.42

The following comparisons with AEC data exclude Site 4 (under the A40 road bridge). The actual BMWP scores for AEC sites on the main river were significantly higher than predicted. This indicates a high quality river, unaffected by pollution. The number of BMWP scoring families at AEC sites on the main river was 35-37 (May) and 32-39 (September). This is greater than the 25 scoring families predicted by RIVPACS. The predicted ASPT of 5.42 was lower than the ASPT scores at AEC sites on the main river (May 5.68 - 5.89; September 5.69 - 5.84).

RIVPACS predicted the following BMWP scoring families in decreasing order of probability of capture

100.00%	Chironomidae
100.00%	Oligochaeta
96.60%	Gammaridae (incl. Crangonyctidae & Niphargidae)
95.80%	Sphaeriidae
95.60%	Baetidae
93.60%	Elmidae
89.00%	Hydrobiidae (incl. Bithyniidae)
87.00%	Hydropsychidae
83.20%	Glossiphoniidae
83.00%	Erpobdellidae
82.90%	Simuliidae
79.00%	Leptoceridae
74.60%	Asellidae
72.30%	Limnephilidae
71.40%	Caenidae
66.60%	Hydroptilidae
65.60%	Ancylidae (incl. Acroloxidae)
56.50%	Tipulidae
53.80%	Polycentropodidae
52.50%	Lymnaeidae
50.30%	Rhyacophilidae (incl. Glossosomatidae)

All these families were found on the main river, but some were absent from Site 4, under the A40 road bridge. Apart from Oligochaeta and Chironomidae (which had a predicted 100% occurrence) all other families occurred more frequently at sites 1-3 and site 5 than predicted by RIVPACS. This is the reason why actual BMWP scores were higher than predicted by RIVPACS.

RIVPACS also predicted the probability of membership to various UK river types:

River Type 27	34.4%
River Type 26	20.5%
River Type 30	14.0%
River Type 25	10.9%

The EA have advised that the 34% probability that the Windrush sites belong to River Type 27 is suitably high (pers. comm. Glen Meadows, Environment Agency), as it exceeds a 20% threshold that they use. In a classification of a large number of British rivers, Type 26 and 27 rivers were very similar to each other (Wright et al, 1989), with mean alkalinities of 231 and

189 mg/l $CaCO_3$ respectively, and mean depths of 30 cm and 28 cm respectively. The nearest river included in the classification by Wright et al (1989) was the River Evenlode, which flows in a valley just north of the Windrush. Three of the five sites on the River Evenlode were classified as being Type 26, one was Type 25 and the other Type 20.

There were a large number of species that were found at most or all of the five sites on the main channel of the River Windrush. Some were present at all sites except site 4 (beneath the A40 bridge). Characteristic species for the Windrush were:

GROUP	CHARACTERISTIC SPECIES
Leeches	*Erpobdella octoculata, Glossiphonia complanata, Piscicola geometra*
Molluscs - Bivalves	*Pisidium henslowanum, Pisidium nitidum, Pisidium subtruncatum, Sphaerium corneum*
Molluscs - Gastropods	*Bithynia tentaculata, Acroloxus lacustris, Ancylus fluviatilis, Potamopyrgus jenkinsi (P. antipodarum), Lymnaea peregra, Theodoxus fluviatilis, Physa fontinalis, Bathyomphalus contortus, Gyraulus albus, Planorbis carinatus, Valvata cristata, Valvata piscinalis*
Crustaceans	*Gammarus pulex, Asellus meridianus*
Insects - Beetles	*Elmis aenea, Limnius volckmari*
Insects - Mayflies	*Baetis rhodani, Baetis scambus, Centroptilum luteolum, Caenis luctuosa, Ephemerella ignita, Ephemera danica*
Insects - Stoneflies	*Leuctra fusca, Leuctra geniculata, Leuctra hippopus*
Insects - Caddisflies	*Oecetis testacea, Brachycentrus subnubilis, Goera pilosa, Hydropsyche contubernalis, Hydropsyche pellucidula, Hydroptila* sp., *Lepidostoma hirtum, Ceraclea dissimilis, Mystacides longicornis, Ylodes conspersus, Limnephlis lunatus, Polycentropus flavomaculatus, Rhyacophila dorsalis*
Insects - Alderflies	*Sialis lutaria*
Insects - Dragonflies	*Calopteryx splendens*
Insects - Hemiptera	*Aphelocheirus aestivalis*

5. DISCUSSION

5.1 RECORDS OF RARE AND SCARCE AQUATIC INVERTEBRATES.

The Biodiversity Action Plan (BAP) for Rivers and Ditches in Oxfordshire lists several aquatic invertebrates that are Priority BAP Species. These are shown below.

Depressed river mussel	*Pseudoanodonta complanata*
Freshwater pea mussel	*Pisidium tenuilineatum*
Southern damselfly	*Coenagrion mercuriale*
Desmoulin's whorl snail	*Vertigo moulinsiana*
White-clawed crayfish	*Austropotamobius pallipes*

The Environment Agency (EA) has provided data from their aquatic invertebrate surveys at 5 sites on the Windrush in the vicinity of Witney. Three of the sampling sites are upstream of our study area, the other two are downstream. Most of these surveys by the EA identified specimens to species level, including difficult groups such as *Pisidium* (pea mussels). None of the five species listed above has been recorded in this reach of the Windrush by the EA.

Tim Sykes (Environment Agency) was contacted by AEC regarding the location of the Southern damselfly population in Oxfordshire. He confirmed that there are no records for Southern damselfly in the Windrush, but thought that it the Windrush and smaller ditches near Witney could potentially support this species. We therefore took particular care with identifying damselfly larvae, but no *Coenagrion mercuriale* were present in the samples.

The surveys by AEC have not recorded any BAP Priority species of aquatic invertebrate, but some Nationally Scarce and RDB aquatic invertebrates were present.

5.1.1 Nationally Scarce

The definition of Nationally Scarce is provided by the Joint Nature Conservation Committee in their Species Status Assessment Project:

> "A category of frequency, not threat, applied to any species occurring in 16-100 hectads (10 km squares) throughout GB. Includes the now unused old Invertebrate Site Register categories of:
>
> Notable A = 30 or fewer hectads
>
> Notable B = 31-100 hectads"

The Nationally Scarce category includes some species that will move into *Near Threatened* when the criteria for that category are finalised.

The following Nationally Scarce species were recorded by either AEC and/or the EA:

Riolus cupreus	Nationally Scarce AEC & EA
Riolus subviolaceus	Nationally Scarce AEC & EA
Gyrinus urinator	Nationally Scarce AEC & EA
Anacaena bipustulata	Nationally Scarce AEC only
Ylodes conspersus	Nationally Scarce AEC only

All these records were from riverine sites, mostly on the main river. The only Nationally Scarce species recorded from the minor channels was *Riolus subviolaceus* at Site 8 in May 2003. Nationally Scarce species were recorded at every site on the main channel except site 4 (below the A40 road bridge).

5.1.2 Red Data Book (RDB) Species

The water beetle *Normandia nitens* is a RDB 2 species, ie it is classed as Vulnerable. The definition of Vulnerable is taxa that are believed likely to move into the Endangered category (RDB 1) in the near future if the causal factors continue operating (Hyman, 1992). This species was only recorded by the EA, at a site downstream of our sites on the Windrush. It could be affected by a significant pollution incident during construction or operation of the new road.

The water beetle *Hydrochus brevis* is a RDB 3 species, ie it is classed as Rare (Hyman, 1992). The definition of Rare is those species with small populations that are not at present Endangered (RDB1) or Vulnerable (RDB 2) but are at risk. This species was only recorded at site 9 (the marshy site).

5.2 DIVERSITY

The main channel of the River Windrush was relatively diverse. In May 2003 most sites had 62-69 taxa per site and in September 59 - 62 taxa per site. The exception was site 4 (under the

A40 road bridge), which had only 41 taxa in May and 33 taxa in September 2003. This represents 66% and 55% respectively of the number of taxa at the nearest upstream site. The reasons for the reduction in diversity at site 4 are considered in detail in section 5.4.

The smaller channels of the Windrush (sites 6-8) were relatively diverse in May (52-68 taxa), but sites 6 & 8 showed a larger than expected reduction in September, falling to 43 taxa at both sites. This may have been due to low flows during an unusually dry summer, or possibly pollution from the nearby road and/or industrial estate.

The marshy area (site 9) had 31 taxa in May, but only 14 in September 2003. The most obvious feature of the marshy area at site 9 is the dominance by bulrush (*Typha latifolia*) and the shallow water with high concentrations of sulphides. The marshy area supported a reasonably diverse assemblage of invertebrates, adapted to the poor water quality conditions. Several species, mainly water beetles, were only recorded at this site:

Water bugs	*Nepa cinerea* (water scorpion)
Water beetles	*Anacaena limbata, Agabus sturmii, Noterus clavicornis, Hygrotus inequalis, Hydrochus brevis, Laccobius minutus, Laccobius bipunctatus & Coelostoma orbiculare*

The presence of the water beetle *Hydrochus brevis* at site 9 is noteworthy, as it is a RDB3 species (Hyman, 1992).

The two ditches that were sampled (sites 10 & 11) had 17-19 taxa per site in May. These sites were not sampled in September due to the lack of water. The lack of permanent water in the ditches is the most likely reason for their relatively low diversity. Temporary water bodies can support some rare or unusual species, but none were recorded at Sites 10 & 11.

5.3 COMPARISON WITH ENVIRONMENT AGENCY DATA

The Environment Agency provided data for three upstream sites and two downstream sites. At the three upstream sites the Windrush is in a single channel:

Worsham Works	NGR SP 30200 10700 (3 occasions)
Minster Lovell Recreation Ground	NGR SP 39100 11100 (3 occasions)
Witan Way.	NGR SP 35900 10100 (3 occasions)

At the downstream sites for which we obtained data the Windrush is in two channels:

Windrush (West Arm) at Cokethorpe.	NGR SP 36600 07000 (4 occasions)
Windrush (East Arm) at Cokethorpe.	NGR SP 37000 07355 (4 occasions)

All available EA data for the period 2001 to 2003 were obtained, but results from most samples in 2003 were not yet available. EA data for two nearest upstream sites and the two downstream sites were entered into an Access database. Data from the AEC surveys were added to the database, and the results examined to check that there was reasonable agreement between the two data sets (Table 3).

Although the sites examined by AEC were not completely comparable with the sites surveyed by the EA, Table 3 shows that there was good agreement between the list of species. Of the 143 distinctly different taxa recorded by AEC and the EA in the Windrush, 87 (61%) were common to both lists. AEC recorded 31 taxa not recorded by the EA. The EA recorded 25 taxa not recorded by AEC. The agreement was best for groups such as molluscs, and poorer

for Diptera (more EA records) and beetles (more AEC records). The main reasons for the differences that did occur are likely to be:

- Different locations for EA and AEC sites
- Species at low densities may not be present in each sample
- Different taxonomic expertise and interests of the biologists sorting the samples
- EA data were mainly from 2001/02 but AEC data were from 2003
- EA samples were from either 3 or 4 sampling occasions, compared to 2 for AEC
- AEC sampled more intensively on the main river, with 5 sites over a relatively short distance.

BMWP (Biological Monitoring Working Party) mean scores for most AEC sites on the main River Windrush ranged from 199-221, somewhat higher than the mean scores of 166 to 180 obtained by the EA for upstream and downstream sites. The only exception was AEC site 4, which was deliberately placed under the A40 road bridge to determine the impact of shading by the bridge on aquatic invertebrates. At site 4 the mean BMWP score was 131, about 63% of the value at other AEC sites on the main river. The Average Score Per Taxon (ASPT) was only slightly reduced under the bridge. This is because the bridge affected taxa belonging to low, middle and high scoring families on the BMWP scoring system.

The only Nationally Scarce species recorded from the minor channels was *Riolus subviolaceus* at Site 8 in May 2003.

The smaller channels had BMWP scores in May 2003 ranged from 177-235, similar to AEC sites on the main river (203-216, excluding site 4). BMWP scores for sites on the smaller channels were lower in September (141-161). These values were lower than most AEC sites on the main river (187 - 225). AEC results were also compared with those for EA sites downstream, where the river Windrush is in two channels. In 2001-2002 these downstream sites had mean BMWP scores of 175 for the western arm and 180 for the eastern arm.

Mean ASPT on the smaller channels was 5.64 in May and 5.39 in September 2003. This was slightly below the mean ASPT of all 5 sites on the main channel (5.82 in May and 5.65 in September). The September values were also lower than the mean values for downstream EA sites (data for 2001/02) of 5.54 for the western arm and 5.67 for the eastern arm.

The reduced BMWP and ASPT scores at site 8 in September may have been due to low summer flows or pollution from the nearby industrial estate.

Table 3 also allows an initial assessment of invertebrate communities in the event that the impacts of other potential routes for the link road are considered.

5.4 IMPACTS OF ROAD BRIDGES

The only species recorded at Site 2 (the point where the proposed road would cross the main channel of the Windrush) that was not found at other sites on the Windrush was the water beetle *Anacaena lutescens*. This species prefers acidic waters (Friday, 1988) which may explain the low numbers on the relatively alkaline Windrush. The loss of overall invertebrate diversity on the Windrush due to the new bridge is expected to be negligible. The general impacts of road bridges on aquatic invertebrates are considered in Section 6.2.

Site 4 was directly under the A40 road bridge. This site was chosen to aid prediction of the impacts of the new road bridge over the Windrush. Information on the ecology of the species apparently affected by the bridge was obtained from various sources (eg Edington and Hildrew, 1995; Elliott, 1977; Elliott et al, 1988; Kerney, 1999; Wallace, 1991).

Table 2 was examined to see which taxa were absent from Site 4 but present at other sites on the main river. Any taxon that appeared to be numerous beneath the bridge were also noted. The only taxon which was more abundant beneath the bridge at Site 4 in both surveys was oligochaete worms. In September 2003 *Gammarus pulex* was more common beneath the bridge than at other sites. The invertebrates absent from site 4, presumably due to the bridge, are shown below:

Taxon	Possible reason for absence
Asellus meridianus Water hog louse	This species feeds on detritus (ie it is a detritivore). Amounts of detritus under the bridge are expected to be lower due to reduced direct impacts from leaf-fall and lack of in-stream and marginal plants.
Gyrinidae Whirligig beetles	These beetles feed mainly on insects that fall onto the surface of the water. This may occur less frequently under the bridge.
Brychius elevatus A water beetle	Reason unclear; insufficient data on ecology.
Baetis vernus A mayfly larva	Lack of macrophytes for clinging to. Possibly unattractive for adults to lay eggs. Lack of detritus and algae to feed on. May be other reasons unrelated to the bridge, as it was also absent from sites 1 and 6.
Centroptilum luteolum A mayfly larva	Lack of macrophytes for clinging to. Possibly unattractive for adults to lay eggs. Lack of detritus and algae to feed on.
Caenis luctuosa A mayfly larva	Possibly unattractive for adults to lay eggs. Lack of detritus and algae to feed on.
Habrophlebia fusca A mayfly larva	Lack of macrophytes for clinging to. Possibly unattractive for adults to lay eggs. Lack of detritus and algae to feed on.
Sialis lutaria Alder fly larvae	The adults probably find the site unattractive for egg laying. Eggs are usually laid on plant stems, but stones, even on bridges are also used (Elliott, 1977). Although older stages of alder-fly larvae are carnivorous on oligochaetes and chironomids, the youngest stage (1st instar) also feed on detritus, which is expected to be less common under the bridge.
Calopteryx splendens Larvae of the banded demoiselle	The lack of suitable plants for adults to lay their eggs on is the most likely reason for the absence of this species.
Goera pilosa A caddisfly larva	This species favours stony substrata in streams and rivers. Larvae feed by scraping algae and material from surfaces (Wallace et al, 1990). Diet may be limited beneath bridge.
Mystacides longicornis A caddisfly larva	The favoured habitat for the larvae of this species is muddy or fine sand substrata and among vegetation in very slow flowing rivers (Wallace, 1991). These habitats are limited beneath the bridge.
Oecetis testacea A caddisfly larva	This species is most numerous among stones under plants (Wallace et al, 1990), so its absence from site 4 may be due to the lack of plants. Note that *Oecetis* sp. was recorded at site 4.
Ylodes conspersus A caddisfly larva	Larvae are principally found amongst *Ranunculus* in fairly fast-flowing productive medium to large rivers (Wallace, 1991). This macrophyte habitat is absent beneath the bridge.
Polycentropus flavomaculatus A caddisfly larva	Larvae of this species favour stony substratum within streams and rivers. They feed by building nets to snare prey among crevices in less exposed locations. Larvae favour stream pools as their nets disintegrate when exposed to high velocities (Edington and Hildrew, 1995).
Acroloxus lacustris A freshwater limpet	Freshwater limpets graze on algae. It was therefore surprising that the river limpet (*Ancylus fluviatilis*) was present at Site 4. The lake limpet (*Acroloxus lacustris*) was not recorded at Site 4. The former is associated with stones, whereas the latter is usually found attached to vegetation (Kerney, 1999).
Bithynia tentaculata A water snail	This species favours muddy sediments with dense growths of aquatic plants (Kerney, 1999).
Planorbis carinatus Keeled ramshorn	This species is found in well-vegetated aquatic habitats (Kerney, 1999).

6. ASSESSMENT OF IMPACTS ON AQUATIC INVERTEBRATES

Roads and motorways are well-known polluters of streams and rivers, both during construction (Extence, 1978; McNeill, 1996) and operation (Hewitt & Rashed, 1992; Pontier et al, 2001).

The invertebrate data collected during these surveys will be an important component of the Environmental Statement. Detailed impact prediction and mitigation of impacts will require dialogue between the various specialists, both within the Babtie Group and Oxfordshire County Council and with relevant personnel from the Environment Agency. With the present level of detail available about the road development it is only possible to identify key areas for consideration.

Provided that sufficient care is taken in design, construction and maintenance it will be possible for the Witney-Cogges link road to have a minimal environmental impact on freshwater invertebrates. Achieving a minimal impact will, however, require commitment from all parties during the detailed planning and construction phases of the road.

6.1 CONSTRUCTION IMPACTS

Aquatic impacts from road construction are mainly due to mobilisation of stream bed sediments and from bankside soil entering the stream. Methods to minimise inputs of sediments and accidental spillages of fuels and lubricants during construction need to be effectively communicate to contractors. Working methods near watercourses should be agreed with staff from the Environment Agency. Ideally an environmental specialist should be on site whenever working near a watercourse, and to check that oil, lubricants and other chemicals are being stored, used and disposed of properly.

A system should be in place for dealing with any pollution incident, however small. It is essential that contractors inform the Environment Agency as soon as possible after an incident.

There will also be a direct loss of aquatic habitat, the marshy area (site 9) that is densely colonised by bulrush (*Typha latifolia*). This is directly on the road route, and is understood to have been inadvertently created by ground condition surveys for the road many years ago. Although it is not a natural feature it has some value for aquatic invertebrates. It would be possible to re-create this habitat away from the road route, and provided that ecological advice was taken at the design stage its ecological value could be enhanced. A new marshy area could provide a greater range of micro-habitats, eg different water depths ranging from a few cms to 30 cm, and different levels of shading by plants. We advise that fish should be excluded from the constructed wetland, to increase its attractiveness to invertebrates and amphibians.

6.2 OPERATIONAL IMPACTS

Operational impacts on water quality and ecology come from a range of sources (Environment Agency, 2002):

- metals (lead, cadmium, zinc etc), hydrocarbons (especially PAHs) and suspended solids from vehicles fuel, lubricants and tyres
- salt from de-icing operations
- spillages and fire-fighting water, as a result of accidents
- erosion of sediments and soils due to improperly located discharges from road run-off

Of these impacts, those due to accidents are the most difficult to mitigate against. The best solution would be to have all run-off directed to constructed wetlands whose primary purpose was in flow balancing and retention of pollutants (ie their ecological function would be secondary). It may be that over time the amount of salt entering the constructed wetland would create a slightly saline habitat. This would result in fewer species of invertebrates and plants, but could be attractive to several species of water beetle and other invertebrates that thrive in brackish water.

It will be important to ensure that inputs of sediments to the Windrush are not increased, as this could cause siltation of the gravel beds and reduce suitability for fish spawning. If the Environment Agency permits any discharges of run-off to the Windrush the suspended solids content should be minimised by passage through a constructed wetland, which will also help to attenuate flows. Any discharge to the Windrush should be engineered so that there is no erosion of nearby bank sediments.

In addition there will be impacts from the new bridges over the three channels of the Windrush. These will produce a poorer quality habitat for aquatic invertebrates, but the length of river affected is likely to be only immediately below each bridge. Impacts from each bridge will be due to:

- Shading and resultant loss of higher plants and algae
- No suitable plants for those invertebrates that lay their eggs on plants (eg damselflies)
- Other impacts due to absence of plants (eg loss of source of detritus, loss of shelter and food for some invertebrates)
- Cooler daytime temperatures in summer due to shading. Possibly warmer temperatures on cold winter nights.
- Reduced direct input of plant matter, eg falling leaves, likely to result in less detritus on the river bed.
- Noise impacts on invertebrates are poorly understood, but are not considered likely to have a significant effect.

Overall the list of invertebrate species that will be affected by the new bridges is likely to be similar to those listed in Section 4.4. In addition there are likely to be local impacts on brook lampreys, which were recorded at both the sites where bridges are proposed (Sites 2 and 7). Although brook lampreys may be widely distributed on the Windrush it would be advisable to discuss the implications with the Environment Agency and English Nature, as they have some legal protection.

Although it would be possible mitigation for some of the bridge impacts, eg by providing artificial lighting that mimicked daylight, it is unlikely that these ideas would be seen as practical or desirable. It would be better to create additional still-water aquatic habitats, either as part of the constructed wetlands for treating road run-off, or as separate water bodies. The latter would ensure that they remained unpolluted, even after a spillage of toxic chemicals on the link road.

The road crossing at Site 6 is likely to require a culvert. This is much more damaging than a bridge, as it creates a habitat that is unsuitable for most aquatic invertebrates. Impacts of the culvert may persist for some metres downstream.

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Photo 1. Site 1, May 2003.

Photo 2. Site 2, May 2003.

Photo 3. Site 3, May 2003.

Photo 4. Site 4. River Windrush under the A40 dual carriageway, May 2003.

Photo 5. Site 5, May 2003.

Photo 6. Site 6, May 2003.

Photo 7. Site 7, May 2003.

Photo 8. Site 8, May 2003.

Photo 9. Site 9, May 2003.

Photo 10. Site 10, May 2003.

Photo 11. Site 11. May 2003.

Photo 12. Site 12, May 2003.

Figure 1. Aerial photograph of the study area showing the approximate route of the proposed road (in grey). See Figures 2 & 3 for sampling sites.
The eastern part of the route does not cross any ponds or watercourses and therefore no samples were obtained in this area.

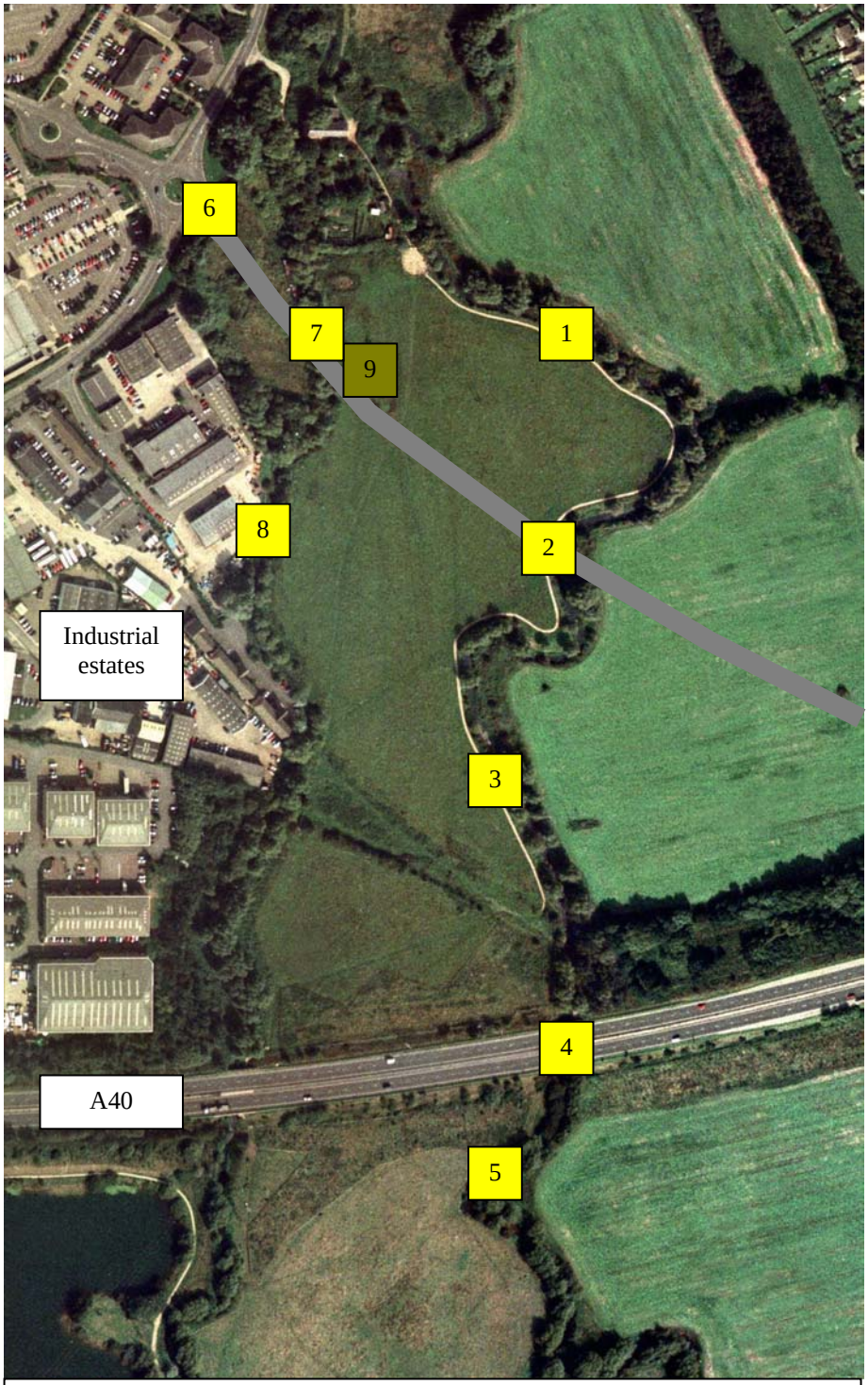


Figure 2. Sampling sites 1-9. Yellow sites are riverine, site 9 was a marshy area. Sites 1-5 on the main channel of the River Windrush.
Grey line shows approximate route of proposed Witney-Cogges Link

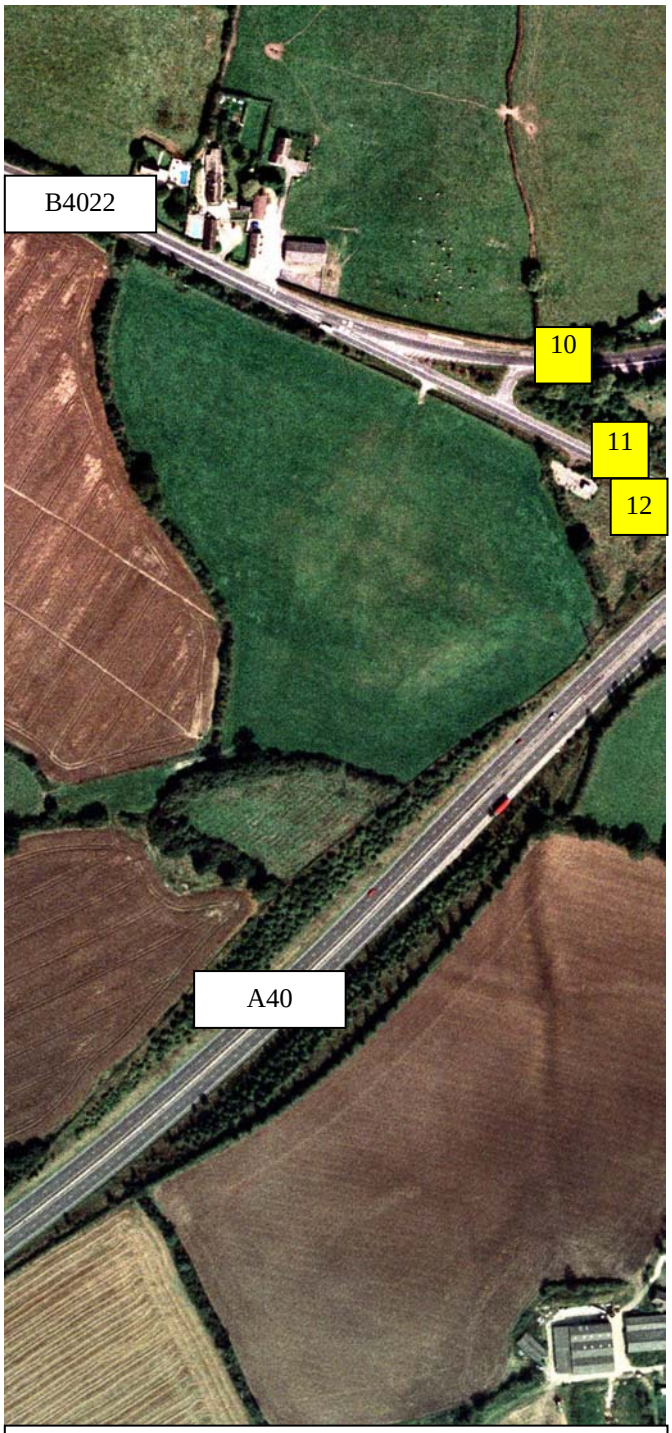


Figure 3. Sampling sites 10-12. All ditches. No sample obtained at Site 12 due to insufficient water depth.

FIGURE 4. BMWP SCORES ON THE RIVER WINDRUSH, 2003

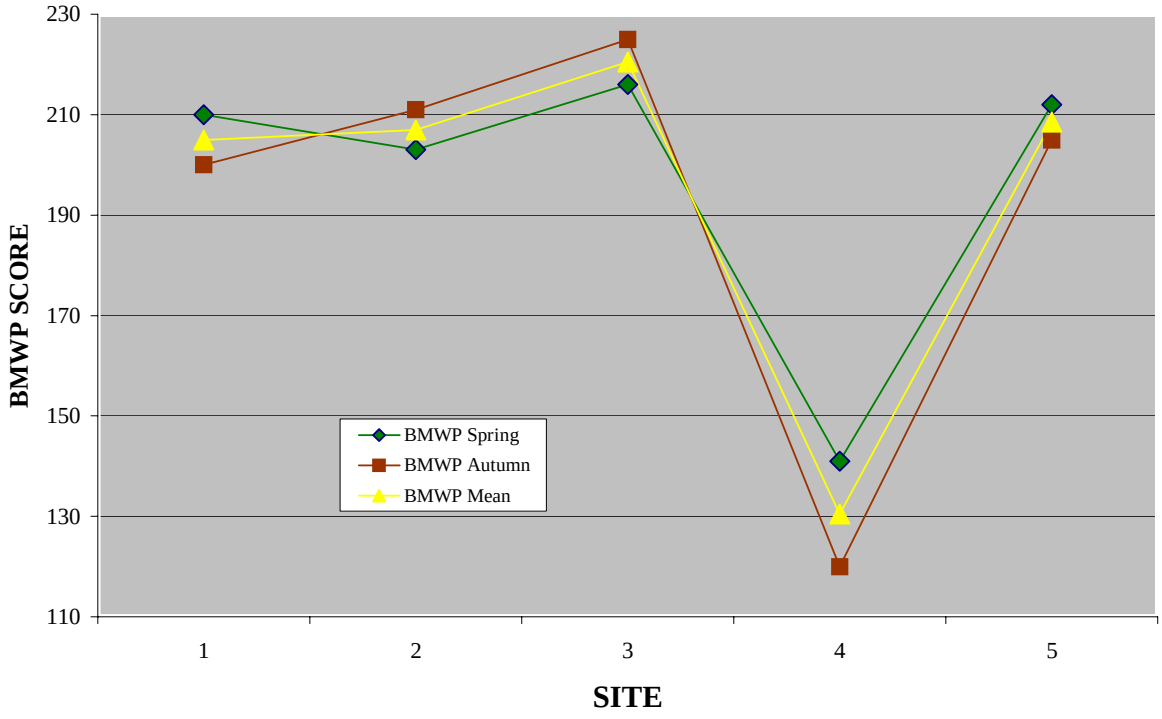


FIGURE 5. AVERAGE SCORE PER TAXON (ASPT) ON THE RIVER WINDRUSH 2003

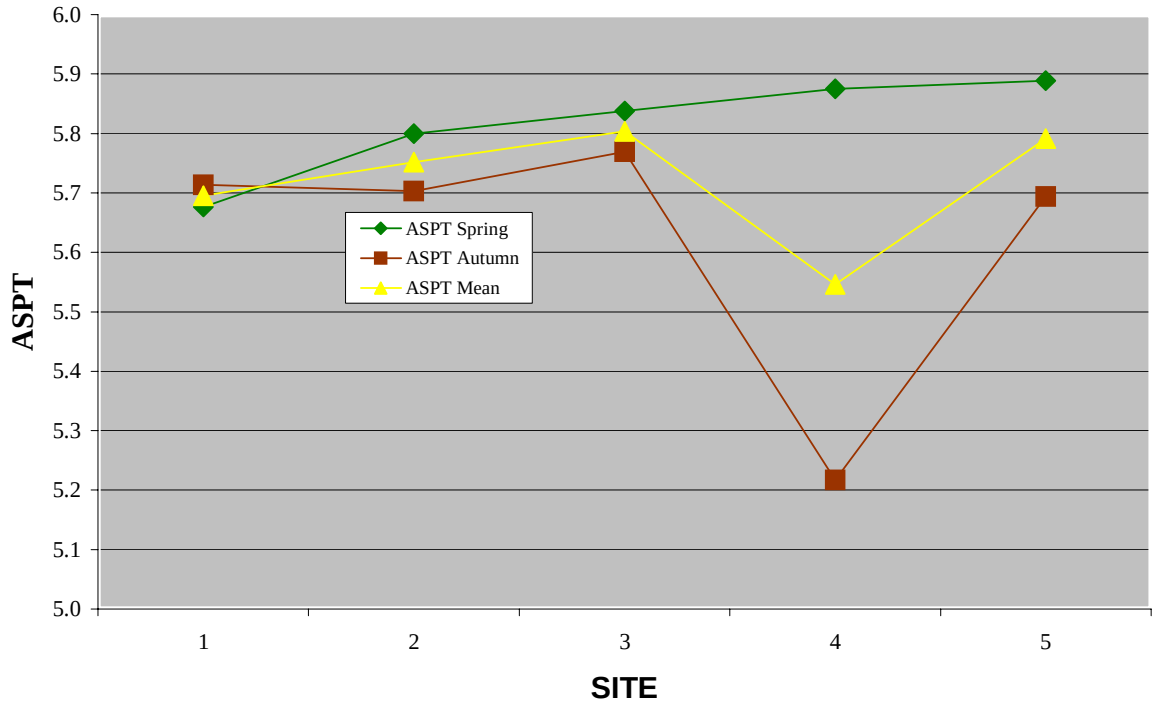
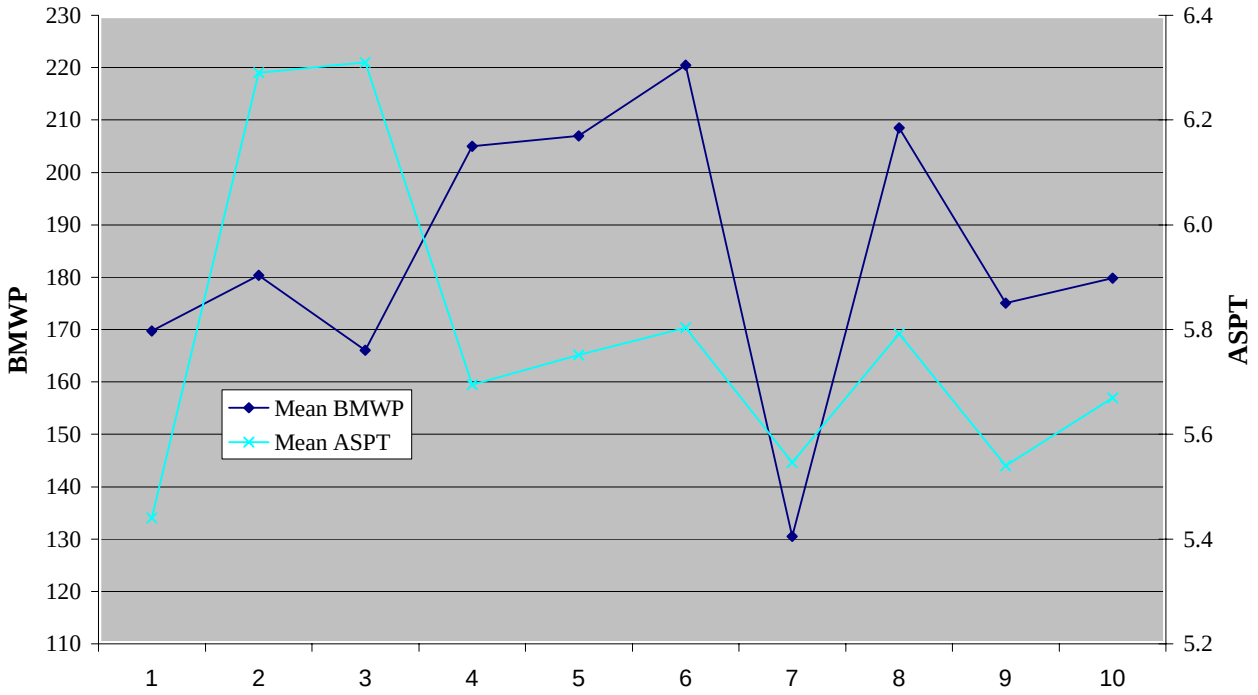


FIGURE 6. COMPARISON OF BMWP & ASPT MEAN VALUES WITH ENVIRONMENT AGENCY DATA



SITE (1-3 & 9-10 ARE EA SITES, SITE 4 = AEC SITE 1, SITE 7 = AEC SITE 4)

NOTE THAT SITES ARE NUMBERED GOING DOWNSTREAM

Site 1	EA site at Worsham Works, NGR SP30200 10700 (3 occasions)
Site 2	EA site at Minster Lovell Recreation Ground, NGR SP 39100 11100 (3 occasions)
Site 3	EA site at Witan Way, NGR SP35900 10100 (3 occasions)
Site 4	AEC site 1 (2 occasions)
Site 5	AEC site 2 (2 occasions)
Site 6	AEC site 3 (2 occasions)
Site 7	AEC site 4 (2 occasions)
Site 8	AEC site 5 (2 occasions)
Site 9	EA site, West Arm of the Windrush at Cokethorpe, NGR SP 36600 07000 (4 occasions)
Site 10	EA site, East Arm of the Windrush at Cokethorpe, NGR SP 37000 07355 (4 occasions)

TABLE 1A. PHYSICAL AND CHEMICAL DATA FOR SAMPLING SITES, 29 MAY 2003

WITNEY-COGGES LINK												
SPRING SURVEY												
29-May-03	1	2	3	4	5	6	7	8	9	10	11	12
NGR	SP 36138 09109	SP 36128 08955	SP 36110 08804	SP 36137 08703	SP 36104 08610	SP 35930 09186	SP 35994 09127	SP 35957 08969	SP 36016 09083	SP 37487 09597	SP 37463 09579	SP 37496 09545
Type	River	River	River	River	River	River	River	River	Marshy area	Ditch	Ditch	Ditch
Time (BST)	11:15	10:35	09:45	09:20	09:00	13:00	13:30	12:10	12:35	15:05	15:30	15:40
Dissolved oxygen (mg/l)	8.82	8.40	9.30	8.95	9.20	10.28	10.03	8.15	NA	NA	NA	NA
Dissolved oxygen (%)	88.7	84.4	92.5	88.3	97.0	106.0	102.4	83.1	NA	NA	NA	NA
pH (pH units)	8.2	8.2	8.1	8.1	8.1	8.1	8.2	8.2	NA	NA	NA	NA
Conductivity (uS/cm)	466	467	467	468	468	465	465	467	NA	NA	NA	NA
Temperature (C)	16.3	15.8	15.5	15.4	15.5	16.5	16.8	16.2	NA	NA	NA	NA
Cobbles (%)	0	3	0	0	0	10	2	0	NA	NA	NA	NA
Pebbles (%)	2	25	10	5	5	25	10	2	NA	NA	NA	NA
Gravel (%)	86	65	80	90	77	40	58	73	NA	NA	NA	NA
Sand (%)	10	4	10	5	17	10	20	10	NA	NA	NA	NA
Silt (%)	2	0	0	0	1	15	10	15	NA	NA	NA	NA
Clay (%)	0	3	0	0	0	0	0	0	NA	NA	NA	NA
Mean width (m)	10.6	6.1	6.8	8.3	6.4	1.85	4.2	5.9	39x22m	0.3	0.7	0.1
Depth 1 (cm)	22	40	48	24	27	14	45	50	NA	NA	9	NA
Depth 2 (cm)	53	26	40	25	39	30	53	51	NA	NA	8	NA
Depth 3 (cm)	49	28	39	24	51	32	57	56	NA	NA	4	NA
Mean depth (cm)	41.3	31.3	42.3	24.3	39.0	25.3	51.7	52.3	3	3	7.0	1
Cover by algae (%)	2	25	4	1	2	NA	6	3	NA	NA	NA	NA
Cover by moss (%)	0	0	0	0	0	NA	0	0	0	NA	NA	NA
Cover by macrophytes (%)	60	40	45	0	20	NA	10	50	NA	NA	NA	NA
Photos	33-36	28-32	25-27	19-23	16-18	40-42	43-44	37-38	39	11,12	45-46	47-48

TABLE 1B. PHYSICAL AND CHEMICAL DATA FOR SAMPLING SITES, 5 SEPTEMBER 2003

WITNEY-COGGES LINK												
AUTUMN SURVEY												
05-Sep-03	1	2	3	4	5	6	7	8	9	10	11	12
NGR	SP 36138 09109	SP 36128 08955	SP 36110 08804	SP 36137 08703	SP 36104 08610	SP 35930 09186	SP 35994 09127	SP 35957 08969	SP 36016 09083	SP 37487 09597	SP 37463 09579	SP 37496 09545
Type	River	River	River	River	River	River	River	River	Marshy area	Ditch	Ditch	Ditch
Time (BST)	12:10	11:45	11:20	10:55	10:40	14:15	13:30	13:05	13:55	NO WATER	NO WATER	NO WATER
Dissolved oxygen (mg/l)	NA	NA	NA	NA	NA	NA	NA	NA	NA			
Dissolved oxygen (%)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NOT	NOT	NOT
pH (pH units)	8.0	8.0	8.0	7.9	7.9	8.0	8.3	8.1	NA	SAMPLED	SAMPLED	SAMPLED
Conductivity (uS/cm)	489	492	492	493	492	479	486	490	NA			
Temperature (C)	14.9	14.7	14.6	14.4	14.4	15.2	15.4	14.9	NA			
Cobbles (%)	1	5	0	0	0	20	10	5	NA			
Pebbles (%)	9	20	10	2	8	40	20	10	NA			
Gravel (%)	65	60	70	85	70	30	60	75	NA			
Sand (%)	25	12	17	13	20	10	10	10	NA			
Silt (%)	0	2	3	0	2	0	0	0	NA			
Clay (%)	0	1	0	0	0	0	0	0	NA			
Mean width (m)	8.0	7.0	6.6	8.3	7.9	1.4	3.2	5.0	39x22m			
Depth 1 (cm)	31	31	21	17	30	23	44	49	NA			
Depth 2 (cm)	35	15	35	15	50	25	42	47	NA			
Depth 3 (cm)	24	7	34	13	41	13	35	46	NA			
Mean depth (cm)	30.0	17.7	30.0	15.0	40.3	20.3	40.3	47.3	2			
Cover by algae (%)	5	15	20	3	10	10	15	2	NA			
Cover by moss (%)	0	0	0	0	0	5	0	0	NA			
Cover by macrophytes (%)	8	20	25	0	30	0	45	70	>95			
Photos	10,11	8,9	6,7	2,3,4,5	1	16,17,18	13,14	12	15			

	TABLE 2	**SPECIES RECORDED AT EACH SAMPLING SITE**										
	Witney-Cogges Link	**29/05/2003**										
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**	**Site 10**	**Site 11**
		River	River	River	River	River	River	River	River	Marsh	Ditch	Ditch
Tricladida	*Polycelis tenuis*						P					
Flatworms	*Polycelis felina*						P					
	Planariidae indet.										P	
	Dendrocoelum lacteum										P	
Hirudinea	*Glossiphonia complanata*	P	P	P		P	P	P	P			
Leeches	*Helobdella stagnalis*	P								P		
	Erpobdella octoculata	P		P	P	P	P	P	P			
	Piscicola geometra	P	P	P	P	P	P	P	P			
	Theromyzon tessulatum											
Mollusca	*Theodoxus fluviatilis*	P	P	P	P	P	P	P	P			
Snails & bivalves	*Bithynia tentaculata*	P	P	P		P	P	P	P			
	Acroloxus lacustris	P	P	P		P	P	P	P			
	Ancylus fluviatilis	P	P	P	P	P	P	P				
	Lymnaea peregra	P	P	P		P	P	P	P			
	Lymnaea truncatula											P
	Lymnaea stagnalis											
	Valvata piscinalis	P	P	P	P	P		P	P			
	Valvata cristata	P	P	P	P	P	P	P	P			
	Planorbis planorbis					P						
	Anisus vortex	P	P			P						
	Bathyomphalus contortus	P	P	P	P	P	P	P	P			
	Gyraulus albus	P			P				P			
	Planorbis carinatus	P	P	P								
	Anisus leucostoma								P			
	Gyraulus laevis								P	P		
	Potamopyrgus antipodarum	P	P	P	P	P	P	P	P	P	P	P
	Physa fontinalis	P	P	P					P			
	Sphaerium corneum	P	P		P		P	P	P			
	Pisidium henslowanum	P	P	P	P			P	P			
	Pisidium subtruncatum	P	P	P	P	P	P	P	P			
	Pisidium hibernicum	P						P	P			
	Pisidium nitidum	P	P	P	P	P	P	P	P			
	Pisidium amnicum		P									
	Pisidium casertanum							P	P			
	Pisidium personatum										P	P
	Pisidium milium											
	Sphaeriidae indet.			P								
	Armiger crista											
Crustacea	*Gammarus pulex*	P	P	P	P	P	P	P	P		P	
	Gammarus sp.		P	P	P							
	Asellus meridianus	P	P	P		P	P	P	P		P	P
	Asellus aquaticus						P		P	P	P	
Hemiptera	*Micronecta* sp.								P			
Water bugs	*Nepa cinerea*									P		
	Velia sp.										P	P

	Witney-Cogges Link		**29/05/2003**								
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**	**Site 10**	**Site 11**
	Velia capnai											
	Aphelocheirus aestivalis	P	P	P	P	P	P	P	P			
	Hydrometra stagnorum											
	Sigara dorsalis											
Trichoptera 1	*Polycentropus flavomaculatus*		P	P		P	P	P	P			
Caseless Caddis	*Hydropsyche pellucidula*	P	P	P	P	P						
	Hydropsyche instabilis		P				P	P	P			
	Hydropsyche contubernalis											
	Hydropsyche angustipennis											
	Hydropsyche sp.											
	Cheumatopsyche lepida						P					
	Rhyacophila dorsalis	P	P	P	P	P	P	P	P			
	Rhyacophila sp.	P	P	P		P		P	P			
	Psychomyia pusilla	P										
	Lype reducta							P				
Trichoptera 2	*Arthripsodes cinereus*					P			P			
Cased Caddis	*Arthripsodes* sp.	P	P	P	P	P	P		P			
	Arthripsodes bilineatus	P	P						P			
	Lepidostoma hirtum	P	P	P	P	P	P	P	P			
	Oecetis testacea	P	P	P		P	P	P	P			
	Oecetis sp.				P							
	Ceraclea dissimilis	P	P		P	P	P	P	P			
	Ceraclea sp.				P							
	Mystacides azurea	P				P	P	P	P			
	Mystacides longicornis	P	P	P		P						
	Mystacides sp.											
	Triaenodes bicolor	P	P	P								
	Ylodes conspersus	P	P	P		P						
	Ylodes sp.					P		P				
	Adicella reducta		P									
	Goera pilosa	P		P		P			P			
	Halesus radiatus		P			P			P			
	Potamophylax latipennis		P				P		P			
	Hydroptila sp.		P	P		P	P	P	P			
	Brachycentrus subnubilus	P	P	P	P	P			P			
	Limnephilus lunatus	P	P	P			P		P	P		
	Limnephilus rhombicus			P								
	Chaetopteryx villosa					P						
	Limnephilidae indet.			P		P	P				P	
	Leptoceridae indet.		P	P								
	Lepidostomatidae indet.		P									
	Molanna angustata								P			
Ephemeroptera	*Ephemera danica*	P	P	P	P	P	P	P	P			
Mayfly larvae	*Caenis luctuosa*		P	P		P	P	P	P			
	Caenis horaria											
	Ephemerella ignita	P	P	P	P	P	P	P	P			
	Habrophlebia fusca	P	P	P		P						
	Paraleptophlebia sp.		P			P						
	Leptophlebiidae indet.											

	Witney-Cogges Link	**29/05/2003**										
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**	**Site 10**	**Site 11**
	Baetis scambus	P	P		P	P	P					
	Baetis rhodani	P	P	P	P	P	P	P	P			
	Baetidae indet.	P		P		P						
	Baetis vernus			P		P			P			
	Centroptilum luteolum	P						P	P			
	Procloeon bifidum	P	P					P	P			
	Cloeon dipterum											
Odonata	*Calopteryx splendens*	P		P		P			P			
Damselflies	Coenagrioniidae indet.	P										
Plecoptera	*Leuctra geniculata*	P	P	P	P	P	P	P	P			
Stonefly larvae	*Leuctra hippopus*	P	P	P	P	P	P	P	P			
	Leuctra fusca											
Neuroptera	*Sialis lutaria*	P				P		P	P	P		
Alderfly larvae												
Coleoptera	*Limnius volkmari*	P	P	P	P	P	P	P	P			
Beetles	*Elmis aenea*	P	P	P	P	P	P	P	P			
	Limnius sp.	P	P	P	P	P	P	P				
	Anacaena globulus	P	P			P			P			P
	Anacaena bipustulata			P		P						
	Anacaena limbata									P		
	Anacaena lutescens		P									
	Esolus parallelepipedus	P			P							
	Hydraena riparia group	P										
	Hydraena gracilis											
	Hydraena sp.		P						P			
	Potamonectes depressus elegans	P	P					P	P			
	Potamonectes sp.								P			
	Brychius elevatus	P		P					P			
	Gyrinus urinator											
	Gyrinidae indet.	P						P				
	Orectochilus villosus						P					
	Oulimnius tuberculatus			P					P			
	Oulimnius sp.											
	Dyticsidae indet.		P							P	P	
	Dryops sp.						P					
	Riolus subviolaceus								P			
	Riolus cupreus											
	Agabus sp. larvae									P		
	Agabus sturmii									P		
	Agabus didymus										P	P
	Agabus bipustulatus											
	Agabus paludosus											
	Helophorus minutus											P
	Helophorus brevipalpis									P		
	Helophorus grandis											
	Helophorus sp.										P	P
	Scirtes sp.											P

	Witney-Cogges Link		**29/05/2003**								
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**	**Site 10**	**Site 11**
	Hydroporus sp.											P
	Hydroporus tessellatus											P
	Noterus clavicornis									P		
	Hygrotus inaequalis									P		
	Hydrochus brevis									P		
	Laccobius minutus									P		
	Laccobius bipunctatus									P		
	Coelostoma orbiculare									P		
	Haliplus confinis											
	Platambus maculatus											
Tipulidae	*Tipula paludosa*		P			P		P				
Cranefly larvae	*Pseudolimnophila* sp.									P		P
	Gonomyia sp.									P		P
	Dicronota sp.	P	P	P	P	P	P		P			
	Tipulidae indet.					P		P		P	P	P
Others	Simuliidae	P	P		P	P	P	P	P			
	Chironomidae	P	P	P	P	P	P	P	P	P	P	P
	Oligochaeta	P	P	P	P	P	P	P	P	P	P	P
	Lumbricidae	P			P	P						P
	Hydracarina	P		P	P	P	P	P		P		
	Ceratopogonidae			P	P			P		P	P	
	Psychodidae			P			P	P		P	P	P
	Stratiomyiidae			P				P		P		
	Empididae						P	P				
	Culicidae									P		
	Phoridae									P		
	Sciomyziidae									P		
	Ptychopteriidae									P		
	Porifera							P				
	NO OF INVERTEBRATE TAXA	69	67	62	41	64	52	56	68	31	17	19
Fish	*Cottus gobio*	P	P	P	P	P	P	P	P			
	Gasterosteus aculeatus	P										
	Phoxinus phoxinus						P					
	Lampetra planerii		P					P	P			

	TABLE 2	**TABLE 2**								
	Witney-Cogges Link		**05/09/2003**							
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**
		River	River	River	River	River	River	River	River	Marsh
Tricladida	*Polycelis tenuis*			P			P			
Flatworms	*Polycelis felina*						P			
	Planariidae indet.									
	Dendrocoelum lacteum	P			P		P			
Hirudinea	*Glossiphonia complanata*	P	P	P	P	P	P	P	P	
Leeches	*Helobdella stagnalis*	P								
	Erpobdella octoculata	P	P	P	P	P	P	P	P	
	Piscicola geometra	P	P	P		P		P		
	Theromyzon tessulatum							P	P	
Mollusca	*Theodoxus fluviatilis*	P	P	P	P	P	P	P	P	
Snails & bivalves	*Bithynia tentaculata*	P	P	P		P	P	P	P	
	Acroloxus lacustris	P						P		
	Ancylus fluviatilis	P		P	P	P	P	P	P	
	Lymnaea peregra	P	P	P	P	P	P	P	P	
	Lymnaea truncatula									
	Lymnaea stagnalis	P			p			P		
	Valvata piscinalis	P	P							
	Valvata cristata	P								
	Planorbis planorbis		P	P						
	Anisus vortex	P	P			P		P		
	Bathyomphalus contortus	P	P	P	P	P	P	P	P	
	Gyraulus albus	P	P	P		P	P			
	Planorbis carinatus	P	P	P		P				
	Anisus leucostoma	P								
	Gyraulus laevis									
	Potamopyrgus antipodarum	P	P	P	P	P	P	P	P	P
	Physa fontinalis	P	P	P	P		P	P		
	Sphaerium corneum	P		P	P		P	P	P	
	Pisidium henslowanum	P		P	P					
	Pisidium subtruncatum	P		P	P		P	P	P	
	Pisidium hibernicum			P			P	P	P	
	Pisidium nitidum	P		P	P	P	P	P	P	
	Pisidium amnicum	P								
	Pisidium casertanum	P								
	Pisidium personatum									
	Pisidium milium	P						P		
	Sphaeriidae indet.									
	Armiger crista									
Crustacea	*Gammarus pulex*	P	P	P	P	P	P	P	P	
	Gammarus sp.									
	Asellus meridianus		P	P			P			
	Asellus aquaticus		P				P			P
Hemiptera	*Micronecta* sp.									
Water bugs	*Nepa cinerea*									P
	Velia sp.									

	Witney-Cogges Link		**05/09/2003**							
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**
	Velia capnai					P				
	Aphelocheirus aestivalis	P	P		P	P	P	P	P	
	Hydrometra stagnorum	P				P		P		
	Sigara dorsalis							P		
Trichoptera 1	*Polycentropus flavomaculatus*	P	P	P		P	P	P		
Caseless Caddis	*Hydropsyche pellucidula*	P	P	P	P	P	P	P	P	
	Hydropsyche instabilis		P	P	P	P	P		P	
	Hydropsyche contubernalis	P	P	P	P	P			P	
	Hydropsyche angustipennis		P					P		
	Hydropsyche sp.					P	P	P	P	
	Cheumatopsyche lepida									
	Rhyacophila dorsalis		P							
	Rhyacophila sp.									
	Psychomyia pusilla									
	Lype reducta									
Trichoptera 2	*Arthripsodes cinereus*									
Cased Caddis	*Arthripsodes* sp.	P	P	P		P			P	
	Arthripsodes bilineatus									
	Lepidostoma hirtum			P						
	Oecetis testacea									
	Oecetis sp.			P		P	P			
	Ceraclea dissimilis					P				
	Ceraclea sp.	P							P	
	Mystacides azurea		P			P				
	Mystacides longicornis	P	P	P						
	Mystacides sp.	P		P						
	Triaenodes bicolor									
	Ylodes conspersus									
	Ylodes sp.									
	Adicella reducta									
	Goera pilosa	P	P	P		P				
	Halesus radiatus								P	
	Potamophylax latipennis									
	Hydroptila sp.	P	P	P	P	P		P	P	
	Brachycentrus subnubilus	P	P	P	P	P	P	P	P	
	Limnephilus lunatus									
	Limnephilus rhombicus									
	Chaetopteryx villosa									
	Limnephilidae indet.			P			P			P
	Leptoceridae indet.									
	Lepidostomatidae indet.						P			
	Molanna angustata	P								
Ephemeroptera	*Ephemera danica*	P	P	P	P	P	P	P	P	
Mayfly larvae	*Caenis luctuosa*	P	P	P		P			P	
	Caenis horaria			P						
	Ephemerella ignita	P	P	P		P			P	
	Habrophlebia fusca									
	Paraleptophlebia sp.		P							
	Leptophlebiidae indet.			P						

	Witney-Cogges Link		**05/09/2003**							
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**
	Baetis scambus	P	P	P		P	P	P	P	
	Baetis rhodani					P	P			
	Baetidae indet.	P				P				
	Baetis vernus		P	P		P		P	P	
	Centroptilum luteolum	P	P	P		P				
	Procloeon bifidum									
	Cloeon dipterum			P						
Odonata	*Calopteryx splendens*	P	P	P		P		P		
Damselflies	Coenagrioniidae indet.									
Plecoptera	*Leuctra geniculata*	P	P			P	P			
Stonefly larvae	*Leuctra hippopus*	P	P	P	P	P	P	P		
	Leuctra fusca	P	P	P	P	P	P	P	P	
Neuroptera	*Sialis lutaria*	P	P	P						
Alderfly larvae										
Coleoptera	*Limnius volkmari*	P	P	P	P	P	P	P	P	
Beetles	*Elmis aenea*	P	P	P	P	P	P	P	P	
	Limnius sp.	P	P	P	P	P	P	P	P	
	Anacaena globulus									P
	Anacaena bipustulata									
	Anacaena limbata									
	Anacaena lutescens									
	Esolus parallelepipedus		P	P	P		P			
	Hydraena riparia group									
	Hydraena gracilis		P	P					P	
	Hydraena sp.									
	Potamonectes depressus elegans			P						
	Potamonectes sp.									
	Brychius elevatus	P	P			P		P		
	Gyrinus urinator					P				
	Gyrinidae indet.	P		P		P		P	P	
	Orectochilus villosus					P				
	Oulimnius tuberculatus	P	P	P	P				P	
	Oulimnius sp.					P				
	Dyticsidae indet.		P							
	Dryops sp.									
	Riolus subviolaceus	P	P							
	Riolus cupreus		P	P						
	Agabus sp. larvae									
	Agabus sturmii									P
	Agabus didymus									
	Agabus bipustulatus									P
	Agabus paludosus									P
	Helophorus minutus									
	Helophorus brevipalpis					P				
	Helophorus grandis					P				
	Helophorus sp.									
	Scirtes sp.									

	Witney-Cogges Link		**05/09/2003**							
	Species/Taxon	**Site 1**	**Site 2**	**Site 3**	**Site 4**	**Site 5**	**Site 6**	**Site 7**	**Site 8**	**Site 9**
	Hydroporus sp.									
	Hydroporus tessellatus									
	Noterus clavicornis									
	Hygrotus inaequalis									P
	Hydrochus brevis									
	Laccobius minutus									
	Laccobius bipunctatus									P
	Coelostoma orbiculare									
	Haliplus confinis									P
	Platambus maculatus					P				
Tipulidae	*Tipula paludosa*									
Cranefly larvae	*Pseudolimnophila* sp.									
	Gonomyia sp.									
	Dicronota sp.	P	P	P	P	P	P	P	P	
	Tipulidae indet.		P							P
Others	Simuliidae		P	P		P	P	P	P	
	Chironomidae	P	P	P		P	P	P	P	P
	Oligochaeta	P	P	P	P	P	P	P	P	P
	Lumbricidae		P		P	P			P	
	Hydracarina		P		P			P	P	
	Ceratopogonidae									
	Psychodidae		P			P		P		
	Stratiomyiidae									
	Empididae		P			P		P	P	
	Culicidae									
	Phoridae									
	Sciomyziidae									
	Ptychopteriidae									
	Porifera						P			
	NO OF INVERTEBRATE TAXA	62	61	60	33	59	43	47	43	14
Fish	*Cottus gobio*		P	P		P	P	P	P	
	Gasterosteus aculeatus	P	P	P		P				
	Phoxinus phoxinus	P		P		P				
	Lampetra planerii			P						

Table 3. Distribution of Taxa down the River Windrush

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Annelida	Hirudinea	Erpobdellidae	Erpobdella octoculata	41	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Annelida	Hirudinea	Glossiphoniidae	Glossiphonia complanata	47	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Annelida	Hirudinea	Glossiphoniidae	Helobdella stagnalis	128	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
Annelida	Hirudinea	Glossiphoniidae	Theromyzon tessulatum	116	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☑	☑
Annelida	Hirudinea	Piscicolidae	Piscicola geometra	100	☐	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Annelida	Oligochaeta		Eiseniella tetraedra	178	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Annelida	Oligochaeta		Oligochaeta	161	☐	☑	☑	☑	☑	☑	☑	☐	☐	☑	☑	☑
Annelida	Oligochaeta	Lumbricidae	Lumbricidae	162	☐	☐	☑	☑	☐	☑	☑	☐	☐	☐	☐	☑
Arachnida	Acarina		Hydracarina	52	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Crustacea	Amphipoda	Crangonyctidae	Crangonyx pseudogracilis	177	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Crustacea	Amphipoda	Gammaridae	Gammarus pulex	46	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Crustacea	Decapoda	Astacidae	Pacifastacus leniusculus	91	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Crustacea	Isopoda	Asellidae	Asellus aquaticus	7	☐	☑	☐	☑	☐	☐	☐	☑	☑	☑	☐	☑
Crustacea	Isopoda	Asellidae	Asellus meridianus	6	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Insecta	Coleoptera	Dryopidae	Dryops sp	158	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐
Insecta	Coleoptera	Dytiscidae	Dytiscidae	157	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Coleoptera	Dytiscidae	Platambus maculatus	86	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Coleoptera	Dytiscidae	Potamonectes depressus elegans	154	☐	☐	☑	☑	☑	☐	☐	☐	☐	☐	☑	☑
Insecta	Coleoptera	Dytiscidae	Potamonectes sp	155	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
Insecta	Coleoptera	Elmidae	Elmis aenea	38	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Coleoptera	Elmidae	Esolus parallelepipedus	42	☐	☑	☑	☑	☑	☑	☐	☐	☑	☑	☐	☐
Insecta	Coleoptera	Elmidae	Limnius sp	148	☐	☐	☑	☑	☑	☑	☑	☐	☐	☑	☑	☑
Insecta	Coleoptera	Elmidae	Limnius volckmari	63	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Coleoptera	Elmidae	Normandia nitens	73	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Insecta	Coleoptera	Elmidae	Oulimnius sp	167	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Coleoptera	Elmidae	Oulimnius tuberculatus	75	☑	☑	☑	☑	☑	☑	☐	☑	☑	☐	☐	☑
Insecta	Coleoptera	Elmidae	Riolus cupreus	103	☑	☐	☐	☑	☑	☐	☐	☑	☐	☐	☐	☐
Insecta	Coleoptera	Elmidae	Riolus subviolaceus	104	☐	☐	☑	☑	☐	☐	☐	☑	☑	☐	☐	☑
Insecta	Coleoptera	Gyrinidae	Gyrinidae	50	☐	☑	☑	☐	☑	☐	☑	☑	☑	☐	☑	☑
Insecta	Coleoptera	Gyrinidae	Gyrinus urinator	51	☐	☐	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐
Insecta	Coleoptera	Gyrinidae	Orectochilus villosus	76	☐	☐	☐	☐	☐	☐	☑	☑	☐	☑	☐	☐
Insecta	Coleoptera	Haliplidae	Brychius elevatus	156	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Insecta	Coleoptera	Hydraenidae	Hydraena gracilis	168	☐	☐	☐	☑	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Coleoptera	Hydraenidae	Hydraena riparia group	152	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Coleoptera	Hydraenidae	Hydraena sp	153	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑
Insecta	Coleoptera	Hydrophilidae	Anacaena bipustulata	150	☐	☐	☐	☐	☑	☐	☑	☐	☐	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Coleoptera	Hydrophilidae	Anacaena globulus	149	☐	☐	☑	☑	☐	☐	☑	☐	☐	☐	☐	☑
Insecta	Coleoptera	Hydrophilidae	Anacaena lutescens	151	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Coleoptera	Hydrophilidae	Helophorus brevipalpis	174	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Coleoptera	Hydrophilidae	Helophorus grandis	175	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Diptera	Ceratopogonidae	Ceratopogonidae	27	☑	☑	☐	☐	☑	☑	☐	☑	☑	☐	☑	☐
Insecta	Diptera	Chironomidae	Chironomidae	28	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Diptera	Empididae	Empididae	43	☑	☑	☐	☑	☐	☐	☑	☑	☑	☑	☑	☑
Insecta	Diptera	Limoniidae	Dicranota sp.	37	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Diptera	Muscidae	Limnophora riparia	68	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Diptera	Psychodidae indet	Psychodidae	97	☑	☐	☐	☑	☑	☐	☑	☐	☑	☑	☑	☐
Insecta	Diptera	Rhagionidae	Atherix sp.	8	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Diptera	Simuliidae	Simuliidae	110	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Diptera	Simuliidae	Simulium ornatum	108	☐	☐	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Diptera	Stratiomyidae	Stratiomyidae	112	☐	☑	☐	☐	☑	☐	☐	☐	☐	☐	☑	☐
Insecta	Diptera	Tipulidae	Antocha vitripennis	12	☑	☑	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐
Insecta	Diptera	Tipulidae	Pilaria sp	92	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐
Insecta	Diptera	Tipulidae	Tipula montium	113	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Insecta	Diptera	Tipulidae	Tipula paludosa	159	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐	☑	☐
Insecta	Diptera	Tipulidae	Tipulidae	119	☐	☑	☐	☑	☐	☐	☑	☐	☐	☐	☑	☐
Insecta	Ephemeroptera	Baetidae	Baetidae	124	☐	☑	☑	☐	☑	☐	☑	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Baetidae	Baetis buceratus	18	☐	☑	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐
Insecta	Ephemeroptera	Baetidae	Baetis rhodani	16	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Ephemeroptera	Baetidae	Baetis scambus	17	☑	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑
Insecta	Ephemeroptera	Baetidae	Baetis vernus	125	☐	☐	☐	☑	☑	☐	☑	☐	☐	☐	☑	☑
Insecta	Ephemeroptera	Baetidae	Centroptilum luteolum	35	☑	☐	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Insecta	Ephemeroptera	Baetidae	Centroptilum pennulatum	26	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Ephemeroptera	Baetidae	Cloeon dipterum	173	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Baetidae	Procloeon bifidum	126	☐	☐	☑	☑	☐	☐	☐	☐	☐	☐	☑	☑
Insecta	Ephemeroptera	Caenidae	Caenis horaria	166	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Caenidae	Caenis luctuosa	30	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Insecta	Ephemeroptera	Ephemerellidae	Ephemerella ignita	40	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Ephemeroptera	Ephemeridae	Ephemera danica	39	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Ephemeroptera	Heptageniidae	Rhithrogena semicolorata	102	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Leptophlebiidae	Habrophlebia fusca	122	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Leptophlebiidae	Leptophlebiidae indet	163	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia sp	123	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Ephemeroptera	Leptophlebiidae	Paraleptophlebia submarginata	84	☑	☑	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐
Insecta	Hemiptera	Aphelocheiridae	Aphelocheirus aestivalis	4	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Hemiptera	Corixidae	Micronecta sp	147	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Hemiptera	Corixidae	Sigara dorsalis	107	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐
Insecta	Hemiptera	Hydrometridae	Hydrometra stagnorum	172	☐	☐	☑	☐	☐	☐	☑	☐	☐	☐	☑	☐
Insecta	Hemiptera	Veliidae	Velia caprai	171	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐
Insecta	Neuroptera	Sialidae	Sialis lutaria	105	☐	☐	☑	☑	☑	☐	☑	☑	☐	☐	☑	☑
Insecta	Odonata	Calopterygidae	Calopteryx splendens	25	☐	☑	☑	☑	☑	☐	☑	☑	☑	☐	☐	☑
Insecta	Odonata	Coenagriidae	Coenagriidae	160	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Plecoptera	Leuctridae	Leuctra fusca	61	☑	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑
Insecta	Plecoptera	Leuctridae	Leuctra geniculata	62	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Plecoptera	Leuctridae	Leuctra hippopus	127	☐	☐	☑	☑	☑	☑	☑	☐	☐	☑	☑	☑
Insecta	Plecoptera	Leuctridae	Leuctra sp	179	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Brachycentridae	Brachycentrus subnubilis	22	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Glossosomatidae	Agapetus fuscipes	14	☐	☑	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐
Insecta	Trichoptera	Goeridae	Goera pilosa	48	☑	☑	☑	☑	☑	☐	☑	☑	☑	☐	☐	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Trichoptera	Hydropsychidae	Cheumatopsyche lepida	33	☐	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐
Insecta	Trichoptera	Hydropsychidae	Hydropsyche angustipennis	56	☐	☐	☐	☑	☐	☐	☐	☑	☐	☐	☑	☐
Insecta	Trichoptera	Hydropsychidae	Hydropsyche contubernalis	53	☑	☑	☑	☑	☑	☑	☑	☑	☑	☐	☐	☑
Insecta	Trichoptera	Hydropsychidae	Hydropsyche instabilis	130	☐	☐	☐	☑	☑	☑	☑	☐	☐	☑	☑	☑
Insecta	Trichoptera	Hydropsychidae	Hydropsyche pellucidula	54	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Hydropsychidae	Hydropsyche siltalai	55	☑	☑	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐
Insecta	Trichoptera	Hydropsychidae	Hydropsychidae indet	169	☐	☐	☐	☐	☐	☐	☑	☐	☐	☑	☑	☑
Insecta	Trichoptera	Hydroptilidae	Hydroptila sp	57	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Hydroptilidae	Ithytrichia lamellaris	60	☑	☑	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐
Insecta	Trichoptera	Lepidostomatidae	Lepidostoma hirtum	67	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Lepidostomatidae	Lepidostomatidae	146	☐	☐	☐	☑	☐	☐	☐	☐	☐	☑	☐	☐
Insecta	Trichoptera	Leptoceridae	Adicella reducta	15	☐	☑	☐	☑	☐	☐	☐	☑	☑	☐	☐	☐
Insecta	Trichoptera	Leptoceridae	Athripsodes albifrons	10	☑	☑	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Trichoptera	Leptoceridae	Athripsodes bilineatus	136	☐	☐	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑
Insecta	Trichoptera	Leptoceridae	Athripsodes cinereus	9	☑	☑	☐	☐	☐	☐	☑	☑	☑	☐	☐	☑
Insecta	Trichoptera	Leptoceridae	Athripsodes sp	135	☐	☐	☑	☑	☑	☑	☑	☐	☐	☑	☐	☑
Insecta	Trichoptera	Leptoceridae	Ceraclea dissimilis	34	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Leptoceridae	Ceraclea sp	138	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐	☐	☑
Insecta	Trichoptera	Leptoceridae	Leptoceridae indet	145	☐	☐	☐	☑	☑	☐	☐	☐	☐	☑	☐	☐
Insecta	Trichoptera	Leptoceridae	Mystacides azurea	70	☑	☐	☑	☑	☐	☐	☑	☑	☐	☑	☑	☑
Insecta	Trichoptera	Leptoceridae	Mystacides longicornis	71	☐	☑	☑	☑	☑	☐	☑	☐	☑	☐	☐	☐
Insecta	Trichoptera	Leptoceridae	Mystacides sp	170	☐	☑	☑	☐	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Leptoceridae	Oecetis sp	137	☐	☐	☐	☐	☑	☑	☑	☐	☐	☑	☐	☐
Insecta	Trichoptera	Leptoceridae	Oecetis testacea	74	☑	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑
Insecta	Trichoptera	Leptoceridae	Triaenodes bicolor	139	☐	☐	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Leptoceridae	Ylodes conspersus	140	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Trichoptera	Leptoceridae	Ylodes sp	141	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☑	☐
Insecta	Trichoptera	Limnephilidae	Anabolia nervosa	13	☑	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐
Insecta	Trichoptera	Limnephilidae	Chaetopteryx villosa	36	☐	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐	☐
Insecta	Trichoptera	Limnephilidae	Halesus radiatus	142	☐	☐	☐	☑	☐	☐	☑	☐	☐	☐	☐	☑
Insecta	Trichoptera	Limnephilidae	Limnephilidae indeterminate	144	☐	☑	☐	☐	☑	☐	☑	☐	☐	☑	☐	☐
Insecta	Trichoptera	Limnephilidae	Limnephilus lunatus	69	☐	☐	☑	☑	☑	☐	☐	☑	☑	☑	☐	☑
Insecta	Trichoptera	Limnephilidae	Limnephilus rhombicus	143	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Limnephilidae	Potamophylax latipennis	90	☑	☐	☐	☑	☐	☐	☐	☑	☐	☑	☐	☐
Insecta	Trichoptera	Molannidae	Molanna angustata	72	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☐	☑
Insecta	Trichoptera	Philopotamidae	Philopotamidae indet	98	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Philopotamidae	Wormaldia sp	121	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Phryganeidae	Phyrangea sp.	93	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Insecta	Trichoptera	Polycentropodidae	Polycentropus flavomaculatus	87	☐	☑	☑	☑	☑	☐	☑	☐	☑	☑	☑	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Insecta	Trichoptera	Psychomyiidae	Lype reducta	134	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐
Insecta	Trichoptera	Psychomyiidae	Lype sp	65	☑	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Insecta	Trichoptera	Psychomyiidae	Psychomyia pusilla	89	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Psychomyiidae	Tinodes waeneri	120	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Insecta	Trichoptera	Rhyacophilidae	Rhyacophila dorsalis	101	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insecta	Trichoptera	Rhyacophilidae	Rhyacophila spp	133	☐	☐	☑	☑	☑	☐	☑	☐	☐	☐	☑	☑
Mollusca	Bivalvia	Pisidiidae	Pisidium amnicum	164	☐	☐	☑	☑	☐	☐	☐	☐	☐	☐	☐	☐
Mollusca	Bivalvia	Pisidiidae	Pisidium casertanum	77	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑
Mollusca	Bivalvia	Pisidiidae	Pisidium henslowanum	78	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Bivalvia	Pisidiidae	Pisidium hibernicum	83	☐	☐	☑	☐	☑	☐	☐	☐	☑	☑	☑	☑
Mollusca	Bivalvia	Pisidiidae	Pisidium milium	79	☐	☐	☑	☐	☐	☐	☐	☑	☐	☐	☑	☐
Mollusca	Bivalvia	Pisidiidae	Pisidium moitessierianum	80	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Mollusca	Bivalvia	Pisidiidae	Pisidium nitidum	81	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Mollusca	Bivalvia	Pisidiidae	Pisidium subtruncatum	82	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Bivalvia	Sphaeriidae	Sphaeriidae indeterminate	165	☐	☐	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐
Mollusca	Bivalvia	Sphaeriidae	Sphaerium corneum	111	☑	☑	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Acroloxidae	Acroloxus lacustris	11	☐	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☐
Mollusca	Gastropoda	Ancylidae	Ancylus fluviatilis	2	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Bithynidae	Bithynia leachii	23	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Mollusca	Gastropoda	Bithynidae	Bithynia tentaculata	21	☐	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Hydrobiidae	Potamopyrgus jenkinsi	88	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Lymnaeidae	Lymnaea peregra	64	☑	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Lymnaeidae	Lymnaea stagnalis	66	☑	☐	☑	☐	☐	☑	☐	☐	☐	☐	☑	☐
Mollusca	Gastropoda	Neritidae	Theodoxus fluviatilis	115	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Physidae	Physa fontinalis	99	☐	☐	☑	☑	☑	☑	☐	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Planorbidae	Anisus leucostoma	131	☐	☐	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Mollusca	Gastropoda	Planorbidae	Anisus vortex	3	☐	☑	☑	☑	☐	☐	☑	☑	☑	☐	☑	☐
Mollusca	Gastropoda	Planorbidae	Armiger crista	5	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Mollusca	Gastropoda	Planorbidae	Bathyomphalus contortus	19	☐	☐	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Planorbidae	Gyraulus albus	49	☑	☐	☑	☑	☑	☑	☑	☐	☑	☑	☐	☐
Mollusca	Gastropoda	Planorbidae	Gyraulus laevis	132	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☑
Mollusca	Gastropoda	Planorbidae	Planorbis carinatus	85	☐	☐	☑	☑	☑	☐	☑	☐	☑	☐	☐	☐
Mollusca	Gastropoda	Planorbidae	Planorbis planorbis	129	☐	☐	☐	☑	☑	☐	☑	☐	☐	☐	☐	☐
Mollusca	Gastropoda	Valvatidae	Valvata cristata	118	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Mollusca	Gastropoda	Valvatidae	Valvata piscinalis	117	☐	☐	☑	☑	☑	☑	☑	☑	☑	☐	☑	☑
Turbellaria	Tricladida	Dendrocoelidae	Dendrocoelum lacteum	45	☐	☑	☑	☐	☐	☑	☐	☐	☑	☑	☐	☐
Turbellaria	Tricladida	Dugesiidae	Dugesia tigrina	44	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐	☐	☐
Turbellaria	Tricladida	Planariidae	Polycelis felina	94	☑	☐	☐	☐	☐	☐	☐	☐	☐	☑	☐	☐
Turbellaria	Tricladida	Planariidae	Polycelis nigra	96	☐	☐	☐	☐	☐	☐	☐	☑	☑	☐	☐	☐

Phylum/Class:	Order etc	Family	Taxon	ID	EA U/s 2	EA U/s 1	1	2	3	4	5	EADs	EAD	6	7	8
Turbellaria	Tricladida	Planariidae	Polycelis tenuis	95	☐	☐	☐	☐	☑	☐	☐	☑	☐	☑	☐	☐

Sample Date: 31-05-03
Sample Code: W01
Sample Location: R. Windrush, most upstream site
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	74	B	Sialidae	3	A
Heptageniidae			Viviparidae			Baetidae	118	C
Leptophlebiidae	3	A	Ancylidae	36	B	Piscicolidae	1	A
Ephemerellidae	152	C	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	6	A	Hydroptilidae					
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	217	C
Leuctridae	19	B				Hydrobiidae	2297	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	143	C	Lymnaeidae	66	B
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	53	B
			Platycnemidae			Sphaeriidae	101	C
Aphelocheiridae	85	B	Coenagriidae	2	A			
Phryganeidae						Glossiphoniidae	2	A
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	8	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	56	B	Mesoveliidae			Asellidae	7	A
Goeridae	5	A	Hydrometridae					
Lepidostomatidae	30	B	Gerridae			**Sub total**	**9**	**9**
Brachycentridae	3	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	783	C
Sub total	**9**	**9**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	1	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	171	C
Lestidae			Dytiscidae	2	A			
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	2	A			
Aeshnidae			Hydrophilidae	9	A	**BMWP-score**	**210**	**210**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**37**	**37**
Libellulidae						**ASPT**	**5.676**	**5.676**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	99	B	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae			Empididae		
						Hydracarina	3	A
Sub total	**0**	**0**	Tipulidae	15	B	Isotomidae		
			Simuliidae	91	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae			Planariidae	1	A	Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	5	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**8**	**8**	Lumbricidae	1	A
						Rhagionidae		
Polycentropodidae						Other		
Limnephilidae	15	B						
						Bullhead	13	
Sub total	**2**	**2**				Stickleback	27	

Sample Date: 31-05-03
Sample Code: W02
Sample Location: R. Windrush main channel at point of road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	25	B	Sialidae		
Heptageniidae			Viviparidae			Baetidae	112	C
Leptophlebiidae	7	A	Ancylidae	2	A	Piscicolidae	7	A
Ephemerellidae	524	C	(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	1	A	Hydroptilidae	11	A			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	14	B
Leuctridae	32	B				Hydrobiidae	744	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	869	C	Lymnaeidae	10	B
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	63	B
			Platycnemidae			Sphaeriidae	21	B
Aphelocheiridae	64	B	Coenagriidae	4	A			
Phryganeidae						Glossiphoniidae	7	A
Molannidae			**Sub total**	**5**	**5**	Hirudinidae		
Beraeidae						Erpobdellidae		
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	94	B	Mesoveliidae			Asellidae	38	B
Goeridae			Hydrometridae					
Lepidostomatidae	70	B	Gerridae			**Sub total**	**8**	**8**
Brachycentridae	2	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	221	C
Sub total	**8**	**8**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	229	C
Lestidae			Dytiscidae	4	A			
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae	6	A	**BMWP-score**	**203**	**203**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**35**	**35**
Libellulidae						**ASPT**	**5.8**	**5.8**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	229	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	13	B	Empididae	1	A
						Hydracarina	3	A
Sub total	**0**	**0**	Tipulidae	29	B	Isotomidae		
			Simuliidae	202	C	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	17	B	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	23	B				Veliidae		
(inc Glossosomatidae)			**Sub total**	**6**	**6**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	7	A				Other		
Limnephilidae	3	A						
						Bullhead	19	
Sub total	**4**	**4**				Brook Lamprey	1	

Sample Date: 31-05-03
Sample Code: W03
Sample Location: R. Windrush downstream of road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	55	B	Sialidae		
Heptageniidae			Viviparidae			Baetidae	238	C
Leptophlebiidae	2	A	Ancylidae	8	A	Piscicolidae	4	A
Ephemerellidae	180	C	(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	11	B	Hydroptilidae	24	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	17	B
Leuctridae	10	B				Hydrobiidae	643	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	165	C	Lymnaeidae	22	B
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	27	B
			Platycnemidae			Sphaeriidae	98	B
Aphelocheiridae	138	C	Coenagriidae	1	A			
Phryganeidae						Glossiphoniidae	2	A
Molannidae			**Sub total**	**5**	**5**	Hirudinidae		
Beraeidae						Erpobdellidae	6	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	97	B	Mesoveliidae			Asellidae	3	A
Goeridae	10	B	Hydrometridae					
Lepidostomatidae	80	B	Gerridae			**Sub total**	**9**	**9**
Brachycentridae	4	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	133	C
Sub total	**9**	**9**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	1	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	202	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae	3	A	**BMWP-score**	**216**	**216**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**37**	**37**
Libellulidae						**ASPT**	**5.838**	**5.838**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	126	C	Ceratopogonidae	2	A
						Dixidae		
Philopotamidae			Hydropsychidae	3	A	Empididae		
						Hydracarina	1	A
Sub total	**0**	**0**	Tipulidae	30	B	Isotomidae		
			Simuliidae	113	C	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	8	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae	1	A
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	5	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**6**	**6**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	4	A				Other		
Limnephilidae	7	A						
						Bullhead	26	
Sub total	**4**	**4**						

Sample Date: 31-05-03
Sample Code: W04
Sample Location: R. Windrush under A40 road bridge
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	84	B	Sialidae		
Heptageniidae			Viviparidae			Baetidae	141	C
Leptophlebiidae			Ancylidae	3	A	Piscicolidae	1	A
Ephemerellidae	89	B	(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	3	A	Hydroptilidae					
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	1	A
Leuctridae	4	A				Hydrobiidae	521	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	528	C	Lymnaeidae		
Perlidae						Physidae		
Chloroperlidae						Planorbidae	3	A
			Platycnemidae			Sphaeriidae	34	B
Aphelocheiridae	58	B	Coenagriidae					
Phryganeidae						Glossiphoniidae		
Molannidae			**Sub total**	**3**	**3**	Hirudinidae		
Beraeidae						Erpobdellidae	4	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	120	C	Mesoveliidae			Asellidae		
Goeridae			Hydrometridae					
Lepidostomatidae	4	A	Gerridae			**Sub total**	**5**	**5**
Brachycentridae	1	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	15	A
Sub total	**7**	**7**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	879	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae			**BMWP-score**	**141**	**141**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**24**	**24**
Libellulidae						**ASPT**	**5.875**	**5.875**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	155	C	Ceratopogonidae	2	A
						Dixidae		
Philopotamidae			Hydropsychidae	1	A	Empididae		
						Hydracarina	1	A
Sub total	**0**	**0**	Tipulidae	30	B	Isotomidae		
			Simuliidae	4	A	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae			Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	4	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**4**	**4**	Lumbricidae	1	A
						Rhagionidae		
Polycentropodidae						Other		
Limnephilidae								
						Bullhead	1	
Sub total	**1**	**1**						

Sample Date: 31-05-03
Sample Code: W05
Sample Location: R. Windrush main channel d/s A40
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	16	B	Sialidae	1	A
Heptageniidae			Viviparidae			Baetidae	98	B
Leptophlebiidae	3	A	Ancylidae	4	A	Piscicolidae	7	A
Ephemerellidae	157	C	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	6	A	Hydroptilidae	6	A			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	20	B
Leuctridae	39	B				Hydrobiidae	547	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	199	C	Lymnaeidae	25	B
Perlidae						Physidae		
Chloroperlidae						Planorbidae	40	B
			Platycnemidae			Sphaeriidae	15	B
Aphelocheiridae	107	C	Coenagriidae	108	C			
Phryganeidae						Glossiphoniidae	5	A
Molannidae			**Sub total**	**5**	**5**	Hirudinidae		
Beraeidae						Erpobdellidae	4	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	40	B	Mesoveliidae			Asellidae	9	A
Goeridae	1	A	Hydrometridae					
Lepidostomatidae	60	B	Gerridae			**Sub total**	**8**	**8**
Brachycentridae	4	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	65	B
Sub total	**9**	**9**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	116	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae	3	A	**BMWP-score**	**212**	**212**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**36**	**36**
Libellulidae						**ASPT**	**5.889**	**5.889**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	76	B	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	2	A	Empididae		
						Hydracarina	3	A
Sub total	**0**	**0**	Tipulidae	11	B	Isotomidae		
			Simuliidae	24	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	5	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	3	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**5**	**5**	Lumbricidae	2	A
						Rhagionidae		
Polycentropodidae	18	B				Other		
Limnephilidae	7	A						
						Bullhead	30	
Sub total	**4**	**4**						

Sample Date: 31-05-03
Sample Code: W06
Sample Location: R. Windrush mill stream "leat" by roundabout
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	144	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	122	C
Leptophlebiidae			Ancylidae	21	B	Piscicolidae	1	Abn
Ephemerellidae	35	B	(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	16	B	Hydroptilidae	21	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	1	A
Leuctridae	39	B				Hydrobiidae	2906	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	742	C	Lymnaeidae	6	A
Perlidae						Physidae		
Chloroperlidae						Planorbidae	11	B
			Platycnemidae			Sphaeriidae	21	B
Aphelocheiridae	84	B	Coenagriidae					
Phryganeidae						Glossiphoniidae	4	A
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	1	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	9	A	Mesoveliidae			Asellidae	6	A
Goeridae			Hydrometridae					
Lepidostomatidae	61	B	Gerridae			**Sub total**	**8**	**8**
Brachycentridae			Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	18	B
Sub total	**6**	**6**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	92	B
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	2	A			
Aeshnidae			Hydrophilidae			**BMWP-score**	**177**	**177**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**32**	**32**
Libellulidae						**ASPT**	**5.531**	**5.531**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	146	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	27	B	Empididae	7	A
						Hydracarina	3	A
Sub total	**0**	**0**	Tipulidae	6	A	Isotomidae		
			Simuliidae	668	C	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	4	A	Planariidae	9	A	Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	5	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**6**	**6**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	4	A				Other		
Limnephilidae	2	A						
						Minnow	1	
Sub total	**4**	**4**				Bullhead	7	

Sample Date: 31-05-03
Sample Code: W07
Sample Location: Windrush mill stream at road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	81	B	Sialidae	1	A
Heptageniidae			Viviparidae			Baetidae	43	B
Leptophlebiidae			Ancylidae	2	A	Piscicolidae	1	A
Ephemerellidae	13	B	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	2	A	Hydroptilidae	24	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	46	B
Leuctridae	4	A				Hydrobiidae	2828	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	69	B	Lymnaeidae	9	A
Perlidae						Physidae		
Chloroperlidae						Planorbidae	19	B
			Platycnemidae			Sphaeriidae	124	C
Aphelocheiridae	9	A	Coenagriidae					
Phryganeidae						Glossiphoniidae	3	A
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	3	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	11	B	Mesoveliidae			Asellidae	2	A
Goeridae			Hydrometridae					
Lepidostomatidae	83	B	Gerridae			**Sub total**	**8**	**8**
Brachycentridae			Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	39	B
Sub total	**6**	**6**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	87	B
Lestidae			Dytiscidae	1	A			
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	3	A			
Aeshnidae			Hydrophilidae			**BMWP-score**	**182**	**182**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**33**	**33**
Libellulidae						**ASPT**	**5.515**	**5.515**
			Scirtidae					
Psychomyiidae	1	A	Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	25	B	Ceratopogonidae	3	A
						Dixidae		
Philopotamidae			Hydropsychidae	3	A	Empididae	11	B
						Hydracarina	6	A
Sub total	**1**	**1**	Tipulidae	4	A	Isotomidae		
			Simuliidae	4	A	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	1	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae	1	A
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	2	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**6**	**6**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	5	A				Other (Sponge)	Present	
Limnephilidae								
Sub total	**3**	**3**				Bullhead	10	
						Brook Lamprey	1	

Sample Date: 31-05-03
Sample Code: W08
Sample Location: R. Windrush mill stream below confluence with "leat"
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	150	C	Sialidae	5	A
Heptageniidae			Viviparidae			Baetidae	198	C
Leptophlebiidae	1	A	Ancylidae	1	A	Piscicolidae	1	A
Ephemerellidae	55	B	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	2	A	Hydroptilidae	20	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	78	B
Leuctridae	36	B				Hydrobiidae	1501	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	289	C	Lymnaeidae	15	B
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	22	B
			Platycnemidae			Sphaeriidae	82	B
Aphelocheiridae	40	B	Coenagriidae	2	A			
Phryganeidae						Glossiphoniidae	2	A
Molannidae	2	A	**Sub total**	**5**	**5**	Hirudinidae		
Beraeidae						Erpobdellidae	1	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	73	B	Mesoveliidae			Asellidae	7	A
Goeridae	1	A	Hydrometridae					
Lepidostomatidae	1	A	Gerridae			**Sub total**	**9**	**9**
Brachycentridae	1	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	72	B
Sub total	**10**	**10**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	2	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	75	B
Lestidae			Dytiscidae	4	A			
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae	4	A	**BMWP-score**	**235**	**235**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**40**	**40**
Libellulidae						**ASPT**	**5.875**	**5.875**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	236	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	2	A	Empididae		
						Hydracarina		
Sub total	**0**	**0**	Tipulidae	11	B	Isotomidae		
			Simuliidae	27	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	1	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	7	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**7**	**7**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	20	B				Other		
Limnephilidae	2	A						
						Bullhead	15	
Sub total	**4**	**4**				Brook Lamprey	1	

Sample Date: 05-09-03
Sample Code: W01
Sample Location: R. Windrush, most upstream site
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	84	B	Sialidae	1	A
Heptageniidae			Viviparidae			Baetidae	14	B
Leptophlebiidae			Ancylidae	14	B	Piscicolidae	3	A
Ephemerellidae	1	A	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	17	B	Hydroptilidae	10	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	519	C
Leuctridae	24	B				Hydrobiidae	1043	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	260	C	Lymnaeidae	26	B
Perlidae						Physidae	2	A
Chloroperlidae						Planorbidae	257	C
			Platycnemidae			Sphaeriidae	93	B
Aphelocheiridae	130	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	35	B
Molannidae	1	A	**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	12	B
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	16	B	Mesoveliidae			Asellidae		
Goeridae	3	A	Hydrometridae	1	A			
Lepidostomatidae			Gerridae			**Sub total**	**8**	**8**
Brachycentridae	230	C	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	27	B
Sub total	**8**	**8**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	2	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	396	C
Lestidae			Dytiscidae					
Calopterygidae	1	A	(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	1	A			
Aeshnidae			Hydrophilidae			**BMWP-score**	**200**	**200**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**35**	**35**
Libellulidae						**ASPT**	**5.714**	**5.714**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	72	B	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	10	B	Empididae		
						Hydracarina		
Sub total	**1**	**1**	Tipulidae	10	B	Isotomidae		
			Simuliidae			Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	8	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae	1	A	Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**7**	**7**	Lumbricidae	1	A
						Rhagionidae		
Polycentropodidae	1	A				Other		
Limnephilidae								
						STICKLEBACK		4
Sub total	**2**	**2**				MINNOW		1

Sample Date: 05-09-03
Sample Code: W02
Sample Location: R. Windrush main channel at point of road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	45	B	Sialidae	2	A
Heptageniidae			Viviparidae			Baetidae	114	C
Leptophlebiidae	1	A	Ancylidae			Piscicolidae	1	A
Ephemerellidae	4	A	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	16	B	Hydroptilidae	28	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	21	B
Leuctridae	72	B				Hydrobiidae	1005	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	622	C	Lymnaeidae	62	B
Perlidae						Physidae	2	A
Chloroperlidae						Planorbidae	36	B
			Platycnemidae			Sphaeriidae		
Aphelocheiridae	172	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	17	B
Molannidae			**Sub total**	**3**	**3**	Hirudinidae		
Beraeidae						Erpobdellidae	10	B
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	8	A	Mesoveliidae	1	A	Asellidae	3	A
Goeridae	18	B	Hydrometridae					
Lepidostomatidae			Gerridae			**Sub total**	**8**	**8**
Brachycentridae	11	B	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	37	B
Sub total	**8**	**8**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	1	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	140	C
Lestidae			Dytiscidae	1	A			
Calopterygidae	10	B	(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	14	B			
Aeshnidae			Hydrophilidae	3	A	**BMWP-score**	**211**	**211**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**37**	**37**
Libellulidae						**ASPT**	**5.703**	**5.703**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	147	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	76	B	Empididae	1	A
						Hydracarina	3	A
Sub total	**1**	**1**	Tipulidae	21	B	Isotomidae		
			Simuliidae	110	C	Muscidae	1	A
GROUP 3 TAXA (7)						Nematoda		
Caenidae	16	B	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae	4	A				Veliidae		
(inc Glossosomatidae)			**Sub total**	**9**	**9**	Lumbricidae	1	A
						Rhagionidae		
Polycentropodidae	3	A				Other		
Limnephilidae								
						BULLHEAD		6
Sub total	**3**	**3**				STICKLEBACK		2

Sample Date: 05-09-03
Sample Code: W03
Sample Location: R. Windrush downstream of road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	358	C	Sialidae	1	A
Heptageniidae			Viviparidae			Baetidae	142	C
Leptophlebiidae	1	A	Ancylidae	9	A	Piscicolidae	5	A
Ephemerellidae	1	A	(Acroloxidae)					
Potamanthidae						**Sub total**	**3**	**3**
Ephemeridae	30	B	Hydroptilidae	12	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	119	C
Leuctridae	22	B				Hydrobiidae	1718	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	210	C	Lymnaeidae	28	B
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	179	C
			Platycnemidae			Sphaeriidae	187	C
Aphelocheiridae	183	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	30	B
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	8	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	29	B	Mesoveliidae			Asellidae	5	A
Goeridae	4	A	Hydrometridae					
Lepidostomatidae	1	A	Gerridae			**Sub total**	**9**	**9**
Brachycentridae	9	A	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	43	B
Sub total	**9**	**9**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	95	B
Lestidae			Dytiscidae	1	A			
Calopterygidae	2	A	(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	7	A			
Aeshnidae			Hydrophilidae	2	A	**BMWP-score**	**225**	**225**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**39**	**39**
Libellulidae						**ASPT**	**5.769**	**5.769**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	235	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	134	C	Empididae		
						Hydracarina	1	A
Sub total	**1**	**1**	Tipulidae	9	A	Isotomidae		
			Simuliidae	25	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	23	B	Planariidae	1	A	Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**8**	**8**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	2	A				Other		
Limnephilidae	4	A						
						BULLHEAD		4
Sub total	**3**	**3**				MINNOW		3
						BROOK LAMPREY		1
						STICKLEBACK		1

Sample Date: 05-09-03
Sample Code: W04
Sample Location: R. Windrush under A40 road bridge
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	180	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	1	A
Leptophlebiidae			Ancylidae	5	A	Piscicolidae		
Ephemerellidae			(Acroloxidae)					
Potamanthidae						**Sub total**	**1**	**1**
Ephemeridae	30	B	Hydroptilidae	5	A			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	10	B
Leuctridae	41	B				Hydrobiidae	345	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	1877	D	Lymnaeidae	6	A
Perlidae						Physidae	2	A
Chloroperlidae						Planorbidae	26	B
			Platycnemidae			Sphaeriidae	31	B
Aphelocheiridae	128	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	15	B
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	6	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae			Mesoveliidae			Asellidae		
Goeridae			Hydrometridae					
Lepidostomatidae			Gerridae			**Sub total**	**8**	**8**
Brachycentridae	39	B	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae		
Sub total	**4**	**4**	Pleidae					
			Corixidae			**Sub total**	**0**	**0**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	538	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae			**BMWP-score**	**120**	**120**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**23**	**23**
Libellulidae						**ASPT**	**5.217**	**5.217**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	187	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	80	B	Empididae		
						Hydracarina	7	A
Sub total	**0**	**0**	Tipulidae	34	B	Isotomidae		
			Simuliidae			Muscidae	2	A
GROUP 3 TAXA (7)						Nematoda		
Caenidae	1	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae	1	A	Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**4**	**4**	Lumbricidae	2	A
						Rhagionidae		
Polycentropodidae						Other		
Limnephilidae								
Sub total	**1**	**1**						

Sample Date: 05-09-03
Sample Code: W05
Sample Location: R. Windrush main channel d/s A40
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	134	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	28	B
Leptophlebiidae			Ancylidae	6	A	Piscicolidae	2	A
Ephemerellidae	3	A	(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	64	B	Hydroptilidae	10	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	12	B
Leuctridae	71	B				Hydrobiidae	1917	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	226	C	Lymnaeidae	29	B
Perlidae						Physidae		
Chloroperlidae						Planorbidae	23	B
			Platycnemidae			Sphaeriidae	3	A
Aphelocheiridae	217	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	24	B
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	2	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	12	B	Mesoveliidae			Asellidae		
Goeridae	5	A	Hydrometridae	3	A			
Lepidostomatidae			Gerridae	6	A	**Sub total**	**7**	**7**
Brachycentridae	208	C	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	13	B
Sub total	**7**	**7**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	1	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	44	B
Lestidae			Dytiscidae	5	A			
Calopterygidae	44	B	(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	2	A			
Aeshnidae			Hydrophilidae	26	B	**BMWP-score**	**205**	**205**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**36**	**36**
Libellulidae						**ASPT**	**5.694**	**5.694**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	459	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	20	B	Empididae	2	A
						Hydracarina		
Sub total	**1**	**1**	Tipulidae	7	A	Isotomidae		
			Simuliidae	3	A	Muscidae	1	A
GROUP 3 TAXA (7)						Nematoda		
Caenidae	9	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	2	A
Nemouridae	1	A				Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**10**	**10**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	2	A				Other		
Limnephilidae								
						BULLHEAD		4
Sub total	**3**	**3**				MINNOW		1
						STICKLEBACK		1

Sample Date: 05-09-03
Sample Code: W06
Sample Location: R. Windrush mill stream "leat" by roundabout
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	357	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	26	B
Leptophlebiidae			Ancylidae	12	B	Piscicolidae		
Ephemerellidae			(Acroloxidae)					
Potamanthidae						**Sub total**	**1**	**1**
Ephemeridae	34	B	Hydroptilidae					
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	4	A
Leuctridae	15	B				Hydrobiidae	2711	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	608	C	Lymnaeidae	7	A
Perlidae						Physidae	1	A
Chloroperlidae						Planorbidae	26	B
			Platycnemidae			Sphaeriidae	33	B
Aphelocheiridae	110	C	Coenagriidae					
Phryganeidae						Glossiphoniidae	33	B
Molannidae			**Sub total**	**3**	**3**	Hirudinidae		
Beraeidae						Erpobdellidae	6	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	1	A	Mesoveliidae			Asellidae	15	B
Goeridae			Hydrometridae					
Lepidostomatidae	1	A	Gerridae			**Sub total**	**9**	**9**
Brachycentridae	15	B	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	12	B
Sub total	**6**	**6**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	112	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae			**BMWP-score**	**156**	**156**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**29**	**29**
Libellulidae						**ASPT**	**5.379**	**5.379**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	172	C	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	24	B	Empididae		
						hydracarina	1	A
Sub total	**0**	**0**	Tipulidae	19	B	Isotomidae		
			Simuliidae	31	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae			Planariidae	7	A	Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae	6	A	Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**6**	**6**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	3	A				Other (Sponge)	Present	
Limnephilidae	3	A						
						BULLHEAD		1
Sub total	**2**	**2**						

Sample Date: 05-09-03
Sample Code: W07
Sample Location: Windrush mill stream at road crossing
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	393	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	24	B
Leptophlebiidae			Ancylidae	7	A	Piscicolidae	1	A
Ephemerellidae			(Acroloxidae)					
Potamanthidae						**Sub total**	**2**	**2**
Ephemeridae	2	A	Hydroptilidae	68	B			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	8	A
Leuctridae	31	B				Hydrobiidae	1548	D
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	448	C	Lymnaeidae	9	A
Perlidae						Physidae		
Chloroperlidae						Planorbidae	5	A
			Platycnemidae			Sphaeriidae	10	B
Aphelocheiridae	72	B	Coenagriidae					
Phryganeidae						Glossiphoniidae	11	B
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	8	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	1	A	Mesoveliidae			Asellidae		
Goeridae			Hydrometridae	2	A			
Lepidostomatidae			Gerridae			**Sub total**	**7**	**7**
Brachycentridae	69	B	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	12	B
Sub total	**5**	**5**	Pleidae					
			Corixidae	1	A	**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae	8	A	**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	42	B
Lestidae			Dytiscidae					
Calopterygidae	3	A	(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae	5	A			
Aeshnidae			Hydrophilidae			**BMWP-score**	**161**	**161**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**30**	**30**
Libellulidae						**ASPT**	**5.367**	**5.367**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	45	B	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	15	B	Empididae	4	A
						Hydracarina	4	A
Sub total	**1**	**1**	Tipulidae	6	A	Isotomidae		
			Simuliidae	23	B	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae			Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae	1	A
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**8**	**8**	Lumbricidae		
						Rhagionidae		
Polycentropodidae	3	A				Other (Sponge)		
Limnephilidae								
						BULLHEAD		1
Sub total	**1**	**1**						

Sample Date: 05-09-03
Sample Code: W08
Sample Location: R. Windrush mill stream below confluence with "leat"
Main Sorter Code: JP

	Num	Abn		Num	Abn		Num	Abn
GROUP 1 TAXA (10)			**GROUP 4 TAXA (6)**			**GROUP 6 TAXA (4)**		
Siphlonuridae			Neritidae	400	C	Sialidae		
Heptageniidae			Viviparidae			Baetidae	95	B
Leptophlebiidae			Ancylidae	3	A	Piscicolidae		
Ephemerellidae			(Acroloxidae)					
Potamanthidae						**Sub total**	**1**	**1**
Ephemeridae	12	B	Hydroptilidae	1	A			
						GROUP 7 TAXA (3)		
Taeniopterygidae			Unionidae			Valvatidae	8	A
Leuctridae	23	B				Hydrobiidae	873	C
Capniidae			Corophiidae			(Bithyniidae)		
Perlodidae			Gammaridae	249	C	Lymnaeidae	6	A
Perlidae						Physidae		
Chloroperlidae						Planorbidae	4	A
			Platycnemidae			Sphaeriidae	15	B
Aphelocheiridae	52	B	Coenagriidae					
Phryganeidae						Glossiphoniidae	11	B
Molannidae			**Sub total**	**4**	**4**	Hirudinidae		
Beraeidae						Erpobdellidae	5	A
Odontoceridae			**GROUP 5 TAXA (5)**					
Leptoceridae	1	A	Mesoveliidae			Asellidae		
Goeridae			Hydrometridae					
Lepidostomatidae			Gerridae			**Sub total**	**7**	**7**
Brachycentridae	500	B	Nepidae					
Sericostomatidae			Naucoridae			**GROUP 8 TAXA (2)**		
			Notonectidae			Chironomidae	1	A
Sub total	**5**	**5**	Pleidae					
			Corixidae			**Sub total**	**1**	**1**
GROUP 2 TAXA (8)								
Astacidae			Haliplidae			**GROUP 9 TAXA (1)**		
			Hygrobiidae			Oligochaeta	231	C
Lestidae			Dytiscidae					
Calopterygidae			(Noteridae)			**Sub total**	**1**	**1**
Gomphidae								
Cordulegasteridae			Gyrinidae					
Aeshnidae			Hydrophilidae	4	A	**BMWP-score**	**141**	**141**
Corduliidae			(Hydraenidae)			**BMWP TAXA**	**26**	**26**
Libellulidae						**ASPT**	**5.423**	**5.423**
			Scirtidae					
Psychomyiidae			Dryopidae			**OTHER TAXA**		
(inc. Ecnomidae)			Elmidae	60	B	Ceratopogonidae		
						Dixidae		
Philopotamidae			Hydropsychidae	29	B	Empididae	2	A
						Hydracarina	2	A
Sub total	**0**	**0**	Tipulidae	2	A	Isotomidae		
			Simuliidae	3	A	Muscidae		
GROUP 3 TAXA (7)						Nematoda		
Caenidae	1	A	Planariidae			Ostracoda		
			(Dugesiidae)			Psychodidae		
Nemouridae						Stratiomyiidae		
			Dendrocoelidae			Syrphidae		
Rhyacophilidae						Veliidae		
(inc Glossosomatidae)			**Sub total**	**5**	**5**	Lumbricidae	1	A
						Rhagionidae		
Polycentropodidae						Other		
Limnephilidae	1	A						
						BULLHEAD		1
Sub total	**2**	**2**						

TABLE 5	SUMMARY OF FAMILY DATA FOR THE MAIN RIVER										
	SITE (MAY)						SITE (SEPTEMBER)				
SCORE 10	**1**	**2**	**3**	**4**	**5**		**1**	**2**	**3**	**4**	**5**
Leptophlebiidae	1	7	2		3			1	1		
Ephemerellidae	55	524	180	89	157		1	4	1		3
Ephemeridae	2	1	11	3	6		17	16	30	30	64
Leuctridae	36	32	10	4	39		24	72	22	41	71
Aphelocheiridae	40	64	138	58	107		130	172	183	128	217
Molannidae	2						1				
Leptoceridae	73	94	97	120	40		16	8	29		12
Goeridae	1		10		1		3	18	4		5
Lepidostomatidae	1	70	80	4	60				1		
Brachycentridae	1	2	4	1	4		230	11	9	39	208
Sub total	**10**	**8**	**9**	**7**	**9**		**8**	**8**	**9**	**4**	**7**
SCORE 8											
Calopterygidae							1	10	2		44
Psychomyiidae & Ecnomidae											
Sub total	**0**	**0**	**0**	**0**	**0**		**1**	**1**	**1**	**0**	**1**
SCORE 7											
Caenidae	1	17	8		5		8	16	23	1	9
Nemouridae											1
Rhyacophilidae & Glossosomatidae	7	23	5	4	3			4			
Polycentropodidae	20	7	4		18		1	3	2		2
Limnephilidae	2	3	7		7				4		
Sub total	**4**	**4**	**4**	**1**	**4**		**2**	**3**	**3**	**1**	**3**
SCORE 6											
Neritidae	150	25	55	84	16		84	45	358	180	134
Ancylidae & Acroloxidae	1	2	8	3	4		14		9	5	6
Hydroptilidae	20	11	24		6		10	28	12	5	10
Gammaridae & Crangonyctidae	289	869	165	528	199		260	622	210	1877	226
Coenagriidae	2	4	1		108						
Sub total	**5**	**5**	**5**	**3**	**5**		**4**	**3**	**4**	**4**	**4**
SCORE 5											
Mesoveliidae								1			
Hydrometridae							1				3
Gerridae											6
Corixidae											
Haliplidae	2		1				2	1			1
Dytiscidae	4	4						1	1		5
Gyrinidae							1	14	7		2
Hydrophilidae	4	6	3		3			3	2		26
Elmidae	236	229	126	155	76		72	147	235	187	459
Hydropsychidae	2	13	3	1	2		10	76	134	80	20
Tipulidae	11	29	30	30	11		10	21	9	34	7
Simuliidae	27	202	113	4	24			110	25		3
Planariidae									1		
Dendrocoelidae							1			1	
Sub total	**7**	**6**	**6**	**4**	**5**		**7**	**9**	**8**	**4**	**10**
SCORE 4											
Sialidae	5				1		1	2	1		
Baetidae	198	112	238	141	98		14	114	142	1	28
Piscicolidae	1	7	4	1	7		3	1	5		2
Sub total	**3**	**2**	**2**	**2**	**3**		**3**	**3**	**3**	**1**	**2**
SCORE 3											
Valvatidae	78	14	17	1	20		519	21	119	10	12
Hydrobiidae	1501	744	643	521	547		1043	1005	1718	345	1917
Lymnaeidae	15	10	22		25		26	62	28	6	29
Physidae	1	1	1				2	2	1	2	
Planorbidae	22	63	27	3	40		257	36	179	26	23
Sphaeriidae	82	21	98	34	15		93		187	31	3
Glossiphoniidae	2	7	2		5		35	17	30	15	24
Erpobdellidae	1		6	4	4		12	10	8	6	2
Asellidae	7	38	3		9			3	5		
Sub total	**9**	**8**	**9**	**5**	**8**		**8**	**8**	**9**	**8**	**7**
SCORE 2											
Chironomidae	72	221	133	15	65		27	37	43		13
Sub total	**1**	**1**	**1**	**1**	**1**		**1**	**1**	**1**	**1**	**1**
SCORE 1											
Oligochaeta	75	229	202	879	116		396	140	95	538	44
Sub total	**1**	**1**	**1**	**1**	**1**		**1**	**1**	**1**	**1**	**1**
BMWP-score	**210**	**203**	**216**	**141**	**212**		**200**	**211**	**225**	**120**	**205**
BMWP TAXA	**37**	**35**	**37**	**24**	**36**		**35**	**37**	**39**	**23**	**36**
ASPT	**5.68**	**5.80**	**5.84**	**5.88**	**5.89**		**5.71**	**5.70**	**5.77**	**5.22**	**5.69**
OTHER TAXA											
Ceratopogonidae			2	2							
Empididae		1						1			2
Hydracarina		3	1	1	3			3	1	7	
Muscidae								1		2	1
Psychodidae		1	1					1			2
Stratiomyiidae			1								
Lumbricidae				1	2		1	1		2	
Total individuals	**3050**	**3705**	**2481**	**2687**	**1851**		**3325**	**2854**	**3875**	**3588**	**3641**
	3320	**2854**	**3875**	**3588**	**3641**						
Change May-Sept	**270**	**-851**	**1394**	**901**	**1790**						

KEY

Absent from Site 4

Reduced Numbers at Site 4?

Increased Numbers at Site 4?

TABLE 5		SUMMARY OF FAMILY DATA FOR SMALLER CHANNELS						
		SITE (MAY)				SITE (SEPT)		
SCORE 10		**6**	**7**	**8**		**6**	**7**	**8**
Leptophlebiidae				1				
Ephemerellidae		35	13	55				
Ephemeridae		16	2	2		34	2	12
Leuctridae		39	4	36		15	31	23
Aphelocheiridae		84	9	40		110	72	52
Molannidae				2				
Leptoceridae		9	11	73		1	1	1
Goeridae				1				
Lepidostomatidae		61	83	1		1		
Brachycentridae				1		15	69	500
Sub total		**6**	**6**	**10**		**6**	**5**	**5**
SCORE 8								
Calopterygidae							3	
Psychomyiidae & Ecnomidae			1					
Sub total		**0**	**1**	**0**		**0**	**1**	**0**
SCORE 7								
Caenidae		4	1	1				1
Nemouridae								
Rhyacophilidae & Glossosomatidae		5	2	7				
Polycentropodidae		4	5	20		3	3	
Limnephilidae		2		2		3		1
Sub total		**4**	**3**	**4**		**2**	**1**	**2**
SCORE 6								
Neritidae		144	81	150		357	393	400
Ancylidae & Acroloxidae		21	2	1		12	7	3
Hydroptilidae		21	24	20			68	1
Gammaridae & Crangonyctidae		742	69	289		608	448	249
Coenagriidae				2				
Sub total		**4**	**4**	**5**		**3**	**4**	**4**
SCORE 5								
Mesoveliidae								
Hydrometridae							2	
Gerridae								
Corixidae							1	
Haliplidae				2			8	
Dytiscidae			1	4				
Gyrinidae		2	3				5	
Hydrophilidae				4				4
Elmidae		146	25	236		172	45	60
Hydropsychidae		27	3	2		24	15	29
Tipulidae		6	4	11		19	6	2
Simuliidae		668	4	27		31	23	3
Planariidae		9				7		
Dendrocoelidae						6		
Sub total		**6**	**6**	**7**		**6**	**8**	**5**
SCORE 4								
Sialidae			1	5				
Baetidae		122	43	198		26	24	95
Piscicolidae		1	1	1			1	
Sub total		**2**	**3**	**3**		**1**	**2**	**1**
SCORE 3								
Valvatidae		1	46	78		4	8	8
Hydrobiidae		2906	2828	1501		2711	1548	873
Lymnaeidae		6	9	15		7	9	6
Physidae				1		1		
Planorbidae		11	19	22		26	5	4
Sphaeriidae		21	124	82		33	10	15
Glossiphoniidae		4	3	2		33	11	11
Erpobdellidae		1	3	1		6	8	5
Asellidae		6	2	7		15		
Sub total		**8**	**8**	**9**		**9**	**7**	**7**
SCORE 2								
Chironomidae		18	39	72		12	12	1
Sub total		**1**	**1**	**1**		**1**	**1**	**1**
SCORE 1								
Oligochaeta		92	87	75		112	42	231
Sub total		**1**	**1**	**1**		**1**	**1**	**1**
BMWP-score		**177**	**182**	**235**		**156**	**161**	**141**
BMWP TAXA		**32**	**33**	**40**		**29**	**30**	**26**
ASPT		**5.53**	**5.52**	**5.88**		**5.38**	**5.37**	**5.42**
OTHER TAXA								
Ceratopogonidae			3					
Empididae		7	11				4	2
Hydracarina		3	6			1	4	2
Muscidae								
Psychodidae		1	1				1	
Stratiomyiidae			1					
Lumbricidae								1
Total individuals		**5234**	**3552**	**3050**		**4404**	**2880**	**2590**
		4404	**2880**	**2590**				
Change May-Sept		**-830**	**-672**	**-460**				

KEY

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