Appendix L1 - Ecological Monitoring Methodologies

Macro-invertebrate flow assessment - LIFE

A flow diagram showing the steps taken to assess the suitability of the macro-invertebrate community to the flow conditions in the river is shown in Figure L1.1 and described below.

Assessment of flow conditions using macro-invertebrates is based on the Lotic-invertebrate Index for Flow Evaluation (LIFE) (Ref. L1). Macro-invertebrates are collected using a standard 3-minute kick sample and sorted following 'Procedures for Collecting and Analysing Macro-invertebrate Samples' (BT 001) published by the Environment Agency (Ref. L2). The invertebrate processing was subject to an analytical quality control scheme as detailed in 'Procedure for quality assurance for RIVPACS compatible macro-invertebrate samples analysed to the taxonomic level needed for the BMWP-score'. BT 003 (Ref. L3).

Each scoring taxa or species is allocated a LIFE score that is dependent on its flow/current velocity requirements and the number of individuals present. In most samples from the Malmesbury Avon there are 20 to 30 taxa present in a sample. The score for each taxa is added together and the total is divided by the number of scoring taxa/species to give the LIFE score for the sample. The theoretical range for LIFE scores is 1-12 although scores typically range between 8 for high gradient headwaters and 6 for slower flowing impounded stretches of water.

Ten sites were selected by the Environment Agency on the Sherston and Tetbury arms and main Avon below Malmesbury and have been sampled in 2001, 2002 and 2004. Samples were taken in spring, summer and autumn wherever resources permitted. General Quality Assessment data from some of these sites are also available from earlier years

To illustrate how the LIFE scoring system works in practice a hypothetical situation involving two macro-invertebrate taxa is described below:

The caseless caddis fly larvae *Hydropsychidae* spins nets to trap food and prefers a fairly high current velocity of 40-50 cm/s for the nets to work effectively. If *Hydropsychidae* are recorded in the sample they will score between 8 and 11 depending on the number of individuals present, 8 if <10 and 11 if >1000. *Polycentropodidae* are also caseless caddis fly larvae that trap food in nets but these require slower currents of about 10 cm/s to operate effectively. If *Polycentropodidae* are recorded in the sample they will only score between 6 and 3 depending on the number found, 6 if <10 and 3 if >1000. A sample containing numerous *Hydropsychidae* will therefore probably have a higher LIFE score than one dominated by *Polycentropodidae*. If the flow to the site is reduced for whatever reason then the velocity will also reduce. This will make conditions less favourable for *Hydropsychidae* as there is not enough food being swept into its net and its numbers may be expected to reduce. Conditions may become more favourable for *Polycentropodidae* as slower flows don't cause their flimsier nets to collapse and their numbers will increase either by individuals migrating to the site or by those present reproducing more effectively. In this way reduced flow can result in a reduced LIFE score.

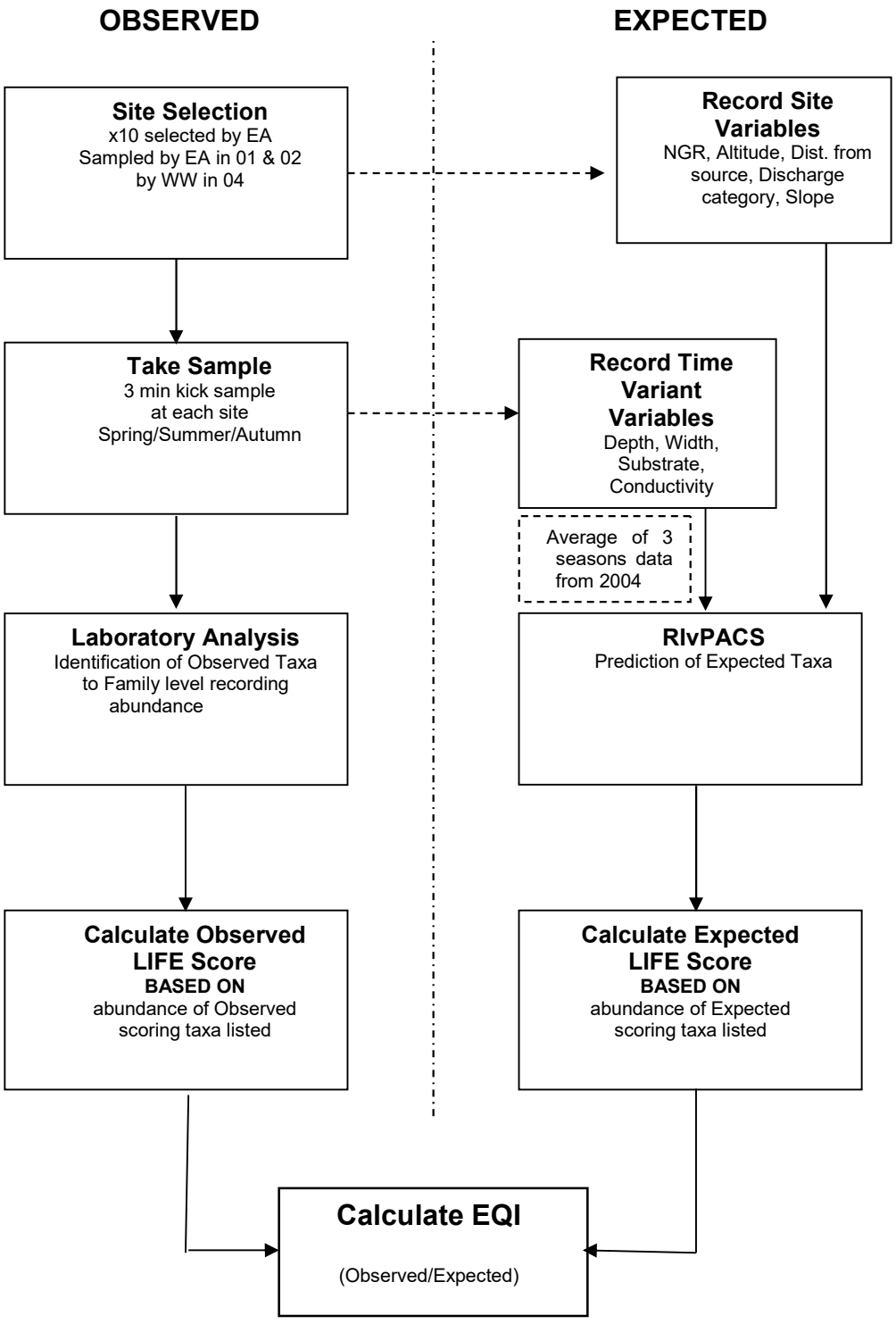

Figure L1.1 Flow Diagram of Family Level LIFE Score EQI Calculation

RIVPACS
River Invertebrate Prediction and Classification System (RIVPACS) software (Ref. L4) provides an objective mechanism for determining the LIFE score that would be expected from a site under benchmark conditions. RIVPACS contains environmental and macro-invertebrate data from 614 sites of high ecological quality. By inputting fixed environmental parameters (altitude, distance from source, gradient and NGR) and sample environmental data (alkalinity/conductivity, channel width, depth and substrate type) RIVPACS generates a macro-invertebrate community that would be expected at that site assuming it too were of high ecological quality. From this 'predicted' community a predicted LIFE score is calculated for the site. Dividing the observed by the predicted scores gives an Environmental Quality Index (EQI), that is used as a measure of flow related stress experienced at a site. An EQI of <1.0 indicates that the taxa present reflects a lower flow velocity than that predicted for the site.

The community predicted for each site has been generated using sample environmental variables collected in surveys in 2004 as this was the only year with a complete data set with surveys completed at every site in spring, summer and autumn. 2004 happened to be a fairly wet year and so the environmental variables that are dependant on flow such as channel width, depth and to some extent substrate, were taken during good flow conditions. This should therefore result in the predicted macro-invertebrate community being appropriate for each site when under relatively good flow conditions. When used to compare with the macro-invertebrate community observed in years when flow may be lower, the impacts of the low flow should be identified.

BMWP
The Environment Agency use RIVPACS for assessing river water quality whereby macro-invertebrate taxa are given a Biological Monitoring Working Party (BMWP) score depending on the sensitivity to organic pollution. The Average Score Per Taxon (ASPT) is compared to that of the predicted community to provide an EQI that can be used to quantify the macro-invertebrate community response to organic pollution. There is a degree of correlation between the LIFE and BMWP scoring systems as invertebrates requiring high current velocity often require high dissolved oxygen and are therefore sensitive to organic pollution. A low LIFE EQI can at times be attributed to organic pollution and the ASPT needs to be considered to help differentiate between the two potential impacts.

Fish
An assessment of whether the fish community is that expected for such a river has been made by examining the results of electric fishing surveys from the whole area and a habitat survey of the Sherston Avon from 1995 (Ref. L5). There is no formal method available to test whether the fish community differs significantly from that expected due to low flow. Instead the life stages of the different species that are most flow sensitive are considered.

Macrophytes
Macrophyte surveys fall into two groups: recent sites undertaken by the Environment Agency and Wessex Water in 2002 and 2004 and historical sites undertaken by N. Holmes in 1992-5 (Ref. L6) and Wessex Water in 2001. While the survey method was essentially the same the method of interpreting the results differs as detailed below.

Recent Monitoring Sites
A flow diagram showing the steps taken in identifying the suitability of the macrophyte community to the flow conditions in the river is shown in Figure L1.2 and described below.

Ten monitoring sites along the Malmesbury Avon were surveyed by the Environment Agency in summer 2002 and by Wessex Water in spring and autumn 2004 using Mean Trophic Rank (MTR) survey methodology described in Holmes et al. (Ref. L7). This method uses subjective visual assessment of percentage cover for all rooted plants within the wetted area (or bed-width channel for dry winterbourne sites) over a 100m length of river. Identification was taken at least to genus level with species recorded where possible.

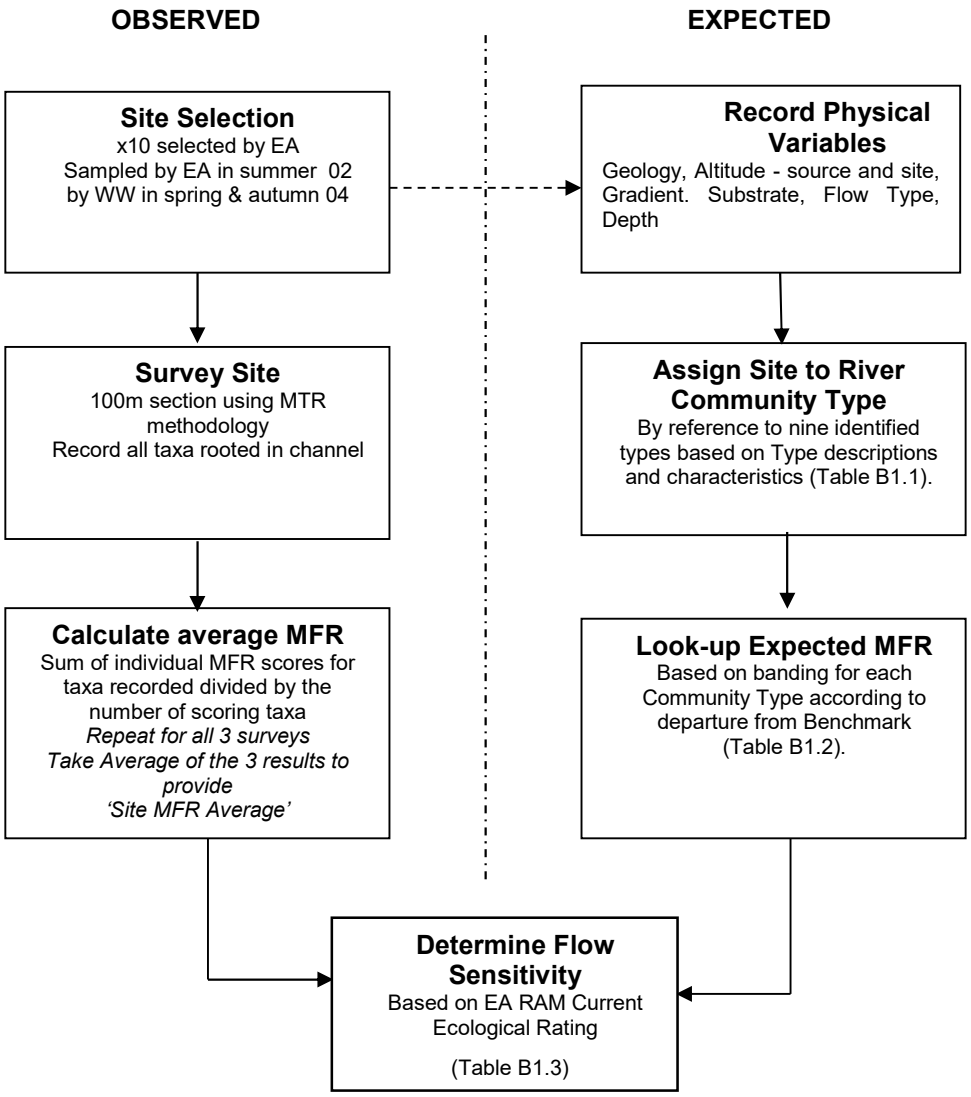

Figure L1.2:- Flow Diagram of Wessex Water Approach to Macrophyte Flow Sensitivity Determination

In order to relate macrophytes to flow and to evaluate the suitability of existing flow arrangements an approach based on the Environment Agency (2002) Resource Assessment and Management (RAM) Framework Environmental Weighting System, (Ref. L8) as described in Text Box L1, was adopted. Many of the macrophytes recorded on the surveys have been assigned a flow sensitivity or Macrophyte Flow Rank (MFR) score. The higher the score, the higher the flow velocity with which the macrophyte is associated.

A benchmark/expected score is derived by categorising the site under investigation into one of nine identified types on the basis of the site's physical characteristics (geology, altitude and gradient) as described in Table L1.1. Other environmental variables such as width, depth and substrate also influence which site type is selected. The seven upper Malmesbury Avon sites were classed as a type III river. This is defined as a base rich river with stable flows. Some Oolite (Cotswolds) rivers are listed as being of this type. The three lower sites were classed as a type II river. This is defined as a low gradient, clay dominated river.

Text Box L1

RAM Framework Environmental Weighting System

Details

The Resource Assessment and Management (RAM) Framework has been developed by the Environment Agency (2002) to provide a consistent technical approach to water resource assessment and management at the catchment scale. The catchment is divided into a number of river reaches, each with an Assessment Point.

The Environmental Weighting (EW) system has been developed in order to assess the environmental sensitivity of river reaches to potential flow variability resulting from abstraction.

The EW system comprises a number of stages, beginning with the definition of a common 'benchmark' for assessing environmental sensitivity to flow variability that could result from abstraction. The next step is to determine the sensitivity of the in-river ecology when under these benchmark conditions. Ecological indicators are used within the EW in order to assess environmental sensitivity to potential flow variability resulting from abstraction and determine the RAM Current Ecological Rating (CER). The EW incorporates information from four indicators: the physical characteristics, fish, macrophyte and macro-invertebrate communities. The EW is based principally on the sensitivity of these indicators to changes in flow velocity. Benchmark conditions provide a pre-determined and common basis for assessing the ecological sensitivity of the ecological indicators used within the EW.

The RAM CER attempts to define the extent of any departure of the ecological indicators from benchmark conditions that is attributable to flow-related stress and which may be caused by abstraction.

The EW is used with long term natural flow duration data to derive an Ecological River Flow Objective and the portion available for abstraction.

Table L1.1 Distribution, characteristics and typical examples of macrophyte community types

River Type	Type Description	Typical examples of River Type
I	**Lowland rivers with minmal gradients** Typically located in S.east England and E.Anglia. Soft geology, predominantly clay and chalk. Lowest mean altitude and shallowest gradient of nine types. Highest proportion of deep, wide and slack rivers	Lower reaches of the Hampshire Avon, Colne, Wissey (lower reaches), Lark, Nar, Wensum and Bure
II	**Lowland, clay-dominated rivers** Predominantly located in central and S.east England, the most significant outlier being the lowlands of the Cheshire Plain. Dominant geology is clay, although soft sandstone and oolite and soft limestone are common and chalk is absent. Wide range of river widths, depths and in-stream habitats. Site altitudes invariably less than 40m, with gentle gradients. Clay more typically a substrate than in any other river type.	Devon (Notts), Welland, Cherwell, Tame, Evenlode.
III	**Chalk and other chemically base-rich rivers with stable flows** Predominantly located in central and S.east England Base-rich geology, with over 60% of rivers on chalk. Stable flow regime due to substantial base-flow. Gravel substrate significantly more prevalent than in I and II rivers	Chalk: Piddle, Frome (Dorset), Test, Itchen, Mimram, Hull, headwaters of many E.Anglian rivers. Oolite (Cotswolds): Coln and Windrush
V	**Sandstone, mudstone and hard limestone rivers of England and Wales** Predominant geology either sandstone or, to a lesser extent, hard limestone. Calcareous shales more frequent than in type VI. Only very few sites north of the Mersey	Tamar, Torridge, Exe, Teifi, Monnow, Lugg and Dove
VI	**Sandstone, mudstone and hard limesone rivers of northern England (and Scotland)** Sandstone and hard limestone predominant as in type V. Altitude similar to type V, but gradient significantly steeper. Substrate broadly similar to type V, with pebbles dominant and finer materials much less prevalent than in types I, II and III.	Ribble, Wharfe, Eden, and Teme
VII	**Shale, hard limestone and hard sandstone rivers dominated by gravels and cobbles** Hard limestone and hard sandstone dominate geology of VII and VIII with double the proportion of non-calcareous shales in VII and shallower gradients. Altitudes similar in both. Greater proportion of fine substrates. Sites scattered most typically in catchments with more basic geology than type VIII or with relatively stable flows.	Coquet, Teifi
VIII	**Shale, hard sandstone rivers dominated by cobbles, boulders and bedrock** Shales, hard limestone and hard sandstone domiante geoplogy. VII has half the proportion of sites on hard limestone and double the proportion on non-calcareous shales compared to VII. Gradients steeper than for VII. Vastly higher proportion of coarse substrates ranging from cobbles to boulders to bedrock. Typically base and butrient poor being downstream of high land.	Mid reaches of Pennine rivers (e.g. Ure), the highlands of the Lake District (e.g. Derwent) and the highlands of Wales (e.g. Conwy, Dee, Cothi) and Exmoor (e.g. Barle).
IX	**Naturally oligotrophic, low altitude rivers** Widely distributed, particularly in the north and west. Also lowland acid heaths (e.g. New Forest). Solid geology broadly similar to type X, but the absence of sites on non-calcareous shales and the presence of hard limestone gives type a slightly less oligotrophic nature. Gentler gradient and much lower altitude than X. More silt and sand. Less cobbles boulders and bedrock than X.	Headwaters of New Forest streams and moorland headwaters (e.g. Conwy)
X	**Naturally ultra-oligotrophic rivers** Rising at high altitudes on base-poor rock and/or where blanket bog dominates the upstream catchment. Typically rivers of stream order 1 or 2. Higher altitude and steeper gradient than IX. Much greater abundance of cobbles boulders and bedrock.	Small streams of Dartmoor, Exmoor, the Brecon Beacons, Plynlimon, Snowdonia, the Pennines and the North York Moors.

Source: Table 5.2 Macrophyte EW component (Ref. L8).

The difference between observed and expected (Benchmark) MFR score (see Table L1.2) is taken as an indication of potential flow related stress and provides the Current Ecological rating (CER). A CER of 0 indicates no flow related stress whilst 4 indicates a community severely changed from that expected as shown in Table L1.3.

Table L1.2 MFR scores for different river types under different degrees of (primarily flow related) stress

River community type	Macrophyte RAM Current Ecological Rating 0	1	2	3	4
I	>= 1.88	1.59-1.87	1.29-1.58	1.01-1.28	1.00
II	>= 1.88	1.59-1.87	1.29-1.58	1.01-1.28	1.00
III	>= 2.50	2.00-2.49	1.50-1.99	1.01-1.49	1.00
V	>= 2.87	2.42-2.86	1.96-2.41	1.51-1.95	<=1.50
VI	>= 2.75	2.34-2.74	1.92-2.33	1.51-1.91	<=1.50
VII	>= 3.00	2.67-2.99	2.33-2.66	2.01-2.32	<=2.00
VIII	>= 3.96	3.58-3.95	3.20-3.57	2.84-3.19	<=2.83
IX	>= 2.67	2.34-2.66	2.00-2.33	1.68-1.99	<=1.67
X	>= 3.79	3.25-3.78	2.71-3.24	2.18-2.70	<=2.17

The criteria for level of confidence assigned to the RAM Macrophyte Current Ecological Rating is:

< 5 macrophyte taxa recorded	Low confidence
5 – 10 macrophyte taxa recorded	Moderate confidence
>10 macrophyte taxa recorded	High confidence

Table L1.3 Definitions of the different RAM Current Ecological Rating

RAM Current Ecological Rating	Definition
0	Flow sensitivity of ecological indicators matches that under benchmark conditions
1	Flow sensitivity of ecological indicators is only slightly changed from that under benchmark conditions
2	Flow sensitivity of ecological indicators is moderately changed from that under benchmark conditions
3	Flow sensitivity of ecological indicators shows major change from that under benchmark conditions
4	Flow sensitivity of ecological indicators is severely changed from that under benchmark conditions

The RAM current ecological rating is defined in terms of the extent of any departure from the benchmark condition attributable primarily to flow-related stress and which may be due to abstraction. Five ratings are identified below. Although the RAM Current Ecological Rating primarily reflects flow stress, it is important to recognise that natural variations in ecological communities could also have important bearing.

Each macrophyte monitoring site has been taken to represent a reach under investigation. The data set obtained does not meet the exact requirements of the system since some sampling dates are outside the recommended range. Surveys should normally be undertaken between mid-June and mid-September. An average MFR from all surveys has been used. A low level of confidence is assigned to this assessment when other factors (e.g. pollution and eutrophication) are likely to be significant. The level of confidence also depends on the number of taxa recorded. Less than 5 taxa is low, 5-10 moderate and greater than 10 high. In most cases only a moderate level of confidence was assigned since only 5-10 taxa were obtained at most sites.

Historic Monitoring Sites

The surveys performed in 1992-95 (Ref. L7)) used the same methodology but over a shorter length of 15-50m. Some sites may have been purposely selected where there was dense macrophyte growth, which may account for the often higher percentage cover recorded. These sites were re-surveyed by Wessex Water in 2001 but concentrated more on aquatic taxa with some identification only to genus level. Actual site relocation may not have been exact so some caution should be applied to the 2001 findings for some sites.

Community Classification
For surveys of all sites, a macrophyte community type was assigned using the key provided in Annex 3 (Ref. L7). There are thirteen different types ranging from 'always perennial' through to winterbournes that flow for less than six months in an 'average' year. A summary of each type is provided in Table L1.4.

The three lowermost sites, namely, Malmesbury DS Bridge, DS Malmebury STW (Cowbridge) and Great Somerford have been keyed out, but because the key is devised for headwaters/upper reaches of rivers, the community type is not particularly applicable. These sites are influenced by impoundments and are deeper with more clay present in the substrate. Nevertheless, the key proved useful for most surveys in assessing the past flow conditions experienced at the site and monitoring and summarising changes that occurred as flow conditions changed.

Blanket weed survey
Excessive growth of blanket weed was raised as an amenity issue on the Malmesbury Avon and considered to be part of the low flow problem. Blanket weed is a term that is sometimes used generically to describe any fouling algae but usually refers to *Cladophora* which thrives in well lit, often shallow, slower flowing, nutrient rich conditions. It will also thrive in faster flowing conditions as long as there is a stable substrate for it to attach to. Another macrophytic algae that is sometimes referred to as blanket weed is *Enteromorpha*. This can bloom in sections of very slow flow and high nutrients levels. One site where this has been seen is on the Tetbury Avon at Abbey Weir where mats of it float to the surface due to gas bubbles forming in the tubular colonies. Colonies of diatoms often cover the substrate and submerged plants. This can look unsightly and is more likely to occur where there is low current velocity.

A survey measuring percentage cover of blanket weed and distinguishing between the different types of algae was carried out 2002-04 in early summer before the onset of stream support and in Sept-Oct while stream support was still operating. Initially 11 sites were recorded and this was later increased to 13 in 2004. Where it was considered useful, a photograph was also taken although at many deeper sites the substrate and algae were not clear enough to capture on film.

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L2 Environment Agency (1999) Procedures for collecting and analysing macro-invertebrate samples. (BT 001). Environment Agency.

L3 Environment Agency (1999) Procedure for quality assurance for RIVPACS compatible macro-invertebrate samples analysed to the taxonomic level needed for the BMWP-score. BT 003. Environment Agency.

L4 Wright, P.J., Moss, D., Armitage, P.D., Furse, M.T. 1984 'A preliminary classification of running water sites in Great Britain based on macroinvertebrate species and the prediction of community type using environmental data'. *Freshwater Biology*, **14**, 221-256

L5 National Rivers Authority (1995) Sherston Avon juvenile brown trout survey

L6 Holmes, N.T.H (1996) Winterbourne Recovery: A Monitoring Programme Using Plants Following the 1989-92 Groundwater Drought b: South-western (Wessex) Region 1992-5.

L7 Holmes N.T.H., Newman J.R., Chadd S., Rouen K.J., Saint L. & Dawson F.H. (1999). Mean Trophic Rank: A users manual Environment Agency R&D Technical Report E38

L8 Environment Agency (2002). Resource Assessment and Management Framework Report and User Manual (Version 3). R&D Technical Manual W6-066M. E.A., Bristol. July, 2002

Table L1.4: Summary of macrophytes Community Types

Perennial (P1-5)

There are five community types in this group. Sites assigned to these five types will *not* be expected to have non-aquatic grasses, non-aquatic herbs, or the grass *Alopecurus geniculatus* (Marsh Foxtail) – these taxa are least likely when there is permanent flow.

Starwort *Callitriche*, water-speedwell *Veronicca anagallis-aquatica/catenata*, blanketweed *Cladophora*, filamentous algae, Fool's water-cress *Apium nodiflorum*, water-cress *Rorippa nasturtium-aquaticum*, water-mint *Mentha aquatica* and water forget-me-not *Myosotis scorpiodes* are typically found.

Type 1
The occurrence of *Berula erecta* is more likely. Fool's water-cress is less likely in Type 1 than in other types, whereas it is especially associated (as are water-cress and water-speedwell) with types 2 and 3.
Type 2
Whorl-grass and sweet-grass are more likely to occur.
Type 3
Brook water-crowfoot *Ranunculus penicillatus* var. *pseudofluitans*, *Verrucaria*, whorl-grass *Catabrosa* aquatica or widespread sweet-grass Glyceria spp. are not expected.
Type 4
Blanketweed is more associated with Type 4, which is often impoverished with Yellow Iris *Iris* spp., *Bittersweet Solanum dulcamara and several algal groups likely to occur.*
Type 5
Only water-mint is most associated with type 5. A variety of reeds are more common in this type than in any others (especially reed canary-grass *Phalaris arundinacea*).

Ditch Types (D9-10)

The two Ditch Types have more in common with the Intermittent Types 11-13 than Types 1-8.

They are not expected to support any of the following: Water crowfoot, whorl-grass, bur-reed, starwort, water-speedwell or Brooklime. They are expected to be colonised by non-aquatic herbs and grasses. Typical sites are impoverished but less so than Intermittent Types 11-13. Marsh foxtail is not a coloniser of Ditch Types, but wetland herbs such as true and fool's water-cress are more typical colonisers. Small sweet-grass species are rarely found

Type 9
Unlikely occurrence of algae. Bittersweet is a typical coloniser. Reed canary-grass, true- and fools-watercress occur more commonly and in greater abundance.
Type 10
Very likely occurrence of algae. Bittersweet is a typical coloniser.

Winterbourne (W6-8)

There are three community types in this group with common features that distinguish them from the remaining ten. Winterbourne sites have a combination of features associated with perennial communities and the communities of ditches or frequently drying sites. There is the potential for non-aquatic grasses, non-aquatic herbs and marsh foxtail. In common with the perennial communities is the potential for wetland herbs such as water-speedwell, true and Fool's water-cress to be common and even crowfoot to be present (Holmes, 1996).

Type 6.
Non-aquatic species, marsh foxtail, filamentous algae and early colonisers are much less likely to be encountered. This shows that they are typically perennial, but lack some of the key aquatic taxa of Types 1-5.
Type 7
There is a much greater likelihood of pond water-crowfoot occurring. Non-aquatics are often common.
Type 8
There is a greater likelihood of water-crowfoot occurring that is not *R. peltatus* or *penicillatus*; commonly it is *R. trichophyllus*. Non-aquatics are often common. Water-speedwell is both commonly occurring and typically much more abundant.

Intermittent Types (I11-13)

There are three community types in this group. The over-whelming dominance of non-aquatic grasses and herbs is unique.

Type 11
Typically, there are no wetland or aquatic plants present. Along with non-aquatic herbs and grasses, filamentous algae the only other taxon expected.
Type 12
Greater chance of Reed canary-grass. Little chance of supporting true or fool's water-cress
Type 13
Greater chance of having true and fool's water-cress present, but only rarely. Marsh foxtail very commonly occurs.

Appendix L2

Macro-invertebrate scores

Site	Date	Obs No Taxa	Obs BMWP	Obs ASPT	Obs LIFE	Exp No Taxa	Exp BMWP	Exp ASPT	Exp LIFE	EQI Taxa	EQI BMWP	EQI ASPT	EQI LIFE
U/S	Summer 2001	15	73	4.87	6.71	22	107	4.86	7.25	0.68	0.68	1.00	0.93
Luckington	Autumn 2001	17	81	4.76	7.29	19	81	4.26	7.00	0.89	1.00	1.12	1.04
Court	Spring 2002	21	116	5.52	7.32	19	102	5.37	7.59	1.11	1.14	1.03	0.96
ST838839	Autumn 2002	27	142	5.26	7.04	19	81	4.26	7.00	1.42	1.75	1.23	1.01
	Spring 2004	26	147	5.65	7.16	19	102	5.37	7.59	1.37	1.44	1.05	0.94
	Summer 2004	27	141	5.22	6.88	22	107	4.86	7.25	1.23	1.32	1.07	0.95
	Autumn 2004	23	137	5.96	7.41	19	81	4.26	7.00	1.21	1.69	1.40	1.06
	Spring 1995	26	145	5.58	7.28	22	113	5.14	7.10	1.18	1.28	1.09	1.03
	Autumn 1995	25	122	4.88	6.92	17	77	4.53	6.73	1.47	1.58	1.08	1.03
Crow	Spring 1999	24	141	5.88	7.32	22	113	5.14	7.10	1.09	1.25	1.14	1.03
Down	Summer 1999	23	125	5.43	7.33	22	104	4.73	6.90	1.05	1.20	1.15	1.06
Springs	Autumn 1999	24	124	5.17	7.19	17	77	4.53	6.73	1.41	1.61	1.14	1.07
ST843859	Spring 2000	25	144	5.76	7.32	22	113	5.14	7.10	1.14	1.27	1.12	1.03
	Summer 2001	21	108	5.14	7.00	22	104	4.73	6.90	0.95	1.04	1.09	1.01
	Autumn 2001	18	94	5.22	7.24	17	77	4.53	6.73	1.06	1.22	1.15	1.08
	Spring 2002	25	129	5.16	6.91	22	113	5.14	7.10	1.14	1.14	1.00	0.97
	Autumn 2002	21	102	5.67	7.11	17	77	4.53	6.73	1.24	1.32	1.25	1.06
	Spring 2004	25	121	4.84	6.70	22	113	5.14	7.10	1.14	1.07	0.94	0.94
	Summer 2004	28	147	5.25	6.68	22	104	4.73	6.90	1.27	1.41	1.11	0.97
	Autumn 2004	24	122	5.08	6.96	17	77	4.53	6.73	1.41	1.58	1.12	1.03
	Spring 1995	19	99	5.21	7.12	19	98	5.16	7.06	1.00	1.01	1.01	1.01
	Autumn 1995	21	124	5.9	6.90	20	88	4.40	6.89	1.05	1.41	1.34	1.00
	Spring 1999	16	87	5.44	7.21	19	98	5.16	7.06	0.84	0.89	1.05	1.02
	Summer 1999	27	151	5.59	7.28	21	97	4.62	7.16	1.29	1.56	1.21	1.02
	Autumn 1999	27	145	5.37	7.12	20	88	4.40	6.89	1.35	1.65	1.22	1.03
	Spring 2000	21	117	5.57	7.05	19	98	5.16	7.06	1.11	1.19	1.08	1.00
	Autumn 2000	22	115	5.23	6.95	20	88	4.40	6.89	1.10	1.31	1.19	1.01
U/S	Summer 2001	27	161	5.96	6.92	21	97	4.62	7.16	1.29	1.66	1.29	0.97
Sherston	Autumn 2001	28	166	5.93	7.19	20	88	4.40	6.89	1.40	1.89	1.35	1.04
STW	Spring 2002	22	133	6.05	7.30	19	98	5.16	7.06	1.16	1.36	1.17	1.03
ST856857	Summer 2002	18	99	5.50	7.00	21	97	4.62	7.16	0.86	1.02	1.19	0.98
	Autumn 2002	18	102	5.67	7.19	20	88	4.40	6.89	0.90	1.16	1.29	1.04
	Spring 2004	24	145	6.04	7.23	19	98	5.16	7.06	1.26	1.48	1.17	1.02
	Summer 2004	25	153	6.12	7.17	21	97	4.62	7.16	1.19	1.58	1.32	1.00
	Autumn 2004	23	135	5.87	7.24	20	88	4.40	6.89	1.15	1.53	1.33	1.05
Fosseway	Summer 2001	25	148	5.92	7.54	23	117	5.09	7.10	1.09	1.26	1.16	1.06
off	Autumn 2001	28	166	5.93	7.19	23	112	4.87	6.90	1.22	1.48	1.22	1.04
B4040	Spring 2002	21	134	6.38	7.70	23	121	5.26	7.10	0.91	1.11	1.21	1.09
ST889870	Autumn 2002	26	157	6.04	7.36	23	112	4.87	6.90	1.13	1.40	1.24	1.07
	Spring 2004	27	163	6.04	7.35	23	121	5.26	7.10	1.17	1.35	1.15	1.04
	Summer 2004	29	169	5.83	7.25	23	117	5.09	7.10	1.26	1.44	1.15	1.02
	Autumn 2004	30	178	5.93	7.28	23	112	4.87	6.90	1.30	1.59	1.22	1.05
Malmesbury	Spring 1995	25	138	5.52	6.28	21	92	4.38	6.16	1.19	1.50	1.26	1.02
D/S	Autumn 1995	30	159	5.3	6.24	22	93	4.23	5.80	1.36	1.71	1.25	1.08
Bridge	Spring 2000	27	155	5.74	6.80	21	92	4.38	6.16	1.29	1.68	1.31	1.10
ST929872	Autumn 2001	22	119	5.41	6.33	22	93	4.23	5.80	1.00	1.28	1.28	1.09
	Spring 2002	18	104	5.78	6.75	21	92	4.38	6.16	0.86	1.13	1.32	1.10
	Autumn 2002	22	120	5.45	6.43	22	93	4.23	5.80	1.00	1.29	1.29	1.11
	Spring 2004	26	149	5.73	6.65	21	92	4.38	6.16	1.24	1.62	1.31	1.08
	Summer 2004	29	154	5.31	6.18	23	101	4.39	6.14	1.26	1.52	1.21	1.01
	Autumn 2004	22	112	5.09	6.19	22	93	4.23	5.80	1.00	1.20	1.20	1.07
	Spring 1995	19	100	5.26	6.94	20	112	5.60	7.72	0.95	0.89	0.94	0.90
	Autumn 1995	19	95	5.00	7.00	17	80	4.71	7.20	1.12	1.19	1.06	0.97
	Spring 1999	19	93	4.89	6.82	20	112	5.60	7.72	0.95	0.83	0.87	0.88
Slads Farm	Summer 1999	15	72	4.80	6.92	19	95	5.00	7.24	0.79	0.76	0.96	0.96
D/S STW	Autumn 1999	16	68	4.25	6.71	17	80	4.71	7.20	0.94	0.85	0.90	0.93
	Spring 2000	15	81	5.40	7.62	20	112	5.60	7.72	0.75	0.72	0.96	0.99
ST898920	Autumn 2000	18	95	5.28	6.69	17	80	4.71	7.20	1.06	1.19	1.12	0.93
	Summer 2001	16	89	5.56	7.71	19	95	5.00	7.24	0.84	0.94	1.11	1.07
	Autumn 2001	19	98	5.16	7.35	17	80	4.71	7.20	1.12	1.23	1.10	1.02
	Spring 2002	18	97	5.39	7.25	20	112	5.60	7.72	0.90	0.87	0.96	0.94
	Autumn 2002	17	92	5.41	7.07	17	80	4.71	7.20	1.00	1.15	1.15	0.98
	Spring 2004	15	86	5.73	7.92	20	112	5.60	7.72	0.75	0.77	1.02	1.03
	Summer 2004	21	122	5.81	7.35	19	95	5.00	7.24	1.11	1.28	1.16	1.02
	Autumn 2004	18	92	5.11	7.63	17	80	4.71	7.20	1.06	1.15	1.09	1.06
Fosseway	Summer 2001	24	145	6.04	7.73	21	97	4.62	7.00	1.14	1.49	1.31	1.10
off	Autumn 2001	23	136	5.91	7.48	21	94	4.48	6.84	1.10	1.45	1.32	1.09
B4014	Spring 2002	26	166	6.38	7.56	20	94	4.70	6.83	1.30	1.77	1.36	1.11
ST910902	Autumn 2002	22	143	6.50	7.55	21	94	4.48	6.84	1.05	1.52	1.45	1.10
	Spring 2004	23	151	6.57	7.33	20	94	4.70	6.83	1.15	1.61	1.40	1.07
	Summer 2004	28	173	6.18	7.35	21	97	4.62	7.00	1.33	1.78	1.34	1.05
	Autumn 2004	25	146	5.84	7.52	21	94	4.48	6.84	1.19	1.55	1.30	1.10
	Spring 1995	36	215	5.97	7.06	20	101	5.05	6.94	1.80	2.13	1.18	1.02
	Autumn 1995	24	135	5.63	6.70	22	101	4.59	6.80	1.09	1.34	1.23	0.99
Back	Spring 1999	32	197	6.16	7.03	20	101	5.05	6.94	1.60	1.95	1.22	1.01
Bridge	Summer 1999	29	171	5.90	7.15	22	107	4.86	7.10	1.32	1.60	1.21	1.01
	Autumn 1999	33	192	5.82	6.90	22	101	4.59	6.80	1.50	1.90	1.27	1.01
ST922882	Spring 2000	27	161	5.96	7.08	20	101	5.05	6.94	1.35	1.59	1.18	1.02
	Autumn 2000	32	183	5.72	7.00	22	101	4.59	6.80	1.45	1.81	1.25	1.03
	Summer 2001	21	109	5.19	7.26	22	107	4.86	7.10	0.95	1.02	1.07	1.02
	Autumn 2001	28	161	5.75	6.81	22	101	4.59	6.80	1.27	1.59	1.25	1.00
	Spring 2002	28	178	6.36	7.35	20	101	5.05	6.94	1.40	1.76	1.26	1.06
	Autumn 2002	22	119	5.41	6.50	22	101	4.59	6.80	1.00	1.18	1.18	0.96
	Spring 2004	27	168	6.22	7.19	20	101	5.05	6.94	1.35	1.66	1.23	1.04
	Summer 2004	26	147	5.65	7.04	22	107	4.86	7.10	1.18	1.37	1.16	0.99
	Autumn 2004	23	128	5.57	6.91	22	101	4.59	6.80	1.05	1.27	1.21	1.02
	Summer 2001	29	164	5.66	7.37	29	152	5.24	6.81	1.00	1.08	1.08	1.08
Malmesbury	Autumn 2001	29	165	5.69	6.96	28	145	5.18	6.85	1.04	1.14	1.10	1.02
D/S STW	Spring 2002	32	183	5.72	7.10	25	131	5.24	6.83	1.28	1.40	1.09	1.04
ST942862	Summer 2002	25	128	5.12	7.04	29	152	5.24	6.81	0.86	0.84	0.98	1.03
	Autumn 2002	23	119	5.17	7.24	28	145	5.18	6.85	0.82	0.82	1.00	1.06
	Spring 2004	29	156	5.38	6.93	25	131	5.24	6.83	1.16	1.19	1.03	1.02
	Summer 2004	29	157	5.41	6.54	29	152	5.24	6.81	1.00	1.03	1.03	0.96
	Autumn 2004	29	156	5.38	6.39	28	145	5.18	6.85	1.04	1.08	1.04	0.93
Great	Summer 2001	19	95	5.00	6.88	28	132	4.71	6.27	0.68	0.72	1.06	1.10
Somerford	Autumn 2001	17	87	5.12	6.81	26	120	4.62	6.38	0.65	0.73	1.11	1.07
ST965832	Spring 2002	20	111	5.55	6.78	24	116	4.83	6.59	0.83	0.96	1.15	1.03
	Spring 2004	27	149	5.52	6.54	24	116	4.83	6.59	1.13	1.28	1.14	0.99
	Summer 2004	23	129	5.61	6.38	28	132	4.71	6.27	0.82	0.98	1.19	1.02
	Autumn 2004	23	133	5.78	6.59	26	120	4.62	6.38	0.88	1.11	1.25	1.03

Appendix L3 – Macro Invertebrates- List of taxa and Abundance

Malmesbury Avon Invertebrate Taxa 2001

	ST8380083900 U/S Lucklington Court			ST8430085900 Cow Down Springs			ST8560085700 U/S Sherston STW			ST8890087000 Fosseway off B4040			ST9290087250 Malmesbury D/S Bridge		
	Spring	31/07/2001	30/10/2001	Spring	31/07/2001	30/10/2001	Spring	31/07/2001	30/10/2001	Spring	31/07/2001	30/10/2001	Spring	Summer	31/10/2001
TRICLADIDA	No data			No data			No data			No data			No data	No data	
Dendrocoelidae	-	-	A	-	-	-	-	-	-	-	-	-	-	-	-
Planariidae	-	-	A	-	-	A	-	-	-	-	-	-	-	-	-
GASTROPODA															
Ancylidae	-	A	A	-	A	-	-	A	A	-	A	A	-	-	A
Bithyniidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Hydrobiidae	-	D	D	-	C	C	-	B	C	-	C	C	-	-	B
Lymnaeidae	-	-	-	-	A	-	-	A	A	-	B	B	-	-	A
Neritidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Planorbidae	-	-	A	-	A	-	-	A	A	-	A	B	-	-	B
Valvatidae	-	-	-	-	-	-	-	-	-	-	A	-	-	-	-
BIVALVIA															
Sphaeriidae	-	B	A	-	B	B	-	A	A	-	B	B	-	-	B
OLIGOCHAETA															
Oligochaeta	-	-	B	-	A	B	-	B	A	-	A	A	-	-	B
HIRUDINEA															
Erpobdellidae	-	A	A	-	-	A	-	-	-	-	-	A	-	-	-
Glossiphoniidae	-	B	A	-	A	B	-	-	A	-	-	A	-	-	A
Piscicolidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CRUSTACEA															
Asellidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Astacidae	-	-	-	-	-	-	-	A	-	-	-	-	-	-	-
Gammaridae	-	C	C	-	C	C	-	C	C	-	D	C	-	-	-
EPHEMEROPTERA															
Baetidae	-	B	C	-	B	C	-	B	C	-	C	C	-	-	A
Caenidae	-	-	-	-	-	-	-	B	B	-	B	A	-	-	B
Ephemerellidae	-	B	-	-	B	A	-	A	A	-	C	A	-	-	-
Ephemeridae	-	-	-	-	-	-	-	A	A	-	B	C	-	-	A
Heptageniidae	-	-	-	-	-	-	-	-	-	-	A	-	-	-	-
Leptophlebiidae	-	-	-	-	-	-	-	A	B	-	-	B	-	-	-
PLECOPTERA															
Leuctridae	-	-	-	-	B	-	-	A	-	-	A	-	-	-	-
ODONATA															
Calopterygidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEMIPTERA															
Corixidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
COLEOPTERA															
Dytiscidae	-	-	-	-	B	A	-	A	-	-	-	A	-	-	A
Elmidae	-	B	B	-	A	B	-	C	C	-	C	C	-	-	B
Gyrinidae	-	-	-	-	-	-	-	A	A	-	-	A	-	-	A
Haliplidae	-	-	-	-	A	A	-	B	A	-	A	A	-	-	-
Hydrophilidae	-	A	-	-	-	-	-	A	-	-	-	-	-	-	-
Scirtidae	-	-	-	-	A	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	B	-	-	-	-	-	-	-	-	-	-	-	-	A
TRICHOPTERA															
Beraeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Glossosomatidae	-	-	B	-	-	B	-	A	B	-	C	B	-	-	-
Goeridae	-	-	A	-	A	B	-	A	B	-	-	B	-	-	-
Hydropsychidae	-	-	A	-	-	-	-	-	B	-	B	B	-	-	-
Hydroptilidae	-	-	-	-	-	-	-	C	B	-	B	B	-	-	A
Lepidostomatidae	-	-	-	-	-	-	-	-	-	-	A	B	-	-	-
Leptoceridae	-	-	-	-	-	-	-	B	B	-	A	B	-	-	-
Limnephilidae	-	B	B	-	B	B	-	-	A	-	A	B	-	-	A
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Phryganeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Polycentropodidae	-	-	-	-	-	-	-	B	A	-	A	B	-	-	A
Psychomyiidae	-	-	-	-	-	-	-	-	A	-	-	-	-	-	-
Rhyacophilidae	-	A	A	-	A	A	-	-	-	-	B	A	-	-	-
Sericostomatidae	-	-	-	-	-	B	-	-	A	-	-	A	-	-	-
DIPTERA															
Chironomidae	-	C	-	-	B	B	-	C	B	-	B	B	-	-	A
Simuliidae	-	-	A	-	A	-	-	A	A	-	B	-	-	-	-
Tipulidae	-	B	-	-	B	A	-	A	A	-	-	-	-	-	-
NTAXA		15	17		21	18		27	28		25	28			22
BMWP		73	81		108	94		161	166		148	166			119
ASPT		4.87	4.76		5.14	5.22		5.96	5.93		5.92	5.93			5.41
LIFE score		6.71	7.29		7.00	7.24		6.92	7.23		7.54	7.19			6.33

Malmesbury Avon Invertebrate Taxa 2001 (Cont'd)															
	ST8977092000			ST9101090240			ST9222088200			ST9420086150			ST9649083200		
	D/S STW at Slads Farm			Fosseway off B4014			Back Bridge			D/S Malmesbury STW			Great Somerford		
	Spring	02/08/2001	31/10/2001	Spring	02/08/2001	31/10/2001	Spring	02/08/2001	30/10/2001	Spring	07/08/2001	31/10/2001	Spring	07/08/2001	05/11/2001
TRICLADIDA	No data			No data			No data						No data		
Dendrocoelidae	-	-	A	-	-	-	-	-	-	-	-	-	-	-	-
Planariidae	-	A	B	-	-	-	-	-	-	-	A	A	-	A	-
GASTROPODA															
Ancylidae	-	A	A	-	A	A	-	B	A	-	B	B	-	A	-
Bithyniidae	-	-	-	-	-	-	-	-	-	-	-	B	-	-	A
Hydrobiidae	-	-	A	-	C	B	-	D	C	-	B	B	-	-	A
Lymnaeidae	-	-	-	-	A	B	-	A	A	-	B	A	-	-	-
Neritidae	-	-	-	-	-	-	-	-	-	-	A	B	-	-	-
Planorbidae	-	-	-	-	-	-	-	B	A	-	A	B	-	A	-
Valvatidae	-	-	-	-	-	-	-	-	-	-	A	-	-	-	-
BIVALVIA															
Sphaeriidae	-	-	A	-	-	A	-	B	B	-	C	C	-	A	A
OLIGOCHAETA															
Oligochaeta	-	B	B	-	C	B	-	C	B	-	B	B	-	A	B
HIRUDINEA															
Erpobdellidae	-	-	A	-	A	-	-	A	A	-	B	A	-	A	A
Glossiphoniidae	-	A	A	-	-	A	-	A	A	-	-	-	-	A	A
Piscicolidae	-	-	-	-	-	A	-	-	-	-	A	A	-	-	A
CRUSTACEA															
Asellidae	-	A	A	-	-	-	-	-	-	-	-	A	-	-	A
Astacidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gammaridae	-	C	D	-	B	B	-	C	B	-	C	C	-	B	A
EPHEMEROPTERA															
Baetidae	-	B	C	-	C	B	-	C	A	-	C	A	-	B	A
Caenidae	-	-	-	-	A	A	-	-	C	-	A	B	-	A	C
Ephemerellidae	-	B	A	-	B	A	-	A	A	-	B	A	-	-	-
Ephemeridae	-	-	-	-	B	B	-	-	B	-	A	A	-	-	A
Heptageniidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptophlebiidae	-	-	-	-	-	-	-	-	A	-	-	A	-	-	-
PLECOPTERA															
Leuctridae	-	A	-	-	C	-	-	B	-	-	C	-	-	-	-
ODONATA															
Calopterygidae	-	-	-	-	-	-	-	-	-	-	-	A	-	-	A
HEMIPTERA															
Corixidae	-	-	-	-	-	-	-	-	-	-	-	-	-	A	A
COLEOPTERA															
Dytiscidae	-	-	-	-	-	-	-	-	A	-	-	-	-	A	-
Elmidae	-	B	B	-	C	B	-	C	C	-	C	B	-	A	B
Gyrinidae	-	-	-	-	A	A	-	-	A	-	-	A	-	-	-
Haliplidae	-	A	-	-	B	-	-	-	A	-	A	A	-	A	-
Hydrophilidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scirtidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	-	-	-	-	-	-	A	A	-	-	-	-	-	-
TRICHOPTERA															
Beraeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glossosomatidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Goeridae	-	-	-	-	A	B	-	B	A	-	A	A	-	A	A
Hydropsychidae	-	-	-	-	B	A	-	B	A	-	B	B	-	A	-
Hydroptilidae	-	-	-	-	A	-	-	C	B	-	B	A	-	-	-
Lepidostomatidae	-	-	-	-	A	B	-	-	B	-	-	C	-	-	-
Leptoceridae	-	-	A	-	-	A	-	-	B	-	A	B	-	A	A
Limnephilidae	-	A	A	-	-	-	-	-	-	-	-	-	-	-	-
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phryganeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycentropodidae	-	-	-	-	A	A	-	-	A	-	A	A	-	A	-
Psychomyiidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhyacophilidae	-	A	A	-	A	A	-	A	-	-	B	-	-	-	-
Sericostomatidae	-	A	A	-	B	B	-	A	A	-	A	-	-	-	-
DIPTERA															
Chironomidae	-	C	B	-	C	A	-	C	B	-	C	B	-	B	B
Simuliidae	-	A	B	-	C	-	-	-	-	-	B	-	-	-	-
Tipulidae	-	-	-	-	A	A	-	B	A	-	A	A	-	-	-
NTAXA		16	19		24	23		21	28		29	29		19	17
BMWP		89	98		145	136		109	161		164	165		95	87
ASPT		5.56	5.16		6.04	5.91		5.19	5.75		5.66	5.69		5.00	5.12
LIFE score		7.71	7.35		7.73	7.48		7.26	6.81		7.37	6.96		6.88	6.81

Malmesbury Avon Invertebrate Taxa 2002															
	ST8380083900			ST8430085900			ST8560085700			ST8890087000			ST9290087250		
	U/S Lucklington Court			Cow Down Springs			U/S Sherston STW			Fosseway off B4040			Malmesbury D/S Bridge		
	14/05/2002	Summer	08/10/2002	14/05/2002	Summer	08/10/2002	14/05/2002	02/08/2002	08/10/2002	14/05/2002	Summer	08/10/2002	14/05/2002	Summer	11/10/2002
TRICLADIDA		No data			No data						No data			No data	
Planariidae	-	-	-	B	-	A	-	-	-	-	-	-	-	-	-
GASTROPODA															
Ancylidae	A	-	A	-	-	A	A	-	A	-	-	A	-	-	B
Bithyniidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Hydrobiidae	C	-	B	B	-	B	B	C	B	A	-	B	-	-	B
Lymnaeidae	-	-	A	A	-	A	-	-	-	-	-	A	-	-	B
Neritidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Planorbidae	-	-	-	A	-	-	A	A	-	A	-	-	A	-	B
Valvatidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Viviparidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIVALVIA															
Sphaeriidae	A	-	B	B	-	B	B	-	B	A	-	-	A	-	B
Unionidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OLIGOCHAETA															
Oligochaeta	B	-	B	B	-	B	B	B	B	A	-	A	B	-	B
HIRUDINEA															
Erpobdellidae	-	-	A	A	-	-	-	-	-	-	-	-	-	-	-
Glossiphoniidae	A	-	B	A	-	A	-	-	-	-	-	A	-	-	-
Piscicolidae	A	-	A	A	-	A	-	-	-	-	-	-	-	-	A
CRUSTACEA															
Asellidae	-	-	-	-	-	-	-	-	-	-	-	-	A	-	-
Astacidae	-	-	-	-	-	-	A	A	-	-	-	-	-	-	-
Gammaridae	C	-	B	C	-	B	B	C	B	B	-	B	A	-	B
EPHEMEROPTERA															
Baetidae	B	-	B	B	-	B	B	C	B	B	-	B	C	-	B
Caenidae	B	-	A	B	-	-	C	A	B	B	-	A	B	-	B
Ephemerellidae	C	-	-	B	-	B	C	-	-	C	-	-	A	-	-
Ephemeridae	-	-	-	-	-	-	A	-	A	A	-	B	A	-	A
Heptageniidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leptophlebiidae	B	-	A	A	-	-	B	-	B	B	-	B	A	-	-
PLECOPTERA															
Leuctridae	-	-	-	-	-	-	A	A	-	-	-	-	-	-	-
Nemouridae	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-
Perlodidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEMIPTERA															
Corixidae	-	-	-	-	-	A	-	-	-	-	-	-	A	-	B
COLEOPTERA															
Dytiscidae	A	-	A	B	-	B	-	A	-	-	-	A	A	-	A
Elmidae	B	-	B	B	-	B	B	B	B	B	-	B	B	-	B
Gyrinidae	-	-	A	-	-	-	-	-	-	-	-	A	-	-	A
Haliplidae	A	-	A	-	-	B	A	A	A	-	-	A	-	-	-
Hydrophilidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	-	A	-	-	-	-	-	-	-	-	-	-	-	-
NEUROPTERA															
TRICHOPTERA															
Glossosomatidae	-	-	B	-	-	-	-	A	-	B	-	B	-	-	-
Goeridae	-	-	A	-	-	A	-	-	-	B	-	A	-	-	-
Hydropsychidae	A	-	A	A	-	-	B	-	B	A	-	B	-	-	-
Hydroptilidae	-	-	A	B	-	-	B	B	B	B	-	B	B	-	B
Lepidostomatidae	-	-	-	-	-	-	-	-	-	A	-	B	-	-	-
Leptoceridae	A	-	B	-	-	-	C	B	B	A	-	B	A	-	B
Limnephilidae	A	-	B	A	-	A	-	-	-	-	-	A	B	-	A
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	A
Polycentropodidae	-	-	-	-	-	-	A	B	B	A	-	A	A	-	B
Psychomyiidae	A	-	A	-	-	-	-	-	-	-	-	-	-	-	A
Rhyacophilidae	A	-	B	B	-	A	A	A	A	A	-	A	-	-	-
Sericostomatidae	-	-	-	A	-	A	-	-	-	A	-	B	-	-	-
DIPTERA															
Chironomidae	C	-	B	B	-	C	C	B	B	B	-	B	B	-	B
Simuliidae	-	-	B	B	-	-	B	B	B	A	-	A	-	-	-
Tipulidae	A	-	A	B	-	-	-	B	-	-	-	A	-	-	-
NTAXA	21		27	25		20	22	18	18	21		26	18		22
BMWP	116		142	129		104	133	99	102	134		157	104		120
ASPT	5.52		5.26	5.16		5.20	6.05	5.50	5.67	6.38		6.04	5.78		5.45
LIFE score	7.32		7.04	6.91		7.11	7.30	7.00	7.19	7.70		7.36	6.75		6.43

Malmesbury Avon Invertebrate Taxa 2002 (Cont'd)

	ST8977092000			ST9101090240			ST9222088200			ST9420086150			ST9649083200		
	D/S STW at Slads Farm			Fosseway off B4014			Back Bridge			D/S Malmesbury STW			Great Somerford		
	16/05/2002	Summer	11/10/2002	16/05/2002	Summer	11/10/2002	16/05/2002	Summer	11/10/2002	14/05/2002	17/07/2002	11/10/2002	14/05/2002	Summer	Autumn
TRICLADIDA		No data			No data			No data						No data	No data
Planariidae	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GASTROPODA															
Ancylidae	B	-	A	A	-	-	A	-	-	-	B	B	-	-	-
Bithyniidae	-	-	-	-	-	-	-	-	-	B	A	-	-	-	-
Hydrobiidae	B	-	A	A	-	B	C	-	B	B	B	B	A	-	-
Lymnaeidae	-	-	-	-	-	-	-	-	-	A	A	A	-	-	-
Neritidae	-	-	-	-	-	-	-	-	-	A	A	A	-	-	-
Planorbidae	-	-	-	-	-	-	A	-	A	A	B	B	A	-	-
Valvatidae	-	-	-	-	-	-	-	-	-	A	-	-	-	-	-
Viviparidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BIVALVIA															
Sphaeriidae	A	-	A	-	-	-	B	-	B	B	C	B	A	-	-
Unionidae	-	-	-	-	-	-	-	-	-	A	-	-	-	-	-
OLIGOCHAETA															
Oligochaeta	B	-	B	B	-	B	B	-	A	B	B	B	B	-	-
HIRUDINEA															
Erpobdellidae	-	-	-	-	-	-	A	-	A	B	A	A	A	-	-
Glossiphoniidae	-	-	A	A	-	-	A	-	A	A	A	A	A	-	-
Piscicolidae	-	-	A	A	-	-	-	-	-	A	-	A	-	-	-
CRUSTACEA															
Asellidae	A	-	A	-	-	-	-	-	-	-	A	-	A	-	-
Astacidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gammaridae	B	-	A	B	-	B	B	-	A	B	C	C	A	-	-
EPHEMEROPTERA															
Baetidae	B	-	A	C	-	B	C	-	A	B	C	B	B	-	-
Caenidae	-	-	-	B	-	B	C	-	B	B	B	B	C	-	-
Ephemerellidae	C	-	A	C	-	A	C	-	-	B	B	-	A	-	-
Ephemeridae	-	-	-	A	-	A	A	-	A	-	-	-	A	-	-
Heptageniidae	-	-	-	-	-	-	A	-	-	A	-	-	-	-	-
Leptophlebiidae	-	-	A	A	-	A	A	-	-	A	-	-	A	-	-
PLECOPTERA															
Leuctridae	-	-	-	A	-	-	A	-	-	B	B	-	-	-	-
Nemouridae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perlodidae	-	-	-	-	-	-	A	-	-	-	-	-	-	-	-
HEMIPTERA															
Corixidae	-	-	-	-	-	-	-	-	-	-	-	-	A	-	-
COLEOPTERA															
Dytiscidae	-	-	A	-	-	-	-	-	A	A	A	-	-	-	-
Elmidae	B	-	B	B	-	B	C	-	B	B	B	B	A	-	-
Gyrinidae	-	-	-	A	-	A	-	-	-	-	-	-	-	-	-
Haliplidae	-	-	-	A	-	A	-	-	A	-	-	-	-	-	-
Hydrophilidae	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	-	-	-	-	-	-	-	A	-	-	-	-	-	-
NEUROPTERA															
TRICHOPTERA															
Glossosomatidae	-	-	-	A	-	-	-	-	-	-	-	-	-	-	-
Goeridae	-	-	-	A	-	A	-	-	-	-	-	A	A	-	-
Hydropsychidae	-	-	-	A	-	B	B	-	A	B	A	B	-	-	-
Hydroptilidae	-	-	-	A	-	A	A	-	B	B	A	A	A	-	-
Lepidostomatidae	-	-	-	A	-	B	A	-	A	A	-	B	-	-	-
Leptoceridae	A	-	B	B	-	B	A	-	B	B	A	B	A	-	-
Limnephilidae	C	-	A	-	-	-	A	-	A	A	-	-	-	-	-
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polycentropodidae	-	-	-	A	-	A	B	-	A	A	A	A	A	-	-
Psychomyiidae	-	-	-	-	-	-	-	-	-	A	-	-	-	-	-
Rhyacophilidae	A	-	-	A	-	B	A	-	-	B	B	A	-	-	-
Sericostomatidae	A	-	A	A	-	B	A	-	A	-	-	-	-	-	-
DIPTERA															
Chironomidae	C	-	A	B	-	B	B	-	A	B	B	B	B	-	-
Simuliidae	B	-	-	B	-	B	A	-	-	B	A	A	-	-	-
Tipulidae	A	-	-	A	-	A	A	-	-	A	A	-	-	-	-
NTAXA	18		17	26		22	28		22	32	25	23	20		
BMWP	97		92	166		143	178		119	183	128	119	111		
ASPT	5.39		5.41	6.38		6.50	6.36		5.41	5.72	5.12	5.17	5.55		
LIFE score	7.25		7.07	7.56		7.55	7.35		6.50	7.10	7.04	7.24	6.78		

Malmesbury Avon Invertebrate Taxa 2004															
	ST8380083900 Luckington Court			ST8430085900 Crow Down Springs			ST8560085700 u/s Sherston STW			ST8890087000 Fosseway off B4040			ST9290087250 Malmesbury D/S Bridge		
	14/04/2004	13/07/2004	06/09/2004	14/04/2004	13/07/2004	06/09/2004	14/04/2004	13/07/2004	06/09/2004	14/04/2004	13/07/2004	06/09/2004	18/04/2004	13/07/2004	06/09/2004
TRICLADIDA															
Dendrocoelidae	-	4	-	-	-	-	-	-	-	1	-	-	-	-	-
Dugesiidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Planariidae	2	30	20	50	3	30	-	-	-	-	1	-	-	-	-
GASTROPODA															
Ancylidae	3	10	1	5	2	20	3	1	4	10	15	5	5	1	2
Bithyniidae	-	-	-	-	-	-	-	-	-	-	-	-	6	6	1
Hydrobiidae	200	3500	2000	200	2000	1000	50	300	1000	40	3000	600	15	150	1
Lymnaeidae	-	1	-	40	20	30	-	-	-	20	15	20	1	6	2
Neritidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Physidae	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Planorbidae	-	2	-	30	10	6	1	1	-	15	12	12	20	10	20
Valvatidae	-	-	-	-	-	-	-	-	-	1	-	10	-	1	-
BIVALVIA															
Sphaeriidae	50	-	30	50	-	50	2	-	20	30	-	30	60	200	60
OLIGOCHAETA															
Oligochaeta	30	80	20	30	15	10	20	10	60	10	12	10	20	20	1
HIRUDINEA															
Erpobdellidae	-	-	1	5	12	1	-	-	-	-	-	-	-	3	-
Glossiphoniidae	12	40	20	10	20	20	-	-	1	-	15	20	-	50	1
Piscicolidae	5	5	10	6	1	-	-	-	-	-	-	3	1	-	-
CRUSTACEA			-												
Asellidae	1	2	-	-	-	-	-	-	-	-	1	-	-	2	1
Astacidae	-	-		-	-	-	-	5	-	-	-	-	-	-	-
Gammaridae	200	800	400	200	500	500	500	600	600	130	250	300	3	40	-
EPHEMEROPTERA															
Baetidae	300	100	200	200	200	300	1000	60	400	1200	250	500	20	100	20
Caenidae	200	60		500	30	-	300	50	1	100	15	-	500	300	4
Ephemerellidae	-	50	2	50	300	15	200	60	3	800	200	90	10	3	-
Ephemeridae	1	-	1	-	5	-	4	3	20	20	50	120	40	2	60
Leptophlebiidae	2	6	-	-	-	-	30	3	2	3	10	1	-	-	-
PLECOPTERA															
Leuctridae	-	12	-	-	2	1	1	60	10	-	50	40	-	1	-
Perlodidae	1	-	-	7	-	-	-	-	-	-	-	-	-	-	-
ODONATA															
Calopterygidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEMIPTERA															
Corixidae	-	-	-	-	-	1	-	-	-	-	-	-	-	60	10
COLEOPTERA															
Dytiscidae	-	6	2	15	150	60	-	12	-	-	-	-	1	20	8
Elmidae	250	60	60	40	40	30	40	280	200	30	300	200	30	15	1
Gyrinidae	-	-	1	-	-	-	1	-	1	4	-	2	7	-	-
Haliplidae	2	-	-	3	15	12	10	15	7	-	2	10	-	1	2
Hydraenidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrophilidae	-	2	-	-	10	-	1	-	-	-	1	-	-	2	-
Scirtidae	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	1	-	-	20	-	-	-	-	-	-	-	1	40	6
NEUROPTERA															
Sisyridae	-	50	-	-	200	-	-	1	-	-	40	-	-	-	-
TRICHOPTERA															
Glossosomatidae	50	-	5	-	3	12	1	-	-	1	10	2	-	-	-
Goeridae	2	-	5	-	30	30	-	-	-	1	10	2	-	-	-
Hydropsychidae	40	-	-	-	-	-	30	20	6	80	20	130	1	-	-
Hydroptilidae	2	-	1	10	4	30	200	800	80	100	100	30	12	12	1
Lepidostomatidae	-	-	-	-	-	-	-	-	-	60	4	4	-	-	-
Leptoceridae	10	1	12	-	-	-	40	30	7	100	10	10	10	-	10
Limnephilidae	20	40	10	15	15	6	-	-	-	1	-	3	30	20	1
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	1	1	15
Phryganeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-
Polycentropodidae	-	-	-	-	-	-	10	15	20	1	10	20	60	3	20
Psychomyiidae	-	-	1	-	-	-	-	-	-	-	-	-	6	-	-
Rhyacophilidae	6	4	12	8	4	6	-	3	4	5	15	6	-	-	-
Sericostomatidae	-	-	1	-	-	-	1	1	-	10	-	10	1	-	-
DIPTERA															
Chironomidae	200	100	200	40	200	60	160	200	50	10	120	30	50	300	100
Simuliidae	60	100	40	100	100	100	80	600	500	500	700	300	15	-	-
Tipulidae	10	40	10	5	10	20	-	10	20	-	12	40	-	-	-
NTAXA	26	27	23	25	28	24	24	25	23	27	29	30	26	29	22
BMWP	147	141	137	121	147	122	145	153	135	163	169	178	149	154	112
ASPT	5.65	5.22	5.96	4.84	5.25	5.08	6.04	6.12	5.87	6.04	5.83	5.93	5.73	5.31	5.09
LIFE score	7.16	6.88	7.41	6.70	6.68	6.96	7.23	7.17	7.24	7.35	7.25	7.28	6.65	6.18	6.19

Malmesbury Avon Invertebrate Taxa 2004 (Cont'd)															
	ST8977092000 Slads Farm			ST9101090240 Fosseway off B4014			ST9222088200 Backbridge			ST9420086150 D/S Malmesbury STW			ST9649083200 Great Somerford		
	14/04/2004	13/07/2004	06/09/2004	14/04/2004	13/07/2004	06/09/2004	14/04/2000	13/07/2004	06/09/2004	14/04/2004	13/07/2004	07/09/2004	18/04/2004	13/07/2004	07/09/2004
TRICLADIDA															
Dendrocoelidae	1	1	4	-	-	-	-	-	-	-	-	-	-	-	-
Dugesiidae	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Planariidae	30	20	40	-	-	-	1	-	-	-	-	-	-	-	-
GASTROPODA															
Ancylidae	2	4	3	4	1	1	10	1	-	12	20	1	2	3	2
Bithyniidae	-	-	-	-	-	-	-	-	-	12	30	40	1	-	4
Hydrobiidae	-	-	1	150	40	200	100	3000	100	600	20	20	20	160	200
Lymnaeidae	-	-	-	-	-	1	-	-	-	10	30	30	-	-	-
Neritidae	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-
Physidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Planorbidae	-	-	-	-	-	2	-	4	2	30	20	60	20	12	20
Valvatidae	-	-	-	-	-	-	-	-	-	1	15	20	-	-	-
BIVALVIA															
Sphaeriidae	-	-	12	-	-	2	60	-	30	500	40	30	30	20	60
OLIGOCHAETA															
Oligochaeta	10	15	10	10	10	10	20	10	10	30	50	10	20	10	12
HIRUDINEA															
Erpobdellidae	-	-	-	-	-	1	2	4	4	2	30	12	1	-	-
Glossiphoniidae	-	12	6	-	1	-	3	18	15	2	60	30	3	10	4
Piscicolidae	-	-	-	-	1	-	-	-	-	-	-	1	-	-	-
CRUSTACEA															
Asellidae	10	90	30	-	-	-	-	1	-	3	30	160	10	16	3
Astacidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gammaridae	400	1300	5000	20	40	60	30	100	80	300	60	80	12	5	6
EPHEMEROPTERA															
Baetidae	180	100	400	500	400	200	60	400	60	800	250	20	5	100	10
Caenidae	-	1	-	300	10	1	50	30	10	60	300	90	500	300	40
Ephemerellidae	60	200	30	20	30	1	40	60	1	60	200	1	1	6	-
Ephemeridae	3	2	-	12	20	60	5	5	30	-	-	10	50	3	50
Leptophlebiidae	-	-	-	2	10	-	2	7	-	-	2	-	-	-	-
PLECOPTERA															
Leuctridae	-	1	-	1	40	200	3	50	4	-	20	2	-	1	1
Perlodidae	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
ODONATA															
Calopterygidae	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
HEMIPTERA															
Corixidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COLEOPTERA															
Dytiscidae	-	-	-	-	6	-	-	1	-	-	200	3	1	20	8
Elmidae	40	200	400	80	40	100	40	100	400	50	20	60	20	20	130
Gyrinidae	-	-	-	4	-	150	1	-	30	1	-	1	-	-	-
Haliplidae	-	-	-	40	20	100	-	10	4	-	4	6	-	20	12
Hydraenidae	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Hydrophilidae	-	6	-	-	-	-	-	2	-	-	-	-	-	-	-
Scirtidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MEGALOPTERA															
Sialidae	-	-	-	-	2	-	-	-	-	-	10	6	1	20	6
NEUROPTERA															
Sisyridae	-	20	-	-	1	-	-	150	-	-	-	-	-	-	-
TRICHOPTERA															
Glossosomatidae	-	-	-	1	-	-	10	-	-	-	-	-	-	-	-
Goeridae	-	-	-	-	1	10	-	-	-	10	-	2	-	3	12
Hydropsychidae	-	-	-	15	3	100	1	80	30	30	2	-	1	-	-
Hydroptilidae	-	1	-	50	50	10	20	400	100	40	60	20	12	50	2
Lepidostomatidae	-	-	-	40	5	1	2	-	-	60	2	1	3	-	-
Leptoceridae	-	-	-	15	20	-	15	30	15	50	20	10	3	1	10
Limnephilidae	10	20	6	15	-	-	20	-	-	10	-	-	5	-	-
Molannidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Phryganeidae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Polycentropodidae	-	-	-	4	10	3	15	40	40	12	50	40	12	7	2
Psychomyiidae	-	-	-	-	-	-	1	2	-	1	20	-	2	-	-
Rhyacophilidae	1	5	3	-	6	2	1	12	4	10	1	-	-	-	-
Sericostomatidae	10	20	10	10	4	30	-	12	2	-	-	-	-	-	-
DIPTERA															
Chironomidae	30	200	20	100	200	30	20	60	50	300	150	20	50	100	150
Simuliidae	100	60	1000	40	100	200	30	80	2	40	40	-	-	-	-
Tipulidae	-	6	20	-	12	30	-	16	12	1	10	2	1	-	-
NTAXA	15	21	18	23	28	25	27	26	23	29	29	29	27	23	23
BMWP	86	122	92	151	173	146	168	147	128	156	157	156	149	129	133
ASPT	5.73	5.81	5.11	6.57	6.18	5.84	6.22	5.65	5.57	5.38	5.41	5.38	5.52	5.61	5.78
LIFE score	7.92	7.35	7.63	7.33	7.35	7.52	7.19	7.04	6.91	6.93	6.54	6.39	6.54	6.38	6.59

Malmesbury Avon Invertebrate Taxa 2006															
	ST8380083900 Luckington Court			ST8430085900 Crow Down Springs			ST8560085700 u/s Sherston STW			ST8890087000 Fosseway off B4040			ST9290087250 Malmesbury D/S Bridge		
	21/03/2006	06/07/2006	18/09/2006	21/03/2006	06/07/2006	15/09/2006	21/03/2006	06/07/2006	19/09/2006	21/03/2006	06/07/2006	19/09/2006	21/03/2006	22/06/2006	06/10/2006
TRICLADIDA															
Dendrocoelidae	-														
Dugesiidae	-														
Planariidae	1	3		15	30	1				5	3				
GASTROPODA															
Ancylidae					2	3	1			6	12			2	
Bithyniidae														7	15
Hydrobiidae	800	2000	1000	2000	50	80	1000	6	500	300	2000	100	1	40	10
Lymnaeidae	1		1	5	1	2	10		20	1	5	10		1	10
Neritidae															
Physidae				1			1		1						
Planorbidae				30		5	6		30	20	30	30	15	50	30
Valvatidae										60	3	5			
BIVALVIA															
Sphaeriidae	100	60	20	100	30	10	100	2	12	20	10	5	2	150	100
OLIGOCHAETA															
Oligochaeta	30	20	20	40	40	5	50	20	50	70	50	60		20	30
HIRUDINEA															
Erpobdellidae				15	10	8				3	1	1	6		
Glossiphoniidae	10	20	10	30	12	15				20	20	30		5	4
Piscicolidae	1	3		12	2	5						1			2
CRUSTACEA															
Asellidae							6	1	2	2			3	20	30
Astacidae															
Gammaridae	2000	600	300	1400	500	120	400	150	300	20	200	600		200	20
EPHEMEROPTERA															
Baetidae	5000	40	90	50	200	50	2000	25	200	30	100	80	1	40	30
Caenidae	2			80	10		200	4	160		40	8	20	50	300
Ephemerellidae	10	20		1600	300	60	20	60	6	50	200	10		10	
Ephemeridae	2						20	15	15	20	30	600	40	35	50
Leptophlebiidae		2					60	2	20	1	2	6		15	1
PLECOPTERA															
Leuctridae		20	1		8	2		25	2	1	30	2			
Perlodidae				2											
ODONATA															
Calopterygidae														3	
HEMIPTERA															
Corixidae			1			1						2		10	1
Gerridae															2
COLEOPTERA															
Dytiscidae			20	1	10	20		1				50		20	3
Elmidae	30	30	80	100	12	80	200	50	700	80	400	100	4	1	70
Gyrinidae			2				2		5	10		8		1	
Haliplidae			2		4	15	1	2	4						1
Hydraenidae															
Hydrophilidae					15			1							
Scirtidae	1			1						1					
MEGALOPTERA															
Sialidae			1									3	2		5
NEUROPTERA															
Sisyridae															
TRICHOPTERA															
Glossosomatidae	6	12	10			10		3		40	50	10			
Goeridae	1	2	4				10	2	3	30	8	10		1	2
Hydropsychidae	3	1	7				30	15	30	30	6	70			
Hydroptilidae			6	20	60	20	200	15	100	6	30	200			10
Lepidostomatidae										12	1	2			
Leptoceridae		2	2				90	40	80	40	20	80		5	3
Limnephilidae	20	20	5	30	40	12	1			8	1	1	10	10	5
Molannidae													6	3	10
Phryganeidae													1		
Polycentropodidae			2				1	1	20	1	1	15	2	30	10
Psychomyiidae			1							1				1	1
Rhyacophilidae	6	10.5			15	7	8	15	10	10	12	15			
Sericostomatidae	2	12	2	7			2	1	3	12	20	40			
DIPTERA															
Chironomidae	300	40	50	100	20	40	100	50	700	80	60	500	100	600	30
Simuliidae	15	10	3	500	12	10	80	4	80	40	10	10			
Tipulidae	20	1	5	10		10	15			10		3		2	
NTAXA	22	22	26	24	23	24	28	24	26	33	30	34	15	27	27
BMWP	120	132	144	118	115	116	161	149	153	193	178	196	81	159	149
ASPT	5.45	6.00	5.54	4.92	5	4.83	5.75	6.21	5.88	5.85	5.93	5.76	5.40	5.89	5.52
LIFE score	7.33	7.41	6.92	6.78	6.86	6.87	7.04	7.52	7.08	7.16	7.38	7.06	6.29	6.65	6.35

Malmesbury Avon Invertebrate Taxa 2006 (Cont'd)

	ST8977092000 Slads Farm			ST9101090240 Fosseway off B4014			ST9222088200 Backbridge			ST9420086150 D/S Malmesbury STW			ST9649083200 Great Somerford		
	21/03/2006	06/07/2006	19/09/2006	21/03/2006	10/07/2006	19/09/2006	21/03/2006	10/07/2006	18/09/2006	21/03/2006	10/07/2006	15/09/2006	21/03/2006	06/07/2006	19/09/2006
TRICLADIDA															
Dendrocoelidae	8	1	1												
Dugesiidae										10		1			
Planariidae	90	30	10				1			1					
GASTROPODA															
Acroloxidae	5	2	15				2			8					
Ancylidae			3	10	12		20	10	6	10	10		1	20	4
Bithyniidae										20	6	5	1	12	1
Hydrobiidae	1	1		100	30	10	600	2000	8000	30	40	8	100	20	16
Lymnaeidae			6		20	5	1	1		15	30	6	1	12	
Neritidae										4		1			
Physidae															
Planorbidae			3				1	6	3	60	40	60	20	4	4
Valvatidae										80	12	20			
BIVALVIA															
Sphaeriidae	50	30	15	6	2	10	30	40	300	60	100	10	20	30	6
Unionidae													1		1
OLIGOCHAETA															
Oligochaeta	50	20	30	20	1	50	30	30	100	30	20	60	60	30	10
HIRUDINEA															
Erpobdellidae			1		1	3				10	10	10	1	12	6
Glossiphoniidae	1	15	12		15	6	4	16	7	10	20	15	2	20	14
Piscicolidae		10	17		1										
CRUSTACEA															
Asellidae	90	20	10				8			20	60	30	10	20	15
Astacidae								1	1						
Gammaridae	200	200	300	20	60	100	201	300	15	70	60	20	3	1	5
EPHEMEROPTERA															
Baetidae	50	20	12	200	300	50	500	300	70	6	70	10	4	30	8
Caenidae			15	40	1	120	30	200	40	80	200	500	60	4000	300
Ephemerellidae	80	60	8	4	200	1	20	300	2		200			1	
Ephemeridae				5	10	6	20	12	50			12	2	2	12
Leptophlebiidae				1	2		3	2	10						
PLECOPTERA															
Leuctridae					30	14		20	4					6	
Nemouridae							1								
Perlodidae							12								
ODONATA															
Calopterygidae						1						1	1		
Coenagriidae												1			3
Platycnemidae													1		2
HEMIPTERA															
Corixidae								2			1			10	5
COLEOPTERA															
Dytiscidae			1		12	3	1			1	60	4	1	10	1
Elmidae	90	20	70	30	200	200	200	300	140	30	50	40	20	10	18
Gyrinidae				12		18	2		12						
Haliplidae				1	90	20			1	1	1	7		30	8
Hydraenidae															
Hydrophilidae		2			1			2			1				
Scirtidae															
MEGALOPTERA															
Sialidae					1	1			2		1	2	1	30	6
NEUROPTERA															
Sisyridae															
TRICHOPTERA															
Glossosomatidae							1	20							
Goeridae				10	2	15	10		5	3		5	3		
Hydropsychidae				6	10	30	10	10	40	10					
Hydroptilidae		20	5	1	30	20	20	30	100	1	20	20	1	40	4
Lepidostomatidae				20		60	1								
Leptoceridae			20	2	10	30	10	30	80	40	70	40		1	20
Limnephilidae	15	2	3	6		3	12	10		20			6	1	
Molannidae								1	1	7			1	2	1
Phryganeidae											1				2
Polycentropodidae					1	4	2	20	4	40	40	20	5	20	10
Psychomyiidae															
Rhyacophilidae	4			4	15	5		6	2	3					1
Sericostomatidae	7	1	8	12	12	7	20	1		1					
DIPTERA															
Chironomidae	5000	40	50	40	50	60	50	100	60	100	100	20	100	50	30
Simuliidae	70	1		70	30	30	80	7	3	20					1
Tipulidae	1	1		1		6	10			1		3			
NTAXA	18	20	22	24	29	30	32	28	27	30	25	27	25	26	28
BMWP	90	98	111	152	169	179	193	171	165	158	122	136	131	141	151
ASPT	5.00	4.90	5.05	6.33	5.83	5.97	6.03	6.11	6.11	5.27	4.88	5.04	5.24	5.42	5.39
LIFE score	7.06	6.83	6.57	7.50	7.37	7.04	7.16	7.15	7.00	6.42	6.00	6.26	6.38	6.04	6.37

Malmesbury Avon Invertebrate Taxa 2008															
	ST8380083900 Luckington Court			ST8430085900 Crow Down Springs			ST8560085700 u/s Sherston STW			ST8890087000 Fosseway off B4040			ST9290087250 Malmesbury D/S Bridge		
	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008
TRICLADIDA															
Dendrocoelidae												1			
Dugesiidae															
Planariidae		2		15	7	1				2	1	4			
GASTROPODA															
Ancylidae	1		1	5	10	4	3	2	9	2	1	2	2	8	
Bithyniidae														5	1
Hydrobiidae	159	2200	130	1081	300	160	208	270	600	20	300	160	6	3	10
Lymnaeidae			2	7	7	10		2	1	2	4	12	4	10	10
Neritidae															
Physidae					1					1					
Planorbidae	1			23		8		4	6	3	4	5	5	12	15
Valvatidae										1		1			
BIVALVIA															
Sphaeriidae	11	8	10	107	12	14	7	10	7	7	1	20	4	20	30
OLIGOCHAETA															
Oligochaeta	133	40	50	35	40	30	52	30	2	8	20	20	3	10	10
HIRUDINEA															
Erpobdellidae			2	15		1				2					
Glossiphoniidae	4	15	4	19	8	5				1		5	1	4	
Piscicolidae		3	2		1	5			2			2			1
CRUSTACEA															
Asellidae									1				3		1
Astacidae															
Gammaridae	100	20	120	1422	180	50	986	350	50	30	200	180	21	16	7
EPHEMEROPTERA															
Baetidae	45	40	30	182	30	60	1554	240	20	1400	180	100	10	3	8
Caenidae				1	10		14	2	2	10	3		3	20	10
Ephemerellidae	115	40	1	339	90	40	231	100	12	1100	40	5	1	1	
Ephemeridae	1			11		2	8	2	12	5	2	12	7	2	3
Leptophlebiidae								11	4	10	1		4	3	
PLECOPTERA															
Leuctridae		4			6		1	6		16	12			1	
Perlodidae				15											
Nemouridae				1											
ODONATA															
Calopterygidae															
HEMIPTERA															
Corixidae														4	4
Hydrometridae														1	
COLEOPTERA															
Dytiscidae			2	3	40	10			1		1		1	5	6
Elmidae	57	80	30	245	8	10	674	260	300	60	30	60	19	20	9
Gyrinidae							2								
Haliplidae					2	1	1	8			1	2			
Hydraenidae		1													
Hydrophilidae		40			12						1			1	
Scirtidae															
MEGALOPTERA															
Sialidae														1	
NEUROPTERA															
Sisyridae															
TRICHOPTERA															
Glossosomatidae		20	2	12	2	30	2	10	12	20	30	50			
Goeridae		1		8	7	20	26	7	20	12	30	30			
Hydropsychidae				1			126	7	7	10	1	25			
Hydroptilidae				2	1	2	4	20	20	2	8	2	1	20	20
Lepidostomatidae										8		7		1	
Leptoceridae			1				4	12	1	4	1			9	20
Limnephilidae	28	90	12	76	10	15	28	1	1	11	1	10	16	20	6
Molannidae													2	4	3
Phryganeidae														1	
Polycentropodidae							6	2	30	1	3	1	3	35	18
Psychomyiidae													1		
Rhyacophilidae	4	8	4	3	5	1	18	5	1	15	5	15			
Sericostomatidae	1	1		15	1		8		12	6	21	12			1
DIPTERA															
Chironomidae	13	200	60	41	80	60	16	100	60	12	60	60	500	4600	20
Simuliidae	3		12	12	4	30	14	290	10	17		20			
Tipulidae	8	41	5	12	25	7	7	11	2		20	6	6		
NTAXA	17	18	19	27	26	24	24	25	26	30	28	28	23	28	21
BMWP	90	100	92	151	140	121	149	150	147	177	170	153	127	170	114
ASPT	5.29	5.56	4.84	5.59	5.38	5.04	6.21	6.00	5.65	5.90	6.07	5.46	5.52	6.07	5.43
LIFE score	7.40	7.00	7.11	7.27	6.92	7.09	7.65	7.42	7.32	7.52	7.30	7.37	6.81	6.48	6.20

Malmesbury Avon Invertebrate Taxa 2008 (Cont'd)															
	ST8977092000 Slads Farm			ST9101090240 Fosseway off B4014			ST9222088200 Backbridge			ST9420086150 D/S Malmesbury STW			ST9649083200 Great Somerford		
	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008	02/04/2008	09/07/2008	03/10/2008
TRICLADIDA															
Dendrocoelidae															
Dugesiidae															
Planariidae	48	18	20				1								
GASTROPODA															
Acroloxidae	3														
Ancylidae	2	10	9	9	10	10	10	6	1	23	8	6	1	6	10
Bithyniidae										43	20	50	1	1	3
Hydrobiidae	6	15	30	1	3	2	1558	620	150	201	350	40	5	3	10
Lymnaeidae		10	4			4				8	19	6			
Neritidae										46	23	40			
Physidae															
Planorbidae										7	11	40		2	10
Valvatidae										13	30	2			
BIVALVIA															
Sphaeriidae	52	30	10			1	25	4	20	275	260	600	2	5	12
Unionidae														1	
OLIGOCHAETA															
Oligochaeta	79	60	50	19	20	5	14	12	60	49	32	20	59	30	30
HIRUDINEA															
Erpobdellidae				1					1	6	3	3	12	3	8
Glossiphoniidae	2	1					1	2			1	4	1	6	12
Piscicolidae		2	1			1									
CRUSTACEA															
Asellidae	20		5				1		1	1		3	4	3	8
Astacidae								2	1						
Gammaridae	2500	3240	400	176	60	30	692	30	6	593			22	6	5
EPHEMEROPTERA															
Baetidae	715	85	300	104	120	40	479	18	20	352	129	500	4	30	10
Caenidae				127	1	2	35	1	20	9	15	20	18	25	30
Ephemerellidae	641	190	7	5	90		17	3		81	108	10	13		
Ephemeridae				43	1	16	88	1	12	20	21	12	11		7
Leptophlebiidae				20	1		9	1	12						
PLECOPTERA															
Leuctridae				1	17	1				3	20	1	5	1	
Nemouridae										1					
Perlodidae							1								
ODONATA															
Calopterygidae										1		5			1
HEMIPTERA															
Corixidae															
COLEOPTERA															
Dytiscidae					3	1			3		1			2	10
Elmidae	281	30	60	190	60	40	181	15	70	201	120	700	31	140	70
Gyrinidae				12		20	5		1	1		3	1		1
Haliplidae				6	40	20					1	1		4	
Hydraenidae															
Hydrophilidae		3			1										
Scirtidae															
MEGALOPTERA															
Sialidae										1		1		4	2
NEUROPTERA															
Sisyridae												2			
TRICHOPTERA															
Brachycentridae												1			
Glossosomatidae	1			4	25		1								
Goeridae				22	30	20	4	2		7	1	1			
Hydropsychidae				3	30	12	11	2	2	10	25	15	1		
Hydroptilidae	6	9	1	8	20	3	25	140	30	5	60	14	4	30	12
Lepidostomatidae				11	3	50				3		10			
Leptoceridae	1			8	4	8	18	20	15	43	30	40		14	25
Limnephilidae	88	20	5	14	1	3	27			15		12	2		1
Molannidae												1			1
Phryganeidae												3			
Polycentropodidae				1	1	1	3	11	12	18	10	15	12	5	12
Psychomyiidae															1
Rhyacophilidae	20	4	8		8		2	1		17	12	7			
Sericostomatidae	7			58	2	15	2			2			1		
DIPTERA															
Chironomidae	121	30	60	13	20	5	42	30	80	163	60	200	457	60	30
Simuliidae	12	207	240	1	20	2	48			11	2	30			
Tipulidae	3	9		1	13	9	5	1		2	7				
NTAXA	19	19	17	26	26	26	27	21	20	33	27	34	21	21	24
BMWP	101	90	80	169	171	154	165	128	109	194	147	204	116	102	129
ASPT	5.32	4.74	4.71	6.5	6.58	5.92	6.11	6.10	5.45	5.88	5.44	6.00	5.52	4.86	5.38
LIFE score	7.37	7.29	7.40	7.5	7.60	7.33	7.31	7.11	6.68	7.09	6.85	6.85	6.95	6.50	6.30

Appendix L4 – Electric Fishing Results

Malmesbury Avon Tributaries Fish Data

Sampler	Watercourse	Site	NGR	Date	Brown Trout		Bullhead	Minnow	Stone loach	Stickle back	Brook Lamprey	Pike	Roach	Chub	Perch	Dace	Eel
					<100mm	>100mm											
EA*	Luckington Brook	Luckington Court	ST838841	03/06/1999		8	100s		100s	100s							
EA*	Luckington Brook	D/S Brookend	ST840846	09/06/1999		13	100s		100s	1-9							
EA*	Luckington Brook	Carriers Farm	ST846852	24/06/1999		17	100s		100s	1-9							
EA*	Sherston Avon	Tubbs Elastics	ST852856	23/06/1999	3	27	100s	1000s	100s	100s	2						
EA*	Sherston Avon	Easton Town Bridge	ST861859	15/07/1999		24	100s	100s	100s		33						
EA*	Sherston Avon	Pinkney Mill	ST881869	19/07/1999	14	18	100s	100s	100s								
EA*	Sherston Avon	Ruckley	ST871870	30/06/1999	3	42	100s		10s								
EA*	Sherston Avon	d/s Fosse Way	ST892870	31/08/1999	5	31	100s	100s	100s			7	1				
EA*	Sherston Avon	U/S Hyam Farm	ST910867	04/08/1999		3	100s	10s	100s			1	13		2		
EA*	Sherston Avon	D/S Hyam Farm	ST923872	04/08/1999	1	2	100s	1000s	100s			2	152	10			
EA*	Tetbury Avon	Merchants Farm	ST913911	05/08/1999	6	53	100s	100s	100s								
EA*	Tetbury Avon	Sunset Hill	ST915901	21/07/1999	9	20	1000s	1000s	1000s		1						
EA*	Tetbury Avon	Brokenborough	ST915893	28/07/1999	7	22	100s	100s	100s								
EA*	Tetbury Avon	Backbridge	ST922883	17/06/1999		21		100s	100s					3			
EA**	Gauze Brook	Rodbourne P.S.	ST937842	02/08/2000		5							7	4		3	1
EA**	Charlton Stream	Crab Mill	ST951866	30/06/1993		1						5	9	13	9	22	
WW***	Luckington Brook	D/S Brookend	ST840843	13/09/2004		4	9	4	5	2							
WW***	Sherston Avon	Stanbridge	ST843859	13/09/2004	2	6	15			7							
WW***	Tetbury Avon	Slads Farm	ST897920	13/09/2004						6							
WW***	Gauze Brook	Rodbourne WTW	ST937841	13/09/2004			14	12	6	7							
WW***	Charlton Stream	Tanners Bridge	ST958877	13/09/2004	3	2	8		1	5							
WW***	Rodbourne Brook	Bottom Farm	ST935828	13/09/2004			4	11	8								

* 'Minor' species estimated abundance

** No estimates for 'minor' species

*** Actual number caught using PAS at 25 points

Appendix L5 – Macrophyte Survey Results

	Site Name		Crow Down Springs						D/S STW at Slads Farm						U/S Luckington Court						Fosseway off B4014						U/S Sherston STW					
	Site NGR	FR	ST84300 85900						ST89770 92000						ST838839						ST91010 90240						ST85600 85700					
	Date		Jun-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jun-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Aug-02	May-04	Oct-04	May-06	Oct-06	Jun-08
Creeping bent	*Agrostis stolonifera*							1																								
Moss	*Amblestegium fluviatile*	3									5	3						3	2					<0.1	50					<0.1	<0.1	
Moss	*Amblystegium riparium*	2		5		5				4					25-50	5	<0.1			1.7			10						<0.1			
Fool's water-cress	*Apium nodiflorum*	2		<0.1	15	<0.1	8	<0.1	5-10	1	30	0.2	15	0.2		0.25		2	3	1.3	1.5-2.5	0.3	4	0.3	20	0.7	2.5-5	<0.1	<0.1	0.2	<0.1	<0.1
Frogspawn alga	*Batrachospermum*	3							1-2.5						0.1-1					<0.1												
Moss	*Bracythecium*	3																1														
Water-starwort	*Callitriche sp.*	3	2.5-5	0.25	<0.1	7	5	0.5	1-2.5	6	5	5	5	2	0.1-1	0.5	1	5	5	0.7	0.1-1	0.14	<0.1		0.5							<0.1
Blanket weed	*Cladophora*	1		2	1	15	5	<0.1		20	2	10	1.5			2		10	15		10-25	30	10	20	20	3	50-75	10	1	5	6	0.2
Canadian pondweed	*Elodea canadensis*	2																														
Nuttal's pondweed	*Elodea nuttalii*	2																														
Tube-weed alga	*Enteromorpha*	1																									0.1					
Great willowherb	*Epilobium hirsutum*			<0.1		<0.1		<0.1		1.6	<0.1	0.5		0.5		2		<0.1		<0.1		0.9	<0.1	0.2				<0.1	0.25	0.2		<0.1
Filamentous algae	Filamentous algae																															
Meadowsweet	*Filipendula ulmaria*										<0.1					<0.1																
Moss	*Fissidens crassipes*																	<0.1						<0.1					2	0.3	<0.1	
Willow moss	*Fontinalis antipyretica*	3									<0.1	2.5	2.5	<0.1	0.1-1	2	1	5	2	1			0.5	<0.1	15	<0.1	5-10	10	0.5	5	3	0.6
Small sweet grass	*Glyceria spp.*			1	10																									<0.1		
Reed sweet-grass	*Glyceria maxima*	1																														
Himalayan balsam	*Impatiens glandulifera*																															
Yellow Iris	*Iris pseudacorus*	1																														
Rush	*Juncus spp.*			<0.1	<0.1	<0.1	0.5																									
Duckweed	*Lemna spp*	1	1-2.5		10		1.5				2		5						1		0.1-1		<0.1		2.5				0.5		0.5	
Water mint	*Mentha aquatica*			1	0.5	<0.1		<0.1		<0.1	2	<0.1	3			0.25		<0.1				0.14	1	0.5	1			1	<0.1	1	1	<0.1
Water forget-me-not	*Myosotis scorpiodes*			4	5	1		4		0.4	<0.1	<0.1	<0.1	<0.1		<0.1	1	2	4	0.3			<0.1	<0.1	1.5	0.1		<0.1	1	0.5	0.2	0.2
Water milfoil	*Myriophyllum*	3																														
Non-aquatic herb	*Non-aquatic herb*																															
Yellow Water Lily	*Nuphar lutea*	2																														
Hemlock water-dropwort	*Oenanthe crocata*	3															<0.1															<0.1
Liverwort	*Pellia spp.*	3									<0.1			<0.1								<0.1	<0.1	<0.1	2	0.1					
Water-pepper	*Persicaria hydropiper*																															
Reed canary-grass	*Phalaris arundinacea*									1	5	2	2	1		<0.1			<0.1	<0.1		0.6	1	1.5	3	0.1		1	3	0.5	0.5	0.6
Common Reed	*Phragmites australis*	1																														
Redshank	*Polygonum persicaria*				<0.1																											
Brook water-crowfoot	*Ranunculus peni. pseudo*	4	5-10	4	0.5	3	<0.1	50													0.1-1						1-2.5			1	<0.1	0.4
Moss	*Rhyncostegium riparioide*	3		<0.1		2																							1	<0.1	1	<0.1
Water-cress	*Rorippa nasturtium-aqua*	2	2.5-5	5	30	3	15	5	0.1-1	1.2	15	3	20	0.5		<0.1	1	1	4	<0.1		0.3	3	0.2	45		2.5-5	<0.1	5	0.5	1	
Arrowhead	*Sagittaria sagittifolia*	2																														
Greater rush	*Schoenoplectus lacustris*	2																														
Water Figwort	*Scrophularia auriculata*										<0.1					<0.1	<0.1						<0.1									
Bittersweet	*Solanum dulcamara*							<0.1						0.2		<0.1	<0.1						<0.1					<0.1	0.25			
Unbranched bur-reed	*Sparganium emersum*	2																														
Branched bur-reed	*Sparganium erectum*	1							25-50	2.8	3	2	2	1	0.1	0.5				<0.1	5-10	2	0.5	1	2.5	1.5	0.1-1	<0.1		<0.1	<0.1	<0.1
Common Comfrey	*Symphytum officinale*																								<0.1			<0.1	0.25			<0.1
Reedmace	*Typha latifolia*	1												<0.1																		
Yellow-green blanket alg	*Vaucheria*	1	0.1-1	1					2.5-5					0.6						<0.1	2.5-5					10	5-10					0.6
Water-speedwell	*Veronica anagallis-aquat*	2		<0.1	1	5	2	2	0.1-1					<0.1			<0.1		1	<0.1				<0.1					<0.1	<0.1	<0.1	<0.1
Brooklime	*Veronica beccabunga*			<0.1	5	2	6	4		<0.1	1		3					0.5	4	1.3					<0.1					0.25		<0.1	<0.1
	Total cover %		**5**	**23.79**	**78.27**	**43.36**	**43.09**	**66.95**		**38.18**	**70.54**	**28.38**	**59.09**	**6.45**		**13.04**	**4.45**	**29.77**	**41.09**	**6.93**		**34.47**	**30.63**	**24.24**	**163.18**	**15.59**		**22.63**	**15.36**	**14.56**	**13.83**	**3.5**
	MFR Score		**2.20**	**2.22**	**2.14**	**2.38**	**2.14**	**2.33**	**2.00**	**1.83**	**2.11**	**2.14**	**1.86**	**2.00**	**2.40**	**2.00**	**2.50**	**2.43**	**2.13**	**2.11**	**1.86**	**2.00**	**2.00**	**2.14**	**2.10**	**1.83**	**1.88**	**1.80**	**2.00**	**2.38**	**2.20**	**2.30**
	No. MFR scoring taxa		**5**	**9**	**7**	**8**	**7**	**6**	**7**	**6**	**9**	**7**	**7**	**9**	**5**	**7**	**6**	**7**	**8**	**9**	**7**	**6**	**9**	**7**	**10**	**6**	**8**	**5**	**8**	**8**	**10**	**10**
	Community type		**Type 3**	**Type 2**	**Type 3**	**Type 3**	**Type 3**	**Type 3**	**Type 3**	**Type 4**	**Type 5**	**Type 4**	**Type 3**	**Type 3**	**Type 5**	**Type 3**	**Type 4**	**Type 4**	**Type 4**	**Type 3**	**Type 3**	**Type 4**	**Type 4**	**Type 4**	**Type 4**	**Type 4**	**Type 3**	**Type 4**	**Type 4**	**Type 3**	**Type 3**	**Type 3**

	Site Name		Back Bridge						Fosseway off B4040						Malmesbury D/S Bridge						D/S Malmesbury STW						Great Somerford					
	Site NGR	FR	ST92220 88200						ST88900 87000						ST92900 87250						ST94200 86150						ST96490 83200					
	Date		Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jun-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08	Jul-02	May-04	Oct-04	May-06	Oct-06	Jun-08
Creeping bent	*Agrostis stolonifera*																															
Moss	*Amblestegium fluviatile*	3										4																				
Moss	*Amblystegium riparium*	2							10-25	5	3			0.1																		
Fool's water-cress	*Apium nodiflorum*	2	0.1-1	0.29	<0.1	<0.1	1	0.5	0.1-1		0.5	<0.1									0.1-1		<0.1		0.2				<0.1		1	
Frogspawn alga	*Batrachospermum*	3						<0.1																								
Moss	*Bracythecium*	3				<0.1				<0.1																						
Water-starwort	*Callitriche sp.*	3	1-2.5	0.14	<0.1	5	2.5	<0.1	0.1-1		<0.1	<0.1	2	<0.1							0.1-1			0.2	0.2							
Blanket weed	*Cladophora*	1	25-50	60	1	15	30	3	0.1-1	5	3	10	8	0.1	50-75						10-25			2	3							
Canadian pondweed	*Elodea canadensis*	2						<0.1																								
Nuttal's pondweed	*Elodea nuttalii*	2											0.5																			
Tube-weed alga	*Enteromorpha*	1	0.1-1												<0.1																	
Great willowherb	*Epilobium hirsutum*			0.14	<0.1	0.2		<0.1				0.5		<0.1		1	<0.1	0.5		<0.1		<0.1	<0.1	<0.1					<0.1		<0.1	
Filamentous algae	Filamentous algae		0.1-1						10-25																							
Meadowsweet	*Filipendula ulmaria*										<0.1																					
Moss	*Fissidens crassipes*					<0.1																										
Willow moss	*Fontinalis antipyretica*	3	0.1-1			<0.1	10	0.5		1	<0.1	2	10	0.2																		
Small sweet grass	*Glyceria spp.*																							15	5							
Reed sweet-grass	*Glyceria maxima*	1	0.1-1						0.1-1	<0.1					2.5-5	4	10	3	8	2	1-2.5	9	5	2	4	5	2.5-5	0.6	5	6	10	2
Himalayan balsam	*Impatiens glandulifera*																												<0.1			
Yellow Iris	*Iris pseudacorus*	1															<0.1	0.5	0.5	<0.1											
Rush	*Juncus spp.*						<0.1				<0.1					<0.1	<0.1	1	0.5													
Duckweed	*Lemna spp*	1	0.1-1		<0.1		1.5				<0.1		2.5				<0.1		0.2		0.1-1		<0.1		<0.1				<0.1		1.5	
Water mint	*Mentha aquatica*			<0.1	0.5	0.2	1.5	<0.1		1	1.5	2	1.5	<0.1			<0.1	<0.1	<0.1	<0.1			<0.1	<0.1	<0.1	<0.1						
Water forget-me-not	*Myosotis scorpiodes*			<0.1	<0.1	0.3	2	<0.1		1	0.2	1	1	<0.1			<0.1	0.5	0.5	<0.1			<0.1	<0.1	<0.1							<0.1
Water milfoil	*Myriophyllum*	3																					<0.1				0.1-1		<0.1	0.5	<0.1	
Non-aquatic herb	*Non-aquatic herb*				<0.1																											
Yellow Water Lily	*Nuphar lutea*	2													25-50	2		0.5		45	25-50	2	1	<0.1		30	25-50	<0.1	<0.1	<0.1		40
Hemlock water-dropwort	*Oenanthe crocata*	3																				<0.1		0.5								<0.1
Liverwort	*Pellia spp.*	3		<0.1		<0.1						0.5																				
Water-pepper	*Persicaria hydropiper*				<0.1																		<0.1						<0.1			
Reed canary-grass	*Phalaris arundinacea*			0.43	0.5	<0.1	<0.1	0.1		<0.1	0.2	0.2		0.2						1		<0.1	2	2	2			2	3	5	1	
Common Reed	*Phragmites australis*	1																								<0.1						
Redshank	*Polygonum persicaria*				<0.1																											
Brook water-crowfoot	*Ranunculus peni. pseudc*	4	5-10	5	<0.1	10	15	10	0.1-1	<0.1	3	0.2	<0.1	1							0.1-1											
Moss	*Rhyncostegium riparioide*	3								<0.1	<0.1	<0.1																				
Water-cress	*Rorippa nasturtium-aqua*	2			1	0.2	<0.1	<0.1		2	6	<0.1	2.5									<0.1	5			<0.1						
Arrowhead	*Sagittaria sagittifolia*	2																			2.5-5						0.1-1					
Greater rush	*Schoenoplectus lacustris*	2													5-10	3	5			2	10-25	3	2			3	2.5-5	5	5			<0.1
Water Figwort	*Scrophularia auriculata*										<0.1						<0.1		<0.1													
Bittersweet	*Solanum dulcamara*				<0.1											<0.1	<0.1															
Unbranched bur-reed	*Sparganium emersum*	2																			2.5-5											
Branched bur-reed	*Sparganium erectum*	1	0.1-1			<0.1		<0.1	0.1-1	<0.1	<0.1		3	<0.1	0.1-1		<0.1	1	1		1-2.5	0.25	<0.1	8	5	3	2.5-5	0.4	<0.1	1.5	0.5	5
Common Comfrey	*Symphytum officinale*																									<0.1						
Reedmace	*Typha latifolia*	1																														
Yellow-green blanket alg	*Vaucheria*	1	2.5-5						0.1-1					0.2																		
Water-speedwell	*Veronica anagallis-aquat*	2		0.14							0.2			<0.1										<0.1	<0.1							
Brooklime	*Veronica beccabunga*						<0.1	<0.1		<0.1							<0.1	<0.1	<0.1				<0.1									
	Total cover %			**66.41**	**3.9**	**31.53**	**63.86**	**14.91**		**15.63**	**18.32**	**20.76**	**31.09**	**2.34**		**10.18**	**15.9**	**7.18**	**10.97**	**50.36**		**14.61**	**15.81**	**30.15**	**19.76**	**41.36**		**6.09**	**12.72**	**11.09**	**18.18**	**48.27**
	MFR Score		**1.80**	**2.50**	**2.17**	**2.44**	**2.29**	**2.33**	**1.88**	**2.22**	**2.18**	**2.67**	**2.13**	**2.13**	**1.33**	**1.67**	**1.20**	**1.25**	**1.00**	**1.50**	**1.91**	**1.83**	**1.75**	**1.86**	**1.57**	**1.50**	**1.83**	**1.50**	**1.71**	**1.75**	**1.60**	**1.80**
	No. MFR scoring taxa		**10**	**6**	**6**	**9**	**7**	**9**	**8**	**9**	**11**	**9**	**8**	**8**	**6**	**3**	**5**	**4**	**4**	**4**	**11**	**6**	**8**	**7**	**7**	**6**	**6**	**4**	**7**	**4**	**5**	**5**
	Community type		**Type 4**	**Type 3**	**Type 3**	**Type 3**	**Type 1**	**Type 1**	**Type 3**	**Type 5**	**Type 3**	**Type 3**	**Type 4**	**Type 3**	**Type 5**	**Type 5**	**Type 5**	**Type 5**	**Type 5**	**Type 5**	**Type 3**	**Type 5**	**Type 3**	**Type 5**	**Type 5**	**Type 5**	**Type 5**	**Type 5**	**Type 3**	**Type 5**	**Type 5**	**Type 5**

Appendix L6 – Summary of Macrophytes community Survey of Recent Site

Each of the ten monitoring sites keyed out to a perennial macrophyte community type, reflecting the fact that all were experiencing perennial flow, which was augmented by stream support.

The three lowermost sites, namely Malmesbury DS Bridge, DS Malmebury STW (Cowbridge) and Great Somerford are influenced by impoundments and are deeper with more clay present in the substrate. These effectively need to be considered seperately from the upper seven sites and the key, designed for upper reaches, is not really applicable for them. All had yellow water lilly (at high abundance in spring), as well as greater rush/common club rush in mid-channel stands.

The Submerged macrophyte water milfoil *Myripohyllum spicatum* was also recorded at both sites below Malmesbury - DS Malmesbury STW (Cowbridge) and Great Somerford. Due to the impoundments present, the quantity of stream support is unlikely to have a significant effect on these macrophyte communities, which appear natural and healthy.

The macrophytes typically found at perennial upper sites for groundwater fed rivers are Starwort *Callitriche*, water-speedwell *Veronicca anagallis-aquatica/catenata*, blanketweed *Cladophora*, Fool's water-cress *Apium nodiflorum*, water-cress *Rorippa nasturtium-aquaticum*, water-mint *Mentha aquatica* and water forget-me-not *Myosotis scorpiodes*.

Considering the upper seven sites together, water mint and forget-me-not were recorded at all sites with crowfoot and speedwell at most sites although in most cases at low percentage cover since many sites were subject to varying degrees of shade.

Starwort was recorded at all of these sites other than US Sherston STW. Based on data from Holmes (1996) the species was likely to be blunt fruited starwort *Callitiche obtusangular*. Unlike many starworts that are often associated with silty conditions, blunt fruited starwort thrives best where flow is swifter and the bed coarser (Holmes, 1996). Increased stream support since 1995 is likely to have provided more of these conditions in summer months. Ironically the flow is very swift and bed very coarse at the US Sherston STW site possibly too fast flowing for starwort to establish.

Even the uppermost sites, namely US Luckington Court, Crow Down Springs, and Slads Farm on the Luckington Brook, Sherston Avon (Stanbridge arm) and Tetbury Avon respectively, are all expected to be perennial regardless of stream support. This is because all are located downstream of natural springs. Incidentally the Crow Down Springs macrophyte site is actually above the stream support site and still experiences perennial flow. This site has brook water crowfoot which is a very good indicator of a perennial reach and will be lost if flows fail for even short periods.

The perennial head on the Luckington Brook arm of the Sherston Avon is a few hundred metres downstream of the stream support outfall. Therefore stream support obviously results in a slightly greater length of river experiencing perennial flow than would otherwise occur. For this small section the flow augmentation will maintain a perennial aquatic plant community rather than a winterbourne plant community type (containing non aquatic herbs and grasses alongside wetland and aquatic species) as has been found above the stream support outfall.

Reed sweet grass *Glyceria maxima* starts to occur at the lower sites on Sherston (Foseway off B4040) and Tetbury Avon (Back Bridge) at low percentage cover and then at higher percentage cover at the lower three (deeper) sites.

Blanketweed has been recorded at nearly all sites sometimes at very high percentage cover, especially in spring although it has usually died off by the autumn. In the 2002 summer surveys much blanket weed was recorded at some sites. Over 50% blanket weed cover was recorded on the Sherston Avon at US Sherston STW with over 25% at Back Bridge on the Tetbury arm.

Appendix L7 - Percentage Cover of *Instream* Macrophyte Taxa

Percentage Cover of *Instream* Macrophyte Taxa at N.Holmes Bristol Avon Sites 1-8, 1992-2001

Su=Summer, Au=Autumn

	NGR	ST840861						ST852857					ST837837					SR852855					ST880873					ST904863			ST894928			ST923882		
	Site name	BAV 1						BAV 2					BAV 3					BAV 4					BAV 5					BAV 6			BAV 7			BAV 8		
	Season	Au	Au	Au	Au	Su	Au	Au	Au	Au	Au	Su	Au	Au	Au	Au	Su	Au	Au	Au	Au	Su	Au	Au	Au	Au	Su	Au	Au	Su	Au	Au	Su	Au	Au	Su
	Date	Oct-92	Oct-93	Sep-94	Oct-95	Aug-01	Oct-01	Oct-92	Oct-93	Sep-94	Oct-95	Aug-01	Oct-92	Oct-93	Sep-94	Oct-95	Aug-01	Oct-92	Oct-93	Sep-94	Oct-95	Aug-01	Oct-92	Oct-93	Sep-94	Oct-95	Aug-01	Sep-94	Oct-95	Aug-01	Sep-94	Oct-95	Jul-01	Oct-01	Sep-94	Oct-95	Jul-01
	Comment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	dry	dry	-	-	-
Algal 'film' on stones	**Alga film**	-	-	**0.1**	-	-	-	-	-	-	-	-	-	-	**0.1**	-	-	-	-	**2.0**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aggregated starworts	***Callitriche* spp.**	**3.0**	**1.0**	**2.0**	**0.5**	**0.9**	**0.8**	**0.5**	**0.5**	**1.0**	**0.1**	**0.1**	**0.1**	**1.0**	**0.5**	**7.0**	-	-	**0.1**	**0.5**	**0.1**	-	**3.0**	**0.5**	**0.5**	**0.1**	**0.7**	-	-	**0.1**	-	-	-	**1.0**	-	**0.1**
Aggregated w-crowfoot	***Ranu* spp.**	**30.0**	**15.0**	**20.0**	**20.0**	**15.0**	**2.8**	-	-	-	**0.5**	-	-	-	-	-	-	**0.1**	**0.1**	**0.2**	**0.1**	-	**0.1**	-	**1.0**	**0.1**	-	-	-	-	-	-	-	**5.0**	**25.0**	**30.0**
Aggregated w-speedwell	***Veronica* spp.**	**0.1**	-	**0.5**	**0.5**	**0.9**	**0.4**	-	-	**0.5**	**0.5**	**0.1**	-	-	-	-	-	-	**0.1**	**0.1**	**0.1**	**0.1**	-	-	**0.5**	-	-	-	-	-	-	-	-	**0.5**	-	-
Aggregated small sweet-gras	***Glyceria* spp.**	**20.0**	**40.0**	**30.0**	**25.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**2.0**	-	-	-	-	-	**20.0**	**10.0**	**2.0**	**15.0**	-	-	-	**0.1**	**0.1**	-	-	-	-	-	-	-	-	**0.1**	-
Fool's water-cress	***Apium nodiflorum***	**5.0**	**25.0**	**30.0**	**35.0**	**0.1**	**0.1**	**20.0**	**1.0**	**0.5**	**1.0**	**2.0**	**0.1**	**1.0**	**6.0**	**0.1**	-	**5.0**	**2.0**	**2.0**	**4.0**	**10.0**	**5.0**	**10.0**	**50.0**	**3.0**	-	**1.0**	**0.1**	**0.9**	-	-	-	**4.0**	**20.0**	**5.0**
Water mint	***Mentha aquatica***	-	**0.1**	**0.1**	**0.1**	-	-	**2.0**	**1.0**	**0.5**	**1.0**	**0.1**	**2.0**	**2.0**	**0.5**	**0.5**	-	**2.0**	**0.5**	**5.0**	**4.0**	-	**0.1**	**0.1**	**0.1**	**0.1**	**0.7**	**0.1**	**0.1**	-	-	-	-	**0.5**	**0.5**	**0.5**
Water forget-me-not	***Myosotis scorpiodes***	**0.1**	**1.0**	**0.5**	**0.5**	**0.9**	**0.0**	**5.0**	**2.0**	**1.0**	**4.0**	**2.0**	**0.1**	**5.0**	**1.0**	**5.0**	-	**2.0**	**5.0**	**2.0**	**15.0**	**0.3**	**0.5**	**0.1**	**0.5**	**0.5**	**0.7**	**0.5**	**0.1**	**0.1**	-	-	-	**0.5**	**0.5**	**0.5**
Water-cress	***Nasturtium officianale***	**15.0**	**5.0**	**10.0**	**2.0**	**9.0**	**40.0**	**60.0**	**80.0**	**20.0**	**70.0**	**4.0**	**40.0**	**25.0**	**1.0**	**0.1**	-	**40.0**	**20.0**	**15.0**	**15.0**	**5.0**	**30.0**	**40.0**	**5.0**	**80.0**	**2.0**	-	**0.5**	-	-	-	-	**0.5**	**0.1**	-
Non-aquatic herb	**Non-aquatic herb**	**0.1**	**0.1**	**0.5**	**0.5**	-	-	**0.1**	**0.1**	**2.0**	**3.0**	**0.9**	**5.0**	**5.0**	**0.0**	**5.0**	**1.3**	**2.0**	**2.0**	**2.0**	**3.0**	-	**0.1**	**0.1**	**0.1**	**0.1**	-	**0.1**	**0.1**	-	**0.5**	**2.0**	-	-	**0.1**	-
Non-aquatic grass	**Non-aquatic grass**	**0.1**	**0.1**	**0.5**	**0.5**	-	-	**1.0**	**1.0**	**0.5**	**0.5**	**1.0**	**1.0**	**2.0**	**1.0**	**0.5**	-	**3.0**	**5.0**	**2.0**	**2.0**	-	**0.1**	**0.1**	**0.1**	**0.1**	-	**0.1**	**0.1**	-	**1.0**	**1.0**	-	-	**5.0**	-
Encrusting red alga	*Hildenbrandia rivularis*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-
Yellow-green blanket alga	*Vaucheria* spp.	-	-	0.5	-	-	4.0	-	-	2.0	6.0	-	-	-	0.5	5.0	-	2.0	-	0.1	1.0	-	10.0	3.0	6.0	4.0	0.7	1.0	0.1	-	-	-	-	-	-	-
Tube-weed alga	*Enteromorpha*	-	-	-	-	-	-	-	-	-	0.1	-	-	-	0.1	-	-	-	-	0.1	30.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	20.0
Blanket weed	*Cladophora glomerata*	-	-	-	4.0	-	-	-	-	0.5	1.0	-	-	-	0.1	10.0	-	-	-	18.0	1.0	5.0	3.0	0.1	1.0	1.0	9.0	1.0	3.0	20.0	-	-	-	15.0	30.0	40.0
Filamentous algae	Filamentous algae	-	0.5	0.1	1.0	-	-	10.0	10.0	18.0	3.0	-	0.1	2.0	-	-	-	3.0	20.0	2.0	8.0	-	-	0.1	0.1	-	-	18.0	2.0	-	-	-	-	5.0	10.0	-
Blue green algae scum	Blue green algae scum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-
Encrusting lichen	*Verrucaria* spp.	0.1	0.1	0.1	0.1	-	-	0.1	0.1	0.1	0.5	-	-	-	0.5	0.5	-	-	-	-	-	-	0.1	0.1	0.1	20.0	-	-	-	-	-	-	-	1.0	1.0	-
Liverwort	*Conocephalum conicum*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-
Liverwort	*Lunularia cruciata*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-
Liverwort	*Pellia endiviifolia*	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.5	-	-	-	-	-	-	0.1	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-
Moss	*Amblestegium fluviatile*	-	-	-	-	-	-	-	-	7.0	2.0	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-
Moss	*Amblystegium riparium*	-	-	0.1	0.1	-	-	-	-	0.5	5.0	-	-	-	5.0	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	15.0	35.0	10.0	10.0	1.0	0.5	1.0
Moss	*Bracythecium*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-	2.0	-	-	-	3.0	2.0	-	-	-	-	-
Moss	*Cinclidotus fontinaloides*	0.1	0.1	0.1	0.1	-	-	0.1	0.1	10.0	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	1.0	1.0	-
Moss	*Fissidens crassipes*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	3.0	2.0	1.0
Willow moss	*Fontinalis antipyretica*	-	-	-	-	-	-	0.5	0.5	4.0	3.0	-	0.1	0.1	5.0	10.0	30.0	-	-	-	-	-	0.1	1.0	1.0	2.0	4.0	-	-	0.1	35.0	40.0	70.0	70.0	6.0	4.0	2.0
Moss	*Rhyncostegium riparoides*	0.1	0.1	0.1	0.1	-	-	1.0	1.0	6.0	5.0	-	0.5	0.5	0.5	1.0	-	-	-	-	-	-	0.1	2.0	2.0	2.0	-	-	-	-	5.0	2.0	-	-	4.0	2.0	-
Moss	*Thamnobryum alopecurum*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-
Wild angelica	*Angelica sylvestris*	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
Blunt-fruited water-starwort	*Callitriche obtusangular*	-	-	2.0	0.5	-	-	-	-	1.0	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-
Common water-starwort	*Callitriche stagnalis*	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Great willowherb	*Epilobium hirsutum*	-	-	-	-	-	-	0.1	2.0	2.0	2.0	0.1	20.0	20.0	20.0	25.0	-	0.1	0.1	0.1	0.1	0.6	0.1	0.1	0.1	0.1	0.1	0.5	0.5	0.1	-	0.1	-	-	0.1	0.1	-
Meadowsweet	*Filipendula ulmaria*	-	-	-	-	-	-	1.0	1.0	0.5	0.1	-	0.1	0.5	0.5	0.5	-	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	-	0.1	0.1	-	-	-	-	-	0.1	0.1	-
Marsh bedstraw	*Galium palustre*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
Hemlock water-dropwort	*Oenanthe crocata*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Common fleabane	*Pulicaria dysenterica*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	-
Common water-crowfoot	*Ranunculs aquatilla*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brook water-crowfoot	*Ranunculus peni. pseudofluit.*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	1.0	0.1	-	-	-	-	-	-	-	5.0	25.0	
Brook w-crowfoot (variety)	*R. pen. sbs. vertumnus*	30.0	15.0	20.0	20.0	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Celery-leaved crowfoot	*Ranunculus sceleratus*	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water figwort	*Scrophularia auriculata*	0.1	0.1	0.1	0.1	-	-	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	-	0.1	0.1	0.1	0.1	-	0.1	0.1	-	-	0.1	-	-	-	-	-
Marsh ragwort	*Senecio aquaticus*	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-
Bittersweet	*Solanum dulcamara*	-	-	-	-	-	-	0.1	1.0	2.0	0.5	0.1	15.0	5.0	3.0	1.0	-	0.1	0.1	0.1	0.5	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	0.1	0.5	-
Marsh woundwort	*Stachys palustris*	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	5.0	2.0	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Comfrey	*Symphytum officinale*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-	-	-
Brooklime	*Veronica beccabunga*	5.0	3.0	0.5	0.5	0.9	0.8	0.1	0.1	0.1	0.1	-	0.1	1.0	2.0	1.0	-	5.0	1.0	0.5	2.0	-	0.1	0.1	0.1	0.1	-	0.5	0.1	-	-	-	-	-	0.1	0.5	-
Nuttall's pondweed	*Elodea nuttallii*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10.0	10.0	5.0	10.0	-	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Canadian pondweed	*Elodea canadensis*	-	-	-	-	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marsh foxtail	*Alopecurus geniculatus*	-	-	1.0	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tufted hair-grass	*Deschampsia cespitosa*	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Floating sweet-grass	*Glyceria fluitans*	20.0	40.0	30.0	25.0	-	-	0.1	0.1	-	-	-	-	-	-	-	-	20.0	10.0	3.0	15.0	-	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-
Reed sweet-grass	*Glyceria maxima*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	15.0	2.0	-	-	-	-	-	-	-
Sharp flowered rush	*Juncus acutiflorus*	-	-	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toad rush	*Juncus bufonius*	-	-	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soft rush	*Juncus effusus*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.1	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hard rush	*Juncus inflexus*	0.1	0.1	0.1	0.1	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Duckweed	*Lemna minor*	0.1	1.0	0.5	0.1	-	-	1.0	0.5	5.0	0.5	0.9	0.1	3.0	0.5	0.1	-	1.0	5.0	40.0	10.0	-	2.0	5.0	1.0	0.5	-	0.5	2.0	-	-	-	-	2.0	3.0	0.5
Reed canary-grass	*Phalaris arundinacea*	-	-	-	-	-	-	-	-	-	0.1	6.0	8.0	10.0	5.0	3.0	-	-	-	-	-	-	0.5	1.0	0.5	0.5	0.1	8.0	15.0	2.0	3.0	3.0	2.0	2.0	-	0.5	0.1
Branched bur-reed	*Sparganium erectum*	-	-	-	-	-	-	-	-	0.1	0.1	0.1	-	-	0.5	-	-	3.0	5.0	10.0	7.0	0.6	-	-	-	-	0.7	20.0	25.0	9.0	-	-	-	-	0.1	-	-
Creeping buttercup	*Ranunculus repens*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silverweed	*Potentila anserina*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stinging nettle	*Urtica dioica*	-	-	-	-	-	-	-	-	-	-	0.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
COMMUNITY TYPE		**W6**	**W7**	**W7**	**W7**	**P2**	**P2**	**P4**	**P4**	**P4**	**D10**	**D9**	**D9**	**D9**	**D9**	**P4**	**P4**	**W7**	**W7**	**P4**	**W7**	**P4**	**P4**	**P3**	**P4**	**P4**	**P4**	**P5**	**P5**	**P4**	**D9**	**D9**	**P4**	**P4**	**P4**	**P4**	**P4**

Appendix L8 - Macrophyte community classification of historical sites

The macrophyte community at BAV1, the uppermost site on the Sherston Avon, which is very close to Crown Down Springs had previously been classified as a Winterbourne 7 community type 1992-95 due to the presence of non-aquatic grasses, non-aquatic herbs and marsh foxtail, albeit at low percentage cover. The absence of these in the 2001 surveys accounts for the switch to a perennial community type 2 due with small sweet grass present at low percentage cover and a classic switch from dominance by water crowfoot in summer to watercress in autumn as flow naturally recedes. This is the most natural site surveyed and the macrophyte community is a good example of a very stable perennial groundwater stream assemblage. The presence of Brook water crowfoot is significant since it is an indicator of a perennial reach and will be lost if flows fail even for short periods.

Further down on the Stanbridge arm at BAV2, before the confluence with the Luckington Brook, a perennial community type 4 had been recorded due to the presence of blanketweed and bittersweet. It was also recorded as ditch community type probably due to the presence of non aquatic grass and herbs at low abundance.

Lower down on the Sherston Avon at BAV5, downstream of the bridge at Easton Grey, blanket weed along with starwort and water cress (at hugely ranging percentage cover) were consistently recorded. Hence the community type was always recorded as a perennial type 4 in the 1990s and in 2001.

Further downstream at Cowage farm the community was dominated by the encroaching emergents reed canary grass, sweet grass and branched bur reed. It had only slightly changed from a type 5 to a type 4 perennial community in 2001 probably due to the greater amount of blanketweed.

On the Tetbury Avon the upper site BAV 7 is located above the Tetbury stream support is dry for many months of the year. It keyed out to perennial 4 by default by virtue of the low number of taxa recorded. It is dominated by willow moss with some reed canary grass present and reflects more a Ditch Community as recorded in 1994-95.

BAV 8 is located on the lower Tetbury Avon, downstream of Backbridge. The community was dominated by blanket weed and brook water-crowfoot probably because the small area surveyed was an unshaded shallow riffle/run. The blanket weed accounts for its keying out to a perennial 4 community type in 1994-95 which remained unchanged in 2001. The higher rate of stream support provided to the Tetbury arm since 1995, resulting in higher summer flows at this site, is likely to have benefited the water crowfoot at this site since fast turbulent flows are often associated with stands of crowfoot.

Two sites were sampled on the Luckington Brook. The upper site BAV3 originally had a ditch type 9 community type due to the channel being straight and dredged with reed canary grass and bittersweet present. This switched to a perennial community type due to the increase in water starwort. This site may have been wrongly relocated in 2001 since only moss was recorded and the community type keyed out to perennial 4 by default. It is also possible that the increased stream support since 1995 from the Luckington borehole washed away silt and loosely rooted plants, providing a more natural cobble/moss dominated section downstream of the bridge where the site is located. The lower site BAV 4 is just above the confluence with the Crow Down/Stanbridge arm. It is impounded and quite impoverished containing the emergent branched bur-reed along with blanket weed, watercress and fool's watercress. The lack of non-aquatic herbs and grass probably accounts for it switching to a perennial community type 4 from a winterbourne community type 7 although the site has always experienced perennial flow.