

Observations on the biological assessment of water quality on the Avon (South Devon): 2000-2010

The EA utilises the standard BMWP/RIVPACS method for the detection of organic pollution in river water. This tried and tested method depends upon the netting of organisms from a wide variety of families, each with different sensitivity to pollution of this specific type, to generate an overall 'pollution score' for any river. Simultaneously, brief notes are recorded on the type and extent of fungal, algal and plant growth and physical aspects of each site. Possible contamination by chemicals (including nitrates and phosphates) is measured separately, by direct assay of a wide variety of agents in river water 12 times/ year.

The Avon data supplied by the EA include sampling sites at Shipley Bridge, South Brent, Horsebrook and Hatch Bridge between 2000 and 2010. Single samples were collected in a 'rolling 3-year programme' according to a standard protocol at different sites but at irregular intervals, infrequently and under variable environmental conditions. Whether single samples are fully representative of the relevant population and are reproducible, especially under sometimes difficult field conditions, is unknown. The frequency of sampling varies greatly from site to site.

It is questionable whether the current sampling regime is adequate to confidently demonstrate subtle changes in the macro-invertebrate population because the sampling is too infrequent and considerable variability is evident in the results even if anticipated seasonal changes are ignored. The observed number of taxa (invertebrate families) fluctuates across a range of 15-21 at Shipley Bridge, 20-25 at South Brent, 12-26 at Horsebrook and 21-26 at Hatch Bridge.

Importantly, there is often a huge delay (up to 8 months) between sampling and analysis. Although - presumably - specimens are well preserved prior to analysis, such delays render the current monitoring system useless as an environmental management tool, offering poor value in terms of environmental protection. Quicker analysis and reporting of results following sampling would be more effective in helping the EA meet their environmental protection objectives. Simply put, there are insufficient data to reveal anything other than an environmental catastrophe and such an event probably would be detected too late by the current system of delayed analysis for preventative action to be effective.

If we accept the Avon results at face value, at none of the sites do they indicate any change in the macro-invertebrate fauna which lies outside routine variability. Furthermore, the results indicate that, according to generally accepted standards, the Avon has remained virtually free of organic pollution all along its (non-tidal) length throughout the period in question. Shipley Bridge is the most frequently sampled (15) and the most recently sampled site (June 2010); the least frequently sampled sites are South Brent (4) and Hatch Bridge (4). The most recent results for South Brent and Hatch are, respectively, from October 2008 and October 2007. Given that Hatch and South Brent are the most likely sites to show organic pollution - because of their proximity to sewage treatment works, if nothing else - it would make sense if more, rather than less, frequent monitoring of these two sites were to be undertaken.

The Avon data set provides an insight into the complexities (and obvious costs) of comprehensive water quality assessment. It also highlights some of the shortcomings of the present monitoring programme. Interestingly, the same biological monitoring component forms an important part of the modern Water Framework Directive and the EA's river basin management programme but one might ask whether teams of water bailiffs would represent better value for environmental management, providing near-continuous monitoring and instantaneous reporting of change.

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