



River Invertebrate Classification Tool

Project Code: WFD72c

Who this research is intended for: Environmental Agencies

Objectives of the project

The overall objective of the project was to produce a new set of River Invertebrate Prediction and Classification System (RIVPACS) models for use within a new River Invertebrate Classification Tool. The tool will be used to classify the ecological status of rivers for Water Framework Directive compliance monitoring.

The new RIVPACS models were required to:

- Incorporate a fully up-to-date taxonomy
- Revise the database of 'reference' river sites
- Be able to predict new biotic indices
- Be able to produce biological status assessments (by comparing observed invertebrate samples with what would be expected under 'reference' conditions)
- Be able to estimate the errors involved in sampling and analysis.

Background

The Regulatory Agencies in the UK (Environment Agency; Scottish Environment Protection Agency; Northern Ireland Environment Agency) currently use River Invertebrate Prediction and Classification System (RIVPACS III+) software to classify the ecological quality of rivers, using data from invertebrate samples.

The Agencies are required to assess the status of invertebrate communities for the Water Framework Directive (WFD); however, the current version of RIVPACS used by the Agencies pre-dates the WFD so is not fully compliant.

This project was needed to produce a model for a new classification tool that fully met the needs of the Agencies in their delivery of WFD monitoring.

Key Findings and Recommendations

This project has produced new RIVPACS IV models that will underpin the Agencies' River Invertebrate Classification Tool. Compared to previous models (RIVPACS III+), the new models have enhanced functionality and include:

- A full revision of the taxonomic framework used by the model. The taxonomy is now up-to-date and compatible with taxonomic systems used by the UK Agencies and beyond.
- Predictions of biotic indices at 'reference condition' that fully satisfy the definition given in the WFD. Predictions are adjusted for certain stream types and by removal of sites that were not in reference condition when sampled.
- Actual abundance values of family level records. In the database, the family level records are recorded in a log-scale which has previously limited the types of biotic indices that RIVPACS can predict. The project estimated actual abundance values from the log-scale and the new models uses these values.
- An extension to the suite of biotic indices used by the models, which allows predictions of a wider range of reference state "expected" index values. This enables full WFD quality reporting capabilities as well as providing the system with the general functionality to predict a much wider range of indices e.g. intercalibration indices, stress-specific indices, and ecological and functional trait indices.
- The ability to estimate and assess uncertainty in (i) classifying biological status and (ii) assessing temporal change in quality and status.

These new RIVPACS IV models will be used by the UK Agencies in their WFD compliance monitoring.

Next Steps

Because the classification tool and its methods must be transparent, the tool will be made readily and freely available to anyone who might seek to use it.

The outputs from the project (database, variables and algorithms) are being programmed into modern software to produce a tool that is compatible with the Agencies' computer systems. The tool is currently being reviewed and will be improved following feedback.

Work is also underway to establish the most appropriate way to make the tool readily available.

Further Information

Copies of the research outputs are available for free download from www.sniffer.org.uk (search on 'Project Search' WFD72c)

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