

# Technical summary

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## Development of a Classification Scheme for the Marine Benthic Invertebrate Component, Water Framework Directive: Phase I and II – Transitional and Coastal Waters

R & D Technical Summary F1-116 and F1-132/TS

The European Water Framework Directive (WFD, 2000/60/EC) establishes a framework by which integrated environmental assessments are used to determine the status of surface water bodies, which includes transitional and coastal waters. The aim of the directive is to protect, enhance and restore all surface water bodies to good status by 2015. The achievement of this aim will be determined through the integration of environmental assessments of hydromorphology, physico-chemical and biological quality elements. The biological quality elements are phytoplankton, macroalgae, angiosperms and benthic invertebrates for coastal waters and in transitional waters fish are also assessed. This report is concerned with the benthic invertebrate quality element and the requirement for a WFD compliant classification scheme for assessing their ecological status.

The Report describes Phase I and II of a three phase project overseen by a Project Board comprised of Regulatory, Conservation and Academic representatives from the UK and ROI. The Board advises on the benthic invertebrate classification scheme development and ensures a consistent approach by the UK and ROI.

A literature review of existing metrics and identification of metrics for possible use within a classification scheme was carried out. It is proposed that the WFD classification scheme will be a multimetric, incorporating appropriate metrics from those univariate and derived indices and functional indices under consideration. Development of the multimetric continues in Phase III (technical report due Nov 2004) to determine the effectiveness of the multimetric in determining ecological status. Prior to their inclusion in a multimetric, the ability of novel metrics; AZTI Marine Biotic Index (AMBI, Borja *et al.*, 2000) and Average Taxonomic Distinctness (AvTD, Clarke and Warwick, 1998) to detect change in the benthic community due to anthropogenic stress, has been investigated.

In order to test and develop classification schemes, historic benthic invertebrate data from the UK was sourced and inputted to a UNICORN<sup>®</sup> database. At the request of the project, the UNICORN<sup>®</sup> database was developed further by Unicomarine Ltd to include the additional functionality required for testing of the proposed classification metrics.

In order to produce biologically relevant reference conditions for the benthic invertebrate community, habitat and salinity need to be considered. WFD ecological assessments will be habitat-specific; habitats being defined using the European Nature Information System (EUNIS) habitat classification scheme. Data truncation rules have also been developed to standardise historic datasets, reducing variability introduced by inconsistent identification and recording of benthic invertebrates.

Initial field and laboratory trials of a more 'rapid assessment' of ecological status based on the benthic invertebrate community were carried out. Field assessment used onboard identification of habitats and obvious taxa (requires staff with a high level of taxonomic expertise). Laboratory assessment considered the effects of time-limited analysis and identification at lower magnification. Preliminary results indicated no significant difference in assigned ecological status, based on the functional index AMBI, using the different approaches. The risk of misclassification, resource implications and ability of the methods to determine ecological status in a wider range of habitats is still to be determined.



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This project describes the technical background in the development of a WFD compliant classification scheme for transitional and coastal water benthic invertebrates. The project reports to a UK and ROI Marine Task Team to ensure the classification schemes implemented across the UK and ROI are integrated with regards to meeting the directive requirements. Ultimately the classification scheme will provide information required by EA ecologists, managers and policy makers.

This R&D Technical Summary relates to information from R&D Project E1-116 and E1-132 reported in detail in the following outputs:-

**R&D Technical Report E1-116 and E1-132/TR**

Development of a classification scheme for the marine benthic invertebrate component, Water Framework Directive: Phase I and II-Transitional and Coastal Waters

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