# Biological Effects Quality Assurance in Monitoring Programmes

# AN OVERVIEW

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## The EU Funded Programme

### 1. Background

BEQUALM was funded by the European Union through the Standards, Measurements and Testing programme of the European Commission. It was set up as a direct response to the requirements of the Oslo and Paris Commission (OSPAR) to establish a European infrastructure for biological effects Quality Assurance/Quality Control, so that laboratories contributing to monitoring programmes such as the OSPAR Joint Assessment and Monitoring programme (JAMP) and the Co-ordinated Environmental Monitoring Programme (CEMP) can attain defined quality standards.

The ultimate aims of BEQUALM were to:

- produce an agreed set of protocols for biological methods used in marine monitoring,
- obtain conformity on acceptable limits of variation for each method
- develop a system for assessing Participating Laboratories' compliance with appropriate quality standards
- develop a self-financing QA system which is fees-based.

*Biomarkers – cod vitellogenin assay*

*Bioassays – whole sediment test*

## What is BEQUALM?

The Biological Effects Quality Assurance in Monitoring Programmes (BEQUALM) project was initiated in 1998 as an EU funded research programme. The aim was to develop quality standards for a wide range of biological effects techniques and devise a method for monitoring compliance of laboratories generating data from these techniques for national and international monitoring programmes and also for regulatory purposes. The ultimate goal was to develop a Quality Assurance (QA) system for biological effects techniques which would be self-financing on the basis of fees recovered from participants.

The research programme was completed in April 2002. The self-funded scheme will be launched Spring 2003.

Potential participants are now being invited to join the scheme and should register their interest by filling in a Questionnaire and returning to the BEQUALM Project Office.

### 2. Summary of Achievements

Nine project partners, experts in particular biological effects monitoring techniques, organised a series of intercalibration exercises and training workshops to develop the QA infrastructure. The workpackages organised were: water and sediment bioassays, metallothionein measurement, ALA-D activity, DNA adduct measurement, P4501A activity, imposex/intersex measurement, lysosomal stability, liver histopathology and external disease measurement, chlorophyll-a and phytoplankton assemblage analysis and benthic community analysis.

The results indicated that many of the techniques can be considered robust enough to be used more widely in monitoring programmes such as the JAMP and CEMP. Exceptions were ALA-D and lysosomal stability, where uptake and use of the techniques was too small for proper evaluation. For EROD, more training and intercalibration was identified since systematic errors were still occurring, despite this assay being a widely used technique.

A set of training manuals in CD-ROM format have been produced for each of the techniques, which contain the key stages of the methods, with special emphasis on those aspects of the procedures where specific skills or knowledge are needed. These will be available to BEQUALM participants as part of the registration fee.

*Community analysis – benthos sieving*

CEFAS
*The Centre for Environment, Fisheries & Aquaculture Science*

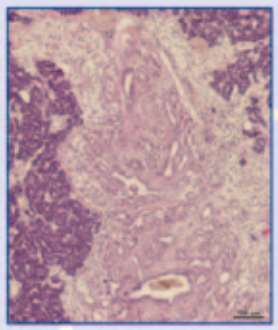
**For more information see www.bequalm.org or contact info@bequalm.org**

## The Self-funded Scheme

### 3. Overview

- The BEQUALM self-funded scheme will be launched in Spring 2003.
- A model for the scheme infrastructure (Figure 1) has been agreed by both the BEQUALM steering group and the EU.
- The scheme comprises three components:
  Biomarkers  Whole Organism  Community Analysis
- Each component is managed by a LEAD LABORATORY:
  Biomarkers: Norwegian Institute for Water Research (NIVA), Norway
  Whole Organism: Centre for Environment, Fisheries and Aquaculture Science (CEFAS), UK
  Community: National Marine Biological Analytical Quality Control Scheme (NMBAQC), UK
- Each is responsible for the organisation and implementation of a QA/QC programme (including intercalibration exercises, training workshops and reporting) and the associated financial aspects.
- The BEQUALM PROJECT OFFICE will act as the administrative and co-ordinating centre for the whole scheme.
- BEQUALM collaborates with QUASIMEME which deals with quality issues in marine chemistry.


*Figure 1: Management Structure of the BEQUALM Self-funded Scheme*



*Fish disease – example of Cholangiocellular carcinoma in winter flounder*

### 4. The BEQUALM QA/QC Programme

Each programme will essentially include:

1. Training workshops - arranged by the lead laboratory if necessary for a particular technique
2. Intercalibration exercises - participants receive protocols, reference materials and data sheet templates and will be requested to conduct the assays and report the results to the lead laboratory within a specified time scale.
3. Summary Reports - one or more reports summarising intercalibration exercise results.
4. Workshops - to discuss e.g. intercalibration exercises results, problems with methodology, sharing of scientific/technical knowledge.

The range of techniques will be extended each year for all components. Details of the QA/QC programme for each of the components can be found on the complementary posters.

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