

## **Limitations and solutions to the exchange of macrobenthos community data between scientists and CZM managers as shown in the frame of human impact monitoring studies in SW Netherlands**

Herman Hummel, Bart Schaub, Wil Sijm, Mieke Rietveld, Rinus Markusse, Ko Verschuure, Olaf van Hoesel, Tom Ysebaert, Dick van Oevelen, and Peter Herman

Centre for Estuarine and Coastal Ecology, Netherlands Institute of Ecology (NIOO-CEMO) Royal Netherlands Academy of Arts and Sciences Koringaweg 7, 4401 NT Yerseke, the Netherlands

E-mail: hummel@cemo.nioo.knaw.nl

Because of their sessile character and relatively long life-span, benthos integrate environmental fluctuations and influences at a particular place over a relatively long time span. It makes that community data of benthos can be a suitable indicator for changes in environmental quality.

The aim of the long-term monitoring studies on benthos at NIOO-CEMO is to obtain insight in the natural development of estuarine and coastal areas and the anthropogenic influences in those areas in order to safeguard natural resources and to allow optimal use of a system's potentials. As most monitoring programmes, this kind of continuous long-term assessments is perfect to detect slow and small deviations from a standard or norm: year-to-year changes may not be significant but longer series of data may reveal trends.

Since in the Netherlands most of these monitoring studies depend on restricted funding by governmental agencies, two major problems arise in the present-day evaluation and use of the monitoring data.

These problems, and the consequences and solutions to these problems, will be exemplified with a series of monitoring data of the brackish lake Grevelingen.

The first problem is that the basic data sets (on species, numbers, biomass) of macrozoobenthos are stored by the funding governmental agencies, yet remarkably, hardly processed and used for further analyses. Because of such, the benefit of monitoring-programmes has been strongly debated: the projects were costly, yet did not yield a proper end-product for the end-users (managers and the public at large).

Nowadays, modern analyses and communication (web-page structured) techniques, allow us to analyse and visualise monitoring data in a limited time and at (relatively) limited costs. A first visualisation of a long-term (10-year) dataset showed dramatic changes in the macrobenthos species composition of Grevelingen without having been noticed before by the managers. Therefore, it is proposed to adjust the handling and processing of monitoring data in order to fulfil more the needs of managers and the public at large.

The second problem is that nowadays coastal managers frequently ask for causal relationships related to changes in environmental quality. Then, information is needed on temporal and spatial distribution and dynamics of benthic populations, together with environmental variables. A first analysis of the available extensive databases showed a mismatch (in time and place) between the macrobenthos and environmental data in Grevelingen. Further analyses (by means of e.g. ordination, correspondence analysis) helped to explain the changes in macrobenthos in relation to variation in sediment and water characteristics (e.g. grain size, chlorophyll, Secchi disk, TBT concentrations).

Accordingly adjustment of strategic monitoring projects is proposed.