Theme Session A – Structure and dynamics of the benthos in ICES waters (A)

Conveners: Hubert Rees (UK), Edward Vanden Berghe (Belgium), Steven Degraer (Belgium), and Heye Rumohr (Germany)

The stimulus for Theme Session A was the completion and publication of the ICES North Sea Benthos Project 2000, as well as additional studies in the same time frame and from other benthos studies in ICES waters. Habitat information was gathered in a very comprehensive form in 2000, backing up the benthic sampling programmes which contributed to the reassessment of the status of the North Sea benthos, following the earlier (1986) North Sea Benthos Survey. The Theme Session attracted presentations about joint North Sea studies on benthic ecology and related fields (e.g. habitat mapping, meroplankton ecology).

The main part of Session A (8 presentations) was therefore covered by presentations from members of the ICES SGNSBP 2000. These presentations were each strongly related to the different chapters of *Cooperative Research Report N° 288*, with valuable information on the North Sea benthos and habitats. Session A covered the project outline (Rees *et al.*) and data management (Vanden Berghe *et al.*), as well as the major ecological findings on community structure and species distributions (Rachor *et al.*, Reiss *et al.*, Eggleton *et al.*), long-term changes (Kröncke *et al.*) and the relationship with the abiotic environment (Kershaw *et al.*, Willems *et al.*). The main lessons learned were;

- Data management is a crucial element when dealing with a large dataset from multiple countries. It should be established at the very beginning of the process and managed by dedicated personnel.
- Abiotic data, especially sediment characteristics, should be considered to be of equal important to the collection of benthic biological data.
- Although community structure, species distributions and temporal variability could be explained by abiotic gradients, these explanations generally do not cross the empirical, descriptive state. Because of covariability among a number of environmental variables, it remains difficult to identify causal relationships needed to sufficiently comprehend spatial gradients and temporal changes.

Next to the presentations of the ICES SGNSBP2000, Theme Session A comprised of ten additional presentations that were clearly related and/or complementary to the SGNSBP study. Some important issues that were raised during these presentations, included:

- Epibenthos sampling and hence data analysis, is still suffering from a long-standing need for standardization, not only at the level of the sampling strategy (Reiss *et al.*), but also at the level of taxonomic discrimination (Vaz *et al.*).
- Correlating biological with environmental gradients still needs some attention (Moulaert *et al.*, Willems *et al.*, Degraer *et al.*, Cordoso *et al.*, Rachor *et al.*), since it offers a first glimpse at potential causal relationships. Consequently, several presentations emphasized the need to move from the quest for empirical models towards more process-, mechanism- or cause-oriented studies. Although empirical models do provide powerful tools in marine management, e.g. habitat mapping (Degraer *et al.*), a mechanism-based understanding of benthic variability is particularly useful when aiming at the prediction of future (anthropogenic) impacts and, consequently, within the framework of adaptive management (Eggleton *et al.*, Munguia & Osman, Moulaert *et al.*).
- Adaptive management should not only be adaptive at the temporal scale, but also at the spatial scale: Lindley et al. demonstrated the impact of temporal variability

within the meroplankton on the benthos, while Ellis et al. and Reiss et al. outlined the importance of spatial scale issues in benthic ecology.

Minutes from Theme Session A discussion

A discussion was held around the following recommendations of the SGNSBP2000.

1) Plan for the conduct of a co-ordinated, interdisciplinary synoptic survey of the North Sea in 2010 initially under ICES/BEWG auspices in doing so;
   - Identify elements which might attract international funding
   - Review the feasibility and costs of increasing national sampling effort to achieve a sea-wide synoptic survey
   - Alternatively, seek support for combining data from national monitoring programmes and other sources on an opportunistic basis
   - Consider widening the time interval (e.g. 2–3 years) for completion
   - Exploit existing ship time for North Sea sampling

2) Consider extending synoptic surveys into other sea areas

3) Plan for integrated assessments (new/existing interdisciplinary effort)

4) Ensure long-term support for the NSBP database and establish links with others

5) Provide wider access to the database, e.g. via the EU MarBEF network

6) Further promote the benefits of annual monitoring at representative national locations to aid the interpretation of infrequent, larger-scale assessments (and *vice versa*)

A discussion was also initiated concerning the standardization of gear and taxonomy, but it was felt that these issues should be discussed in more detail within the Benthos Ecology Working group rather than in the Theme session.

It was suggested that, to address the first bullet point, the proposal should be directed towards issues that policy makers need to address, e.g. drivers such as the WFD, climate change, ecosystem approach to fisheries.

It was felt that it would be easier to get funding for a synoptic benthic survey if sampling was tagged onto existing monitoring studies thereby reducing the requirement for extra ship time, although it would be essential to use standard methods when taking the extra samples. It was thought that the integration of multidisciplinary surveys including demersal fish, epifauna, benthos and sediment sampling (including taking samples for trace metals and organic contaminants) would be a good way forward making use of surveys such as IBTS to collect the data. Information from bycatch landed will also provide extra information. In light of the forthcoming EU Marine Strategy Directive it was suggested that we should focus on key species representative of a certain function along with certain habitats.

The idea to extend the survey into other sea areas was welcomed. Suggestions included the Barents Sea where Russia has conducted many benthic surveys over the years. The Norwegians are currently collaborating with the Russians in a joint survey of the Barents Sea but have found that there is a problem with standardizing the taxonomy as Russia have developed their own system and nomenclature. Other countries that have interests in the Barents Sea include, Poland, Germany, France (Oil) and Spain (Fishing).

Considerations should also be given to extending synoptic surveys into the Black sea and the Mediterranean, Irish Sea, east coast of North America and Canada.

In order to help answer questions on climate change/global warming, it was suggested that a smaller, more directed, number of monitoring stations should be chosen for further study rather than a large spatial survey. Within these ‘strategic’ areas we should concentrate on

certain groups of species that will be most affected by warming seas (such as cold-temperate species). However it was also noted (CRR 288) that the effect of climate changes may not follow the same trajectory in different areas and observations in a North Sea-wide setting were therefore important. It was noted that examples of species from warmer waters are mainly seen in the epifauna, so far.

It was thought that if another synoptic survey were to take place in 2010, planning would have to start soon. Experience gained during the NSBP2000 concerning the compilation of data from a large number of sources suggested that it would be more effective to have one person to spend time (a year full time was suggested) thoroughly compiling the data, accompanied by consultation with data providers to ensure a consensus in decision-making, before any data analysis was conducted.

It was also suggested that formalizing a hypothesis-testing framework would help in the planning of any repeat survey and would help lower the cost of the survey itself.

Finally the recommendation for a formal and open link between ICES and the NSBP2000 database (see CRR 288) was endorsed.