RECOMMENDATIONS 11th INTERNATIONAL SCIENTIFIC WADDEN SEA SYMPOSIUM Esbjerg, 4 - 8 April 2005

(Final Draft Version, 1 May 2005)

Preamble

The 11th International Scientific Wadden Sea Symposium held at Esbjerg, Denmark, from 4 till 8 April 2005, was attended by 155 scientists, government officials and representatives of non-governmental organizations. The main theme of the symposium was 'Monitoring and assessment'. During the symposium 65 scientific papers were presented and discussed, as were 25 posters.

From the papers and posters a large number of recommendations for improvement of monitoring and assessment in the Wadden Sea area resulted. These recommendations have been screened on their relationship to the theme of the symposium and on possible overlap with the recommendations in the forthcoming Quality Status Report 2004 by the preparatory committee for the scientific programme of the symposium. This committee consisted of J.E.E. van Beusekom, Bruno J. Ens, K. Thomas Jensen, Karsten Laursen, Harald Marencic, Wim A. Wiersinga, and Wim J. Wolff. The chair of the Trilateral Monitoring and Assessment Group (TMAG), Karel Essink, was asked to participate as well. The screened recommendations were discussed and accepted or rejected in a two plenary meetings of the symposium chaired by Prof. Wim J. Wolff.

Finally, the accepted recommendations have been edited by the committee mentioned above to remove overlap and unclear formulations.

Relationship with Quality Status Report 2004

Until the 11th International Scientific Wadden Sea Symposium, the Quality Status Report 2004 on the Wadden Sea had not yet been published but was available as an electronic version. A limited number of pre-prints of the report could be consulted by the symposium participants, but this was insufficient to inform all participants of all recommendations included in the report. Nevertheless, it appeared that many of the QSR recommendations were supported by the participants of the symposium.

Relationship with the TMAP revision

The recommendations from the 11th International Scientific Wadden Sea Symposium should contribute to the TMAP revision process. Where needed these recommendations may also be used to prioritize the TMAP monitoring activities.

Recommendations

The relationship between monitoring, assessment and research

1. Monitoring and assessment cannot be carried out without research. Hence, the ongoing TMAP should be accompanied by concomitant research projects to investigate the underlying processes of observed changes and trends. Examples of such projects are given in the following recommendations. Because there is a need in the Trilateral Wadden Sea region to coordinate research with monitoring and assessment, the feasibility should be explored of establishing a "Clearing House" for all relevant science. Such a Clearing House could play a role in guiding future research efforts e.g. by identifying gaps and overlaps.

Gaps in the Trilateral Monitoring and Assessment Program (TMAP)

2. Current monitoring programs insufficiently cover lower trophic levels (phytoplankton, zooplankton) and the processes that regulate primary and secondary production. Information on these parameters is vital for the understanding of the functioning of the whole ecosystem and monitoring of relevant parameters should be promoted.

3. Monitoring of bottom-living flora and fauna (benthos) is until now restricted to tidal flats. Benthic monitoring should be extended to include beaches, the supralitoral fringe of tidal flats,

and subtidal habitats. Benthic monitoring should include also the species composition of meiofauna and benthic diatoms since this might act as an early-warning system.

4. The state of benthic species particularly sensitive to specific human pressures (e.g., gastropods sensitive to organotin, epifauna sensitive to demersal fishing gear, brackish-water fauna sensitive to reclamations) should be assessed.

5. Through centuries of coastal reclamations the share of muddy habitats in the Wadden Sea has strongly diminished. The consequent spatial decline of nearshore mud benthos, for example the bivalve *Scrobicularia plana*, due to this development should be assessed.

6. The areal extent of hard substrate (stones, wood, peat) habitats and their epigrowth should be assessed in order to estimate their functional role in the Wadden Sea.

7. Functional shifts in Wadden Sea ecosystems caused by introduced species such as the Pacific oyster should be explored.

8. To explain changes in populations of birds, fish and major benthic species as well as the concentrations of algae, information is needed on total stocks of shellfish in the Wadden Sea as well as on changes of these stocks.

9. To facilitate the interpretation of monitoring data, fishermen should be obliged to report their catches and the locations of their catches of shellfish and shrimps, also when they only move shellfish from one location in the Wadden Sea to an other.

10. A pilot study should be implemented to unravel relationships between breeding birds and habitat features using existing data from Wadden Sea wide census areas. The established data-bases such as maps of vegetation, land use and drainage as well as maps of breeding birds should be included in this analysis. This should be coordinated by the Common Wadden Sea Secretariat and could be carried out by the Joint Monitoring group on Breeding Birds.

11. The northern and the southwestern Wadden Sea seem to differ in nutrient concentrations and organic matter cycling. Research should be initiated towards understanding these differences in order to better manage eutrophication.

New insights necessitating adaptations of the Trilateral Monitoring and Assessment Program and other actions

12. The issues of concern for the Wadden Sea are partly the same as 10 years ago when the TMAP was established. New issues came up the last decade like sea level rise, the food supply of migratory birds, introductions of exotics, the lack of dynamics of dune and salt marsh vegetation, the changing of the functioning of the mudflats by processes like coarsening of the sediment and shift of bivalve recruitment to the upper tidal zones. This leads to the recommendation to reconsider the contents of the TMAP programme, taking into account identified gaps such as fish, exotics, beach parameters and composition of tidal-flat sediments.

13. In the process of revising the TMAP, monitoring of new hazardous substances should get attention. Possible exclusion of some currently monitored hazardous substances, which have substantially declined, should be considered as well as optimization of the monitoring effort (frequency and locations). It is recommended to include ecological risk-based targets in monitoring of hazardous substances.

14. In view of the development of grey seal population and breeding colonies, the present monitoring scheme for grey seals is inadequate. It has to be improved and should be included in the TMAP.

15. Installing a special monitoring program to discover newly introduced exotics at an early stage will not be effective. Exotic species already present should be included – if not already done so - in running TMAP monitoring programs. Only in exceptional cases, such as the Pacific oyster, a monitoring program may be set up to follow the development of an introduced

species with the aim to obtain data to document possible functional shifts within the ecosystem.

16. Reference values for benthic quality should be evaluated with respect to both the present monitoring results and the former ecological structure based on historical information.

17. To distinguish between ecosystem effects of human impacts and those of natural processes, it is recommended to establish more and larger zero-use zones (order of magnitude one tidal basin). The TMAP has to be conducted both in the human-influenced parts of the Wadden Sea and in these zero-use zones.

18. An international network of long-term ecological research (ILTER) sites should be established on the basis of the existing TMAP sites to study long-term changes in different marine and terrestrial habitats enabling the identification of common drivers. Researchers and the policy makers should have access to these ILTER-sites and the parameters should be recorded on a website under the auspices of the CWSS.

19. The observed changes in distribution and abundances of young flatfish and their underlying causes require more fundamental research into biological processes and responsible causal factors. Such research should be carried out on appropriate spatial scales, with structural funding of analyses of data on by-catch species in surveys carried out for commercial stock management.

20. When evaluating monitoring results for birds breeding in or migrating through the Wadden Sea, factors influencing the populations in their wintering or breeding areas should also be taken into account.

Methods

21. Production and remineralization are important processes in the Wadden Sea and have already been recommended to be integrated into long-term monitoring. New techniques to quantify organic matter turnover in sediments developed can be applied in the near future. It is recommended to establish time series with small-scale experiments and modelling.

22. To fill the gaps in the existing overview of salt-marsh zonation and dune vegetation, the TMAP typology key for salt-marsh and dune vegetation should be applied in all Wadden Sea countries in forthcoming regular vegetation mappings within the framework of the TMAP, thus enabling the production of a trilateral overview on the recent dune and salt-marsh vegetation in the entire Wadden Sea area.

23. As the EU Habitats Directive classification schemes for salt marshes and dunes are too rough for a proper assessment of a „favourable conservation status“ it is recommended to apply the newly developed TMAP typology vegetation key.

24. Although in some areas *Zostera* surveys are done regularly, this is not done in the entire Wadden Sea. Hence, it is recommended that every 5-10 years a complete and concerted survey of *Zostera* throughout the Wadden Sea be conducted. In addition, selected seagrass sites should be monitored annually. Monitoring seagrass beds should be combined with monitoring of macroalgae.

25. To obtain valuable information on population structure, often indispensable for good data interpretation, the ages of animal specimens monitored in TMAP should noted whenever this can be done at relatively low costs (e.g., bivalves, fish).

26. Care should be taken that benthic species living deep in the sediment are included in benthic monitoring programs.

27. Annual population growth rate should used as an indicative parameter for reproduction capacity of seals; for harbour porpoises population density should be used.

28. All TMAP parameters, methods and data collection regimes should be reviewed to determine the most cost-effective approaches (incl. questions of density and frequency of monitoring).

29. Remote sensing techniques (for sediment, macrophytes, mussels and phytoplankton) should be integrated into national monitoring programs and trilaterally harmonized.

Data handling and information exchange

30. Data and results from TMAP and research projects should be made faster and easier available by using an appropriate TMAP Information System.

31. The functionality of TMAP data handling should be increased to support assessments and facilitate information provision required by EU Directives, e.g. by providing data retrieval by SPA, SAC, theme, geographic area, and to handle GIS mapped data on species and habitat distribution.

32. In the interest of continuity of the monitoring and assessment of developments in the trilateral Wadden Sea Region, the data management of TMAP should be granted structural funding.

Working structure

33. Additional trilateral expert groups (e.g., on beaches and dunes, on fish and on seagrass) should be established to support TMAP and implementation of EU directives. These expert groups should function under the TMAG and largely be run by the initiative of the scientists involved.

34. A TMAP dunes and beaches working group should be installed to exchange experience and knowledge concerning protection, restoration and management of the Wadden Sea dune areas and beaches. The main tasks of the working group should be:
    - to exchange knowledge and advice on the following priority subjects: obvious differences in application of active management measures (grazing, sod-cutting etc) and differences in managing ecological effects of groundwater extractions.
    - to initiate new approaches of nature management of uninhabitated dune areas by stimulating experiments in handling coastal defense elements (e.g. removing old sand dikes, stopping fixation of dunes) and investigate their ecological consequences.
    - to stimulate vegetation mapping in all dune areas, at least up to the detail of the newly developed TMAP classification.

35. The ongoing revision process of the TMAP should be a concerted action within the Wadden Sea co-operation and should include, a.o., improvement of the TMAP data base, a better tuning of the organization within the co-operation, evaluation of the Issues of Concern and the Targets, also taking into account the requirements of EU Directives and the specific Wadden Sea characteristics.

EU Directive requirements

36. All species listed in the EU Habitat Directive and occurring in the Wadden Sea should be included in the TMAP (also the rare species such as Twaite shad – *Alosa fallax*).

37. According to Art. 1 of the Habitat Directive the “structure and function” of Annex I habitats should be monitored as well as ecological functioning of the typical species living there. Additionally the processes underlying the distribution and abundance of the typical species of these habitats should be taken into account. The study of such processes may be vital for the understanding of changes in distribution and abundance of species occurring in Annex I habitats but these studies are beyond the scope of regular monitoring programs. Nevertheless they could be catalogued and studies on these processes should become part of the work of scientific institutes.

38. The EU Water Framework Directive aims at protecting the structure and the functioning of aquatic ecosystems by optimizing habitat providing conditions and optimizing water quality. Judging the effects of the actions at the ecosystem level requires:
    1. An integral approach in the biological monitoring and thus extension of the current TMAP with organisms smaller than 1 mm;
    2. The integration of the results in ecosystem indices at an:

(a) high aggregation level,
(b) application of data in dynamic process-oriented models and
(c) application of the data in static structure- and process-oriented models like Ecological Network Analysis

39. The TMAP should be used as a platform for a closer cooperation in the implementation of the EU Directives in the Wadden Sea to enhance synergy in monitoring and management.

40. Many monitoring programs in the Wadden Sea are insufficiently financially safeguarded. Attention should be given to improve this situation, given the fact that reporting on the conservation status of Annex I habitats is one of the obligations set out by the Habitat Directive.

Miscellaneous

41. Where not already in place, seagrass beds need protection of a large buffer zone around these beds because of the high dynamics displayed by seagrass beds from year to year. Protection of so called 'high-potential zones' is also needed to allow expansion of existing seagrass populations.

42. According to the EU Birds and Habitat Directives nature preservation can be overruled by significant socio-economic interests. In order to conclude a decision on nature preservation versus socio-economic development a comparison of all impacts needs to be made. For that purpose the (standard) procedure of environmental impact assessment is insufficient since it merely comes down to drawing up environmental (nature) impacts. A decision support technique could be social benefit cost analysis (SBCA). SBCA draws up all the environmental (nature) impacts (e.g. by environmental impact assessment), values them and balances them against all socio-economic impacts. Some pilot SBCAs are recommended, preferably in a trilateral context, to gain experience with this technique.