

Common Package Parameters and TMAP Issues of Concern

The TMAP parameters have been defined on the basis of selected so-called Issues of Concern and Hypotheses (TMEG 1993). A sub-set of these parameters have been included into the TMAP Common Package. Therefore, several shortcomings occur with regard to these five Issues of Concern (I-V) when implementing only the Common Package parameters (see also TMAG Implementation Report, 1997).

I Climate change

1.1 Influence of changes in climate on physical conditions, rise in sea level, and on the stability and abiotic environment of plants, animals and man.

The basic information can be derived from the Common Package. However, information on the development of the coastline (e.g. from remote sensing) is not available but may be included during a later phase.

II Input of pollutants

2.1 The changes in the chemistry of soils, sediments and the water column due to the input of pollutants.

Changes in the chemical cycles in the sediment cannot be sufficiently monitored with Common Package. Additional information from other sources is necessary.

2.2 The response of natural processes in the ecosystem to changes in the pollutant level: Primary production, food chain fluxes, reproduction and decomposition.

The Common Packages gives no information for calculating the primary production of the benthic microalgae which can be considered as a serious gap.

Another major gap is the fact that the decomposition parameters (also related to the "black spots") could not yet be included into the Common Package mainly due to a lack of appropriate monitoring methods.

Furthermore, important species (Crangon and polychaetes: species parameters and contaminants) are not included in the Common Package so that not all parts of the food web are covered.

2.3 The response of species to changes in pollution levels.

The Common Package is not sufficient to assess the effects of inputs of pollutants on all key species. As already stated in II.2, important species (Crangon and polychaetes: species parameters and contaminants) are not included.

2.4 The response of community occurrence and structure to pollutant inputs.

Important communities of the salt marshes (vegetation and fauna communities) and fish (demersal and pelagic fish communities) have not been included in the Common Package. Therefore, an assessment of the influence of pollutants on these communities cannot be given by the TMAP.

III Commercial fisheries

3.1 The response of species to fisheries in the Wadden Sea, and

3.2 The response of community occurrence and structure to the fisheries in the Wadden Sea.

The demersal and pelagic fish communities have not been included into the Common Package. Accordingly, no assessment of the influence of fisheries on the communities can be made. Additionally, to work on the Issue of Concern, reference areas for monitoring and research are needed. A representative set of tidal basins (including ebb deltas and adjacent coastal areas of the barrier islands) should be selected in which no or only little human activity is allowed.

IV Recreation

4.1 The response of species to recreational activities in the Wadden Sea.

Because the many of the relevant tourism parameters (socio-economic data, overnight stays, bed capacity, harbor capacity, no. of visitors) are not covered by the Common Package, serious gaps can be detected.

V Agricultural Practice

5.1 The response of salt marsh communities to agricultural utilization.

Relevant parameters like vegetation and fauna community parameters and soil parameters are not included in the Common Package. The assessment will be based mainly on remote sensing methods (large spatial and temporal scales) and information on migrating and breeding birds.

Conclusion

Concerning the evaluation of the TMAP hypotheses, it has to be stressed that, in principle, all parameters are necessary. However, in most cases, the Common Package will give the basic information about the TMAP hypotheses. Table

1 provides an overview about the main gaps concerning the TMAP Issues of Concern and Hypotheses.

Table 1: Information which is required for assessment of TMAP hypotheses and the Wadden Sea Plan Targets in addition to the common package.

Topic	Parameters	Relevance
Decomposition	Changes in chemical cycles (chemistry of soils, sediments and water column), decomposition, microbial processes of the sediment (C-parameter), nutrients in the sediment	Target "eutrophication" and the TMAP hypotheses "response of natural processes to changes in pollutant level"
Benthos	Benthic microalgae: primary production	Target "eutrophication" and the TMAP hypotheses "response of natural processes to changes in pollutant level"
	Location and area of biotopes (intertidal flats)	Target "tidal areas" and the TMAP hypotheses "response of community structure to input of pollutants"
	Crangon (species parameters)	TMAP hypotheses "response of species to changes of pollutant levels"
	Crangon (contaminants)	Target "micropollutants, man-made substances" and the TMAP hypotheses "response of species to changes of pollutant levels"
	Arenicola and Nereis (contaminants) (C-parameter)	TMAP hypotheses "response of species to changes of pollutant levels"
Salt marshes	Vegetation communities	Target "salt marshes" and the TMAP hypotheses "response of communities to agricultural utilization and climate change"
	Invertebrate fauna	Target "salt marshes" and the TMAP hypotheses "response of communities to agricultural utilization"
Fish	Fish communities (pelagic and demersal)	Target "tidal areas" and the TMAP hypotheses "response of community occurrence structure to input of pollutants and fisheries"
	Fishery (fishing areas and periods, shrimping by-catch composition and discard)	Target "tidal areas" and the TMAP hypotheses "response of community occurrence structure to the fisheries"
Recreation	Socio-economic data, overnight stays, bed capacity, harbor capacity, no. of visitors	TMAP hypotheses "response of species to recreational activities."

Status TMAP Data Handling

Objectives

The TMAP data management has the task to harmonize the TMAP data, to store the data on national database sites (TMAP data units) and to make it available for scientists and expert groups, as an essential prerequisite for trilateral assessment and reporting of monitoring data.

Based on the data management concepts, technical preconditions and the development of a prototype within the DEMOWAD project, the German data handling project (1998-1999) has improved the user interface and technical possibilities of the TMAP data units. There is a more efficient and user-friendly database access, the TMAP data units are now easily expandable and the technical maintenance is less expensive. The development of database structures for chemical, biological and geographical (the latter as proposal) parameter data allows the data input of most TMAP parameters. The improvement has been realized in close cooperation and agreement with the Trilateral Data Handling Group (TDG).

The de-central concept of the TMAP data exchange system allows the installation of TMAP data units at each national database center, responsible for the TMAP monitoring data. This open approach enables data storage within administrative boundaries and provides an easier and independent dealing of national data on the trilateral level, because of data ownership, data quality and close contact to data originators. Moreover, the data unit can easily be used for management of national monitoring data.

Two of the four intended TMAP data units have been installed and are operational. The installation of data units in Denmark and The Netherlands, including filling in TMAP data, is expected in 2001. TMAP data units, parameter groups, which has been already stored and responsible data managers, who are available at these data sites, are listed in the Table1.

The TMAP data unit

The development and implementation of the TMAP data unit, which is a combination of database and Internet access, fulfils the prereq-

uisites of a modern data storage and data management system.

The time consuming effort of data collection and data harmonizing in the past is being replaced with an easy accessible and already harmonized stock of monitoring data.

The trilateral harmonized and equally structured relational TMAP databases are meeting the state of art of data storage and the Java Internet interface allows an user friendly selection and access of TMAP data. Information on data stored in the data catalogue of the Units, like the parameter groups with their co-variables, the corresponding monitoring programs, monitoring stations, time range of monitoring programs, exact the information to find out the status of the TMAP, is available for public. Registered trilateral users are even able to download raw monitoring data in a common format on their desktop computer.

Moreover, the TMAP database extension, which is a part of the database, allows to configure the Java interface. That means, that in case of the implementation of new parameter groups, the Java interface will get the information on how to offer this new parameter to the user from the database extension. The Java interface has not to be reprogrammed.

The concept of distributed TMAP data units in the three countries in combination with the flexible technical solution and user friendly interface is comparable with solutions of other international monitoring programs and will surely be fulfill the demands and standards in

Table 1: Overview of available data and responsible data manager at the TMAP data units.

TMAP data unit	Parameter group	Responsible data manager
The Netherlands, Haren	-	Two persons (half time) until the end of 2001.
Germany, Wilhelmshaven	Contaminants in sediment Beached Birds Seal counts	Not available
Germany, Tönning	Phytoplankton Breeding Birds Migratory Birds Beached Birds Survey Seal counts	Not available
Denmark, Roskilde	-	One persons (half time) until the end of 2001.

the next years. The architecture of the system (three tier model) allows no direct access to the TMAP database from outside. Each access is controlled and checked by a special program (application server). This reasonable principle prevents user behind a firewall (security software against unauthorized persons from the Internet) from getting data out of the TMAP data units. Though this problem is known and technically solvable, no reasonable steps from the network administrations have been undertaken to get rid of this dilemma.

Compared with the technical solution, which allows an easy and reasonable installation of TMAP data units, it is enormously important that data has to be entered in the TMAP databases to make the trilateral data exchange system alive. The German data handling project has developed, in cooperation with trilateral data experts, database structures for chemical

and biological TMAP parameter groups. A proposal on how to implement the parameter groups with geographical references is available. For general data no database structures are available (delayed development of guidelines), but the effort for development are rather low.

Beside the successful technical development of the unit, it is of course immensely important that data managers with a permanent employment on national level guarantee the data flow from the monitoring programs into the TMAP data units. This effort will be lower, if, in case of not existing central national monitoring databases, the data unit or a copy of it would be used as national database. The benefits would be low or no development expenditure, low maintenance cost, easy expandability and experience exchange with trilateral partners.

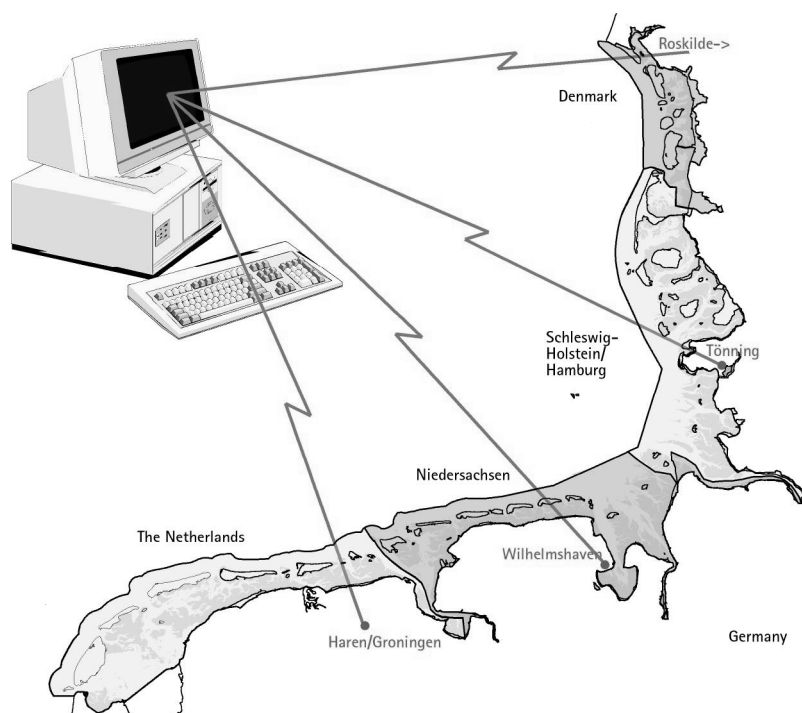


Figure 1: TMAP data unit sites with responsible monitoring areas.

Information quality of the Common Package with regard to the Wadden Sea Plan Targets

An analysis of information quality of the Common Package by the TMAG in 1997 already revealed several shortcomings with regard to the Wadden Sea Plan Target requirements (TMAG 1997). The shortcomings of the TMAP are also reflected by the recommendations of the QSR for monitoring. The recommendations have been elaborated by an independent group of experts in their various fields can therefore be taken as directions for future improvement of the monitoring and research program in the TMAP.

The QSR 1999 also revealed that the scientific evaluation of Targets is limited by a number of factors. Beside the lack of suitable data, the most important is that the Targets are of general nature and provide in most cases not a desired end situation. They indicate the policy direction to be followed by the three Wadden Sea states. For future work it is essential that the Targets are specified as much as possible and as desirable. It will guide the further development of the monitoring program and concomitant research and will improve the overall assessment of the implementation of the Targets.

1. Targets on the Quality of Water and Sediment

"Background concentrations of natural micropollutants"

"Concentrations of man-made substances as resulting from zero discharges."

The TMAP common package covers all relevant matrices (sediment, biota) and contaminants (except PAH) for trend analysis. The common package will allow an assessment of the concentrations in most important species and in the sediment.

All of the contaminant parameters are also part of the OSPAR - JAMP. The new JAMP guidelines were endorsed by OSPAR in last years and are also valid for the TMAP. In some cases, the JAMP guidelines are still under discussion, e.g. concerning technical details like sediment normalization.

Preliminary assessment criteria like background concentrations and ecotoxicological values for selected substances and matrices have been elaborated by OSPAR/ICES in 1997 for the OSPAR convention area and its sub-regions. For the first time, these assessment criteria could be applied in the Wadden Sea QSR 1999. It became obvious that for a proper evaluation of the Target, Wadden Sea specific background values of natural micropollutants for mussel and sediment are necessary. The present background values cover only larger areas like the North Sea. It is recommend that more specific values be derived for the Wadden Sea on the basis of a literature study, supplemented with field studies of sediment historical records.

An information deficit occurs with regard to the situation of new hazardous substances. Because not all of these substances can be included into a regular monitoring program, a comprehensive evaluation of the situation regarding distribution and fate of pesticides and other potentially dangerous substances should be carried out.

"A Wadden Sea which can be regarded as a eutrophication non-problem area"

The common package gives information on inorganic nutrients, phytoplankton, macroalgae and zoobenthos. The QSR 1999 revealed that these data are necessary for an assessment but have to be complemented with other data related to eutrophication. Otherwise a proper evaluation of the eutrophication status is not possible. Therefore, sufficient information must be available about production and decomposition and nutrient fluxes. Zooplankton complements the scope of monitoring to allow for a better understanding of what is going on in the water column. What is more, community structure may reflect short term as well as large scale fluctuations of the system driven by intrinsic and external factors such as nutrient release, algae blooms or NAO events. Zooplankton is already sampled regularly, however, there are only limited resources to produce data from these time series.

2. Targets on Salt Marshes

- "An increased area of natural salt marshes"
- "An increased natural morphology and dynamics, including natural drainage patterns of artificial salt marshes, under the condition that the present surface area is not reduced."
- "An improved vegetation structure, including the pioneer zone of artificial salt marshes."
- "Favorable conditions for migrating and breeding birds."

The common package parameter provides basic information concerning locations and areas of salt marshes at a larger scale.

A new comprehensive inventory of Wadden Sea salt marshes with regard to surface area, management, drainage, grazing intensity and protection status and the basis of harmonized quality criteria is under preparation to update the last survey from 1986.

A more detailed information about natural morphology, dynamics, vegetation structure and drainage systems is provided by national monitoring programs for selected areas.

3. Targets on the Tidal Area

- "A natural dynamic situation in the tidal area."
- "An increased area of geomorphologically and biologically undisturbed tidal flats and sub-tidal areas."

The common package provides only information about the size and distribution of tidal flats. To evaluate the Target, more information about the morphological and biological characteristics of the tidal area (including the sublittoral areas) and their spatial and temporal development is necessary. These data are available only for selected sites on tidal flats where benthos monitoring is carried out (eelgrass, mussel beds, macrozoobenthos). Information on human impacts on the tidal area is also very limited e.g. concerning fisheries and their impact on specific areas.

A main deficit is that important parameters of demersal and pelagic fish communities are not included in the common package. Therefore, the development of these important fish communities cannot be followed sufficiently and, subsequently, a proper evaluation of the Target is not possible. It is recommended to include fish monitoring into the TMAP which could

provide at least basic information about the present status of the Target.

The assessment of the Target would be very much improved if data from fished and non-fished reference areas could be compared. This concerns also research on the interactions between sediment composition, disturbances and subsequent biotic development.

- "An increased area and a more natural distribution and development of natural mussel beds, Sabellaria reefs and Zostera fields."

Mussel beds:

Location and area of blue mussel beds can be derived from the common package and provide the basic information for the Targets. However, the key role of blue mussels concerning their ecological and economic importance is by no means reflected in the TMAP. For a proper management, additional information is necessary with regard to the characterization of mussel beds and the distribution of these different mussel bed types. The current monitoring in the intertidal can easily be supplemented by species parameters which are already part of the ongoing national programs. Only a marginal harmonization effort is required. A common monitoring protocol is under preparation which allows a comparability of the different surveys. Still, surveys in the subtidal are scarce and their thematic scope limited. Initiatives should be taken to improve the situation with regard to subtidal monitoring.

In recent years, an increased abundance of the introduced oyster *Crassostrea gigas* has been observed in all areas of the Wadden Sea. It is therefore necessary to follow the further development of the oyster to be able to evaluate the possible effects on native biota.

Eelgrass:

Basic information about the distribution of eelgrass stands is available from the Common Package. However, the reasons of the decline and the failure of return of eelgrass have not been revealed. Projects should be initiated to study the causes and prepare proposals how the situation can be improved.

Sabellaria:

Sabellaria reefs are not part of the common package and information about the development relies on national surveys. For the time being no recent information is available for an

evaluation of the Target. Pilot studies will be necessary before *Sabellaria* can be included a regular monitoring.

"Favorable conditions for migrating and breeding birds."

"Viable stocks and a natural reproduction capacity, including juvenile survival, of the common Seal and the grey seal."
(see under section 8 and 9).

4. Targets on Beaches and Dunes

"Increased natural dynamic of beaches, primary dunes, beach planes and primary dune valleys in connection with the offshore zone."
"An increased presence of a complete natural vegetation succession."

The common package can be regarded to give sufficient basic information on the targets on beaches and dunes (every 5 years, remote sensing techniques). A common classification of beaches dunes has been developed based on habitat classification by the EU (EUNIS habitat classification, Habitat Directive).

Information additional to the common package may be necessary with regard to a detailed inventory into local factors relevant for dune management, in particular erosion-sedimentation patterns, exposure to storms and size of the islands. Another important items is the spreading of alien/introduced species which should be followed in order to detect signs of strong displacement effects on the local flora and fauna.

"Favorable conditions for migrating and breeding birds"

(see under section 8)

5. Targets on Estuaries

"Protection of valuable parts of the estuaries."
"Maintaining and, as far as possible, restoring the river banks in their natural state."

The common package obtains only limited information to evaluate the Target on estuaries. Long-time data series of systematic monitoring only exist for hydrological and water quality parameters. Biological monitoring programs were set up a few years ago. They have to be maintained and intensified in order to evaluate the anthropogenic impact on community structures and ecological processes and to detect

long-term changes, e.g. with regard to salt marsh development, morphology of tidal flats, nutrients, and contaminants.

Additional important parameters like shipping intensity and dredging are not included in the TMAP. The information has to be gathered via other programs.

Because the Targets have not yet been specified in detail, a final conclusion about the information quality can not be drawn.

6. Targets on the Off-shore Zone

"An increased natural morphology, including the outer deltas between the islands."

"A favorable food availability for birds."

"Viable stocks and a natural reproduction capacity of common seal, grey seal and harbour porpoise."

The parameters of the TMAP do not cover the off-shore zone and consequently do not provide enough information to assess relevant targets especially concerning birds, common seal, Grey Seal and harbor porpoise.

Bird numbers at sea, especially moulting sea ducks, are only poorly known. It is therefore recommended to improve monitoring of birds in the off-shore zone.

A regular monitoring scheme for Harbour Porpoises in the coastal zone should be set up and become part of the TMAP.

Generally, studies are needed to elucidate the specific significance of the offshore zone within the Wadden Sea ecosystem. It is also recommended to start an inventory of the information needs regarding a proper management, which may serve as a basis for the development of an adequate monitoring program in the offshore area.

7. Targets on Rural Areas

"Favorable conditions for flora and fauna, especially migrating and breeding birds."

Information on rural areas in the common package is limited to the monitoring of bird numbers. For selected areas, e.g. the Wadden Sea islands, remote sensing data or agricultural statistics are available and may be used for the evaluation of the Targets.

A more detailed specification of the Target is necessary concerning the information needed for management before a monitoring can be implemented.

8. Targets on Birds

"Favorable conditions for migrating and breeding birds: a favorable food availability, a natural breeding success, sufficiently large undisturbed roosting and moulting areas, natural flight distances."

The joint monitoring program of breeding and migratory birds allows an analyses of the population developments of important bird species. The results are regularly published in the series "Wadden Se Ecosystem".

With regard to the Targets the common package gives very limited indication with regard to a favorable food availability, a natural breeding success, sufficiently large undisturbed roosting and moulting areas, and natural flight distances. These gaps should be filled to safeguard a proper assessment of the Targets.

Food availability:

The direct food intake rate of birds cannot be measured within a monitoring program. However, some parameters can give an indication of the food intake, e.g. development of the body mass of chicks (see also breeding success), departure weights of waders and geese in spring prior to their migration to the breeding grounds, and investigations of regurgitated food remains (pellets) can show the composition of their diet. These parameters should be carried out for selected species in special concomitant research projects in the framework of the TMAP.

The monitoring program must be supplemented by event-related research in cases of severe effects on food supply of bird populations, for example during cold winters with food shortage.

Flight distance:

It is recommended to investigate the actual flight distances of birds in the Wadden Sea and to develop a standardized method for such measurements within an applied research project on the trilateral level.

Breeding success:

Monitoring of breeding success should be carried out regularly to check the environmental conditions relevant for coastal birds. It can be used as an "early warning system" for negative changes in birds' population sizes. It is also suited to determine the "natural breeding suc-

cess" of birds and to differentiate between naturally, and anthropogenically, caused changes. It is, therefore, recommended to continue the trilateral breeding bird pilot project.

Roosting areas:

Research should be done to evaluate the situation of roosting sites and to find out the factors that determine the choice of roosting sites by birds in the Wadden Sea. The availability of suitable (natural) roosting sites as well as the regularly/naturally used flight routes between roosting and feeding sites in each country should be regularly evaluated.

Moulting areas:

The counting of seaducks and boats by aerial surveys should be continued within the TMAP. Because the moulting area of, i.e., shelducks are changing, the aerial surveys should be adapted to these changes.

9. Targets on Marine Mammals

"Viable stocks and a natural reproduction capacity of the Common Seal including juvenile survival."

"Viable stocks and a natural reproduction capacity the grey seal including juvenile survival."

"Viable stock and a natural reproduction capacity of the harbour porpoise."

At present, a quantification of the parameters 'viable stock' and 'natural reproduction capacity' cannot be given because they depend on a multitude of factors. The assessment of the viability of the stocks, therefore, have to be based upon best experts' judgement.

The common package entails only counting of Common Seals. The counting is carried out in the framework of the Seal Management Plan which entails also other activities related to research and monitoring.

No regular monitoring of grey seals and harbour porpoise is carried out. This concerns numbers and distribution but also natural reproduction capacity and survival of grey seals in the Wadden Sea. Because of lacking data, no sufficient information is available for a proper Target evaluation.

It is recommended to implement a two-year pilot project for grey seals as soon as possible. A project proposal has already been prepared (doc. TWG 99/1/4d-2, March 1999), statement by TMAG (doc. TWG 99/2/5b-1, September 1999).

Furthermore, it is proposed to initiate a survey to record the spatial and temporal pattern of harbour porpoise. A research project is under preparation in Schleswig-Holstein and will be carried out in the harbour porpoise sanctuary of the islands of Sylt and Amrum.

Regular monitoring of grey seal and harbour porpoise is necessary for an evaluation of the Targets and should be included into the TMAG after finalization of the proposed pilot projects.

10. Targets on Landscape and Cultural Aspects

"Identity – to preserve, restore and develop the elements that contribute to the character, or identity, of the landscape."

"Variety – to maintain the full variety of cultural landscapes, typical for the Wadden Sea landscape"

"History – to conserve the cultural-historic heritage"

"Scenery – to pay special attention to the environmental perception of the landscape and the cultural-historic contributions in the context of management and planning."

A contribution from the TMAP to the evaluation of these Targets may be data about socio-economic issues like development of tourism and infrastructure. No major additional contribution from the common package for these Targets can be expected. Recommendations for data gathering and assessment should be prepared by the Lancewad project.

11. Topics related to several Targets on Habitats and Species

The direct effects of recreational activities have to be considered when evaluating the Targets on habitats and species. This concerns mainly disturbances of species (birds, seals) or habitat destruction (e.g. dunes, salt marshes). The parameters currently included in the Common Package do not adequately cover the full range of human activities. Therefore, it is recommended to initiate a project to develop a tourism monitoring in the Wadden Sea regions in connection with the follow-up activities of just finished tourism project by the Inter-regional Wadden Sea Cooperation.

Conclusions

The evaluation of the common package revealed, that the basic information concerning the requirements of the Targets can be obtained by the current TMAP. However, in some cases, gaps exist which lead to an insufficient data base and hampers a proper assessment of the Targets. The recommended modifications of the Common Package are therefore essential in order to meet all the requirements of the Targets.

The QSR 1999 clearly demonstrated that, because the TMAP was still in its implementation phase, the interpretation of monitoring data were severely hampered by different national monitoring methodologies and insufficient suitable data. The QSR 1999 prepared a number of recommendations for monitoring and research which have been considered by the TMAG in the evaluation of the Common Package and the proposed follow-up activities..

The QSR 1999 also revealed that, beside the lack of suitable data, the scientific evaluation of the Targets is limited because the Targets are of general nature and not specified in more detail. For future work it is essential that the Targets are specified as much as possible and as desirable. It will guide the further development of the monitoring program and concomitant research and will improve the overall assessment of the implementation of the Targets.

In addition to these recommendations further deficits may be identified concerning the biogeographical and chemical processes in the sediment and the interactions at the boundary sediment/water and sediment/air. The sediment is the key compartment for central processes and functions in the Wadden Sea. The gaps in knowledge have best been dismantled during the "Black spot" events some years ago. However, routine procedures for monitoring are not yet available.

Table 1 summarizes the evaluation and gives an overview which additional parameters are necessary to optimize the Common Package with regard to the requirements of the Wadden Sea Plan Targets and how they could be implemented. Considering the budget limitations the number of additional monitoring parameters and projects can only be limited.

In several cases, inquiries have to be carried out and pilot projects have to be initiated before it can be assessed whether and how parameters should be included in regular monitoring. If necessary, routine procedures for monitoring have to be developed. This preparatory work can be carried out by the TMAG within the next three-year work plan.

Data from other programs (national monitoring programs, single survey, research projects) which are not part of the Common Package have to be included in the preparation of assessment reports as far as possible. Although the results from these different programs can not be compared directly because different methodologies are used, they may provide useful information for the Targets assessment.

Table 1: Overview about proposed additional parameters to be included into the Common Package and follow-up activities to be carried out by the TMAG as part of its regular work.

No.	Topic	Proposal	Remarks
Target Water and Sediment:			
1	Background values	Development of specific background values for the Wadden Sea.	Based on OSPAR background values.
2	Hazardous substances	Evaluation of status and fate of potentially dangerous substances.	In close cooperation with OSPAR.
3	Nutrients	Investigate the possibility to increase monitoring frequency (in February/March) and coverage of entire salinity and/or geographical gradient.	Long term task; financial implications to be investigated; tuning with OSPAR and EU Water Directive necessary.
4	Production and decomposition.	Initiation of a trilateral project to define a monitoring concept.	Concerns also nutrient fluxes.
5	Zooplankton	Investigate the current status of zooplankton monitoring at trilateral level.	Zooplankton is already sampled regularly at selected sites but data cannot be compared directly.
Target Tidal Area			
6a	Demersal fish communities	Inclusion of the Demersal Young Fish Survey into the TMAP.	High priority. Inclusion of DYFS may require modifications of running programs.
6b	Pelagic fish communities	Inquiry for monitoring of pelagic fish should be made.	Required by Habitat Directive (fish species, priority species housing)
7	Blue mussel	Inclusion of blue mussel species parameter into the TMAP.	Existing program are sufficient and reveal comparable results; minor modifications may be necessary. Initiatives should be taken to improve subtidal monitoring.
8	Sabellaria	Pilot study for monitoring Sabellaria.	No recent information about the status of Sabellaria available.
9	Zostera	Initiate project about causes of failure of return to prepare proposal to improve the situation..	
10	Oyster	Investigate the present situation.	The development of the introduced Oyster should be followed.
11	Subtidal habitats	Investigate the current status of subtidal monitoring.	Lack of information regarding subtidal mussel beds, effects of Spisula fishery.
Target Offshore zone			
12	Offshore Zone	Inventory of information needs for a proper management. Development of an offshore monitoring proposal.	Significance of the offshore zone (primary production, benthos, fish, birds, mammals).
Target Birds			
13	Breeding birds	Inclusion of monitoring of breeding success in selected areas in the TMAP.	Continuation of the trilateral pilot project on breeding success.
14	Birds	Investigate the possibility of a research projects on food availability for selected species and the situation on roosting sites. Investigation of flight distances.	Continuation of monitoring of moulting sites and abundance of seaducks in the TMAP.
Target Marine Mammals			
15	Marine mammals	Implementation of a two-year pilot survey of grey seals. Preparation of a pilot study for harbour porpoise monitoring.	Required by Habitat Directive (grey seal, harbour porpoise). Regular monitoring after finalization of pilot studies.
Targets on species and habitats (Influences of recreational activities)			
16	Socio-economic data	Initiate project to develop of a tourism monitoring in the Wadden Sea Region.	Project proposal under preparation as follow up of the IRWC Tourism Project.

1. Common Package and EU Directives

1.1. Habitat Directive

The "Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora" (Habitat Directive) complements the 1979 Bird Directive. The Habitat Directive is a major contribution by the European Union to the Biodiversity Convention agreed by more than 150 countries at the 1992 Rio Earth Summit.

The Habitat Directive is an important instrument for policy and management of the European Commission (EC). It has the aim to ensure that biodiversity is maintained through conservation of important, rare or threatened habitats and the habitats of certain species. The Directive also aims to make a contribution to sustainable development of the sites.

Regular surveillance of the conservation status of the natural habitats and species covered by the Directive has to be undertaken by the member states (Art. 11). The main results of this monitoring has to be reported to the EC every six years (Art. 17).

The TMAP also contributes the requirements of the Habitat Directive regarding the surveillance of the conservation status of the natural habitats and species. In the following sections, it is summarized how the TMAP contributes to the Directive.

In the Habitat Directive, surveillance of the conservation status of habitats and species is requested in particular with regard to priority natural habitat types and priority species (Article 11 of the Habitat Directive, Annex I and II of the Habitat Directive, Annex I of the Bird Directive).

The Common Package covers monitoring of locations and areas of habitats related to beaches, dunes, salt marshes and tidal flats. Furthermore, for a number of habitats, human activities which may have an influence on the conservation status of the habitats (e.g. recreational activities, coastal protection measures, fisheries) are regularly monitored in the TMAP (see Table 1).

By implementation of the Common Package in all three countries, the TMAP can now provide

consistent information for the whole Wadden Sea concerning most of the habitats listed in Annex I of the Habitat Directive. Only limited information is available about reefs concerning subtidal blue mussel beds and Sabellaria reefs. Monitoring of beaches and dunes in the TMAP is carried out according to the habitat classification of the Directive. Concerning sandbanks, mudflats and bays, only limited information may be obtained from the Common Package (parameters: size of tidal area, sediment type).

Regarding the monitoring of Annex II species, the TMAP provides sufficient information only for the Harbour seal (*Phoca vitulina*) because other marine mammals (Grey Seal, Harbour porpoise) have not yet been included in the TMAP (see Table 2).

No information is available from the TMAP Common Package concerning the development of fish communities especially the status of priority species such as houting (*Coregonus oxyrhynchus*). This gap has to be considered during the further development of the TMAP.

Other Annex-II species are abundant only in a few regions of the Wadden Sea. Therefore, they have not been included in the TMAP (e.g. *Microtus*, *Liparis*). Information has to be gathered by surveillance on the national level.

Monitoring of birds in the TMAP is carried out by the Joint Monitoring Groups of Breeding and Migratory Birds according to the requirement of the Bird Directive. The Annex I species of the Bird Directive are covered by the ongoing monitoring.

Reporting

Every six years, a report of the conservation measures and their impact on the conservation status of habitats and species together with the main results of the surveillance is required (Article 17 of the Habitat Directive).

In the TMAP, monitoring results are regularly assessed and published. For selected monitoring themes, such as monitoring of breeding and migratory birds, trilateral reports have been published almost yearly since 1994.

The last comprehensive assessment of the status of the Wadden Sea ecosystem was published in 1999 (QSR 1999).

By implementing a data management system for the TMAP, the monitoring data together with the necessary meta information will be available also for the Habitat Directive more rapidly than in the past.

Research

Research and scientific work should be initiated in order to fulfill the requirements of the Directive regarding the following topics (Article 18 of the Habitat Directive):

- Biodiversity (Article 2)
- Management measures (Article 2)
- Consideration of economic, social and cultural requirements, and regional and local characteristics (Article 2)
- Monitoring methods and strategies (Article 11)
- Criteria for selecting sites (Article 4)
- Land-use planning (Article 4).

Relevant research project carried out on the national level should also be related to the TMAP in order to join the effort on the trilateral level and to make the results available for improvement and further development of the monitoring program.

Table 1: Relevant Habitats to be considered under the EC Habitat Directive (Annex I) and the related TMAP parameter groups of the Common Package.

Natura 2000 Code	Annex I Habitats relevant for the Wadden Sea	Occurrence	Related TMAP parameter groups (common package)
1110	Sandbanks which are slightly covered by sea water all the time (11.123, 11.22, 11.31)	x	Geomorphology
1130	Estuaries (13.2, 11.2)	x	Geomorphology, salt marshes, coastal protection measures, land use
1140	Mudflats and sandflats not covered by sea at low tide # (14)	x	Geomorphology, coastal protection measures, recreational activities, blue mussel beds
1160	Large shallow inlets and bays (12)	x	Geomorphology, coastal protection measures
1170	Reefs (11.24, 11.25) (inter- and subtidal mussel beds, Sabellaria reefs)	x	Blue mussel beds
1210	Annual vegetation of drift lines # (17.2)	x	Beaches and dunes
1310	<i>Salicornia</i> and other annuals colonizing mud and sand (15.1)	x	Salt marshes, geomorphology, coastal protection measures
1320	<i>Spartina</i> swards (<i>Spartinion</i>) (15.2)	x	
13.30	Atlantic salt meadows (<i>Glaucop.</i>) (15.3)	x	
2110	Embryonic shifting dunes # (16.211)	x	Beaches and dunes, coastal protection measures
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) # (16.212)	x	
2130*	Fixed dunes with herbaceous vegetation (grey dunes) # (16.221 to 16.227)	x	
2140*	Decalcified fixed dunes with <i>Empetrum nigrum</i> # (16.23)	x	
2160	Dunes with <i>Hyppophae r.</i> # (16.251)	not SH	
2170	Dunes with <i>Salix repens</i> # (16.26)	x	
2190	Humid dune slacks (16.31 to 16.35)	x	
4010	Northern Atlantic wet heaths with <i>Erica tetralix</i> # (31.11)	not Nds	
4030*	Dry heaths (all subtypes) # (31.2)	x	

Note: * = priority natural habitat types according to Article 1 of the Habitat Directive; X = existent in all Wadden Sea regions; not NL, SH, Nds, NL = non-existent in the mentioned region; # = habitats, also existent on islands, (no.) = Palaearctic code (replaced the Corine Code in 1995)

Source: EC-HD Report, CWSS, December 1993. Interpretation Manual of European Union Habitats. EUR 15/2 October 1999. EC/DG Environment

Table 2: Main species to be considered under the EC Habitat Directive (Annex II) and the related TMAP parameters.

Animals	Occurrence	Related TMAP Parameter groups (Common Package)
Rodentia		
* <i>Microtus oeconomus arenicola</i>	Only NL	none
Phocidae:		
<i>Halichoerus grypus</i> (V) (Grey Seal)	X	none
<i>Phoca vitulina</i> (V) (Common Seal)	X	Seal population
Cetacea		
<i>Phocoena phocoena</i> (Harbour porpoise)	X	none
Fish		none (fish communities are not part of the common package)
Petromyzoniformes #:		
<i>Lampetra fluviatilis</i> (V)	Only SH	
<i>Petromyzon marinus</i> (o)	Only FRG	
Salmoniformes:		
* <i>Coregonus oxyrhynchus</i>	X (NL?)	
Clupeiformes: #		
<i>Alosa spp.</i> (V)	? (Not DK)	
Plants		
Orchidaceae:		
<i>Liparis loeselii</i>	X	none

Note: * = priority species according to Article 1 of the Habitat Directive, X = existent in all Wadden Sea regions;

not NL, SH, Nds, NL = non-existent in the mentioned region, # = lack of information. Source: EC-HD Report, CWSS, December 1993

1.2 Water Framework Directive

The EU Water Framework Directive (WFD) was enacted in December 2000. The Directive establishes a framework for the protection of all bodies of surface water (rivers, lakes, transitional and coastal) and groundwater on EU level. The overall purpose of this Directive is "to establish a framework for the protection of inland surface water, transitional water, coastal waters and groundwater which prevents further deterioration and protects and enhances the status of aquatic ecosystems and, with regard to their water needs, terrestrial ecosystems directly depending on the aquatic ecosystems..." (Article 1, a)

The environmental objectives of the Directive are "preventing deterioration of ecological status and pollution of surface waters and restoring surface waters, with the aim of achieving good surface water status [...] in all bodies of surface waters." (Article 4.1, a)

The Directive gives a description of what needs to be done in the field of description of different types of surface waters, including transitional and coastal waters and provides normative definitions of ecological status classifications (high, good and moderate) by applying biological, hydro-morphological and physico-

chemical criteria. Furthermore, the Directive describe the monitoring of ecological and chemical status and classification and presentation of ecological status.

The objectives of the WFD are to be implemented through a water catchment area approach. Management plans for river basins have to be implemented to reach the aims of the Directive. River basins are the area of land from which all surface water run-off flows into the sea. The limitation of a river basin at the seaside is formed by the coastal water, which by definition is limited to one nautical mile on the seaward side of the baseline (extending where appropriate up to the outer limit of transitional waters). Transitional waters are defined as surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows.

In the Wadden Sea, the area between the islands, the islands itself and the coastal waters up to 1 nautical mile seaward of the baseline (or more in case of transitional waters) have to be assigned to river basins.

As part of a River Basin Management Plan, a monitoring network has to be established to provide a coherent and comprehensive overview of ecological and chemical status within each

river basin. Different types of monitoring programs have to be established for each period for which a River Management Plan applies:

1. Surveillance monitoring

- establishing type specific reference conditions,
- to provide information for an assessment of long term changes of natural conditions or resulting from anthropogenic activity,
- to provide an assessment of the overall water status within a River Basins,
- for each monitoring site for a period of one year during the period covered by a management plan unless previous monitoring showed that the water body concerned reach good status,

2. Operational monitoring

- to establish the status of those water bodies identified as being at risk of failing to meet their environmental objectives,

to assess any changes in the status of these bodies resulting from measures.

3. Investigative monitoring

- shall be carried out where reasons for any exceedances is unknown,
- where surveillance monitoring indicates that the objective for a water body are not likely to be achieved and operational monitoring has not already been established,
- to ascertain the magnitude and impacts of accidental pollution.

The possible implications of the Water Framework Directive could not yet be examined in detail for the TMAP, especially from the perspective of integrating nature conservation and water quality and quantity aspects. It seems that most of the relevant water quality parameters (e.g. nutrients, phytoplankton, benthos) are already monitored in the Common Package (Table 3).

Table 3: Quality elements for the classification of ecological status (Water Framework Directive, Annex 5)

Quality Element	Transitional	Coastal	TMAP Common Package
<i>Biological</i>			
Phyto-Plankton	Composition, abundance, biomass	Composition, abundance, biomass	+
Other aquatic flora	Composition, abundance	Composition, abundance	+
Macroinvertebrates	Composition, abundance	Composition, abundance	+
Fish	Composition, abundance	-	-
<i>Hydro-morphological</i>			
Morphology	Depth variation Quantity, structure and substrate of the bed, Structure of the intertidal zone	Depth variation Quantity, structure and substrate of the bed, Structure of the intertidal zone	+ (partly)
Tidal regime	Freshwater flow, wave exposure	Direction of dominant currents, wave exposure	+ (partly)
<i>Physico-Chemical</i>			
Transparency	+	+	+
Thermal Conditions	+	+	+
Oxygenation	+	+	+
Salinity	+	+	+
Nutrient condition	+	+	+
Other Pollutants	Other substances identified as being discharged in significant quantities into the water body ^{*1}	Other substances identified as being discharged in significant quantities into the water body ^{*1}	- (partly, in sediment: organohalogen compounds, heavy metals, TBT)
Priority Substances	All priority substances identified as being discharged into the water body ^{*2}	All priority substances identified as being discharged into the water body ^{*2}	-

^{*1}: WFD Annex VIII: Indicative list of the main pollutants: 1. Organohalogen compounds and substances which may form such compounds in the aquatic environment, 2. Organophosphorus compounds. 3. Organotin compounds. 4. Substances and preparations, or the breakdown products of such, which have been proved to possess carcinogenic or mutagenic properties or properties which may affect steroidogenic, thyroid, reproduction or other endocrine-related functions in or via the aquatic environment. 5. Persistent hydrocarbons and persistent and bioaccumulable organic toxic substances. 6. Cyanides. 7. Metals and their compounds. 8. Arsenic and its compounds. 9. Biocides and plant protection products. 10. Materials in suspension. 11. Substances which contribute to eutrophication (in particular, nitrates and phosphates). 12. Substances which have an unfavourable influence on the oxygen balance (and can be measured using parameters such as BOD, COD, etc.). ^{*2} WFD Annex X: To be developed based on the OSPAR Priority List.

2. Other International Conventions

The Wadden Sea states are contracting parties to a number of international agreements, conventions and treaties, in particular, the Ramsar, Bonn and Bern Convention, the EC-Bird resp. Habitat Directive, the OSPAR Convention and the African-Eurasian Waterbird Agreement. With regard to bird monitoring, they have committed themselves to monitor birds which specifically include surveillance / monitoring activities and the Memorandum of Intent between the Wadden Sea and the Wash resp. Guinea-Bissau are also important for breeding and migratory birds.

The recently adopted OSPAR monitoring program JAMP and the Annex V of the Convention on "The Protection and Conservation of the Ecosystem and Biological Diversity of the Maritime Area" have also to be taken into consideration.

The Seal Agreement was enacted on October 1, 1991 as the first agreement, as defined in Article 4, of the Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention). The Seal Agreement was concluded between the countries adjacent to the Wadden Sea - Denmark, Germany and The Netherlands - with the aim to cooperate closely in achieving and maintaining a favorable conservation status for the common seal population of the Wadden Sea.

This agreement provides for the development of a conservation and management plan, coordination of research and monitoring, prohibition of taking (with few exceptions), habitat protection, reduction of pollution and public awareness initiatives. The conservation and management plan outlines in simple terms the specific efforts that are needed to implement various aspects of the agreement, indicates what is presently being done, and outlines specific prescriptions to be undertaken by the Parties.

Pursuant to Art. 4 of the Seal Agreement, the first "Seal Management Plan for the Wadden Sea Seal Population 1991-95" was adopted at the 6th Trilateral Governmental Conference on the Protection of the Wadden Sea in November

1991 (Esbjerg Declaration). The Seal Agreement contains provisions, amongst others, on research and monitoring, taking, and protection of habitats, which have been implemented in the Seal Management Plan (SMP).

The first SMP expired at the end of 1995. Following the decision of the Leeuwarden Conference in 1994 (LD § 62), a revision of the SMP was to be elaborated in 1995. The "Conservation and Management Plan for the Wadden Sea Seal Population 1996 - 2000" was adopted by the Senior Officials in March 1996. Currently, a new seal management plan is under preparation. The Seal Management Plan also entails additional measures for the management of Grey Seals.

3. Conclusion

The TMAP common package entails most of the Wadden Sea habitats and can deliver sufficient information for most habitats listed in the Habitat Directive. Several gaps in the TMAP occur with regard to the main species to be considered under the Directive. Insufficient information is available concerning fish species and marine mammals.

It is proposed to include monitoring of demersal and pelagic fish communities and marine mammals (grey seal, harbour porpoise) into the TMAP with priority to meet the requirements of the Habitat Directive.

The possible implications of the Water Framework Directive for the TMAP have to be examined in detail especially from the perspective of integrating nature conservation and water quality and quantity aspects. A detailed evaluation of the TMAP Common Package regarding the requirement of the EU Water Framework Directive should be carried out after the implications of the Directive on the national level have been worked out.

ANNEX 5

TMAP Groups and Terms of Reference

1. Trilateral Monitoring and Assessment Group (TMAG)

Description: Permanent working group under TWG, established in 1994.
 Tasks: The TMAG is responsible for the Trilateral Monitoring and Assessment Program (see Terms of Reference TMAG).
 Composition: Representatives of the authorities in charge of monitoring and assessment.
 Secretary: Mr. Harald Marencic.

Members:

Mr. Karsten Laursen, Chairman
 Danmarks Miljøundersøgelser / NERI
 Grenåvej 12
 DK 8410 Rønde
 Tel. +45 89 20 14 00
 Fax +45 89 20 15 14
 kl@dmu.dk

Mr. Wim Wiersinga
 Expertisecentrum. LNV
 Postbus 30
 NL 6700 Wageningen
 Tel. +31 (0)3174 74943
 Fax +31 (0)3174 27561
 w.a.wiersinga@eclnv.agro.nl

Mr. Tom Knudsen
 Sønderjyllands Amt
 Jonfrustien 2
 DK 6270 Tønder
 Tel. +45 74 33 50 32
 Fax +45 74 33 50 01
 tom_knudsen@sja.dk

Mr. Jan Kroos
 RIKZ
 Postbus 20907
 NL 2500 EX Den Haag
 Tel. +31 (0)70 311 4512
 Fax +31 (0)70 311 4500
 j.kroos@rikz.rws.minvenw.nl

Mr. Ole Manscher
 Danmarks Miljøundersøgelser / NERI
 Frederiksborgvej 399, P.O. Box 358
 DK 4000 Roskilde
 Tel. +45 46 30 12 00
 Fax +45 46 30 12 11
 ohm@dmu.dk

Mr. Adolf Kellermann
 Landesamt für den Nationalpark
 Schleswig-Holsteinisches Wattenmeer
 Schloßgarten 1
 D 25829 Tönning
 Tel. +49(0)4861 616 44
 Fax +49(0)4861 459
 Adolf.Kellermann@nationalparkamt.de

Mr. Karel Essink
 RIKZ
 Postbus 207
 NL 9750 Haren
 Tel. +31 (0)50 533 1373
 Fax +31 (0)50 534 0772
 K.Essink@rikz.rws.minvenw.nl

Mr. Hubert Farke
 Nationalparkverwaltung
 Niedersächsisches Wattenmeer
 Virchowstr. 1
 D 26382 Wilhelmshaven
 Tel. +49(0)4421 911 281
 Fax +49(0)4421 911 280
 hubert.farke@br-we-whv.niedersachsen.de

TMAG Terms of Reference

(Annex 4 of TWG 98/1/Min, Tønder, 27 - 28 May 1998, amended by TWG 98/2)

On the basis of the Stade Declaration, the Tri-lateral Monitoring and Assessment Group (TMAG) will prepare and co-ordinate the execution of the trilateral monitoring program and establish assessments of the status of the Wadden Sea Ecosystem.

The TMAG has the task:

A. Monitoring

1. to supervise and coordinate the implementation of the TMAP Common Package as defined in Annex 2 of the Stade Declaration;
2. to further develop and refine the trilateral monitoring guidelines, taking into account the already existing procedures and guidelines and developments in other relevant international fora;
3. to further develop, implement and maintain the trilateral data management system on the basis of the existing DemoWad Unit in close coordination with the parameter groups which have been defined under 1 (database structures, interfaces, exchange formats, data reporting guidelines);
4. to organize and coordinate the collection of relevant monitoring data for the TMAP at the national level in order to provide the data via the DemoWad Unit and to carry out trilateral assessments;
5. to prepare progress reports on the implementation of the TMAP Common Package to the SO meetings to enable an evaluation of the program in accordance with § 22 Stade Declaration;
6. to propose research projects concomitant to the TMAP including to improve the exchange of information between the countries on TMAP-relevant national projects.

B. Assessment

7. to establish an assessment of the status of the Wadden Sea to the Trilateral Governmental Conference that should, inter alia,
 - describe and evaluate the current status of the Wadden Sea, including

- the identified changes in this status and the possible causes thereof;
 - evaluate the status reached in the implementation of the ecological targets;
 - identify issues of concern and indicate possible activities to address these concerns;
 - identify gaps in knowledge;
 - define the shortcomings of the TMAP common package with regard to assessing the Wadden Sea ecosystem,
8. to prepare ad-hoc assessment reports upon request of the TWG.

C. Organization

9. The TMAG shall work under the responsibility of the TWG.
10. The TMAG will work on an annual work program to be endorsed by the TWG.
11. The TMAG can install special ad-hoc expert groups after prior consent of the TWG to carry out specific tasks and organize workshops to discuss matters on common interest as entailed in the annual work program.
12. The TMAG delegation of each of the countries will consist of a maximum of three persons in charge of the coordination of the program and the data handling on the national level.
13. The TMAG will meet at regular intervals and at least twice per year.
14. Denmark will nominate the chairperson for the period until 2001. The chair will attend the TWG meetings and report on the progress of the work within the TMAG.

2. Trilateral Data Handling Group (TDG)

Description: Working group under the TMAG, established in 1994.

Tasks: The TDG is responsible for the data management of the Trilateral Monitoring and Assessment Program (see Terms of Reference).

Composition: Representatives of the authorities in charge of data management in the TMAP.

Secretary: Mr. Gerold Lüerßen.

Members:

Mr. Ole Manscher (Chairman)
Danmarks Miljøundersøgelser / NERI
Frederiksborgvej 399, P.O. Box 358
DK 4000 Roskilde
Tel. +45 46 30 12 00
Fax +45 46 30 12 11
ohm@dmu.dk

Mr. Jan Kroos
RIKZ
Postbus 20907
NL 2500 EX Den Haag
Tel. +31 (0)70 311 4512
Fax +31 (0)70 311 4500
j.kroos@rikz.rws.minvenw.nl

Germany:
to be nominated

TDG Terms of Reference

The TDG is an ad-hoc expert group installed under the responsibility of the Trilateral Monitoring and Assessment Group (TMAG) and consists of members from all participating TMAP data centers.

To make the TMAP data available on the trilateral level, the DEMOWAD project developed and implemented a prototype of a trilateral data management system. The TDG has to continue the implementation and the expansion of the system to all parameters of the TMAP Common Package.

Therefore the tasks of the TDG are:

Co-ordination

to co-ordinate the implementation and the further development of the trilateral data management of the TMAP Common Package (Stade Declaration, §21).

to serve the trilateral data management interests at the national TMAP data sites as defined in the TMAG report "Implementation of the Trilateral Monitoring and Assessment Program" (Final Report, December 1997) and in the working document "TMAP Manual";

to integrate results of national data handling projects concerning the TMAP data management in the existing trilateral data handling (DEMOWAD Unit);

to propose technical solutions and to give support in administrative problems on the trilateral level;

Quality assurance

to implement and safeguard the identical functionality of the DEMOWAD Units at each TMAP database site;

to implement and to safeguard identically structured TMAP databases at each participating TMAP database site;

to develop data exchange formats for the parameter groups of the Common Package;

to supervise the use of trilaterally implemented and agreed standards for the TMAP data exchange and management;

Development of guidelines for the TMAP

to develop and provide guidelines for data management and data delivery on the trilateral level;

to provide a data security scheme for the TMAP data;

to provide a maintenance plan for the DEMOWAD Units, which safeguards the continuous operation of the system and includes the necessary updating procedures;

Evaluation

to prepare a regular trilateral data handling report, which entails information on the status, progress, gaps, requirements and needed efforts of the trilateral data management.

3. Joint Monitoring Group of Breeding Birds (JMBB)

Description: Working group under the TMAG; established in 1989.

Tasks: The JMBB is responsible for the coordination, implementation, assessment and documentation of the monitoring program of breeding birds. Furthermore the group is responsible for the harmonization of the program, the guidelines, the quality assurance and the methods as well as the coordination and implementation of testing phases/pilot projects for TMAP-parameters.

Composition: Representatives of the monitoring/management authorities in charge of bird monitoring and coordinators of the national monitoring programs.

Secretary: Ms Bettina Reineking.

Members:

Mr. Ben Koks
SOVON
Hylkemaheerd 22
NL 9736 JB Groningen
Tel: +31 (0) 50 - 5035166
Fax: +31(0) 50 - 5035117
bkoks.sovon@inter.NL.net

Ms. Petra Potel
Nationalparkverwaltung Nds. Wattenmeer
Virchowstr. 1
D - 26382 Wilhelmshaven
phone office: +49 (0)4421 911-283
fax: +49 (0)4421 911-280
petra.potel@br-we-whv.niedersachsen.de

Mr. Lieuwe Dijkzen (SOVON)
G. Doustraat 23
NL - 1816 CP Alkmaar
lieuwe@multiweb.nl

Mr. Lars Maltha Rasmussen
Danmarks Miljøundersøgelser
Møllegade 12
DK - 6280 Højer
phone office: +45 74 78 90 33
fax: +45 75 44 66 04 (phone first!)
lmr@dmu.dk

Mr. Peter Südbeck
Nds. Landesamt f. Ökologie (NLÖ)
Staatl. Vogelschutzwarte
Göttingerstr. 14
D - 30449 Hannover
phone office: +49(0)511 4446 203
fax: +49(0)511 4446 214
peter.suedbeck@hg.nloe.niedersachsen.de

Mr. Bernd Hälterlein
Landesamt für den Nationalpark Schleswig-
Holsteinisches Wattenmeer
Schloßgarten 1
D - 25832 Tönning
phone office: +49 (0)4861 61661
fax: +49 (0)4861 459
haelterlein@nationalparkamt.de

4. Joint Monitoring Group of Migratory Birds (JMMB)

Description: Working group under the TMAG; established in 1992.

Tasks: The JMMB is responsible for the coordination, implementation, assessment and documentation of the monitoring program of migratory birds. Furthermore the group is responsible for the harmonization of the program, the guidelines and the methods.

Composition: Representatives of the monitoring/management authorities in charge of bird monitoring and coordinators of the national monitoring programs.

Secretary: Ms Bettina Reineking

Members:

Mr. Lars Maltha Rasmussen
Danmarks Miljøundersøgelser
Møllegade 12
DK 6280 Højer
Tel: +45 74 78 90 33
Fax: +45 75 44 66 04
lmr@dmu.dk

Ms. Petra Potel
Nationalparkverwaltung Nds. Wattenmeer
Virchowstr. 1
D - 26382 Wilhelmshaven
Tel: +49 (0)4421 911-283
Fax: +49 (0)4421 911-280
petra.potel@br-we-whv.niedersachsen.de

Mr. Kai Eskildsen
Landesamt für den Nationalpark
Schleswig-Holsteinisches Wattenmeer
Schloßgarten 1
D 25832 Tönning
Tel: +49 (0)48 61 616-60
Fax: +49 (0)48 61 4 59
eskildsen@nationalparkamt.de

Mr. Marc v. Roomen
SOVON
Rijksstraatweg 178
NL 6573 DG Beek-Ubbergen
Tel: +31 (0)24 68 48 111-43 (direct)
Fax: +31(0)24 68 48 188
sovon@inter.NL.net

Mr. Hans-Ulrich Rösner
WWF Wattenmeerstelle Schleswig-Holstein
Norderstr. 3
D 25813 Husum
Tel: +49 (0)48 41 6 20 73
Fax: +49(0)48 41 4 73 6
e-mail: roesner@wwf.de

Mr. Ben Koks
SOVON
Hylkemaheerd 22
NL 9736 JB Groningen
Tel: +31 (0) 50 - 5035166
Fax: +31(0) 50 - 5035117
bkoks.sovon@inter.NL.net

Mr. Peter Südbek
Nds. Landesamt f. Ökologie (NLÖ)
Fachbehörde Naturschutz, Staatl. Vogelschutz-
warte
Göttingerstr. 14
D - 30449 Hannover
Tel: +49(0)511 4446 203
Fax: +49(0)511 4446 214
peter.suedbeck@hg.nloe.niedersachsen.de