

**TRILATERAL MONITORING AND  
ASSESSMENT PROGRAMME**

**STRATEGY**

# TMAP STRATEGY

## 1. INTRODUCTION

The Trilateral Monitoring and Assessment Programme (TMAP) is one of the cornerstones of the Trilateral Cooperation on the Protection of the Wadden Sea. The TMAP covers the entire Wadden Sea cooperation Area and spans a broad range from physiological processes over population developments to changes in landscape and morphology. The TMAP common package was implemented based on a decision at the Ministerial Conference in Stade 1997 and further developed to fulfil the needs of various national and international reporting obligations, in particular those from the EU Habitats, Birds and Water Framework Directives. A comprehensive overview of the development of the TMAP is in **Annex 1**.

At the 11<sup>th</sup> Trilateral Governmental Conference (Sylt, 2010) the ministers shared the view to

- § 8 Acknowledge the broad spectrum of harmonisation already achieved within the trilateral cooperation and its value added, in particular with regard to monitoring and assessment at an integrated ecosystem level.
- § 42: Reconfirm the central importance of the Trilateral Monitoring and Assessment Programme (TMAP), which was further revised to fit the requirements of relevant EC Directives as stipulated in the Schiermonnikoog Declaration, as the indispensable basis for the joint status assessment and the successful management of the Wadden Sea as a single ecological entity.
- § 43: Reconfirm the continuation of TMAP and incorporate, as necessary, parameters to develop TMAP in order to facilitate an integrated assessment across the relevant EC Directives and better monitor new challenges, e.g. climate change and its impacts, and agree on a long term development strategy to increase its value to a wider range of stakeholders.

In this document a long-term strategy for the TMAP is outlined.

In Chapter 2, the value added of the TMAP is presented, leading to a long-term vision for the programme.

On the basis of the long-term vision, objectives are formulated, including medium and short-term activities, to reach the objectives (Chapter 3).

Chapter 4 outlines the implementation of the activities in terms of responsibilities and time-frame.

## 2. TMAP VISION

An external evaluation of the Trilateral Wadden Sea Cooperation was made in 2007, followed by a High Level Review of EC Directives for Collaboration and Harmonisation (HLR) in early 2009. It was concluded, that

“The Trilateral Monitoring and Assessment Programme (TMAP), including the advanced handling and management of comprehensive data on a harmonized basis, and the Quality Status Report process - with its suite of targets and baselines - is a world-class monitoring system, against which the Wadden Sea Plan can be assessed and managed.”

It was furthermore recommended

“that every effort should be made to continue to harmonise around the parameters and methodologies used in TMAP, and in particular to maximise its value in relation to reporting under the Birds, Habitats and Water Framework Directives (including to the best possible extent the need of the Marine Strategy Framework Directive).”

On the basis of the recommendations of the HLR, several decisions of the Sylt declaration were formulated (see introduction). In the World Heritage Statement of Outstanding Universal Value (WHC-09/33.COM/20, 2009) it is stated:

“Specific expectations for the long-term conservation and management of this property include maintaining and enhancing the level of financial and human resources required for the effective management of the property. Research, monitoring and assessment of the protected areas that make up the property also require adequate resources to be provided.”

In summary the TMAP provides significant value added for the Trilateral Wadden Sea Cooperation (TWSC) as it:

1. Provides an important and scientifically sound evidence base for decision making and policy development at all levels
2. Provides essential contextual information to support the management of the Wadden Sea as a single ecological entity
3. Supports reporting against Directives and the World Heritage status
4. Enables integrated assessment to be undertaken which is an essential prerequisite for the application of the ecosystem approach
5. Provides information about progress towards trilateral targets and facilitates the discussion about the priorities for the period ahead.

This leads to the following vision for the TMAP

**A harmonised and effective monitoring and assessment programme, based on sound scientific evidence, that serves the needs of policy making at all levels, the commitments ensuing from relevant Directives and conventions, as well as the World Heritage status and that supports the management of the Wadden Sea as an ecological entity**

### 3. OBJECTIVES AND ACTIVITIES

The following objectives are based upon the outcome of the 2010 Sylt Conference and address the future challenges for monitoring and assessment of the Wadden Sea ecosystem.

- 1. Facilitate adequate, cost-effective monitoring and integrated scientifically based assessment of the Wadden Sea ecosystem taking into account Member States' monitoring and reporting requirements under the relevant EC Directives and international conventions**
- 2. Better monitor new challenges, i.e. pressures on the Wadden Sea ecosystem e.g. climate change and their impacts**
- 3. Increase the value of the TMAP to users and to a wider range of stakeholders including the handling of data and presentation of information resulting from those data**

- 1. Facilitate adequate, cost-effective monitoring and integrated scientifically based assessment of the Wadden Sea ecosystem taking into account Member States' monitoring and reporting requirements under the relevant EC Directives and international conventions**

The integrated assessment across the HD, the BD, the WFD, the MSFD and the WH consists of two main elements.

The first element is integrated reporting, aiming at optimising the trilateral reporting requirements, in particular the Quality Status Reports (QSR) at regular intervals, with those under the various EU Directives and the World Heritage. An important aspect of integrated reporting is the tuning of the timing of the various reporting events. Integrated reporting furthermore adds integrated ecosystem information to national reports under the EU Directives, thereby putting the latter type of information in a broader perspective.

The second element is the integration of assessment through the harmonisation of monitoring and assessment methodologies. Several steps into this direction have already been made, through, amongst others, the monitoring of contaminants in bird eggs monitoring and the harmonisation of salt marsh and mussel bed monitoring methodologies.

In the coming years efforts to harmonise monitoring and assessment methodologies will be continued and possibilities for integrated ecosystem assessment and reporting further explored and tested.

- 2. Better monitor new challenges, i.e. pressures on the Wadden Sea ecosystem e.g. climate change and their impacts**

In the coming years new requirements to the TMAP will emerge, related to (new) trilateral policies with regard to, *inter alia*

- Impacts of climate change (see climate adaptation strategy)

- Invasive Alien Species (see trilateral IAS Strategy, upcoming EU Directive on Alien Species)
- HD (Habitat types with unknown status, especially sublittoral), MSFD (Wadden Sea relevant descriptors), WHS
- Sustainable human use.
- Shipping (see shipping vision)

Proposal for new or amended parameters and methodologies will be delivered by the TMAP expert network groups and the Task Groups. Also input from relevant research and monitoring projects is expected. TG-M will coordinate the overall evaluation of proposed amendments to the TMAP with the support of the TMAG, which will deliver the technical background for the evaluation.

Generally, the following procedure will be applied when adapting the TMAP:

1. Investigate to what extent relevant information regarding the future challenges can be collected through the existing TMAP parameters;
2. Investigate the integration of additional measuring needs in existing and optimised measuring methodologies and practices (for example combining the screening for alien species with running mussel bed monitoring)
3. Investigate the application of intelligent methodologies for data evaluation, such as modelling and the application of tidal basins comparisons.
4. Investigate the necessity and feasibility of introducing new parameters, including organisational and financial arrangements. This must include investigating the application of technologies such as remote sensing.

This will be done in close cooperation with the scientific community amongst others by organising international Wadden Sea symposia at regular intervals. Working cooperation already exist with relevant projects, i.e. the Dutch WaLTER project and the German WIMO project (see Chapter 4, time schedule).

### **3. Increase the value of the TMAP to users and to a wider range of stakeholders including the handling of data and presentation of information resulting from those data**

The TMAP data units used so far were designed to delivering harmonized raw TMAP data for scientists and the QSR. In order to increase the value of the TMAP for a wider audience a modern and central information system, based on considerations made by the Trilateral Data Handling Group, a study from 2010, as well as recommendations by ORBIS from 2004, will replace the user interface of the TMAP data units. The data-handling aspect will be reviewed also in order to cooperate and look for the best synergy to contribute to international reporting as well as publication obligations, f. e. from the Directive 2007/2/EC establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) or the Directive 2003/4/EC on public access to environmental information. Data of the four TMAP databases in the countries will be collected in a centralized data warehouse, where state-of-the-art software allows selection, processing and presentation of TMAP data. The chosen approach of an information system has the following advantages:

- Access to trilaterally harmonized data in one place. Previously, users had to collect complete Wadden Sea data sets by retrieving data from each single data unit. This data had to be assembled and scientifically harmonized according to differently used monitoring methods in the countries.
- State-of-the-art representation of TMAP data for public, stakeholders, managers and scientists. The TMAP data units allowed download of raw monitoring data in various files. Instead of skill needed efforts to prepare data for further processing, the information system allows direct presentation of data with standardized implicit data processing.
- Usage of GIS data for producing maps and spatial analysis of TMAP data. The GIS functionality allows the selection and presentation of TMAP data by maps. Habitat data can directly visualized and used for other TMAP parameter.
- Standardized pre-processing of TMAP data for assessment and reporting. Fixed processing procedures allow the always same treatment of monitoring data. Standardized reporting formats can be filled in with new data or updated data.
- Assemblage of different TMAP parameter on data level, such as breeding bird counts and saltmarsh vegetation data. The direct comparison of different TMAP parameter data on spatial or temporal level will support the ecosystem approach of the Quality Status report.
- Inclusion of EU Directive aspects on different levels. Data can be selected on the basis of EU Directive requirements and assessed accordingly.
- Trend and indicator calculation of several TMAP parameters. Data for indicators and trends can directly be loaded into the data warehouse or, depending on their complexity or aggregation status, calculated by the information system.
- Use of the national TMAP databases. The further maintained national TMAP databases (relational database management systems) will remain in the countries to safeguard data delivery on administrative catchment areas.
- Presentation of relevant but non-TMAP data and close connection to World Heritage website by delivering web services. Additional contextual information can be placed and linked to the information system, such as monitoring methods, unforeseen events, species presentation and news.

The information system will allow users to work with the data in different ways. Scientists will have more selection, processing and presentation possibilities than the public. A more simplified and understandable TMAP data presentations will attract public, students and persons, who are not that familiar with the Wadden Sea.

## 4. IMPLEMENTATION

### Responsibilities

#### Ministerial Council

Parties need to be consistent in their support for TMAP and ensure that short term decisions do not inadvertently undermine the long term future and value of TMAP.

Every Ministerial Council should:

- reconfirm the central importance of the (TMAP) and if necessary to adapt it to the requirements of relevant EC Directives, as the indispensable basis for the joint status assessment and the successful management of the Wadden Sea as a single ecological entity.
- reconfirm the continuation of TMAP and incorporate, as necessary, parameters to develop TMAP in order to facilitate an integrated assessment and reporting across the relevant EC Directives and better monitor new challenges, e.g. climate change and its impacts, and agree on the long term development strategy to avoid doubling of work and to increase its value to a wider range of stakeholders.

#### TG-Management

The Trilateral Task Group Management (TG-M) was installed in March 2011 with the following tasks regarding monitoring and assessment:

With regard to harmonised EU assessment and reporting TG-M shall

- Investigate possibilities for collaboration on appropriate assessments
- Investigation feasibility N2000 Wadden Sea Report

In order to further optimise the TMAP in accordance with MCD §43, TG-M shall

- Investigate possibilities for harmonisation of monitoring methods on the basis of the outcome of relevant studies. To this end TG-M will
  - Investigate the feasibility of a common EU project
  - Cooperate through CWSS with the Dutch WaLTER project
  - Elucidate the needs of transverse development of monitoring across the directives and harmonisation of assessments in relation to and across directives.
- Optimise and supervise the relation between TMAP and policy and management assessment.

#### TMAG

A Trilateral Monitoring and Assessment Expert Group (TMAG) shall secure the harmonized management and methodological soundness of the TMAP, i.e. that assessments are produced with equal methodology and quality control, and Quality Status Reports are regularly produced, and make annual progress reports on the implementation of the TMAP and define issues that need decision by the

Cooperation. The chairperson of the TMAG is simultaneously member of the Wadden Sea Management Task Group.

## **Time schedule**

### Objective 1. Integration across EU Directives and World Heritage

A feasibility report on producing a HD roof report will be submitted to WSB spring 2013.

The feasibility assessment will be based on the HD 2013 national reporting. In case of a positive decision by WSB a first trilateral HD roof report can be produced in 2018, together with a full QSR.

Harmonisation of assessment methodologies is an on-going task for which the main input will be delivered by the expert network groups and the TMAG.

### Objective 2. Better monitor new challenges

Proposals on required improvements/additions to TMAP by TGs and expert network to TG-M. TMAG to advise TG-M on improvements/additions after having gone through procedure described under section 3.2. On-going activity but on coordinated basis, i.e. every two years all existing proposals will be evaluated as a comprehensive package so as to avoid that this happens on an ad-hoc basis for single parameters. This will make it possible to set priorities.

### Objective 3. Availability to wider audience

Depending on personal and financial resources the framework of the information system will be installed in summer 2012. First chemical TMAP data will be available and populate the data warehouse soon after. Tests and biological TMAP data implementation together with GIS data input are planned in autumn-winter 2012. Final implementation and development of ETL process (automatic transfer and adaptation of monitoring data from the national TMAP databases to the central data warehouse) is foreseen in spring/summer 2013.

In developing the information system, there will be close cooperation with the Dutch WaLTER project ([www.walterproject.nl](http://www.walterproject.nl)), the German WIMO project ([www.wimo-nordsee.de](http://www.wimo-nordsee.de)), as well as the Wadden Sea Forum. Both the WaLTER and WIMO projects aim at optimising monitoring methodologies and data handling and presentation. The Wadden Sea Forum applies an information system (<http://waddensea-forum.org/Specialissues/wsr-gis.html>) as well as a sustainability index tool for which ecological (mainly TMAP) as well as socio-economic data are used (<http://waddensea-forum.org/Specialissues/Indicator-tool1.html>).

## **ANNEX. HISTORY AND STRUCTURE OF THE TMAP**

### **I. The development of the TMAP**

The Trilateral Monitoring and Assessment Programme (TMAP) was developed following a decision of the 6th Trilateral Governmental Conference in Esbjerg in 1991, where the ministers decided “to cooperate in scientific research and monitoring” and to further implement a common Wadden Sea monitoring program pursuant to decisions of the 5th Governmental Conference 1988 in Bonn “to continuously evaluate the ecological state of the Wadden Sea as a whole, in order to be able to decide on relevant trilateral policy measures”.

This decision was initiated amongst others by the seal epidemic in 1988, through which it became clear that there was a serious lack of data and thus difficulties to assess this event at both both the scientific and policy levels.

In addition, the first feasibility study on the possibility of a successful nomination of the Wadden Sea as a World Heritage Site by Prof. Burbridge (1991) pointed out that one of the necessary elements for a nomination of the Wadden Sea as a World Heritage Site is a proper monitoring of the area.

Following the decision of the 6th Trilateral Governmental Conference, the Trilateral Monitoring Expert Group (TMEG) elaborated a basic concept for an integrated Trilateral Monitoring and Assessment Programme (TMAP) of the entire Wadden Sea in the period 1992 - 1993.

In 1993, the concept was adopted by the TWSC and the programme started January 1994 as a pilot with a subset of parameters based on the existing and not yet harmonized national monitoring programmes. In parallel, the programme was further developed in order to harmonize the running national monitoring programmes and to implement new parameters.

Also in 1994, the Trilateral Monitoring and Assessment Group (TMAG) was established as a permanent working group to further elaborate the concept and to implement the TMAP. The TMAG was also responsible for the coordination of ecological research, the development of a trilateral data handling structure and the preparation of assessment reports of the Wadden Sea ecosystem at regular intervals.

In every stage of its development the TMAP has been an integral part of the national monitoring programmes of The Netherlands, Germany and Denmark. Therefore, all responsible monitoring authorities are involved in the development and the execution of the TMAP. Additionally, on-going developments on the national level regarding the refinement of the national programmes have been considered. The work was carried out and supported within the “DEMOWAD” project which ran from April 1995 to March 1998, co-financed by the LIFE programme of the European Commission.

#### **Objective and Structure**

The general aim of trilateral Wadden Sea monitoring, assessment and research is basically twofold, namely

- to provide a scientific assessment of the status of the ecosystem,

- to assess the status of implementation of the Ecological Targets of the Wadden Sea Plan,

Both categories of information are essential for the development and evaluation of trilateral Wadden Sea conservation policies and management. The main purpose of monitoring the ecosystem and human activities is to collect data necessary for a scientific evaluation of the status of the ecosystem and the intensity and impact of human use.

The scientific assessment is an important basis for the formulation of policies and measures. Scientific knowledge is a prerequisite for the development of appropriate monitoring, application of assessment criteria and the formulation of policy goals for the protection of the ecosystem. The TMAP combines a comprehensive set of physical, chemical, biological and socio-economical parameters with concomitant ecosystem research. This research looks for causes of observed changes, its environmental significance and the need and possibilities for management measures. Furthermore, it gives a foundation for the selection of parameters and measuring strategies of the monitoring part, thus adapting it to current needs and knowledge. All parts of the monitoring programme have been integrated in a common structure for the collection, processing and exchange of data.

#### **Issues of Concern, Hypotheses and Ecological Targets**

As indicated above, at the start the TMAP served two goals, the scientific assessment of the status of the ecosystem and the assessment of the implementation status of ecological targets (Ecotargets). The first task is mainly a scientific one, whereas the second is relevant for management.

A basic element in the elaboration of the Guiding Principle of the cooperation as laid down in the Joint Declaration is the presence of the full scale of habitat types, which belong to a natural and dynamic Wadden Sea. The physical, biological, chemical and geomorphological quality of the habitats has been specified by means of Ecological Targets, in short Ecotargets, elaborated by the trilateral Eco-Target Group (ETG) in 1994.

The Ecotargets have been adopted at the 7th Trilateral Governmental Conference in 1994. They are valid for the whole area of the trilateral cooperation, be it with a differentiation in scale, place and time.

The Ecotargets have been formulated in a general and open-end way. Their purpose is to indicate the direction of policy and management. The scientific assessment provides insight in questions about the status and development of impacts on the ecosystem, i.e. disturbance, pollution and habitat destruction.

The assessment of the status of the ecosystem is based upon so-called "Issues of Concern". These were derived from the (second) Quality Status Report (QSR) 1993 in which all possible anthropogenic impacts on the Wadden Sea ecosystem were evaluated and assessed. Those issues for which problems already existed or could be anticipated were given highest priority and were included in the monitoring programme.

For each "Issue of Concern", hypotheses have been formulated and monitoring parameters deduced. Through this procedure a close connection between the general objectives of the programme and the selection of the parameters to be monitored was provided for. The TMAP encompasses five "Issues of Concern":

- I Effects of climate change on the morphology,

- II Effects of pollutant inputs (nutrients and contaminants) on processes, species and communities,
- III Effects of fisheries on species and communities,
- IV Effects of recreational activities on species,
- V Effects of agricultural utilization on salt marsh communities.

The parameters to be monitored were derived from hypotheses formulated for each issue.

The trilateral conservation policy and management is thus directed towards achieving the common Ecological Targets. The aim is to achieve the full scale of habitat types which belong to a natural and dynamic Wadden Sea. Each of these habitats needs a certain quality (natural dynamics, absence of disturbance, absence of pollution) which can be reached by proper conservation and management. The quality of the habitats shall be maintained or improved by working towards achieving Ecological Targets which have been agreed for six habitat types. Targets on the quality of water and sediments are valid for all habitat types. Supplementary, targets on birds and marine mammals have been adopted as well as targets on landscape and cultural aspects.

### **The Trilateral Wadden Sea Plan**

For the implementation of trilateral conservation policies, a management plan, the Trilateral Wadden Sea Plan (WSP), was set up and adopted at the Trilateral Governmental Conference in Stade in October 1997. The WSP is structured according to the target categories. For each target category, trilateral policy and management and proposals for trilateral projects and actions necessary for the implementation of the targets have been adopted. The TMAP supports the implementation of the Wadden Sea Plan by making the results of the monitoring available to relevant authorities, interest groups and local citizens as laid down in the Wadden Sea Plan.

The TMAP concept was developed and implemented as an integrated ecosystem concept. Three scenarios of a possible monitoring programme were proposed, reaching from a pragmatic and thus cheaper to a more holistic approach. This implied that data of all ecosystem levels and compartments were needed for a proper analysis of the quality status of the ecosystem. Hence all parameters of the concept are relevant.

For practical and financial reasons, it was decided to only implement those parameters which are sufficient for a basic evaluation of the Issues of Concern and the Ecotargets and for which a relatively low implementation effort is anticipated. It has been ensured however that the priority parameters provide at least the basic information that is necessary for the evaluation of the TMAP hypotheses and the Ecotargets. The implementation of the so called Common Package of the TMAP was decided at the Stade conference in 1997. A revised WSP was adopted in 2010.

## **II. Revisions of the TMAP**

Since TMAP came into operation in 1997 it has been substantially revised to contribute to international reporting requirements such as the Birds, Habitats and Water Framework Directives, the Oslo and Paris Conventions (OSPAR) and the

Ramsar Convention, most of which are legally binding for the three Wadden Sea states.

A detailed description of TMAP parameters is in the TMAP Handbook, which is accessible at the CWSS website ([www.waddensea-secretariat.org](http://www.waddensea-secretariat.org)). TMAP parameters are coordinated trilaterally and a large number of parameters have been harmonised (breeding and migratory birds, harbour seals, blue mussels, salt marshes, contaminants in bird eggs). They have proven their value for the Target assessment (QSR 2004, 2009) and for national and international reporting obligations (such as EC Directives, Ramsar, and OSPAR). The TMAP information has furthermore been of substantial value for the formulation of the nomination dossier of the Wadden Sea as a World Heritage site with its inscription on the World Heritage List in 2009.

The TMAP has been revised on the basis of the outcome of the Interreg IIIB HARBASINS project in 2005 – 2008. In the HARBASINS project a pilot for an integrated monitoring and assessment concept for a coherent coastal ecosystem shared by three countries (NL, D, DK) has been developed. As a result of this revision TMAP now matches the various approaches and instruments for management, monitoring and assessment and combines the requirements of the EU Water Framework, Habitats and Birds Directives and other relevant agreements. Thus, considerable progress has been made over time in harmonising parameters and methodologies, as well as the obligatory installation of new parameters (e.g. fish) in the TMAP, as documented in the continuously updated TMAP Manual.

An overview of the TMAP parameters underlines that nearly all of the TMAP parameters are part of existing monitoring programmes in the three countries and already cover the requirements of the EC Directives and other international agreements. Thus, TMAP has reached a status of full fulfilment of legal requirements.

The information delivered by the TMAP is essential for the development and evaluation of the trilateral Wadden Sea conservation policies and management in line with the relevant EC directives, the inscription on the World Heritage list and other international obligations. Without the existence of the TMAP, national programmes would have had to be installed with the same set of parameter and probably with a much higher effort, both in finance and coordination. Monitoring on a national basis only would have caused a loss of the trilateral perspective of the data. Only on the basis of these data a proper assessment of the Wadden Sea ecosystem as one ecological entity is possible.

### **TMAP Data Management**

Common data handling is an essential component of the TMAP, making monitoring data available for trilateral assessment. For this purpose, identical TMAP data units have been installed in each country, in which data are stored in the same way. The TMAP data handling system aims to exchange monitoring data in a common format so that it can be used directly in the trilateral assessment work for the following tasks:

- preparation of Quality Status Reports entailing most recent data and developments,
- preparation of trilateral reports on specific topics (thematic reports, like breeding birds, migratory birds, seals, contaminants),
- preparation of reports on unforeseeable events (e.g. eider mass mortality),

- safeguarding long-term storage of relevant Wadden Sea data,
- use of trilateral data for national and international programmes.

An evaluation of TMAP data handling was undertaken in 2004 by the Orbis Institute, Canada. The evaluation concluded that TMAP has been developed with a clear top down approach from broad objectives, through issues of concern to generally specified targets. Also that it is

“an enormously valuable data repository which is just beginning to show its worth” and which “for the full benefits to be realised, resources must be stabilised and increased, organisational arrangements strengthened and value added uses pursued”.

Following this evaluation, the TWSC has stabilised and increased resources for TMAP and the system developed further to deliver the requirements of the parties in relation mainly to the key EU Directives. It is in daily operational use by the parties.

The TMAP data handling system today supports reporting obligations (e.g. national status reports, EU reports concerning Natura 2000 and the Water Framework Directive, World Heritage, international reports concerning OSPAR, RAMSAR or other international conventions) by providing up-to-date and harmonised Wadden Sea data (including GIS) from different sources on the national and international level.

### **Assessment Reports and Public Information**

Assessment reports on the Wadden Sea ecosystem (Quality Status Reports, QSR) are prepared at regular intervals, related to the Trilateral Governmental Conferences. The reports

- describe and evaluate the current ecological status of the Wadden Sea,
- identify changes in this status and their possible causes,
- identify issues of concern and indicate possible measures of redress, including evaluation of the likely effectiveness of these measures,
- identify gaps in knowledge.

Assessments are carried out by experts and relevant national institutions in charge of the national assessment. Additionally, thematic reports are prepared which entail the results of running trilateral monitoring programmes, e.g. monitoring of migratory and breeding birds. In addition short thematic reports are published in the CWSS Wadden Sea Ecosystem series and the CWSS Email Newsletter.

The most recent QSRs (2004 and 2009) have proven to be a proper basis for the assessment of the quality of species, habitats and water bodies, as well as the reporting requirements of the relevant EU directives.

### **Ecological Research**

The research component is the flexible element of the TMAP. Ecosystem research studies the environment on a broader perspective, and weighs the more detailed species and habitat research work to gain an overall picture of the condition of the ecosystem. The foremost tasks of ecosystem research are to discriminate between natural fluctuations and human impacts to find the causes of changes observed in the ecosystem. A further task is to continuously improve the efficiency of the monitoring programme. These tasks are essential for two goals of policy and

management: the capability of providing evidence for man-made causes, and the capability of interpreting and predicting the reactions of the ecosystem correctly.

Because research into the cause of issues of concern and observed changes is a prominent task for concomitant investigations of the ecosystem, new or alternative parameters and monitoring methods may have to be developed in order to adapt to new developments and to increase the efficiency of the programme.

### **III. Evaluation of the TMAP**

The High Level review<sup>1</sup> (HLR) concluded the following about the TMAP:

“One of the most significant achievements of the TWSC to date has been the development of the Trilateral Monitoring and Assessment Programme (TMAP) and the associated Quality Assessment Report (QSR) and Policy Assessment Report (PAR). Rather than this being considered an area of non-harmonisation it should be regarded as an achievement of a high level of harmonisation.

TMAP is an essential data source to ensure assessments of Favourable Conservation Status (FCS) from the Habitats Directive and the reporting under the Birds Directive that are put into a wider context, and hence are accurate and meaningful. A good example of this is winter counts of birds as low counts in one part of the Wadden Sea may well not reflect the overall situation. If TMAP was ignored or inadequate then national reporting under the Directives would be significantly weakened, and potentially misleading.

One of the significant areas of work for those implementing Directives is undertaking appropriate assessments or Environmental Impact Assessments of development proposals in or around the Wadden Sea. Again the TMAP provides some of the essential information for such assessments and there is little doubt that without TMAP such assessments would either be more expensive to undertake or would be weaker through lack of data.

In summary the TMAP provides significant value added for the TWSC as it:

- Provides an important evidence base for sound decision making and policy development at all levels
- Provides essential contextual information to support the management of the Wadden Sea as a single ecological entity
- Supports reporting against Directives
- Enables integrated assessment to be undertaken which is an essential prerequisite for the application of the ecosystem approach
- Provides information about progress towards trilateral targets and facilitates the discussion about the priorities for the period ahead.

The Trilateral Monitoring and Assessment Programme (TMAP), including the advanced handling and management of comprehensive data on a harmonized

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<sup>1</sup> Trilateral Wadden Sea Cooperation, Final report, High level review of EC Directives for collaboration and harmonisation Stage 2, Dr Andy Brown, Independent Consultant, May 2010

basis, and the Quality Status Report process - with its suite of targets and baselines - is a world-class monitoring system, against which the Wadden Sea Plan can be assessed and managed.”

It was recommended (HLR recommendation 10)

“that every effort should be made to continue to harmonise around the parameters and methodologies used in TMAP, and in particular to maximise its value in relation to reporting under the Birds, Habitats and Water Framework Directives (including to the best possible extent the need of the Marine Strategy Framework Directive). The Trilateral Monitoring and Assessment Programme (TMAP), including the advanced handling and management of comprehensive data on a harmonized basis, and the Quality Status Report process - with its suite of targets and baselines - is a world-class monitoring system, against which the Wadden Sea Plan can be assessed and managed.”