

## Quality Assurance of the German Marine Monitoring Programme (North Sea and Baltic Sea)\*

### Qualitätssicherung im marinen Monitoring (Nord- und Ostsee)

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**Key Words:** Quality assurance, German coastal waters, North Sea, Baltic Sea, interlaboratory comparisons, monitoring methods, nutrients, contaminants, phytoplankton, zooplankton, macrophytes, macrozoobenthos, Water Framework Directive, Habitats and Birds Directives, Marine Strategy Framework Directive

### Summary

Marine monitoring is the basis for the assessment of the ecological status of the seas and allows decisions to be made on the measures required to achieve good environmental status according to WFD, Natura 2000 (FFH Directive, Birds Directive) and MSFD. The monitoring data must be reliable and comparable to ensure that the right decisions are made, as wrong decisions may result in enormous investments in the wrong projects or may, in the worst case, prevent the achievement of good status.

Responsible for the assurance of quality and comparability of the analytical results in marine monitoring is the Quality Assurance Panel (QS-Stelle; Eng. QA Panel) of the German Marine Monitoring Programme for the North and Baltic Seas (BLMP) at the Federal Environment Agency (UBA) which is an independent institution not directly involved in the monitoring acting both on federal and federal state level (here coastal federal states). This institution is accountable to the ARGE BLMP/BLANO. The work is done in co-ordination with the working group "Quality assurance" (AG QS) in

which professional experts from the federal government and the coastal federal states are represented. According to national and international directives the quality assurance programme includes the validation of the procedures and methods used in marine monitoring as well as measures for internal and external laboratory quality assurance. The Quality Assurance Panel is responsible for the coordination of all related activities. It manages relevant concepts and data in this context for all institutes involved in marine monitoring and organises the exchange of information and harmonisation of methods at the national and international level.

### Zusammenfassung

Das marine Monitoring ist die Grundlage für die Bewertung des ökologischen Zustands der Meere. Auf dieser Basis werden Entscheidungen getroffen, inwieweit Maßnahmen für das Erreichen des guten Umweltzustandes entsprechend den Forderungen von WRRL, Natura 2000 (FFH-RL, VSCH-RL) und MSRL durchgeführt werden müssen. Für die Absicherung dieser Entscheidungen sind Zuverlässigkeit und Vergleichbarkeit

\* English version of the German report 2012/1

der Untersuchungsergebnisse notwendig, da falsche Entscheidungen unter Umständen zu hohen Fehlinvestitionen führen und im schlimmsten Fall sogar das Erreichen des guten Zustands verhindern können.

Die Koordinierung aller die Qualitätssicherung des marinen Monitorings betreffenden Fragen obliegt der dem Umweltbundesamt zugeordneten Qualitätssicherungsstelle (QS-Stelle) des Bund/Länder-Messprogramms Nord- und Ostsee. Diese ist selbst nicht direkt am Monitoring beteiligt und gegenüber der ARGE BLMP/ BLANO rechenschaftspflichtig. Somit ist die Wahrung der Unabhängigkeit und Vermeidung von Interessenskonflikten gewährleistet. Die Arbeit erfolgt in Abstimmung mit der Arbeitsgruppe „Qualitätssicherung“ (AG QS), in der Fachexperten aus Bund und Küstenländern vertreten sind.

In Übereinstimmung mit nationalen und internationalen Anforderungen (z. B. WRRL, FFH-RL, VSCH-RL, MSRL) beinhaltet das Qualitätssicherungsprogramm die Validierung der im marinen Monitoring eingesetzten Analysenverfahren und Bestimmungsmethoden sowie Maßnahmen zur internen und externen Qualitätssicherung. Die Qualitätssicherungsstelle koordiniert für das marine Monitoring alle diese Aktivitäten, verwaltet dazu die Konzepte und Daten für die am marinen Monitoring beteiligten Einrichtungen und organisiert den fachlichen Informationsaustausch und die Harmonisierung der Verfahren auf nationaler und internationaler Ebene.

## Background

European Directives like the Water Framework Directive (WFD), the Habitats Directive, the Birds Directive and the Marine Strategy Framework Directive (MSFD) request Member States to assess the status of waters regularly and to take measures if the good status is not met or if there is a risk of failing good status. Thereby, the existing monitoring of the marine environment under the regional seas conventions of HELCOM and OSPAR is considerably expanded and raised to a new level. Basis for any kind of assessment of the status of water bodies is the characterisation and monitoring of the hydromorphological, chemical and ecological status.

The reliability and comparability of data collected is an important condition for the characterisation of water bodies and thus for the assessment of anthropogenic impacts. The issue of data quality has to be considered for both physico-chemical and biological data. Data are only deemed to be reliable if they are backed up by appropriate quality assurance measures. This also applies to the monitoring of water bodies according to WFD, Natura 2000 network and MSFD. If the stipulated "good status" is not met cost-effective measures may be required for achieving the en-

vironmental targets. Monitoring data of assured quality are therefore of utmost importance for the assessment of the hydromorphological, chemical and ecological status of water bodies and essential to the efficient use of available financial and human resources.

In 1997 "The principles for the establishment of a Working Committee for the German Marine Monitoring Programme (ARGE BLMP Nord und Ostsee)" were signed, which form the fundament of the positive co-operation between the competent federal ministries and the coastal federal states concerned. In the rules of procedure it was laid down that a Quality Assurance Panel at the Federal Environment Agency should coordinate all quality assurance issues within the German Marine Monitoring Programme. This ensures that the co-ordination of quality assurance is conducted by an independent authority not directly involved in the marine monitoring. The current restructuring of marine monitoring including the diversification of tasks of the Quality Assurance Panel (QA Panel) takes into account the new requirements resulting from WFD, Natura 2000 and the MSFD.

Below, the basic concept of quality assurance is illustrated and insight is delivered into the work of the Quality Assurance Panel which has been done so far.

## Principles of quality assurance in marine monitoring

In future the results of marine monitoring will only be accepted if they are backed up by quality assurance measures. Therefore, the establishment and maintenance of quality management systems is essential for all institutions involved in the German Marine Monitoring Programme.

Quality management systems include technical requirements concerning e.g. the equipment of laboratories, a sufficient number of qualified staff, validation of the methods of analysis used, as well as documented self-monitoring procedures. They also comprise requirements on the organisation of all processes and procedures such as handling of orders, management of documents<sup>1)</sup>, validation of test results and corrective actions if necessary as well as internal audits (management requirements). The aim is to have a complete documentation and to ensure the traceability of data from sampling to the final report and to continually improve all procedural steps.

The use of validated procedures suitable for the intended purpose is a key requirement for quality assurance in analytical laboratories. In this context a wide range of national and international standard procedures for chemical, physical and biological analyses is available. An important national set of standards is to be found in the loose-leaf publication "Deutsche Einheitsverfahren zur Wasser-, Abwasser- und Schlammuntersuchung, (DEV)" (Eng.: German standard methods for the examination of water, waste water and sludge), which comprises more than 300 different methods. These analytical procedures are regularly reviewed and where appropriate revised.

The basic principles for the establishment of quality management systems in laboratories are set out in DIN EN ISO/IEC 17025 "General requirements for the competence of testing and calibration laboratories". Pursuant to this standard, internal (within a laboratory) and external measures (between several laboratories, at national or international level) have to be implemented in order to ensure and improve the quality of the analytical results.

Internal quality assurance measures include:

- Establishing a quality management manual, which describes the organizational and technical measures taken by each laboratory to ensure certain quality standards,
- Documentation of all analytical methods used in the laboratory in the form of Standard Operating Procedures (SOPs) describing all procedural steps including sampling, analysis, reporting of results, data storage and archiving of the samples,
- Documented validation<sup>2)</sup> or verification<sup>3)</sup> of the analytical methods used and determination of the relevant performance characteristics,
- Providing continuous evidence of the accuracy of analytical results by applying elements of quality assurance in laboratory routine, e.g. by operating control charts or by analysing (certified) reference materials
- Compiling specimen collections for the purpose of comparison and documentation when performing biological investigations,
- Sufficient qualification and regular training of personnel with regard to the applied analytical procedures,
- Regular implementation of internal audits (assessments) and management reviews.

External quality assurance measures include:

- Participation in national and international inter-laboratory comparisons, proficiency tests, training courses and workshops,
- External audits, e.g. as part of an accreditation
- Random control of results of field investigations, laboratory results and species determinations by an external independent organisation not involved in the measuring programme, particularly in the case of biological investigations.

A suitable way to ensure or improve the quality of analytical data is the accreditation of laboratories. The accreditation of analytical laboratories is carried out according to standard DIN EN ISO/IEC 17025. It involves that a laboratory's competence (technical skills, reliability, independence, availability of qualified personnel and material resources) to carry out certain analyses is formally recognized by an authorised body. The aim is to ensure

1) All processes of drawing up, checking, approval and archiving of QM documents

2) Validation: demonstration that an analytical method is suitable for its intended purpose

3) Verification: demonstration that defined requirements are fulfilled

comparable test results and to improve the mutual acceptance of analytical results. Since the 1st of January, 2010 the Deutsche Akkreditierungsstelle GmbH (DAkkS) has been responsible for carrying out accreditations in Germany in accordance with Regulation (EC) No. 765/2008. The DAkkS was established by merging of the German Kalibrierdienst (DKD) and the former accreditation institutes DACH (Deutsche Akkreditierungsstelle Chemie GmbH), DAP (Deutsches Akkreditierungssystem Prüfwesen GmbH) and TGA/DATech (Trägergemeinschaft für Akkreditierung GmbH/Deutsche Akkreditierungsstelle Technik).

Experience from the implementation of the WFD and from monitoring of the marine environment within OSPAR and HELCOM has shown that there is no need to predefine the applied analytical methods for chemical analysis. However, they must be validated comprehensively and meet certain minimum requirements according to the objective of the monitoring programme to enable a reliable and accurate monitoring of the chemical status of the water bodies. In contrast, methods for biological investigations need to be harmonised as far as possible taking into account site-specific circumstances.

In addition to the biological characteristics already monitored within the scope of the WFD others have to be surveyed within the context of MSFD and Natura 2000, such as characterisation of zooplankton communities or monitoring of birds and mammals, which must be included in the quality assurance programme. Therefore, in the coming years, suitable quality assurance procedures must be developed for biological characteristics relevant to the area of nature conservation. This must be done in cooperation with those authorities at federal government and federal state level responsible for the implementation of the Birds Directive and the Habitats Directive. In this context, the decision of ARGE BLMP (2006) on the mandatory establishment of quality management systems according to DIN EN ISO/IEC 17025 in all facilities involved in the GMMP should also be applied to organisations conducting monitoring tasks in the area of nature conservation.

Within the scope of European Commission Directive 2009/90/EC of 31 July 2009 laying down

technical specifications for chemical analysis and monitoring of water status it was stipulated that laboratories involved in WFD chemical monitoring shall set up a quality management system in accordance with DIN EN ISO/IEC 17025. Furthermore, the Directive 2009/90/EC lays down the following specifications:

- All methods of analysis, including laboratory, field and on-line methods, shall be validated and documented on the basis of DIN EN ISO/IEC 17025 or equivalent internationally accepted standards (Article 3).
- The minimum performance criteria for all applied methods of analysis shall be based on
  - a) An uncertainty of measurement of 50 % or below ( $k = 2$ ) estimated at the level of relevant environmental quality standards, and
  - b) A limit of quantification equal or below a value of 30 % of the relevant environmental quality standard (Article 4 paragraph 1).In absence of a relevant environmental quality standard or in absence of an analytical method meeting the requirements set out in Article 4 paragraph 1 monitoring is to be carried out using the best available techniques (Article 4 paragraph 2).
- Laboratories shall apply quality management practices in accordance with EN ISO/IEC-17025 or other equivalent standards accepted at international level and prove their competence for the analysis of physico-chemical and chemical parameters by participation in proficiency testing programmes and analysis of reference materials (Article 6).

The QA/QC requirements set out in Article 6 should also be applied to biological investigations, if possible and reasonable, to ensure an equivalent quality level in that area as well.

Similar to the implementation of the WFD, it can be expected that within the scope of the implementation of the MSFD the European Commission will define minimum performance criteria for the analytical methods to be applied and require prove of the effectiveness of the quality management systems to be set up.

For most criteria the methodical requirements laid down in existing European Union legislation have to be taken into account<sup>4)</sup>.

<sup>4)</sup> Commission Decision of 1 September 2010 on criteria and methodological standards on good environmental status of marine waters (2010/477/EC)

For chemical analysis, proficiency tests for the purpose of external quality assurance have been established for many years (e.g., QUASIMEME proficiency testing programme for the analysis of pollutants in sea water, marine sediments and biota). In the biological sector suitable laboratory performance studies as well as taxonomic training courses are offered by the QA Panel of the GMMP because so far there is no provider of laboratory performance studies in Germany for the marine sector and because international providers cannot take specific regional aquatic ecology aspects sufficiently into account.

### Practical implementation

For the purpose of a uniform national assessment of the status of water bodies, co-ordinated national and international harmonisation activities involving institutions of both the federal government and the federal states (in the present context: coastal states) are indispensable. The QA Panel at the Federal Environment Agency coordinates the ef-

orts to ensure the reliability and comparability of results. This is carried out in coordination with the working group "Quality Assurance" (AG QS), in which experts from federal authorities and the coastal federal states are represented (see Fig. 1). This working group works closely together with the working group "Monitoring and Assessment" (AG ErBe) and its ad-hoc working groups ensuring a direct and permanent link to the institutes conducting the measurements. Moreover, it has proved useful to establish temporary subgroups of the AG QS to deal with specific issues, like the quality assurance subgroups "Quality Management", "Plankton", "Macrophytes" and "Macrozoobenthos".

The work of the Quality Assurance Panel is based on an annual work programme agreed within the working group "Quality Assurance". At the beginning of each year this programme is presented to the ARGE BLMP/BLANO for approval.

Internal quality assurance is carried out by the institutions involved in the monitoring on their own responsibility. The Quality Assurance Panel sup-

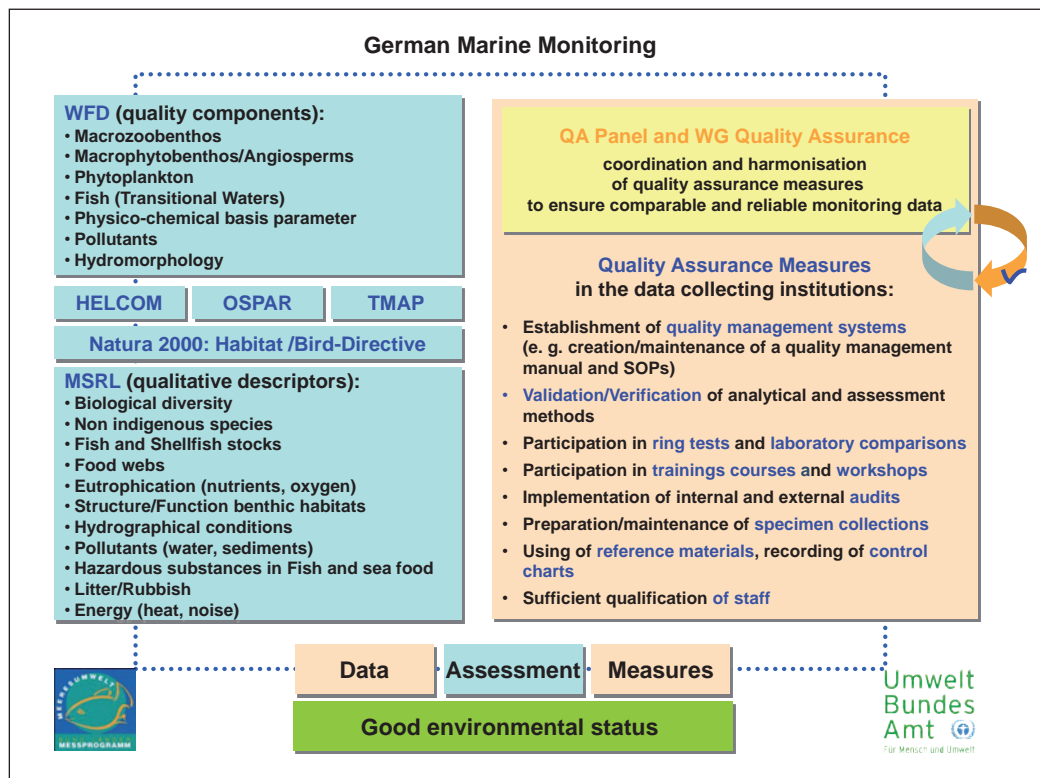


Fig. 1: Tasks of the Quality Assurance Panel at the Federal Environment Agency in marine environmental monitoring  
Abb. 1: Aufgaben der Qualitätssicherungsstelle am Umweltbundesamt bei der Überwachung der Meeresumwelt

ports them for example in developing guidelines for method validation, establishing minimum performance criteria like the limit of quantification. The Panel also organises workshops dealing with various methods for the determination of biological and chemical parameters. Since 1998 the QA Panel, in cooperation with external contractors, has been offering laboratory performance studies (see Table 1) and taxonomic workshops (see Table 2) regarding the biological quality components of the GMMP like phytoplankton and zooplankton, macrophytes and macrozoobenthos.

In 2006 the ARGE BLMP/BLANO decided that quality management systems according to DIN EN ISO/IEC 17025 should be established at all

laboratories involved in the GMMP. The establishment of the QM systems was due to be completed by the beginning of 2012 and for laboratories newly participating due to the implementation of the MSFD by 2014. For this purpose, in 2007 the QA subgroup "Quality Management" compiled a template of a Quality Management Handbook (QMH) tailored to the requirements of the GMMP (see Figure 3) which has been available to all GMMP laboratories since 2008. In the QA subgroups "Plankton", "Macrozoobenthos" and "Macrophytobenthos" model Standard Operating Procedures (SOP) were developed for selected biological methods and have been available since the beginning of 2009, and additional ones are in preparation (see Table 3).

**Table 1: Overview of the biological interlaboratory comparisons organised by the Quality Assurance Panel (MZB: Macrozoobenthos, PP: Phytoplankton, ZP: Zooplankton)**

**Tab. 1: Übersicht zu den von der Qualitätssicherungsstelle durchgeführten biologischen Ringversuchen (MZB: Makrozoobenthos, PP: Phytoplankton, ZP: Zooplankton)**

	Objective of the interlaboratory comparison	Final report, Number of participants
PP	Identification and counting of 4 selected species from algae cultures	March 1999: 10 participants
PP	Identification of 20 selected species from the North and Baltic Seas via photographs	March 1999: 10 participants
MZB	Identification of 25 selected macrozoobenthos species	January 2000: 11 participants
PP	Identification and counting of species in a natural phytoplankton sample from the North Sea	March 2001: 12 participants
MZB	Identification of selected macrozoobenthos species from the North and Baltic Seas	October 2001, revised May 2002: 13 participants
PP	Comparability of chlorophyll a analyses carried out with different methods	November 2002: 11 participants
MZB	Identification of selected macrozoobenthos species in a "semi-natural" macrozoobenthos sample from the western Baltic Sea	November 2004: 16 participants
ZP	Species identification, counting and biomass determination in a zooplankton sample from the Baltic Sea (HELCOM/GMMP)	February 2010: 22 participants
PP	Identification, counting and biomass determination in synthetic and natural phytoplankton samples (HELCOM/GMMP)	May 2010: 26 participants

**Table 2: Overview of the workshops and biological training courses organised by the Quality Assurance Panel (Bio: Biology, Che: Chemistry, MPB: Macrophytobenthos, MZB: Macrozoobenthos, PP: Phytoplankton, QS: Quality Assurance/Quality Management)**

**Tab. 2: Übersicht zu den von der Qualitätssicherungsstelle durchgeführten Workshops und biologischen Trainingskursen (Bio: Biologie, Che: Chemie, MPB: Makrophytobenthos, MZB: Makrozoobenthos, PP: Phytoplankton, QS: Qualitätssicherung/Qualitätsmanagement)**

	Subject of the workshop	Venue and date Number of participants
MZB	Polychaeta	Institut für Angewandte Ökologie Neubroderstorf, 23.03. – 26.03.1998: 20 participants
PP	Small naked flagellates	Institut für Meereskunde Kiel, 30.03. – 02.04.1998: 14 participants
MZB	Amphipoda	Institut für Angewandte Ökologie Neubroderstorf, 28.09. – 01.10.1998: 18 participants
PP	Species difficult to identify	Forschungs- und Technologiezentrum Westküste Büsum, 16.11. – 18.11.1998: 11 participants
Che	Analytical methods and quality assurance for the determination of nutrients, heavy metals and organic pollutants in marine waters	Tagungsstätte des Bundesamtes für Naturschutz Insel Vilm, 02.07. – 04.07.2001: 11 participants
PP	Taxonomy of cyanobacteria and coccale green algae and their distribution in the Baltic Sea	Biologische Station Hiddensee (Universität Greifswald), 18.09. – 22.09.2000: 18 participants
MPB	Taxonomy of marine macrophytes and their importance for monitoring under international marine conventions	Feldstation des Institutes für Meereskunde der Universität Kiel, Maasholm, 27.05. – 02.06.2001: 25 participants
Che, Bio, QS	Marine monitoring and quality assurance – 1st exchange of experiences	Internationale Naturschutzakademie, Insel Vilm, 04.11. – 06.11.2002: 25 participants
PP	Identification and taxonomy of marine dinoflagellates	Wattenmeerstation Sylt (AWI), 13.01. – 17.01.2003: 23 participants
Che, Bio, MZB	Blue mussel monitoring within the GMMP	Umweltbundesamt Berlin, 17.02.2004: 9 participants
MZB	Mollusca, Polychaeta, Oligochaeta	MARILIM, Kiel, 22.03. – 26.03.2004: 37 participants
MPB	Methods for monitoring macrophytobenthos in the context of the GMMP and EU-WFD including exercises on the identification of marine macrophytes, Part 1: Hard bottom monitoring	Biologische Anstalt Helgoland (AWI-BAH), 11.04. – 15.04.2005: 26 participants
MPB	Methods for monitoring macrophytobenthos in the context of the GMMP and the EU-WFD including exercises on the identification of marine macrophytes, Part 2: Soft bottom monitoring	Biologische Station Hiddensee (Universität Greifswald), 20.06. – 24.06.2005: 20 participants
QS	Accreditation according to DIN EN ISO/IEC 17025	Umweltbundesamt Berlin, 30.11.2005: 30 participants
QS	Accreditation of laboratories according to DIN EN ISO/IEC 17025	Bundesamt für Seeschifffahrt und Hydrographie, Hamburg, 08.02.2007: 34 participants
PP	Identification and taxonomy of marine diatoms	Botanisches Museum Berlin-Dahlem, 26.03. – 28.03.2007: 16 participants
MZB, MPB	Identification of recently occurring neobiota in the North and Baltic Seas and hard bottom monitoring in the Baltic Sea	IFM-GEOMAR Kiel, 15.06. – 16.06.2011: 38 participants

**Table 3: Overview of the quality management documents prepared by the Quality Assurance Panel so far and those in preparation (QMH: prototype of a quality management manual, VA: procedural instruction, SOP: Standard Operating Procedure)**

**Tab. 3: Übersicht zu von der QS-Stelle bisher erarbeiteten bzw. in Vorbereitung befindlichen QM-Dokumenten (QMH: Muster-Qualitätsmanagementhandbuch, VA: Verfahrensanweisung, SOP: Standardarbeitsanweisung)**

	Title of the QA document
QMH	Exemplary Quality Management Handbook version 01, 2008, loose-leaf collection - template
VA	Preparation and handling of Standard Operating Procedures (SOP test methods - template), VA-403-01-01, 2008
VA	Preparation and handling of Standard Operating Procedures (SOP devices - template), VA-403-02-01, 2008
VA	Storage of records, VA-413-01-01, 2008
VA	Estimation of measurement uncertainty, VA-504-01-01, 2008
VA	Verification and validation of test methods, VA-504-02-01, 2009
SOP	Test method SOP: Macrozoobenthos investigations in marine substrates (soft bottom), Version 01, 2009, P-SOP-BLMP-MZB_v01
SOP	Test method SOP: Macrozoobenthos investigations in marine substrates (soft bottom), Version 02 in preparation
SOP	Test method SOP: Macrophytobenthos investigations in marine substrates: frame sampling in the sublittoral, Version 01, 2009, P-SOP-BLMP-MPB_RB-SUB_v01
SOP	Test method SOP: Macrophytobenthos investigations in marine substrates: frame sampling in the eulittoral (hard bottom), Version 01, 2009, P-SOP-BLMP-MPB_RB_EUL_v01
SOP	Test method SOP: Phytoplankton investigations of coastal surface waters (qualitative and quantitative), Version 01, 2009, P-SOP-BLMP-PP_v01
SOP	Test method SOP: Phytoplankton investigations of coastal surface waters (qualitative and quantitative), Version 02, 2010, P-SOP-BLMP-PP_v02
SOP	Chlorophyll a analysis in surface waters, in preparation
SOP	Transect mapping in the sublittoral, in preparation
SOP	Coastal and estuary mapping of vegetation, in preparation
SOP	Sediment classification und grain size determination, in preparation
SOP	Mesozooplankton monitoring in marine waters (without inner coastal waters), in preparation
SOP	Bird watching, in preparation
SOP	Porpoises, in preparation
SOP	Seals, in preparation





Fig. 2: Participants of the workshop „Monitoring methods of macrophytes, part 2: soft bottom monitoring“ in the laboratory classroom of the Hiddensee Biological Station

Abb. 2: Teilnehmer des Workshops zu „Methoden des Makrophyten-Monitorings, Teil 2: Weichboden-Monitoring“ im Kurssaal der Biologischen Station Hiddensee

In future, all QA documents will also be available in English. By preparing templates of quality management documents (QA documents) the QA Panel seeks to promote the harmonisation of methods and to ensure that uniform quality standards are established at the laboratories involved in the GMMP as a precondition for comparable and reliable data. Participation in national (DIN<sup>5)</sup> and international (CEN<sup>6)</sup> working groups on standardisation of test methods also belongs to the ongoing tasks of the Quality Assurance Panel. The work on standardisation is assisted by national experts in marine monitoring.

Since 2001 the QA Panel has also offered external audits according to DIN EN ISO 17025 for GMMP laboratories which are carried out by properly trained staff.

The tasks of the QA Panel also include initiating and providing technical support to research projects aimed, e.g., developing identification keys for difficult-to-identify taxonomical groups or exploring the use of innovative passive samplers for monitoring pollutants in the marine environment.

Furthermore, they include comparative statistical evaluations of the results of national and international laboratory performance studies obtained by GMMP laboratories to identify possible weaknesses and to make proposals on how to improve performance.

At the moment, the information system “Quality Assurance for the German North Sea and Baltic Sea Monitoring Programme” (QA-GMMP) is under development to ensure that the increasing demand for exchange of information, data and software can be met in future. The communication platform to be installed shall serve as an exchange forum for the general public and for the laboratories and institutions involved in the GMMP. It shall also support the QA Panel itself and improve and facilitate the cooperation between the partners at all levels.

The aim is to adapt the QA Panel to the increased amount of duties, to speed up processes and to establish simple and efficient quality assurance instruments. The pilot run is planned to start at the end of 2012.

<sup>5)</sup> Deutsches Institut für Normung e. V. (German Institut of Standardisation e.V.)

<sup>6)</sup> European Committee for Standardisation (frz.: Comité Européen de Normalisation; engl: European Committee for Standardization)

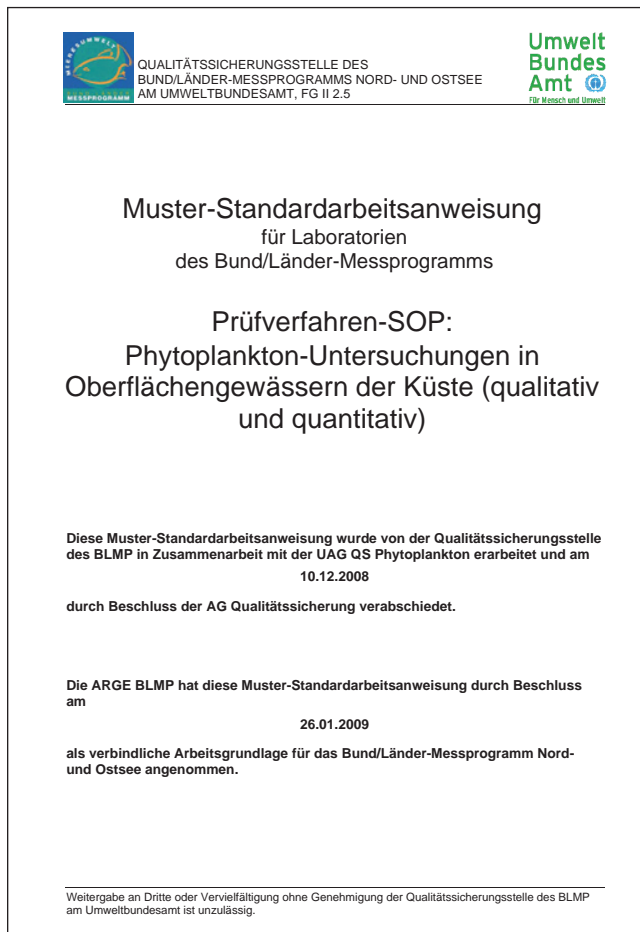


Fig. 3: Examples of selected prototypes of quality management documents issued by the Quality Assurance Panel

Abb. 3: Beispiele ausgewählter, von der QS-Stelle herausgegebener Muster-Qualitätsmanagementdokumente

## Outlook

The QA Panel of the GMMP at the UBA acts as a central contact point for the coastal federal states and the federal government in order to promote cooperation between the organisations involved in the GMMP. Moreover, it provides services regarding QA/QC issues for the laboratories. This reduces the work load of the institutions

involved in the GMMP in respect of the organisation, implementation and evaluation of quality assurance measures. At the same time it significantly increases the efficiency of all efforts taken to establish quality management systems within the scope of the marine monitoring. The aim is to ensure and improve the reliability and comparability of monitoring results especially when implementing national and international directives and standards.

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## Abbreviations / Glossary

AG	Arbeitsgruppe (Eng.: working group)
ARGE BLMP	Arbeitsgemeinschaft Bund/Länder-Messprogramm für die Meeresumwelt von Nord- und Ostsee (Eng.: Working Committee for the GMMP)
BLANO	Bund-Länder-Ausschuss Nord- und Ostsee (Eng.: Federal/Länder Committee)
BLMP	Bund/Länder-Messprogramm Nord- und Ostsee (Eng.: German Marine Monitoring Programme, GMMP)
Habitats Directive	Directive 92/43/EWG
HELCOM	Helsinki Commission, governing body of the "Convention on the Protection of the Marine Environment of the Baltic Sea Area"
Natura 2000	European network of protected areas in favour the protection of threatened habitats and species, based on protected areas according to Birds Directive and Habitat Directive
MSFD	European Marine Strategy Framework Directive. Directive 2008/56/EG
OSPAR	Governing body of the western coasts and catchments of Europe, together with the European Community, cooperating to protect the marine environment of the North-East Atlantic; the Oslo Convention against dumping of 1972 and the Paris Convention covering land-based sources and the off-shore industry of 1974 were unified by the OSPAR Convention in 1992
QM	Quality management
QA/QC	Quality assurance/Quality control
QUASIMEME	Quality Assurance of Information for Marine Environmental Monitoring in Europe
SOP	Standard Operating Procedure
UBA	Umweltbundesamt (Eng.: Federal Environment Agency)
Birds Directive	Directive 2009/147/EC
WFD	Water Framework Directive, Directive 2000/60/EG

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## ARGE BLMP Nord- und Ostsee

Auf der 34. Umweltministerkonferenz Norddeutschland am 17. April 1997 sind die zuständigen Ressorts des Bundes und der Länder Hamburg, Mecklenburg-Vorpommern, Niedersachsen und Schleswig-Holstein übereingekommen, für die Zusammenarbeit bei der Überwachung der Meeresumwelt von Nord- und Ostsee eine Arbeitsgemeinschaft Bund/Länder-Messprogramm für die Meeresumwelt von Nord- und Ostsee (ARGE BLMP Nord- und Ostsee) zu bilden.

Mitglieder der ARGE BLMP sind:

- Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz
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## Impressum

Herausgegeben vom  
Bundesamt für Seeschifffahrt und Hydrographie (BSH)  
Sekretariat Bund/Länder-Messprogramm für die Meeresumwelt von Nord- und Ostsee (BLMP)  
Bernhard-Nocht-Straße 78  
20359 Hamburg

[www.blmp-online.de](http://www.blmp-online.de)

Zu zitieren als: Meeresumwelt Aktuell Nord- und Ostsee, 2012 / 3  
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Hamburg und Rostock 2012

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