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PROJECT

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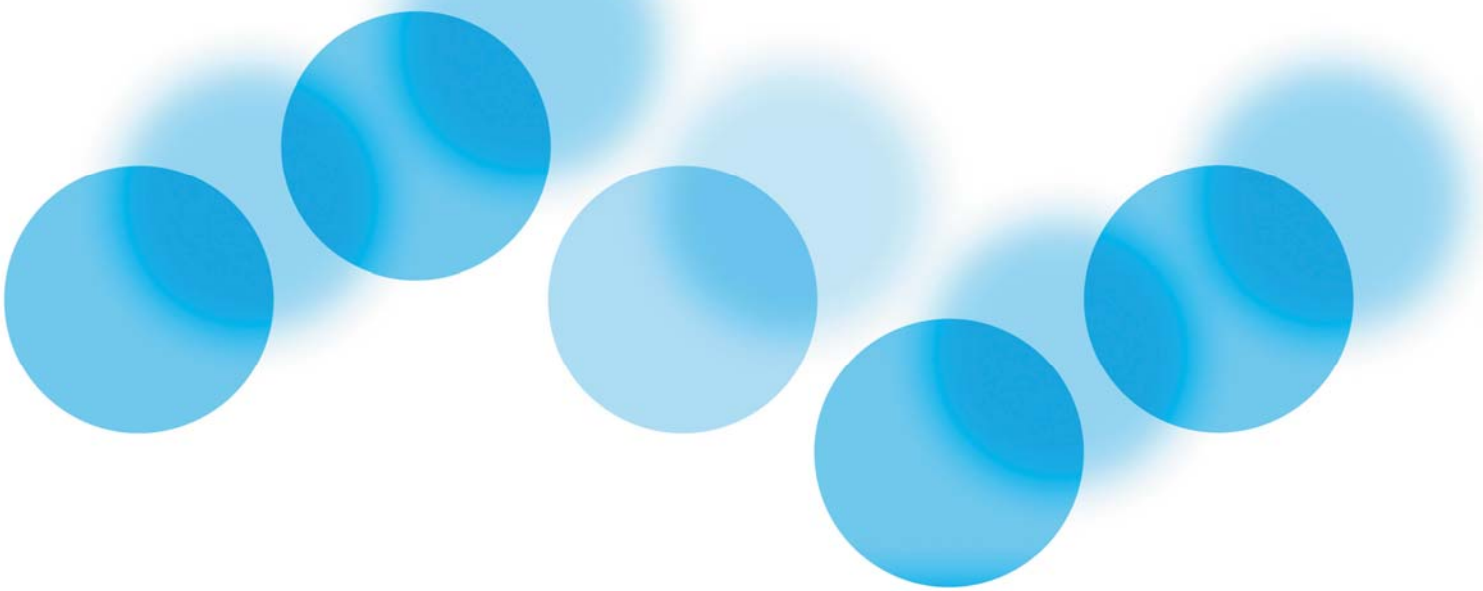
Development of operational tools for monitoring, laboratory and information management

Inception Report



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ABBREVIATIONS

AOX	Adsorbable Organic Halogens
DABLAS	Danube Black Sea Task Force Project
DOC	Dissolved Organic Carbon
DRB	Danube River Basin
DRP	Danube Regional Project
DRPC	Danube River Protection Convention
EC/EEA	European Commission / European Environment Agency
ECO EG	Ecological Expert Group
EG	Expert Group
EI	Environmental Institute
EQO	Environmental Quality Objectives
EQS	Environmental Quality Standards
EU	European Union
EU WFD	EU Water Framework Directive
GEF	Global Environment Facility
ICPDR	International Commission for the Protection of the Danube River
JDS	Joint Danube Survey
MLIM EG	Monitoring, Laboratory and Information Management Expert Group
OSS	Open Source Software
PHS	Priority Hazardous Substances
PS	Priority Substances
RBM EG	River Basin Management Expert Group
RBMP	River Basin Management Plan
TNMN	Trans-National Monitoring Network
TOC	Total Organic Carbon
UNDP	United Nations Development Programme
WFD CIS	WFD Common Implementation Strategy
WISE	Water Information System for Europe

1. OBJECTIVES OF THE ASSIGNMENT

- To review the current TNMN network taking into account the requirements of the ICPDR and to provide a recommendation for the upgrade of the TNMN in line with the WFD and other drivers including developments on data reporting at a European level (e.g. Water Information System for Europe – WISE);
- To develop a biological monitoring database in line with the recommendations of the ICPDR's MLIM EG; and,
- To prepare harmonised water quality objectives and standards for nutrients leading to an agreed water classification system (compliant with the WFD) for the Danube River Basin.

2. APPROACH OF WORK

The Danube Regional Project (DRP) has been established to contribute to the sustainable human development in the Danube River Basin (DRB) through reinforcing the capacities in the basin to develop effective co-operation to ensure the protection of the Danube River. The objective of the DRP is to complement the activities of the International Commission for the Protection of the Danube River (ICPDR) to provide a regional approach to the development of national policies and legislation and the definition of actions for nutrient reduction and pollution control in the DRB.

The tasks of the ICPDR are mandated by the "Convention on Cooperation for the Protection and Sustainable Use of the Danube River" (Danube River Protection Convention, DRPC). From this Convention also derive the responsibilities of the ICPDR to elaborate and implement joint programmes for monitoring the riverine conditions in the Danube River Basin (Article 9).

This project represents an activity within the DRP's objective of "Reinforcement of monitoring, evaluation and information systems to control transboundary pollution, and to reduce nutrients and harmful substances" and aims primarily to assist the ICPDR's Monitoring, Laboratory and Information Management Expert Group (MLIM EG) with the development (or upgrade) of operational tools necessary for the water quality management. Specifically this is to: review, and where necessary, upgrade the Trans-National Monitoring Network (TNMN) to reflect the changes in monitoring under the EU Water Framework Directive and other drivers; to develop and assist with implementing a biological database; and, to prepare harmonised water quality objectives and standards for nutrients for the Danube River Basin. This assignment builds on previous work undertaken by the MLIM EG and in Phase 1 of the UNDP/GEF Danube Regional Project.

2.1. Objective 1 - Review and assessment of TNMN

The TNMN constitutes the main data source on water quality of the Danube and its major tributaries. It was formally launched in 1996, and aims to contribute to the implementation of the Danube River Protection Convention. The Contracting Parties cooperate in the field of monitoring and assessment with the aim to harmonise or make comparable their monitoring and assessment methods, in particular in the field of river quality.

The main objective of the TNMN is to provide a structured and well-balanced overall view of the pollution status as well as of the long-term development of water quality and pollution loads in terms of relevant determinants for the major rivers in the Danube River Basin. The international aspect of TNMN is of high importance.

At its 6th Ordinary Meeting in December 2003 the ICPDR asked the MLIM EG to upgrade TNMN in line with the WFD CIS process and to prepare for the 7th Ordinary Meeting an interim report on this upgrade. The MLIM EG in cooperation with the ICPDR Secretariat prepared the status report indicating the expected way of upgrading TNMN.

A consensus was achieved by the MLIM EG at its 33rd meeting that TNMN should be a surveillance monitoring on a basin-wide scale. The issues to be covered by the operational monitoring should be primarily dealt with at the national level. Should there be any need to carry out the operational monitoring at the basin-wide level the MLIM EG will deal with it in future (i.e., an option to include the operational monitoring to TNMN will be kept open). The ICPDR Secretariat was asked to draft the objectives for the revised TNMN that should possibly include both surveillance and operational monitoring. This future strategy of TNMN is under preparation to become a key document for accomplishing Objective 1 of this assignment.

EI Consortium held the initial discussions with the Secretariat on the proposal on the TNMN strategy. It was pointed out that TNMN should reflect the provisions of the DRPC as well as the requirements of the WFD. In line with the WFD, TNMN shall be designed so as to provide a coherent and comprehensive overview of ecological and chemical status within the Danube River Basin District and shall permit classification of water bodies into five classes consistent with the normative definitions. DRPC among others requires that the Contracting Parties shall elaborate and implement joint programmes for monitoring the riverine conditions in the Danube catchment area concerning both water quality and quantity, sediments and riverine ecosystems as a basis for the assessment of transboundary impacts such as transboundary pollution. Moreover, having in mind availability of the TNMN data from years 1996-2005 supported by a sound analytical quality control programme it would be useful to have the possibility of combining these data with those being collected from the revised TNMN after 2005. This would enable a long-term view of the surface water quality trends in the Danube River Basin and would create a good informational basis for the decision makers in the region.

During discussions the Secretariat pointed at the preliminary consensus of the MLIM EG that the primary function of TNMN should be based on principles of the surveillance monitoring. These principles correspond with the future requirements of TNMN as stated above. Therefore, in line with the recommendations of the MLIM EG and the Secretariat, following objectives of the surveillance monitoring according to WFD will be taken into account during identification of TNMN monitoring sites and selection of parameters as well as of sampling frequencies:

- Supplementing and validating the impact assessment procedure detailed in Annex II;
- The efficient and effective design of future monitoring programmes;
- The assessment of long-term changes in natural conditions;
- The assessment of long-term changes resulting from widespread anthropogenic activities;
- Estimating pollutants loads transferred across international boundaries and their discharging into the Black Sea.

The final set-up, however, will be adjusted to the adopted TNMN revision strategy. It is also understood that TNMN should be based on the national surveillance monitoring networks with the effort to achieve a coordinated approach to definition of TNMN monitoring variables.

With regard to the above-mentioned facts and following the MLIM EG strategy, the EI Consortium will perform a review of the current activities and performance of the TNMN in light of the following gaps and uncertainties as were given in the Danube River Basin Roof Report 2004.

The Roof Report 2004 indicated that the analysis of the data on impacts from organic pollution had shown considerable data gaps. Of importance, not all countries measure all determinants. Roof report recommends that the following determinants should be measured in the future regularly on all TNMN monitoring sites: Total Organic Carbon (TOC), Dissolved Organic Carbon (DOC) and Adsorbable Organic Halogens (AOX). In addition, the quality of the data should be improved.

The biological impact assessments were not found fully comparable between all countries. In the upstream and middle countries the assessment is based on macrozoobenthos, in the down-stream countries (Bulgaria, Romania and Ukraine) on phytoplankton. The Saprobic System in its current form is not in line with the ecological status assessment as required by Annex V of the WFD. It will therefore be necessary to develop ecological classification methods in line with the requirements of the WFD by all countries.

The lack of data on hazardous substances is a problem caused mostly by the deficiency of adequate analytical instrumentation in the downstream countries and the lack of legal instruments for obligatory measurements. An additional factor is the high costs of the trace analysis. Thus, for each hazardous substance included in the TNMN a substantial amount of data is missing (40 to 60 %) mainly from the lower section of the Danube.

Moreover, it is necessary to emphasize that out of the 33 priority substances identified from the Decision No. 2455/2001/EC only seven are included in the TNMN. Concerning the other 26 substances very limited basin-wide information is available. The major source of information is the Joint Danube Survey. Therefore, to achieve a reliable assessment of the risk of failure to reach the good status, a vast portion of information on the ”new” substances must be collected.

The analysis of the impact from nutrient loads on a basin-wide scale is ideally based on the availability of data of high and homogenous quality, covering the whole catchment area. Analysing the issue requires data over a long period of time. There is not one individual data set with such a temporal and spatial coverage. For this reason, the analysis presented in the Roof report 2004 was based on different existing data sets.

The TNMN is the key source of surface water quality data in the Danube Basin. Despite the huge achievements within the TNMN in its relatively short period of existence (since 1996), improvements are still necessary with respect to the reliability and the completeness of the data. This refers in particular to data for total nitrogen and silicates (completeness) and data for total phosphorus (consistency). In general, this fact introduces some minor uncertainty in the analysis. The lack of basin-wide data for chlorophyll-α creates a strong uncertainty as to the possible eutrophication in the Danube and its large transboundary tributaries.

High quality data with sufficient temporal and spatial coverage are not always available. The availability of data for organic nitrogen, for silica and for chlorophyll-α is poor, while the quality of the available data for phosphorus is not good. Furthermore, the consistency of data from different sources presents a major problem.

These conclusions from the Danube basin analysis report together with the other outcomes of the WFD CIS process (in particular the products of work of the Expert Advisory Forum on Priority Substances/AMPS, WG 2A ECOSTAT and FP6 research projects AQEM, STAR, NORMAN and REBECCA) will be used for formulating the recommendations on following TNMN variables:

- Monitoring stations;
- Determinant list;
- Frequency of monitoring.

Last but not least, an important guiding principle for the consideration on TNMN variables will be their basin-wide relevance. Further details are discussed below.

Monitoring stations

The WFD requires that sufficient water bodies should be included in the surveillance monitoring programme to provide an assessment of the overall surface water status within each catchment and sub-catchment of the river basin district. It also requires that surveillance monitoring should be carried out at points where:

- The rate of water flow is significant within the river basin district as a whole; including points on large rivers where the catchment is greater than 2 500 km2;
- The volume of water present is significant within the river basin district, including large lakes and reservoirs;
- Significant bodies of water cross a Member State boundary;
- Sites are identified under the Information Exchange Decision 77/795/EEC; and

At such other sites as are required to estimate the pollutant load which is transferred across Member States boundaries, and which is transferred into the marine environment.

The first surveillance programme should also seek to establish a quantitative baseline for future assessments of long-term natural or anthropogenically induced changes, and also against which reductions in pollution from Priority Substances (PS), and cessation and phasing out of emissions of Priority Hazardous Substances (PHS) will be judged. This will be important in supplementing and validating the assessment of whether water bodies are at risk of failing Article 4 of the WFD on EQOs or not.

WFD Guidance Document on Monitoring allows Member States to determine the size of water body that needs to be included in monitoring programmes pointing that this should depend on the nature (natural and anthropogenic) of each River Basin District being characterized and the attainment of the objective to obtain a coherent and comprehensive overview of water status within the River Basin District. This approach would imply that selection of monitoring points for TNMN should bear in mind a basin-wide scope which should be kept separately from the overview necessary for the sub-basin or sub-unit level (using the terminology introduced recently by the RBM EG). The sampling profiles for the TNMN should be derived from the set of the national surveillance monitoring sampling points having on mind the TNMN upgrade strategy prepared by the Secretariat and agreed by the MLIM EG.

For identification of candidate TNMN monitoring stations the EI Consortium will perform following actions:

- Inquiry of the proposed changes in TNMN stations at the national level;
- Harmonization of the present TNMN stations with the proposed list of water bodies on the Danube and its significant tributaries from the Roof Report 2004;
- Preparation of the questionnaire searching for the necessary information (e.g. water bodies, sampling sites, coordinates, natural and heavily modified water bodies);
- Consideration on the sites for chemical and ecological monitoring (in some cases the chemical sites may not be suitable for certain biological quality elements);
- Distinguishing and identification of the surveillance monitoring sites and the operational monitoring sites.

Quality elements / determinants list

WFD Guidance Document on Monitoring stipulates that for surveillance monitoring Member States must monitor at least for a period of one year parameters indicative of all biological, hydromorphological and general physico-chemical quality elements as given in Annex V.1.1.

Biological quality elements

For rivers, the biological parameters chosen to be indicative of the status of each biological element such as the aquatic flora, macro-invertebrates and fish must be monitored for. For example, in the case of the aquatic flora, the parameters might be (i) presence or absence of indicator species or (ii) the population structure. WFD indicates that monitoring of the biological quality elements must be at an appropriate taxonomic level to achieve adequate confidence and precision in the classification of the quality elements.

Chemical quality elements

WFD requires that those priority list substances discharged into the river basin or sub-basins must be monitored. Other pollutants also need to be monitored if they are discharged in significant quantities in the river basin or sub-basin. No definition of 'significance' is given but quantities that could compromise the achievement of one of the Directive's objectives are clearly significant, and as examples, one might assume that a discharge that impacted a "Protected Area", or caused exceedance of any national standard set under Annex V 1.2.6 of the Directive or caused a biological or ecotoxicological effect in a water body would be expected to be significant.

For recommendation on the chemical quality elements for TNMN a structured approach will be used for the process of selecting which chemical should be monitored for in the surveillance monitoring programme. This approach will take into account the existing data flows from the current TNMN programme and, in addition, will be based on:

- a knowledge of use patterns of a substance (quantity and locations);
- pathways for inputs (diffuse and/or point source);
- existing information on potential ecological impacts;
- risk assessment performed in line with the Annex II of WFD;
- potential existing indications of toxic impacts (using the outcomes of the 6th EU Framework Programme project AQUATERRA). This may help to identify situations where unknown chemicals are entering the environment, which need investigative monitoring.

Hydromorphological quality elements

Surveillance monitoring shall be carried out for each monitoring site for a period of one year during the period covered by a river basin management plan for parameters indicative of all hydromorphological quality elements. Hydromorphological elements supporting the biological elements listed in WFD are following:

- Hydrological regime
  - quantity and dynamics of water flow
  - connection to groundwater bodies
- River continuity
- Morphological conditions
  - river depth and width variation
  - structure and substrate of the river bed
  - structure of the riparian zone

According to the Roof report 2004, the most important hydromorphological pressures are related to hydropower use, navigation and flood defence measures. In this report it is also stressed that:

- Methods for the assessment of significant hydromorphological alterations need to be harmonised. A type-specific approach would be advisable.
- Further research is needed on the link between hydromorphological pressures and the response of the biota. Ecological classification systems should be developed in a way to also assess hydromorphological degradation. Common methods would be needed (e.g. common sampling method, common approach for the analysis and interpretation of results, stressor specific multimetric classification systems).
- Future monitoring networks need to include sites that are "at risk" of failing to reach the environmental objectives due to impacts from hydromorphological pressures.

At present, the analysis of hydromorphological quality elements within TNMN is limited only to quantity of water flow. To comply with WFD, TNMN has to be amended with a regular analysis of a full set of hydromorphological parameters. More important, at this point, is setting of a jointly harmonized methodological approach throughout the whole Danube River Basin.

Timing / frequency of monitoring

Surveillance monitoring has to be undertaken for at least a period of one year during the period of a RBMP. The deadline for the first RBMP is 22 December 2009. The monitoring programmes must start by 22 December 2006. The first results will be needed for the first draft RBMP to be published at the end of 2008, and then for the finalised RBMPs at the end of 2009. This is a formal requirement of WFD. As for the minimum requirements by the law for the surveillance monitoring period, the frequencies for monitoring parameters indicative of physico-chemical quality elements given below should be applied unless greater intervals would be justified on the basis of technical knowledge and expert judgement. For biological or hydromorphological quality elements monitoring shall be carried out at least once during the surveillance monitoring period.

Quality element	**Rivers**	**Lakes**	**Transitional**	**Coastal**
Biological				
Phytoplankton	6 months	6 months	6 months	6 months
Other aquatic flora	3 years	3 years	3 years	3 years
Macro invertebrates	3 years	3 years	3 years	3 years
Fish	3 years	3 years	3 years	
Hydromorphological				
Continuity	6 years			
Hydrology	continuous	1 month		
Morphology	6 years	6 years	6 years	6 years
Physico-chemical				
Thermal conditions	3 months	3 months	3 months	3 months
Oxygenation	3 months	3 months	3 months	3 months
Salinity	3 months	3 months	3 months	
Nutrient status	3 months	3 months	3 months	3 months
Acidification status	3 months	3 months		
Other pollutants	3 months	3 months	3 months	3 months
Priority substances	1 month	1 month	1 month	1 month

WFD Monitoring Guidance points out that some determinants and quality elements will be very variable (natural, anthropogenically caused and due to sampling error) in particular water bodies. A lot of monitoring in terms of numbers of sites and frequency of monitoring might thus be required to obtain high or sufficient levels of confidence and precision in a water body's status. There will of course be a cost implication for Member States for the required monitoring. It is likely therefore, that the levels of confidence and precision achievable will be balanced against the costs, i.e. an assessment of the cost-effectiveness of the monitoring programme may be undertaken. In short, the provision of reliable information from monitoring programmes will allow measures to be effectively and efficiently targeted.

The discussion with the ICPDR Secretariat indicated that an increase in the surveillance frequency of the monitoring cycle within the TNMN would be preferred in order to provide a sound picture on the status of the Danube River Basin. This means that there is an intention to maintain the frequency used in TNMN at present. The philosophy behind is a need to preserve the current level of the information flow for the long-term considerations and trend assumptions, as well as to maintain current statistical confidence interval leading to achievement of a sound and stable overview on the status of surface waters in the Danube River Basin.

The optimization of the TNMN monitoring frequency of chemical determinants (primarily nutrients) will also be reconsidered in the view of necessary inputs for water quality modelling. In this respect the recommendations of the 5th EU Framework Programme project Danubs will be referred to.

Operational monitoring

For all bodies of water, which have been identified as being at risk of failing to meet their environmental objectives under the Article 4 of WFD and for those bodies of water into which priority substances are discharged an operational monitoring has to be carried out. The results of the operational monitoring will be an essential part of the Danube River Basin Management Plan. That is why the MLIM EG put the potential concept of TNMN operational monitoring into consideration. The project team will follow the dialogue within the ICPDR concerning incorporation of operational monitoring into TNMN, and will adjust the recommendations accordingly. Nevertheless, the EI Consortium is of the opinion that an establishment of the operational monitoring is primarily national issue directly linked with the commitments of the country towards implementation of WFD.

Regarding geographical coverage, the threshold for the TNMN operational monitoring should be identical with the cut-off criteria applied for the Roof report 2004:

- the Danube and its tributaries with a catchment size of > 4 000 km²,
- all lakes and lagoons with an area of > 100 km²,
- the main canals,
- transitional and coastal waters.

As regards the structure of the future TNMN operational monitoring it may be directly combined with the surveillance monitoring or it may be organized as a separate network. In our opinion the preferable option is to run the operational monitoring under a separate monitoring network and report on it in a specific format.

Monitoring of coastal waters and protected areas

Monitoring of coastal waters will be performed by Romania; four sampling points were proposed to the TNMN.

As regards monitoring of the protected areas, the MLIM EG is responsible for developing a monitoring program in line with the Article 8 of WFD. At the 33rd MLIM EG meeting, it was agreed that the discussion on this issue on the basin-wide level would start only after the concepts of monitoring of the protected areas had been developed at the national level in the Danube countries. In the light of the conclusions adopted at the 34th MLIM EG meeting, the Secretariat will initiate discussion with the ECO EG on monitoring of the protected areas. The outcomes of that dialogue will influence accomplishment of Task 2.

Monitoring of wetlands (referring to their function as wetlands and not as protected areas) is beyond the scope of the TNMN.

EUROWATERNET/WISE

At present, there is a proposal at the EC/EEA level for a shared pool of common and timely data and information on the state of, and pressures on, Europe's water (WISE = Water Information System for Europe) that meets the needs of all those organisations requiring to report and make assessments at the European level. Agreement among countries will have to be reached on many aspects such as the determinants (e.g. physico-chemical (nitrate, phosphate, etc.), biological (benthic invertebrates, fish etc.) and hydromorphological (habitat features, river flow etc.) quality elements), level of data aggregation, spatial and temporal resolution, and on the metadata held within WISE. Appropriate tools are available (e.g. REPORTNET) to facilitate the process of populating and developing WISE. In the past, EUROWATERNET (EIONET-water) was developed and implemented to provide much of the data and information on the state and trends of Europe's waters needed by the EEA. EUROWATERNET is one of the EEA's REPORTNET tools. Currently, the ICPDR Contracting Parties report water quality data to the EUROWATERNET separately from the TNMN reporting.

In order to simplify the enormous complexity of the natural environment, the EEA has, for its major reports and assessments, developed a multi-thematic core set of indicators which includes indicators on water, most of which are based on data arising from EIONET-water. These are updated annually and are published on the EEA's website. There is also a more comprehensive set of water indicators that are used in broader assessment reports such as the Water Indicator Report published in 2003. At present, following groups of indicators are used by EEA:

- Nutrients in rivers. Annually aggregated data over as long a time period as possible (concentrations of total oxidised nitrogen, nitrate nitrogen, nitrite nitrogen, total phosphorus, ortho-phosphate phosphorus).
- Oxygen consuming substances in rivers. Annually aggregated data over as long a time period as possible (concentrations of dissolved oxygen, ammonium nitrogen, nitrite nitrogen, Kjeldahl nitrogen, biological oxygen demand, chemical oxygen demand).
- Hazardous substances (metals) in rivers. Disaggregated data over as long a time period as possible (concentrations of mercury, cadmium, copper, lead, nickel and zinc).
- Hazardous substances (organics) in rivers. Disaggregated data over as long a time period as possible (concentrations of anthracene, benzene, benzo-a-pyrene, benzo-b,k,-fluoranthene, benzo-g,h,i,-perylene, naphthalene, etc.)
- Hazardous substances (pesticides) in rivers. Disaggregated data over as long a time period as possible (concentrations of lindane, simazine, alachlor, aldrin, alpha-endosulfan, dieldrin, endrin).

It is now recognised by Member States, the European Commission, the EEA and other bodies with a stake in reporting procedures that there is a need for "streamlining" the reporting process, gathering more useful and relevant information and making the exchange process as efficient as possible using modern technology.

The ultimate aim of the new proposed information system is to get a true appreciation of the real situation of the environment at the European level and to facilitate the use of information supplied for the legal obligations of compliance checking for use in other environmental reporting systems. This will be achieved through transparent and manageable procedures where data quality, treatment, delivery, access and use are clearly addressed. The scheme also indicates where the responsibilities of the Commission and Member States lie. Ultimately, proper sharing of information should lead to Member States being able to operate consolidated

monitoring programmes that can provide the correct data and information for a number of different purposes, including those of the Member States themselves.

The European Commission (DG ENV, Eurostat and JRC) and the EEA are committed to continue the development of a new, comprehensive and shared European data and information management system for water, including river basins, following a participatory approach towards the Member States, in order to have it operational as soon as possible and to implement it, including all the various elements set out in this document, by 2010.

Current situation regarding the overlap of monitoring points between TNMN and EIONET-Water was assessed within the UNDP-GEF Danube Regional Project. The report on "Harmonisation and streamlining the ICPDR reporting and information collection needs in line with the EU directives and national obligations" compared the TNMN stations with those stations included in the EEA's EIONET-Water system. It was found that of the 124 TNMN stations, 62 are also included in EIONET-Water, 31 are not, and there are 31 stations where the location is included in EIONET-Water but not including all the stations at that location (e.g. where there are three stations across the river at a location, EIONET-Water may only have one of the three). There are also 669 stations in the Danube catchment included in EIONET-Water and potentially another 37 stations, which would need their exact location checked against the geographic limits of the Danube catchment.

Having on mind planned streamlining of the data flows to WISE and TNMN the above-mentioned analysis has to be updated for the revised TNMN. Moreover, a full coherence has to be achieved as far as the selection of monitoring points for TNMN and WISE is concerned. In addition to that, it will be necessary to compare the Water (rivers) Indicators used by the EEA for its assessment reports with the proposed parameters for TNMN. It is foreseen that future TNMN may require incorporation of specific determinants other than those used in EIONET-Water.

The EI Consortium will make their best efforts in identifying the means to ensure that the same national data sets are used (wherever possible) for as many reporting needs as feasible. The major attention will be given to streamlining of water quality data reporting to the EEA and ICPDR.

EI Consortium will perform a review of the current activities and performance of the TNMN in light of the gaps and uncertainties as given in the Danube River Basin Roof Report 2004 as well as of the present reporting on water quality to the EUROWATERNET.

2.1.1. Applied methodology

2.1.1.1. EIONET-Water reporting / national monitoring revision plans enquiry

Enquiry will be organized during second and third month of the project. It will review the planned revision of the TNMN monitoring points as seen from the national perspective, updating the information provided in the Interim Report "Upgrade of TNMN in response to WFD implementation", which was presented at the 7th ICPDR Ordinary Meeting in December 2004. The enquiry will also collect available data on nomination of monitoring points for national operational monitoring applying the basin-wide cut-off level as used in the Roof report 2004. Simultaneously, a possibility of inclusion of these sampling sites into the existing annual EIONET-Water data flows will be investigated.

2.1.1.2. TNMN revision draft proposal

Referring to the objectives and concepts mentioned earlier as well as to the TNMN upgrade strategy as proposed by the ICPDR Secretariat and agreed by the MLIM EG, a draft TNMN revision concept will be elaborated containing discussion on major issues (objectives, streamlining of data flows, types of monitoring applied) and recommendations on the monitoring variables (monitoring stations, determinant list, monitoring frequencies). Draft TNMN revision concept will be submitted to the UNDP/GEF DRP to be commented by the MLIM EG and the ICPDR Secretariat.

2.1.1.3. Feedback on concept from the ICPDR

Original plan was that the members of the EI consortium would attend the meeting of the MLIM EG to receive a feedback on the draft proposal. However, the planned date of the forthcoming MLIM EG meeting (6-7 October 2005) is too early for presenting the first draft of the TNMN revision concept (planned for November 2005). Therefore, it is suggested that the members of the EI consortium will attend the MLIM EG meeting in October to monitor the discussion and expected approval of TNMN revision objectives; to present the basic ideas of the TNMN revision concept and to collect the first comments and impressions from the MLIM EG. After preparation of the Draft TNMN revision concept (expected by the end of November) this will be distributed by e-mail and placed onto the UNDP/GEF DRP as well as ICPDR websites. Collection of the feedback will be organized via a written procedure. The revised draft will be presented at the expected meeting of the MLIM EG in the spring 2006 and a final set of comments will be collected.

2.1.1.4. TNMN revision final report

After two rounds of commenting procedure as stated above the EI consortium will incorporate the comments and will prepare a final version of the TNMN revision report.

For drafting TNMN revision report a close cooperation with the MLIM EG and the relevant national experts is inevitable, as the future TNMN must be fully compatible with the national goals and developments of the WFD CIS implementation process. For this purpose the EI Consortium subcontracted members and/or experts from the ICPDR Contracting Parties covering about 75% of the Danube River Basin area (Germany, Austria, Slovak Republic, Hungary, Serbia, Romania) having a strong background in the TNMN operation.

The EI Consortium will assure that all conclusions and recommendations will be discussed with the MLIM EG prior their final presentation to the UNDP/GEF DRP.

2.2. Objective 2 - Biological database development

2.2.1. General considerations / taxonomy

The EI Consortium will continue in the development of the biological database applying the recommendations of EI experts formulated at its conceptual design, which was completed under the Phase 1 of the DRP. The concept, including recommendations, has already been approved by the MLIM EG.

The general recommendations regarding the biological database were as follows:

- Using the JDS Database structure and coding for establishment of the TNMN Biological Database;
- Coding:
  - Change/upgrade of the JDS codes taking into account work of expert groups at the EU level (AQEM (www.aqem.de) and STAR (www.eu-star.at) projects);
  - Incorporation of taxonomical changes according to AQEM and STAR;
  - Introduction of a shortcode for species, different national codes and a table of current synonyms;
- Using special (non-Excel) data collection sheets (e.g., adjusted AQEM-DIP programme);
- Development of a tool for calculation of the dominance of Higher Taxonomic Groups (HTG) for macrozoobenthos, phytobenthos and macrophytes;
- Development of a query option for the selection tree "HTG – Families – Species" in all biological databases;
- Upgrades and introduction of data into each part of the biological database (macrozoobenthos, phytobenthos, macrophytes, phytoplankton and fish) should be taken care of by different specialised institutions/team of experts.

The specific comments were as follows:

Macro-invertebrate data

The current coding system for benthic invertebrates is based on the Austrian database system ECOPROF (www.ecoprof.at). However, in order to progress towards a harmonised European taxalist the consortium plans to use taxonomy, synonyms and systematics from the AQEM (www.aqem.de) and STAR (www.eu-star.at) taxalists, which were already checked by taxonomical experts at wider European scale. The macrozoobenthos database currently contains double entries that have to be removed.

Phytobenthos

Similar to macroinvertebrates, the problem of synonyms and new taxa names will have to be solved. This relates mainly to the diatoms, where new taxa and new combinations of the taxa are published frequently in connection to the new development in this field, e.g., techniques using electron microscopy.

New taxa will have to be added to the database and coded using the new information and outcomes of STAR project (cf. above). Renamed taxa should be connected to the previous version of the database in order to assure continuity between the old and new data.

As the first step it is proposed to start with diatoms (method of sampling, treatment, counting and identification); later on to continue with the other groups of phytobenthos (e.g. Cyanophyta, Chlorophyta, Rhodophyta).

Macrophytes

Following improvements/corrections were suggested for the macrophyte database:

a) Corrections concerning terminology mistakes;

b) Addition of species, which were not collected during the JDS, but known to be present in general within the Danube River Basin;

c) Deletion of species which do not exist;

d) Abbreviation P. within the column GENUS should always be changed to POTAMOGETON.

e) The Higher Taxonomic Group CHLOROPHYTA/CHAROPHYCEAE shows a mismatched Group Code. Therefore, the current Group Code should be changed from H (phytobenthos) to F (macrophytes). If the biological parameter group Phytobenthos also includes the Higher Taxonomic Group CHLOROPHYTA/CHAROPHYCEAE both Group Codes H and F need to be included in the database.

Phytoplankton and Zooplankton

Only minor specific recommendations to the phytoplankton and zooplankton database were proposed. EI consortium will focus mostly on the database of phytoplankton (as this is a biological quality element of the WFD).

All above recommendations will be followed by the EI Consortium during the development of the biological database. A care will be taken that biological databases for macrozoobenthos, phytobenthos, phytoplankton, fish and macrophytes will use the same software platform as regards the structure and queries. The concept for reporting data on fish and ecotoxicological data will be proposed.

Fish

A first draft of the Danube Basin fish list will be prepared. For a successful accomplishment of this task a strong cooperation with the fish experts in the Danube countries recommended by the MLIM EG will be essential.

2.2.2. Applied methodology

The key aspects of the development of the ICPDR biological database from the standpoint of information technologies as well as the methodology are proposed below.

Database prototype

A prototype for a biological database has been developed during the Joint Danube Survey (JDS) in 2001-2002. This prototype consists of:

- A database structure extending the database format used in the TNMN (for a description, see Annex 1).
- Spreadsheets (MS Excel) for data collection with validation (drop-down lists) for sampling stations and species;
- Data collected during the JDS: 7,833 records of species definitions (codes) and 17,686 records of species found;
- Several database reports based on Oracle Portal and Oracle Database for querying and exporting the data.

As a part of the project, all the above elements have to be revised and adapted according to lessons learned during the work with the prototype, new developments (e.g., AQEM/STAR, EEA/WISE) and inputs from Task 2 - Review and assessment of TNMN.

Purpose and users

The purpose of the database (e.g., storage, archive, consolidation, aggregation, analysis, decision-support, reporting) and its target user groups (e.g., biological experts, other experts, managers, general public, stakeholders) have to be clearly defined prior to making further decisions on the database development.

An enquiry will be performed among the MLIM EG members addressing, among others, following questions:

- Who are the future users?
- What is the intended use of the database (viewing only, queries of old data or also upload of new ones, etc.?
- Which are the main queries that will be needed?

Software platform

Although the prototype and all closely interrelated databases (TNMN and Danube Surveys Database, which includes data from the JDS, JDS-ITR and ADS) are developed under Oracle Portal, a platform change to OSS (Open Source Software) should be considered for newly developed components. OSS applications based on Oracle database have successfully been used in recent IT projects within the ICPDR (DABLAS II, ICPDR public website). The use of OSS instead of Portal would give more flexibility in the design of the user interface. Additionally, database-independent code should be used to increase the portability of the application for future usage options.

Database structure, data coding

The database model will be thoroughly reviewed and enhanced to accommodate relevant codings and synonyms. A primary coding system developed within the AQEM and STAR projects will be adopted. The additional introduction of national codes should also be considered to ease the integration of national data. For this purpose, national experts will have to provide translation tables of national codes to the primary coding system as a part of the enquiry.

The usage of uncoded species is not recommended and should be avoided. To have a sound and extensive taxa collection as a base, it is therefore necessary to collect as many species from all future user countries as possible and apply to them the primary coding system before the databases will be viewed publicly. Possible new/not available species in the database should be gathered at a central place and undergo a quality assurance procedure.

Data entry and import tools

Prior to the design of data entry and import tools, the update process of the database has to be clarified (frequency of updates, decentralised or central updates, batch or on-line processing, formats, coding and methods, as well as data approval and editing options, access rights and related user roles).

The Excel sheets used during the prototype development phase had several weaknesses: (i) data providers found them too restrictive (no copy and paste allowed) and too complicated (drop-down lists with more than 4000 entries); (ii) the database import still needed considerable manual intervention as not all validations could be made within the Excel sheets.

A more efficient and sustainable solution will be developed within this task. This solution could still use spreadsheets or other types of file formats for mass data, e.g., CSV files (comma-separated text files) or XML files. However, in contrast to the validation in the local files, the validation logic would be on the server side only. This import interface will have to be well defined and developed according to the defined database structure and coding conventions.

Additionally, the publicly available data input software developed during the AQEM and STAR projects (AQEM-DIP I & II) could be used. The programme includes quality control features and synonyms and its possible usage will be evaluated by the biological experts from the EI Consortium. As a part of the project activities, the software's user interface and export functions would have to be made compatible to the import format of the ICPDR.

The sampling methods used for the collection of species in the database have to be comparable. In cases of using different methods it has to be clarified how these methods will be made comparable (use of presence/absence data or individuals per m² etc.).

Data review tools

Existing data will have to be revised and corrected as mentioned above in the *General considerations/taxonomy*.

Mass review of data will be done using data export and import tools. Depending on the defined update process, on-line forms to approve, edit or delete data might be needed as well.

Data query and export tools

The needed data queries, their parameters and interlinkages, as well as export formats for the new database have to be defined clearly prior to implementation. The current user interface for the JDS biological data should be regarded as a prototype and reviewed by relevant experts. This review should result in recommendations towards improving usability and efficiency of the user interface for the specified target group(s). The obtained definitions and recommendations will be the base for the implementation of the tools.

Testing

All tools for entry, import, review, querying and export of the data will be tested by a selected group of target users. During these tests, fine-tuning and recommendations for further development of the tools will be performed.

During the work on the databases a close cooperation will be secured with the biology experts of the MLIM EG to enable a rapid feedback as well as streamlining and harmonisation of the existing national approaches for storage of the biological data.

A special attention will be given to the development of the biological database under WISE to ensure a coherent approach during the elaboration of the ICPDR biological database.

2.3. Objective 3 - Development of Water Quality Standards

2.3.1. Background

In the report "Orientation on environmental quality standards for nutrients and other Danube specific priority substances" published in 2003, a first exercise was conducted to formulate Environmental Quality Standards (EQS) for nutrients in line with the WFD. While the report adhered to the WFD denominators for "high" and "good" status, it did not apply a type-specific approach. For instance: the proposed EQS for nutrients were derived from a rather generic pool of water quality standards that also mixed standards for lakes and rivers. Not having applied the type-specific approach was considered the major comment on the study.

Excerpt from the Technical Proposal

Task 4 - Development of Water Quality Standards

The EI Consortium will take this task as a continuation of outputs of the Phase 1 activities. The Consultants will propose a development of the required water quality standards for nutrients leading to a harmonised water classification system. This system will be compatible with the needs of the WFD.

In the Phase 1 report the "good status" EQSs were suggested for nutrients, in line with the WFD. The proposed EQS was to avoid eutrophication in the Danube basin. However, no type-specific approach was applied.

Therefore, the revision of the EQS for nutrients developed in the Phase 1 will be based on the type-specific approach accounting for the natural background conditions. Current development at the EU level (WG2A ECOSTAT – Guidance Document on assessment of Eutrophication) will be taken into account.

Task 4 activities will further include:

- consultations with biological experts;
- investigations on the actual occurrences of eutrophication in the Danube River Basin, combining the findings with the physico-chemical data available;
- reviewing developments in other European river basins during implementation of the WFD.

The EQS for nutrients developed in the Phase 1 did not take into account the impact of pollution on the Black Sea. Since the EQSs to be set should both enable a "good status" situation within the Danube Basin itself, as well as in the Black Sea regions influenced by the discharge of the Danube, this factor will be critically considered as well.

2.3.2. WFD and type-specific water quality standards

'Good status'

The final objective of the WFD is 'good status' of surface- and groundwaters. WFD article 2.18 gives the following definition: 'Good surface water status' means the status achieved by a surface water body when both its ecological status and its chemical status are at least 'good'1.

The chemical status relates to the specific synthetic and non-synthetic pollutants, including the priority substances. The ecological 'good status' comprises both hydrobiological and physico-chemical quality elements, the nutrients being part of the latter group.

WFD Annex V.1.2 describes the 'good' status of the physico-chemical quality elements as follows:

General conditions

- Temperature, oxygenation conditions and transparency do not reach levels outside the ranges established so as to ensure the functioning of the ecosystem and the achievement of the values specified above for the biological quality elements.

[1] For the sake of simplicity in this Inception report also for the time being 'Good Ecological Potential' for artificial and or heavily modified water bodies is implied.

- Nutrient concentrations do not exceed the levels established so as to ensure the functioning of the ecosystem and the achievement of the values specified above for the biological quality elements.

The physico-chemical (general conditions) quality elements and the hydromorphological quality elements sometimes are qualified as elements supporting the biological elements. Meaning that the biological status is the penultimate goal; if the status according to the physico-chemical quality elements is 'good' or 'high', but the biological status 'moderate' or worse, then the ecological status is qualified as 'moderate' or worse. Vice versa a similar situation applies. In its document "Overall Approach to the Classification of Ecological Status and Ecological Potential", Working Group 2A Ecological Status (ECOSTAT) mentions the following in chapter 4: "However, if one or more of the general physico-chemical quality elements or specific pollutants do not meet the conditions required for good ecological status/potential but the biological quality elements do, the overall ecological status/potential will be moderate."

The implications of the latter statement can be quite considerable, since in this case a water body is qualified to be 'at risk' and has to be subjected to a plan of measures in order to improve the ecological status.

Type-specific quality standards

WFD Annex V.1.3. Establishment of type-specific reference conditions for surface water body types prescribes the following:

(i) For each surface water body type characterised in accordance with section 1.1, type-specific hydromorphological and physico-chemical conditions shall be established representing the values of the hydromorphological and physico-chemical quality elements specified in point 1.1 in Annex V for that surface water body type at high ecological status as defined in the relevant table in point 1.2 in Annex V. Type-specific biological reference conditions shall be established, representing the values of the biological quality elements specified in point 1.1 in Annex V for that surface water body type at high ecological status as defined in the relevant table in section 1.2 in Annex V.

Table 1.2 in section 1.2 of WFD Annex V mentions the following in relation with 'high status' for nutrients: *Nutrient concentrations remain within the range normally associated with undisturbed conditions*.

As mentioned above, 'good status' for nutrients is described as: *Nutrient concentrations do not exceed the levels established so as to ensure the functioning of the ecosystem and the achievement of the values specified above for the biological quality elements*. The description of 'good' status for biological quality elements is considered to be one of the more complicated parts of the WFD. WFD Annex V.1.2, table 1.2: "*The values of the biological quality elements for the surface water body type show low levels of distortion resulting from human activity, but deviate only slightly from those normally associated with the surface water body type under undisturbed conditions*". Quantification of 'a slight deviation' already caused many headaches all around Europe…

The "Overall Approach to the Classification of Ecological Status and Ecological Potential" [2] in clear words describe the necessity for type-specific 'good status' levels of physico-chemical quality elements: (4.2) "*The ranges and levels established for the general physico-chemical quality elements must support the achievement of the values required for the biological quality elements at good status or good potential, as relevant. Since the values for the biological quality elements at good status will be type-specific, it is reasonable to assume that the ranges and levels established for the general physico-chemical quality elements should also be type-specific. Several types may share the same ranges or levels for some or all of the general physico-chemical quality elements"*.

2.3.3. Problem formulation

2.3.3.1. Limit scope to 'good status' values

From WFD Annex V.1.4 "Classification and presentation of ecological status" one would infer that also for the physico-chemical quality elements five quality classes are to be defined. Among others from the REFCOND and the ECOSTAT documents one though may conclude that it suffices to define only 'high' and 'good' status. From a compliance testing point of view one further can argue that only 'good status' quality standards have to be formulated, since this is the major criterion (objective) under the WFD. It is proposed that the underlying study indeed only will focus on the development of 'good status' quality standards for nutrients.

2.3.3.2. Natural background or 'high status' values

Although just above it has been proposed to limit the scope of the study to the development of 'good status' quality standards, it still can be considered useful to investigate natural background concentrations for nutrients in the Danube basin. The following arguments could apply:

a) having the natural background concentrations provides a good reference of what will be the lower limits when dealing with setting the good status values; historic monitoring data (e.g. from the 1950-ies) may serve as a proxy for natural background levels;

b) knowing the type-specific natural background concentrations of the various types of water bodies definitely will facilitate setting 'good status' values, rather independent of having to infer/defer them from the general biological/ecological (reference) conditions.

At least the following bottlenecks can be expected:

- During the Phase 1 study only very few references to natural background levels of nutrients in the Danube Basin could be found at all.
- Lack of data. It is questionable whether for the whole Danube basin records exist with historic measurement data for nutrients, more or less covering the various water types.
- Missing data. In many (e.g. 1990-ies) water quality data sets of CEEC countries, total nitrogen often is missing since it simply has not been analysed.
- Use of models. In the Phase 1 report also estimates for natural background concentrations based upon MONERIS calculations were included. However, part of the Austrian comments included the statement that "However, MONERIS cannot be used for setting any concentration values for High Status or other management thresholds" (Phase 1 Report, chapter 7).

2.3.3.3. Levels as to ensure the functioning of the ecosystem

This comprises the core issue. Ideally, one would like to know for each type-specific ecosystem the boundary conditions for physico-chemical and hydromorphological quality elements to ensure proper functioning. But, already for one type-specific ecosystem it will be quite complicated to define/prescribe such boundary conditions, so let alone to do so for a variety of water types.

In the Phase 1 report is was proposed to make the normative definition "*Nutrient concentrations do not exceed the levels established so as to ensure the functioning of the ecosystem*" more operational by rephrasing 'good status' values as ""nutrient concentrations such that chances on

the occurrence of eutrophication are minimised, or (preferably) avoided". It is proposed to maintain this working definition also for the present study.

An additional advantage is that the study can incorporate the progress and findings made by the ECOSTAT Working Group 2.a in their "Guidance Document on assessment of Eutrophication". The figure and table below (quoted from the Guidance Document) summarise the derived questions in an illustrative way.

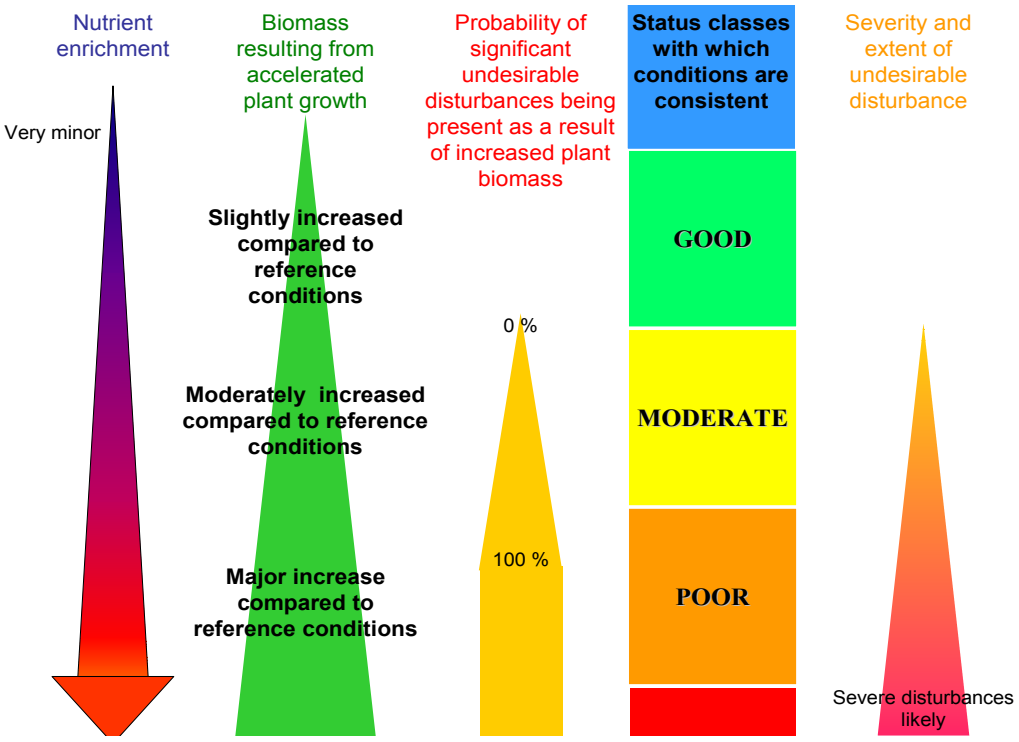


Figure 1: Once phytoplankton biomass; macroalgal cover; average phytobenthic abundance; average macrophytic abundance or angiosperm abundance has reached levels at which the probability of a significant undesirable disturbance to the aquatic ecosystem is no longer negligible, the condition of the water body would not be consistent with good status.

Table 1: Qualitative criteria for assessing Ecological Status in terms of eutrophication impacts

Ecological Status	WFD normative definition	Primary impacts (e.g. phytoplankton biomass)	Secondary impacts (e.g. O_2 deficiency)
High	Nearly undisturbed conditions	None	None
Good	Slight change in composition or biomass.	Slight	None
Moderate	Moderate change in composition or biomass.	Change in biomass & composition begins to be environmentally significant, i.e. pollution tolerant species more common.	Occasional impacts from increased biomass.
Poor	Major change in biological communities.	Pollution sensitive species no longer common. Persistent blooms of pollution tolerant species	Secondary impacts common & occasionally severe.
Bad	Severe change in biological comm.	Totally dominated by pollution tolerant species	Severe impacts common

2.3.3.4. Amount of types of water bodies

Based upon the Danube Basin Analysis (WFD Roof Report 2004) the following numbers of water bodies have been distinguished in the Danube basin:

- Danube river (main course): 44
- Tributaries: 485
- Lakes and lagoons (for the basin-wide overview): 5
- Transitional waters: 5
- Coastal waters: 3

Not all differences between water types necessarily are also 'nutrient relevant'. For instance: the systems A and B descriptors for rivers (WFD, Annex II) are mainly physically, like altitude, geology, mean water depth, acid neutralising capacity, et cetera. Within the project it will not be possible to address all (relevant) water types in the Danube basin. A selection will be proposed during implementation.

2.3.3.5. Links with the Black Sea

As suggested in the project proposal, it is proposed to include pollution of the Black Sea with nutrients into the assessment and development of nutrient quality standards. Already from a conceptual point of view this introduces an intriguing situation, since one may put as a statement that when considering (reduction of) pollution of the Black Sea with nutrients discharged through the Danube one adds "non type-specific" criteria to the Danube itself. It would be interesting situation, when for instance one could argue that lower nutrient concentrations in the Danube are to be achieved to prevent eutrophication phenomena in the Black Sea than would be required by type-specific conditions in the Danube itself.

2.3.4. Applied methodology - optional approaches

2.3.4.1. Major concern

Our major concern is to identify and agree on those activities, which with this complex topic and resources available will render the most useful outputs. There are serious risks for the activities trying to encompass too wide a scope, like trying to actually formulate type-specific nutrient 'good status' nutrient levels for the various water types in the Danube Basin.

To our opinion it is more relevant that the projects aims at elaborating practical methods and procedures that can be applied when establishing type-specific 'good status levels' for nutrients. Preferably the procedure already can be applied to some cases, where maybe the main course of the Danube River itself might prevail as an example.

2.3.4.2. Possible activities

Below, we have listed a series of activities we consider useful and relevant in the framework of this project task. We propose to discuss these and other options during the meetings with the responsible staff of UNDP/GEF DRP, ICPDR and MLIM EG.

1. **Collect, examine, and evaluate examples in which type-specific good status levels for nutrients have been formulated.**

Several cases already have been identified in which type-specific target values for nutrients have been formulated. Austria concluded such an exercise last year and for the Netherlands several reports with such results have been published. Also results of studies like REBECCA will be included. The available examples will be examined for their approaches and methods and summarised for possible application in the Danube Basin.

2. **Investigate availability of data, or possible sources with data on natural background and/or historic nutrient concentrations.**

As mentioned in section on "Natural background or 'high status' values" such data can be useful when discussing and assessing good status levels. The first search is merely to investigate availability as such. Depending on the expected success, the data actually can be collected and processed. Limiting factors for instance can be: data are included in hardcopies only, which furthermore are hard to be accessed (like stored in bulk archives).

Simultaneously, the possible use of models like MONERIS in this context might once more be investigated and probed.

3. **Investigate availability of actual monitoring or other research data with occurrences of eutrophication and nutrient concentrations.**

In the Phase 1 report an example has been elaborated in which the Joint Danube Survey data were used and interpreted against the then proposed EQSs for nutrients. Such 'real life data' examples are considered to be very valuable while setting standards.

4. **Identify and contact some key biological experts for the Danube Basin.**

As suggested in the proposal, we consider it useful to discuss the issue of setting type-specific standards for nutrients with some hydrobiological experts. Besides trying to get actual indications for such levels, it is equally important to get better understanding on how to approach the issue of setting type-specific 'good status' standards for nutrients from a hydrobiological point of view. Like: what criteria do hydrobiologists use when assessing critical nutrient concentrations in various water types.

5. **Elaborate conceptual framework to include the (mitigation of) eutrophication Black Sea in setting target values for nutrients in the Danube Basin.**

Only existing reports and results will be used to elaborate on this subject. Among the sources of information to be included are:

- the outputs of the daNUbs project; besides the Final Report, many working documents are available through the daNUbs website (http://danubs.tuwien.ac.at/);
- outputs of Phase 1 of the GEF/UNDP Black Sea Ecosystem Recovery Project;
- and other relevant documentation.

6. Elaborate methodology at a 'meta-level'.

The project aims at elaborating practical methods and procedures that can be applied when establishing type-specific 'good status levels' for nutrients. With 'meta-level' we mean that presumably not all anticipated steps and procedures actually can be implemented under this project, for instance when dealing with the use of models.

7. Elaborate examples of type-specific nutrient standards for some of the water types in the Danube (Basin).

As mentioned in the introduction, this preferably will be part of the project outputs as well. Its feasibility partially will depend on the findings and progress of activities like the ones mentioned above.

2.3.5. Assumptions and risks

It is important that for instance MLIM-EG members and other relevant country representatives and/or experts will support the project in giving access to and providing with actual data and information.

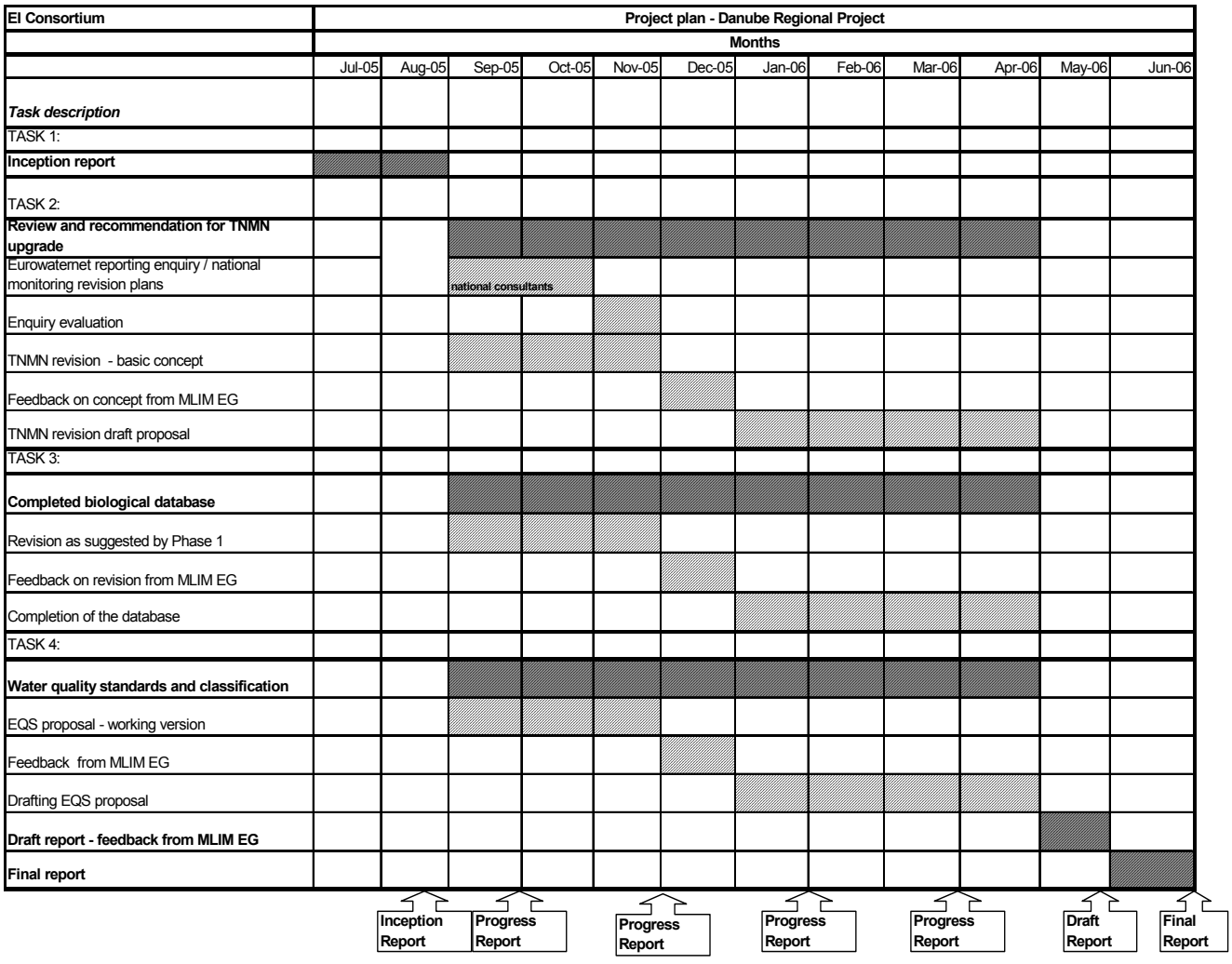
3. DEFINITION OF EXPECTED OUTPUTS / RESULTS AND THE TIMEFRAME FOR THEIR DELIVERY

Duration of the Project

The project activities shall be carried in the general time frame of July 2005 – June 2006.

Task	Output	Number of person-days	Expected Delivery Month
1	Inception Report	10	1
2	Review and recommendations for the TNMN upgrade	71	10
3	Completed biological database	45	10
4	Water Quality Standards and classification	20	10
	Reporting (progress reports and final report)	22	12

Time Frame



4. IMPLEMENTATION ARRANGEMENTS AND COMPOSITION OF THE WORK TEAM

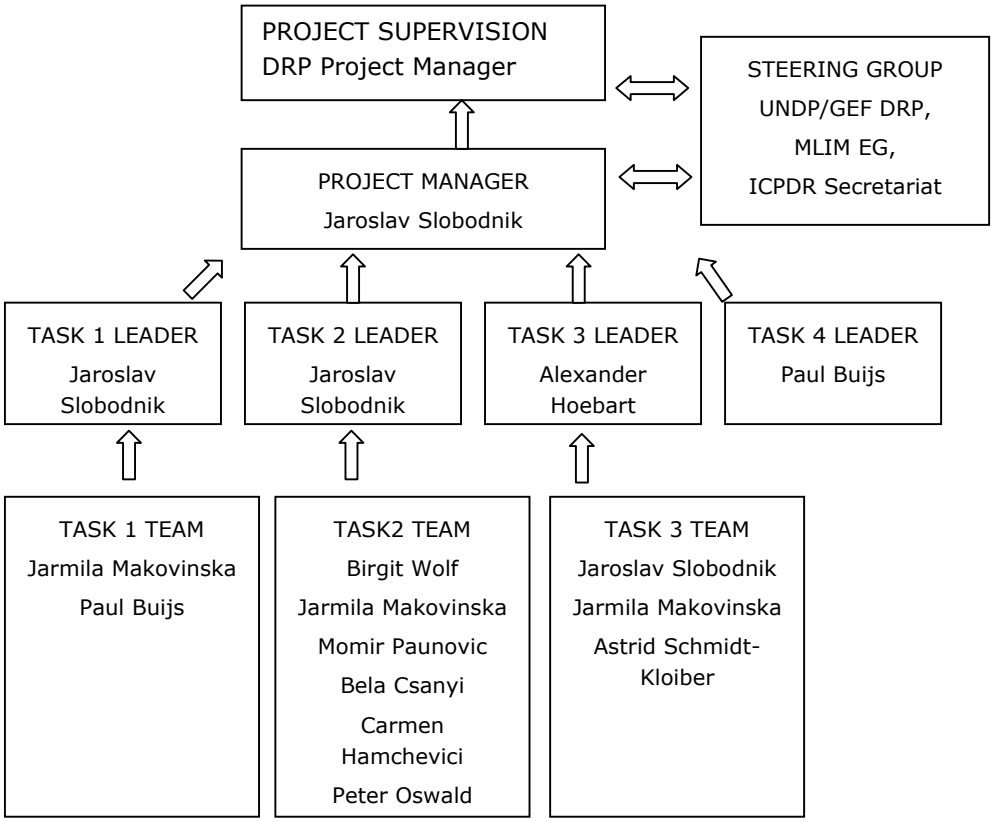
Cooperation and coordination with the ICPDR activities will be ensured via the regular contact and information exchange with the ICPDR Secretariat. The international consultants will closely cooperate with MLIM EG and they will participate at relevant MLIM EG meetings. At present the participation at two meetings in October 2005 and spring 2006 is foreseen.

The documents to be discussed within the MLIM EG meetings will be submitted at least 2 weeks before the EG meetings.

4.1. Project Team Members

Objective	Team Member	Tasks
1	Jaroslav Slobodnik	Task coordination, EUROWATERNET/TNMN streamlining, organizing national reviews, TNMN structure set-up, WFD compliance checking
	Birgit Wolf Jarmila Makovinska Momir Paunovic Bela Csanyi	Biological monitoring upgrade, WFD compliance checking
	Jaroslav Slobodnik Carmen Hamchevici Peter Oswald	Chemical monitoring upgrade
2	Alexander Hoebart	Database upgrade
	Jarmila Makovinska Astrid Schmidt-Kloiber	Biological data compliance checking
	Jaroslav Slobodnik	Task coordination, liaison with MLIM EG, harmonization with TNMN and JDS databases
3	Paul Buijs	Elaboration of EQS proposal

Team structure organigram indicating reporting lines:



4.2. Workload distribution

No.	Expert	Organisation/institute	Country	Input in persondays
1	Jaroslav Slobodnik	Environmental Institute	Slovak Republic	51
2	Paul Buijs	Buijswater	The Netherlands	24
3	Jarmila Makovinska	Water Research Institute	Slovak Republic	21
4	Astrid Schmidt-Kloiber	BOKU	Austria	14
5	Alexander Hoebart	ICPDR	Austria	20
6	Bela Csanyi	VITUKI	Hungary	7
7	Birgit Wolf	Bavarian Agency for Water Management	Germany	13
8	Carmen Hamchevichi	ICIM	Romania	6
9	Momir Paunovic	IBISS	Serbia and Montenegro	5
10	Peter Oswald	Environmental Institute	Slovak Republic	7

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ANNEXES

ANNEX I Joint Danube Survey - reporting of results from biological analyses

ANNEX I

JOINT DANUBE SURVEY - REPORTING OF RESULTS FROM BIOLOGICAL ANALYSES

Determinants such as *Saprobic index* of macrozoobenthos, *Number of Taxa* of macrozoobenthos, *chlorophyl-a* and *phytoplankton (quantity)* are currently included in the database as a part of reporting of results from water samples analysis. The following text therefore deals only with reporting of species resulting from analysis of:

- Macrozoobenthos
- Phytobenthos
- Macrophytes
- Zooplankton
- Phytoplankton

As the TNMN Database is not yet suitable for holding such kind of information, biological results from Danube Surveys Database (JDS, JDS-ITR, ADS) should be reported using the following procedure:

a) Using the existing set of tables for data reporting:

- COUNTRY table
- MONITORING POINT table
- SAMPLING METHOD table
- SAMPLE table
- DETERMINANT table

b) Tables ANALYTICAL METHODS and ANALYSIS are not used in this context. Instead, the following tables apply:

SPECIES CATALOGUE table

This table records each genus and species with a code. The following fields are included:

NAME OF FIELD	NOTE
Species code	Number
Group code	Species Group as given below
Species	Text
Genus	Text
Family	Text
Author	Text
Higher Taxonomic Group	Text

The unique key of this table is the combination of the Species code and the Group code.

The following group codes are defined:

GROUP CODES
B Macrozoobenthos
F Macrophytes
H Phytobenthos
Y Phytoplankton
Z Zooplankton

Note:

Currently, the codes for macrozoobenthos are taken from the Austrian ECOPROF database. All other species codes are preliminary codes.

SPECIES table

This table holds the records for each determined species of a sample.

NAME OF FIELD	NOTE
Monitoring point code	key to SAMPLE table
Location in profile	key to SAMPLE table
Date of sampling	key to SAMPLE table
Time of sampling	key to SAMPLE table
Determinant Code	key to DETERMINANT table
Date of determination	Date of determination in the format DD.MM.YYYY (DD = day of month, MM = month, YYYY = 4 digit year)
Value	Number
Genus Species	Text
Species Code	Number
Group Code	Species Group as in table SPECIES CATALOGUE
Laboratory Code	
Family	Text
Author	Text

The unique key of this table is the combination of Monitoring point code, Location in profile, Date of sampling, Time of sampling, Determinant code, Date of determination and Genus Species.

Note:

This structure is a compromise as it holds uncoded and coded records of species. If only coded records were used, the columns Genus Species, Family and Author in the SPECIES table should be removed and the unique key should be changed so that Genus Species is replaced by Species Code and Group Code.

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