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Location: Swe EPA
Stockholm

Minutes from First CHARM Dialogue meeting

Participants: See attachment (DK, FIN, LT, SWE, RU and JRC)

Welcome and introduction by Sif Johansson

Presentation of all participants.

Objectives of the meeting:
The overall aim of the dialogue meeting is to bridge the gap between on the one hand senior officials and managers involved in the legal implementation of the directive in the countries around the Baltic Sea and on the other hand scientists working within the CHARM project.

Presentation of the CHARM project (Jesper Andersen)

CHARM is an EU-funded RTD-project, which aims to get a common Baltic view. It started in December 2001 and will run till December 2004. CHARM consists of 11 partners from the countries around the Baltic (Denmark, Finland, Lithuania, Germany, Estonia, Latvia, Sweden, Poland and EU). The DoW-document is available on the CHARM website, as is a description of all the deliverables from the different workpackages. The web site will be updated with links to reports, papers etc that could be of interest to end-users.

Overall scientific aim: To develop, test and validate a methodological approach to characterise type areas of the Baltic Sea and study the dynamics and function of these areas in relation to anthropogenic pressure.

Overall strategic aim: To provide a scientific foundation for fulfilling the requirements of the Water Framework Directive (WFD).

Specific aims:
• Develop common methods for defining coastal types in the Baltic Sea
• Identify key factors for ecosystem alteration
• Identify key indicators for ecosystem function
• Develop ecological relationships and empirical models
• Define reference conditions for the Baltic Sea
• Recommendations for monitoring strategies

CHARM consists of 7 work packages:
WP1: Typology
WP2: Phytoplankton
WP3: Macrophytes

WP4: Benthic infauna
WP5: Water chemistry
WP6: Monitoring strategy
WP7: Dissemination
⟶ A total of 36 deliverables (to be read in the DoW)

The products does not include:
• Any classification schemes
• Any recommendation on the establishment of a monitoring network for the coastal waters
• An assessment of the effects of different measures necessary to fulfil the EQOs in the coastal waters

CHARM focus on the effects on nutrient inputs. Pressures as fisheries, pollution with heavy metals and persistent organic substances, physical modification and climate change is not included. Introduced species will perhaps be addressed (in relation to phytoplankton, aquatic flora, benthic infauna).

Further reading:
http://charm.dmu.dk
http://europa.eu.int/comm/environment/water/
http://www.wfddatabase.com/

Typology for coastal waters (Björn Sjöberg)

Objectives

- Develop a typology for the Baltic ecoregion on the basis of hydrographic and biological variables.
- Evaluate and modify the typology with respect to the biological indicators of the Water Framework Directive.

Tasks

1.0 Assess and evaluate current understanding and strategies with respect to the typology required by the WFD
1.1 Compilation of sediment data
1.2 Compilation of water residence times and stratification
1.3 A first draft of the Typology based on statistical analysis of spatial gradients of all parameters. Maps and annex by end of 2003
1.4 Interaction biological indicators and geohydrography
1.5 Revision of draft typology that reflects ecosystem functioning. GIS presentation

Achievements

1. Digitised maps in ARC/GIS-format of all Baltic Sea areas available on the website.

2. A 10 years simulation of the hydrodynamics of the Baltic Sea using a 3D OGCM Water level and water stratification, depth of 30 m. Gives boundary data to coast model (ROFI: Reestablishment of Freshwater influence)

3. A coastal PBM (process based model) to calculate stratification and water exchange to the open sea. 25 out of 95 done today (only the physics).

4. “Baltic Sea Coastal Catalogue”. Description of 95 bays, fjords and estuaries (morphology, forcing, hydrography and water exchange). Run-off included. In a spreadsheet/file today, not available on the net yet.

The proposal on types will be based on national inputs.

Examples of questions addressed:

- What is the highest level of aggregation?
- Most relevant period of averaging and most appropriate statistical measures?
- Should residence time reflect turnover of freshwater or surface water?

What next:

•Assess the relevance of the different type factors through iteration with the other WPs while they establish type specific biological reference conditions.
•Evaluate how representative the typing of fjords/bays/estuaries are for larger coastal segments.

It is still not decided if or where there are transitional waters. Possibly Dauguva, Neva? Pay attention to the Habitat directive when discussing transitional waters.

The typologiwork is an iterative process, which has to be coordinated with the biological factors.

Comments:

What scale should be used on the GIS-maps? Still not decided.

DK: There is a need for typology by the end of this year.

SWE: it will be costly to revise the classification every 5 years.

Swe-Info: There will be a workshop May 13´th in Stockholm, held by SMHI, the Swedish Meteorological and Hydrological Institute. The purpose is to discuss the typology in accordance to the biological factors. Focus is on the Swedish typology, but typology representatives from other countries around the Baltic will also be invited.

Anna-Stiina: Most MS lack biological monitoring data today, so the typology must be based on hydro morphological parameters. The pragmatic approach.

BS: The west coast of Sweden is more heterogeneous than the Gulf of Bothnia for example. Is another scale needed?

Need for future horizontal co-operation between the workpackages.

Water Chemistry (Fredrik Wulff)

Task: To build a database on hydro geographical data, from the coasts and tools to look at these data. Classify coastal/offshore data.

Some info on website, other info will be possible to ask for (data older than 5 yrs no problem).

Objectives:

- To supply data on hydrography and freshwater for the calculations of water residence times in WP2
- To supply quality assured data on water chemistry, Secchi depth and oxygen for the development of typology criteria in WP2, 3, 4, 5, 6, 7.
- Evaluate and calculate water quality, in terms of nutrient data, in relation of oxygen conditions and nutrient loads for selected coastal regions.
- Estimate pristine coastal nutrient concentrations in selected coastal regions

Quite a large number of coastal stations exist, but we need to get access to all of them. They are also highly variable in frequency. The quality of these data must be checked. Data on nutrients are highly variable in input. There is better cover on salt, temperature and oxygen.

DK: Separate data into decades to clarify?

Look at the *response* from nutrients and check biological relevance.

Impact from physical typology? Need to co-operate between WPs and make comparisons. Need to arrange workshops between ecologist people and typology people. Best steps further will be discussed in the Scientific meeting next week in Vilm, Germany.

DK Presented an article by Dan Conley et al, from the MOLTEN-project " WFD-bestämmelse av bakgrundskoncentration för näringsämnen i kustvatten" (in Danish) To be published after the summer.

Phytoplankton (Anna-Stiina Heiskanen)

Objectives

Approach how to use phytoplankton as an quality element for classification of coastal waters as required by WFD

Develop phytoplankton indices for classification of the ecological status of the Baltic Sea coastal types
Develop reference conditions for these indices for coastal types
Develop integrated indices (pooling all biological quality elements)
Recommendations for phytoplankton monitoring (to assess ecological status)

Tasks

Task 1: Quality analysis and Harmonization of DATA
Task 2: Analyzing temporal and spatial distribution of indices
Task 3: Development of functional relationships
Task 5: Integrating with other biotic quality indices
Task 4: Applicability of indices for monitoring
Task 6: Establishing of reference conditions

Achievements:

- Metadata survey has been carried out for inventory of all available data from project partners (summary is available in the restricted CHARM web pages).
- All phytoplankton data has been quality controlled and harmonized (most of samples/ data available has been analysed according to HELCOM guidelines). This included agreement of harmonised taxonomic nomenculature and, and coding for different taxonomic groups and species, and morphological, functional, and size group codes. There are more than 1200 species names listed in the agreed species list between participants.
- All data (from ca. 450 stations) which includes more that 15000 samples, is now compiled in a joint, harmonized and quality controlled database.

Next steps

- Assessing natural variability of various taxomonic groups, potential indicator species and indices (e.g. ratio diatoms/dinoflagellates). This requires analysis of temporal variability and identification of 'seasons' when distinct blooms appear, since seasonal varibility of phytoplankton is considerable and many key sepcies or indices will be season specific (start: June 2003).
- Multivariate statistical **a**nalysis with respect of salinity impacts; considering both average salinity and amplitude of salinity changes.
- Multivariate statistical approach to establish functional relationships btw phytoplankton parameters and abiotic factors;
- Further analysis with restricted numbers of variables to establish classification metrics and reference conditions for selected indices (draft reference conditions should be ready by the end of November 2003)

The WP2 aims to supply functional relationships between selected phytoplankton indices that are promising as indicators of anthropogenic change, and abiotic factors (i.e. response of phytoplankton indices as quality element for nutrient loading/ eutrophication). This approach aims to give a scale for classification of coastal types depending their trophic state, but it will not set the actual classification boundaries. The aim is to have a matrix with numerical values, rather than only qualitative descriptions. A crucial questions concerning phytoplantkon as quality indicator is that is it possible to separate impact of pressures from natural variability?

Information on national activities (focus on typology):

Lithuania: Lithuania is missing typology for coastal water based on hydromorphological factors today.

Finland: Bothnian Bay LIFE project, a co-operation between Finland and Sweden, running from 2001 to 2004. To get a general view of the state of the Bothnian Bay and improve the information exchange. Develop guidelines for management. There is an environmental info database on the net: www.ymparisto.fi/perameri/welcome.htm

Eight guidances to be tested in river Oulujoki Pilot River Basin.

7 or 8 water districts proposed for Finland.

Denmark: Odensefjord a PRB in Denmark.

Russia: Mr Michel Begak presented his institute, St.Petersburg Scientific Research Centre for Ecological Safety Russian Academy of Science. Invasive species that arrives with the ballast water from oil tanks is a big problem.

Demark: Informed about a report on their 6 coastal types and 10 fjord types proposed.

They also have a report on reference conditions that will be published in AMBIO during the spring. A paper on transitional waters is on the way. Denmark works in two projects financed by the Nordic Council of Ministry. One is on the open waters of Kattegatt and Skagerrak. Focus is on Heavy metals and harmful substances, and it will run for two years. Will try to come up with ecological classification schemes and reference conditions.

Jesper stressed the fact that there is a very close connection to the Habitat directive, many pieces already exists.

Phytobentos (Dorte Krause-Jensen)

A metadatabase is available on the website.

Aims:
•Identify factors that regulate benthic vegetation at local & regional scale
•Identify long-term changes
•Define vegetation indicators
•Define reference conditions - from historic records and predictive models

Hypotheses:
·Water quality, temperature, salinity, insolation, exposure, icecover & geomorphology regulate the vegetation.
·The relative importance of the regulating factors changes with the scale of study.
·Short- & long-term changes differ among species due to differences in tolerance to changing water quality & colonisation capacity.
·Robust key indicators can characterise the ecological state of coastal waters.
·Reference conditions for these indicators can be identified based on historical records and/or hindcasting models

Tasks:
•Compile and quality assure existing data from the Baltic Sea
•Characterise actual and historic status of vegetation indicators
•Perform small-scale analyses: identify regulating factors at local scale
•Perform large-scale analyses: identify regulating factors at regional scale

Deliverables:
·Quality controlled data sets for vegetation (Jun ’02)
·Small-scale vegetation models (Aug ‘03)
·Ref. con. (Dec ‘03) & verified ref. con. (Dec ’04) for veg.
·Paper relating phytopl. & veg. to typology (Dec ‘03)
·Large-scale vegetation models (Jun ‘04)
·Papers relating biological indicators and water quality to physical gradients emphasising ref. con. (Dec ‘04)

·Definition of vegetation indicators (Dec ‘04)
·Monitoring recommendations (Dec ‘04)

Status
•vMetadata
- Avaliable at the homepage
•vProposal of possible indicators
- Species composition vary depending on the evaluator. Depth distribution of key species and abundance ratios of annual to perennial species are therefore likely to be more comparable across different monitoring programs than the number and composition of all species.
•vData templates
- Avaliable at the homepage
•vQuality controlled data sets
- Avaliable at the homepage
•vInitial analyses at local scale

Example of local analyses
As an example of analyses at local scale, Dorte presented a study: **Eelgrass as a quality element – the WFD in practice.** The study concluded:
•Reference conditions may vary markedly within a given water body type.
•The larger the range in type-specific ref. levels the less accurate the type-specific classification.
•Type-specific reference conditions therefore imply a risk of misinterpretation of ecological status. Classification errors can be either false-negative or false positive.
•Site-specific reference conditions seem to be a robust alternative.

Comments:
Fin: Due to the few macrophytes in the Bothnian Bay, we may need to define special indicators for this region. Possibly epiphytes could be used as indicators.
DK: Maybe the diversity of angiosperms and characeans can be used as indicators in this region. Epiphytes vary very much and demand intense monitoring.

Benthic infauna (Alf Josefsson)

Task:
Compile and analyse existing information on benthic infauna in Baltic coastal waters
Identify and explain relationships between infauna and other ecological state variables in relation to environmental change
Reconstruct reference conditions for benthic assemblages
Contribute to an overall monitoring strategy using selected zoobenthic quality elements.

Benthic index proposed:
- Species diversity (Shannon-Wiener)
- Species composition (sensitive taxa)
- Depth distribution in the sediment
- Trophic composition

- Productivity (abundance, biomass)

There are plenty of benthic stations in Finland, Denmark and Germany for example. Fjords and the Baltic Sea have less diversity than the Open Sea. The flux of water is important to the number of species. Abundance and biomass are dominated by different species. Reference conditions are very affected by alien species in the Baltic Sea.

Intercalibration by (Anna-Stiina Heiskanen)

Timetable
-03 Draft intercalibration register
-04 Analysis of characteristics
Final Intercalibration register
-05 Intercalibration exercise
-06 Monitoring programs operational
-06 Intercalibration completed and results published

Aims: Harmonised class boundaries in monitoring systems. Limited to certain types, pressures and quality elements (where data is available). Choose sites that represent classboundaries (2 for high/good and 2 for good/moderate). Select types and sites. Intercalibration on the *outcome* of measurements. Only biological quality elements will be intercalibrated.

Focal point: EEWAI: http://ies.jrc.cec.eu.int/eewai/

Issues of common interest

A network has been created between researchers, several research programmes and several international authorities. In the future we will use the email list for info both ways.

Password to restricted area on the CHARM web site to this group? Ask in Vilm.

Workshop next year. Dates?

For the final guidance from CHARM we need input from you.

Message to all the researchers: Please, speed up!

Make sure to take good care of all the data collected, make sure it will be available and used in the future, after the end of the CHARM project. It is very valuable.

Mr Begak, Russia, has expressed willingness and readiness of the centre to participate in the CHARM project as partner and co-ordinator of the works at Russian parts of the Baltic seashore.

Swedish experts are missing in several of the WPs, please send them information and invitations to work meetings too. (Add the names to the email list on the web)

These minutes will be put on the website, available to everyone.

Thank you for your participation!