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Marine Environmental
Quality Committee

REPORT OF THE SECOND MEETING OF THE WORKING GROUP ON POLLUTION-RELATED STUDIES IN THE SKAGERRAK AND KATTEGAT

Copenhagen, 28-29 May 1984

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REPORT OF THE SECOND MEETING OF THE WORKING GROUP ON POLLUTION-RELATED STUDIES IN THE SKAGERRAK AND KATTEGAT

Copenhagen, 28-29 May 1984

1. OPENING OF THE MEETING

1.1 The Chairman, Mr. P.T. Hognestad, opened the meeting at 10.15 hrs on 28 May 1984 and welcomed the participants.

2. APPROVAL OF THE AGENDA

2.1 The Agenda was adopted as proposed. The Agenda is attached as Annex 1. The list of participants is contained in Annex 2. The ICES Environment Officer, Dr. J. Pawlak, served as Rapporteur.

3. MISCELLANEOUS

3.1 Report from Meetings

3.1.1 The Chairman reported that an informal meeting of the Working Group had been held in Göteborg on 13 October 1983 in connection with the ICES Statutory Meeting. At that meeting, it had been agreed that the assessment work should be carried out in accordance with the ICES guidelines (contained in Annex 3 of the 1983 Report of the Advisory Committee on Marine Pollution (Coop.Res.Rep. No. 124)). The tasks of writing drafts of the various chapters of the assessment had been distributed to selected Working Group members. It had been agreed that a section on sediments should be included in the assessment and that the Working Group on Marine Sediments in Relation to Pollution should be contacted for assistance. Finally, information on research projects in the Skagerrak-Kattegat area had been considered.

3.1.2 Having taken note of the outcome of this informal meeting, the Working Group decided to annex the report from that meeting to the present report. It is contained in Annex 3.

3.1.3 The Working Group then briefly noted some of the main activities being carried out in various other ICES Working Groups. The Working Group on Marine Pollution Baseline and Monitoring Studies in the North Atlantic will coordinate a Baseline Study on Contaminants in Fish and Shellfish and a Baseline Study of Trace Metals in Coastal and Shelf Sea Waters in 1985. Both of these activities are expected to encompass the Skagerrak-Kattegat area. The Working Group on Marine Sediments in Relation to Pollution (WGMS) is coordinating a pilot study of sediments and suspended particulate matter in the Skagerrak. A detailed report on the progress in this study, which had been presented at the 1984 WGMS meeting, was made available to the Working Group.

3.1.4 It was noted that the ICES/SCOR Working Group on the Study of the Pollution of the Baltic was coordinating several projects under which studies were being carried out in the Kattegat. These include studies of inhomogeneities of physical, chemical and biological properties and a pilot study of contaminants in sediments in the Baltic Sea Area.

3.1.5 Information on the activities of the Benthos Methodics Working Group was presented, but it was noted that that Group will not be carrying out much work in the Skagerrak-Kattegat area.

3.1.6 In terms of organizations outside ICES, it was noted that the Baltic Marine Biologists Committee will be meeting in Poland in late September 1984 and the Conference of Baltic Oceanographers will take place immediately thereafter in Gdynia, Poland.

3.1.7 It was noted that an assessment of the North Sea is being prepared in connection with the ministerial meeting on pollution in the North Sea, hosted by the Federal Republic of Germany. The Skagerrak is considered to be part of the North Sea in that assessment work.

3.1.8 Several relevant reports prepared on the national level were also noted.

3.2 Circulations

3.2.1 The Working Group took note of the list of research projects being carried out in the Skagerrak-Kattegat area, which had been compiled over the past year. The Working Group agreed that all projects in the area conducted by the Scandinavian countries were now covered in the list.

4. ASSESSMENT OF THE ENVIRONMENT OF THE SKAGERRAK-KATTEGAT AREA - REVIEW OF CHAPTERS

4.1 The Working Group reviewed the draft assessment document on a chapter-by-chapter basis.

4.2 Dr. Svansson presented Chapter 2.1, general circulation and physical oceanography, which he had prepared. He stated that the first part of this chapter stresses that the Skagerrak and Kattegat are very different; the Skagerrak is part of, yet different from, the North Sea, whereas the Kattegat is part of the Transition Zone to the Baltic Sea. In terms of the currents, the Baltic outflow occurs as a surface current throughout the Kattegat, while in the Skagerrak it changes to a narrow current along the coasts of Sweden and Norway. All water from the North Sea is carried into the Skagerrak and passes through, with most of it leaving again via the Norwegian Coastal Current. The Skagerrak current is generally permanent in direction but variable in strength. There is upwelling on the western side of the Skagerrak and downwelling on the eastern side, resulting in a nutrient situation in the central area which should favor primary production.

4.3 In the discussion of Chapter 2.1, the Working Group agreed that the draft provided the necessary general information about the currents, temperature and salinity of the area, although perhaps somewhat simpler language could be used for the non-scientist who would be reading it. It was felt that several figures should be included, e.g., a figure illustrating the surface currents. Among the specific comments on the chapter, Dr. Svansson was requested to recheck the figures concerning transport time from the North Sea through the Skagerrak and to qualify his statement concerning the levels of radionuclides found in the area. It was also suggested that additional information should be provided concerning the coastal current from the Baltic along the Swedish west coast and the effect of the coastal current and other conditions in the coastal zone on the transport of substances from the coast to the open sea. Mr. Nielsen and Mr. Söderström agreed to draft this addition on factors

affecting transport through the coastal zone. Other comments included: (1) in paragraph 2, mention whether the currents described are surface or deep currents; (2) in paragraph 3, mention the strong, sharp halocline in the Kattegat; (3) in paragraph 4, check the salinity quoted for the Kattegat; (4) stress the statement that nearly all the water entering the North Sea passes through the Skagerrak before leaving; (5) emphasize the dome-shaped up-coming of surface water in the Skagerrak and its importance for primary production.

4.4 During the discussion of Chapter 2.1, the Working Group recognized that there was a need for a general introduction to the document, to be placed before Chapter 2.1, to provide an overview of the document and its aims as well as a general introduction to the area under consideration. This should include a map of the area and a description of its geography, including the sediments. In terms of the audience toward which the document should be aimed, the Working Group agreed that the document should be aimed at administrators and politicians to provide them with appropriate information about conditions in the Skagerrak and Kattegat and anthropogenic influences on them.

4.5 Dr. Svansson, author of Chapter 2.2 on the extent of anthropogenic modifications to the physical oceanography, introduced this chapter on a paragraph-by-paragraph basis. Section 2.2.1 described changed river water flow owing to run-off regulation of certain rivers for hydroelectric power purposes. Several members of the Working Group pointed out that this is a controversial subject in some countries and, thus, the section should be phrased very carefully. The Chairman and Mr. Føyn agreed to redraft this section.

4.6 Concerning Section 2.2.2, changes of cross sections, it was pointed out that no decisions have been made to build a bridge across the Great Belt or the Øresund. However, studies of the possible effects of such structures have been conducted. For Section 2.2.3, changed temperature conditions owing to the discharge of cooling water, it was indicated that the effects are probably very local and that this should be made clear. The Chairman and Mr. Føyn offered to amend this section accordingly. A general comment concerning Chapter 2.2 was that it covered effects on physical oceanography which were mainly very local, whereas Chapter 2.1 describes the open areas of the Skagerrak-Kattegat region and not the fjords or near-coastal conditions.

4.7 In terms of Chapter 3.1 on general marine chemistry, Mr. Nielsen stated that he had only agreed to obtain information on the inputs of nutrients to this area, and had not agreed to prepare the entire chapter on marine chemistry. He then presented a table of figures giving land-based inputs of nitrogen and phosphorus to the Kattegat for the years 1975 through 1981. Some figures were also presented on the atmospheric deposition of nitrogen and phosphorus to the Kattegat, but these were not complete. He pointed out that 1976 was a very dry year, with very low runoff figures, and 1981 was a very wet year, with very high runoff figures. A comparison of primary production figures for these two years showed that, if the low runoff values of 1976 for nitrogen and phosphorus had occurred in 1981, a reduction in primary production of 30% would have been observed from the actual 1981 figure for primary production. However, projections of the effects of reducing the land-based inputs of nitrogen and/or phosphorus on the levels of primary production showed that the load of these nutrients from land does not affect production in the open sea to any extent. Reductions in the atmospheric deposition of nitrogen and phosphorus will have a much greater effect on production in the open sea.

4.8 In the discussion of this presentation, it was noted that increases in atmospheric nitrogen are due to automobile exhaust fumes, a change from oil to coal in electricity-generating plants, and the use of certain fertilizers in agriculture. It was also pointed out that a major contribution of nutrients is from the nutrient-rich waters of the North Atlantic Ocean.

4.9 In terms of the further development of Chapter 3.1, it was agreed that Mr. Nielsen would assemble all input data from Denmark, Sweden and Norway and will prepare a chapter on inputs to the Skagerrak and Kattegat. In addition, Mr. G. Ærtebjerg would be requested to prepare a chapter on the general marine chemistry of the Kattegat, using the final report from the Belt Project and some additional data from Sweden. Mr. Føyn will prepare a chapter on the general marine chemistry of the Skagerrak.

4.10 Mr. Føyn then presented Chapter 3.2 on nutrients in the Skagerrak, which he had drafted. The chapter illustrated the nitrate distribution in the Skagerrak and concluded that anthropogenic sources of nutrients have little to no influence on the open waters of the Skagerrak.

4.11 In the discussion of this chapter, the Working Group requested that information be added on the concentrations and distribution of phosphorus in the Skagerrak. Several members expressed reservations concerning the conclusion that anthropogenically mobilized nutrients have no influence on the open waters of the Skagerrak. It was pointed out that there has been a recent increase in the occurrence of dinoflagellates in the middle of the Skagerrak at 20-30 m depth, including some species new to the area. While it is not known what has caused this increase in dinoflagellates, there must be some micronutrient(s) which trigger such plankton events. It was also reported that the mid-1970s anomaly had resulted in a small decline in nutrient concentrations in waters coming into the Skagerrak from the North Atlantic. This decline occurred over 20 years, but the nutrient values may be returning to their former levels now.

4.12 It was agreed that Chapter 3.2 should be supplemented with information on phosphorus, oxygen, trace metals and other toxic substances. Several members agreed to send relevant data on trace metals and other contaminants to Mr. Føyn, who will then complete the chapter on the marine chemistry of the Skagerrak.

4.13 The Chairman introduced Chapter 4.1 on general biology and fisheries, which he had drafted. This chapter was intended as an introduction to a biological description of the area and began with a discussion of the great variability in physical and chemical conditions as background information.

4.14 In the discussion of this chapter, it was felt that the paragraphs dealing with the variability in physical and chemical conditions could be shortened or deleted and the appropriate portions of earlier chapters referred to instead. Primary production and secondary production, especially in shallow areas, should also be mentioned.

4.15 Chapter 4.1.2 on fisheries was presented by its author, Dr. Dybern. This chapter provided an overview of the numbers of species of fish and shellfish in the Skagerrak-Kattegat area. The most important species of commercial fish were listed along with some catch figures for the past few decades. The chapter then mentioned the various factors affecting the fishery and noted some possible effects of pollution.

4.16 In discussing this section, it was pointed out that there has been a recent decrease in the stocks of sprat over the entire area of distribution of sprat. This has resulted in a decline in the populations of birds which feed on this fish. There were speculations as to whether it could be a climate change which affected the sprat and also the herring, which declined rapidly in the late 1960s in the North Sea and Skagerrak-Kattegat area.

4.17 A discussion was held concerning whether it could be stated that there is a successive downward trend in the concentrations of oxygen in the bottom waters of the southern Kattegat. It was ultimately agreed that this could not be considered a trend because, as this area generally has a low overall dissolved oxygen level and there are very variable conditions, it is easy to trigger problems of low oxygen. There are very large year-to-year variations in oxygen as well as strong seasonal variations.

4.18 Having concluded the discussion of this chapter, Dr. Dybern offered to re-draft it, taking into account the comments made.

4.19 Dr. Vagn Hansen presented Chapter 4.2 on biological trends or disturbances due to human activities, which he had drafted. He stated that he had focussed on one important area of change, namely, the introduction of certain species of phytoplankton into the area, how they have become established, and their effects. He stressed the importance of being able to identify these phytoplankton and the toxins they produce, and to try to predict the occurrence of unusual phytoplankton blooms. The information contained in the chapter about nutrient inputs and their possible effects on primary production will be merged into Chapter 3.1.

4.20 It was agreed that the last section of Dr. Dybern's chapter, concerning the effects of human exploitation of fisheries resources, should be moved to Chapter 4.2.

4.21 The Working Group agreed on the following timetable for future work on the assessment document:

(1) the authors will re-write their drafts and send them to the Chairman by 1 August;

(2) the Chairman will compile these drafts and distribute them to the Working Group members for review;

(3) an informal meeting of the Working Group should be held in connection with the 1984 ICES Statutory Meeting to review this draft of the assessment;

(4) the final review of the document will be carried out at the meeting of the Working Group in spring 1985;

(5) the final document will be ready to present at the 1985 Statutory Meeting.

4.22 The Working Group then discussed other items in the terms of reference. Concerning the coordination of research cruises in the Skagerrak-Kattegat area, the Working Group agreed that cruises should be coordinated as early as possible in each year. For Denmark, the draft cruise plan for 1985 will be available in September 1984. Sweden will have its draft 1985 cruise plan completed at the end of October 1984. The 1985 Norwegian cruise plans will be completed in November or December 1984.

4.23 In terms of the planning of projects in the Skagerrak-Kattegat area, Dr. Vagn Hansen suggested that a coordination of monitoring procedures and an exchange of data regarding plankton blooms be established. A crucial element of this project is the correct identification of the phytoplankton species. Dr. Vagn Hansen stated that a manual describing the best methods for the identification of phytoplankton species is being prepared in Denmark. He will try to develop this manual so that it can be used in all the Scandinavian countries.

4.24 The Working Group considered its term-of-reference to promote interactions and discussions among scientists working in the Skagerrak-Kattegat area. The Working Group members present agreed that there is already a very good cooperation among scientists from Denmark, Norway and Sweden working in the area and that more contacts among scientists are not needed. The Working Group encouraged the further continuation of this cooperation.

4.25 The final term-of-reference for the Working Group was to consider the priorities in studies in this area, taking into account available national and international resources. It was noted that, in carrying out the assessment work, the level of information on a number of subjects was found to be inadequate. These gaps in information should be considered when setting priorities, so that the information that is most needed to obtain a better picture is given a high priority. Among the questions identified were whether there is eutrophication in the Skagerrak or Kattegat area and, if so, how much. Another question concerned whether there is a coastal zone in this area and whether it can be found and measured, especially to determine what changes occur in the coastal zone and whether contaminants are trapped there.

4.26 The Chairman requested the members to consider these problems in greater detail and gather relevant information for initial discussion at the informal meeting during the 1984 Statutory Meeting. The final discussion can be held at the 1985 meeting of the Working Group.

5. NEXT MEETING

5.1 Dr. Graneli extended an invitation for the Working Group to meet at the University of Lund in 1985. Accordingly, the Working Group recommended that it meet for three days in February or April 1985 in Lund, Sweden to

(a) review and finalize the draft assessment of the environment of the Skagerrak-Kattegat area,

(b) consider priorities in studies in this area, taking into account national and international resources, and

(c) discuss proposals for future research on a cooperative basis.

This recommendation has been attached in Annex 4 to this report.

6. ANY OTHER BUSINESS

6.1 Dr. Vagn Hansen informed the Group about the ICES Special Meeting on Causes, Dynamics and Effects of Exceptional Marine Blooms and Related Events, which will be held in Copenhagen on 4-5 October 1984. He stated that, in connection with the ICES Special Meeting, a meeting of OIKOS

will be held on 6-7 October at the H.C. Ørsted Institute in Copenhagen. The opening lecture will deal with the global phenomenon of blue-green algae, after which a scientist from each of the four Scandinavian countries will describe the status of plankton blooms in their waters. On the afternoon of the first day, proposals for a research programme on plankton blooms will be discussed. On the second day, the toxicology of plankton blooms will be considered and the concluding discussions on research proposals will be held.

6.2 Dr. Vagn Hansen also reported that the ICES Biological Oceanography Committee has requested that reporting forms be developed to report data on phytoplankton blooms to ICES. He suggested that a Working Group member from each Scandinavian country submit a copy of their reporting sheets for phytoplankton blooms to the Chairman of the Working Group so that the forms can be annexed to the Working Group report for information to other countries and for use by the Biological Oceanography Committee in preparing an overall form.

6.3 It was agreed that examples of forms presently available should be annexed to the report of this meeting. Additional forms will be collected intersessionally and reviewed at the 1985 Working Group meeting. (RAPPORTEUR'S NOTE: No forms were submitted for inclusion in the report of this meeting.)

6.4 As there was no other business, the Chairman thanked the members for their contributions and closed the meeting at 12.40 hrs on 29 May 1984.

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ANNEX 1

WORKING GROUP ON
POLLUTION-RELATED STUDIES IN THE SKAGERRAK AND KATTEGAT

Copenhagen, 28 - 29 May 1984

A G E N D A

1. Opening of the Meeting
2. Approval of the Agenda
3. Miscellaneous
   3.1 Report from meetings
   3.2 Circulations
4. Assessment of the environment of the Skagerrak-Kattegat area - review of chapters
5. Next meeting
6. Any other business

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ANNEX 2

WORKING GROUP ON
POLLUTION-RELATED STUDIES IN THE SKAGERRAK AND KATTEGAT

Copenhagen, 28 - 29 May 1984

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ANNEX 3

NOTES FROM AN INFORMAL MEETING OF THE WORKING GROUP ON POLLUTION-RELATED STUDIES IN THE SKAGERRAK AND KATTEGAT

Gothenburg, 13 October 1983

1. OPENING OF THE MEETING

1.1 The Chairman, Mr. P Hognestad, opened the informal meeting at 09.00 hrs 13 October 1983 and welcomed the participants. Dr Dybern introduced Dr J Söderström as a new member of the Swedish participation in the Group. Dr Dybern will inform the ICES General Secretary and the Environment Officer.

1.2 The background for this informal meeting was the decision at the Group's first meeting to hold an informal meeting in Gothenburg in connection with the ICES Statutory Meeting in Gothenburg (Item 7.1 in ICES, C.M. 1983/E:29). The time for the informal meeting was announced during the ICES meeting.

2. THE AGENDA

2.1 The Working Group approved the agenda (Annex 1).
List of participants, see Annex 2.
The Chairman will make notes from the meeting for distribution.

3. MISCELLANEOUS

3.1 Report of the first meeting. ICES, C.M.1983/E:29. There were comments on the Working Group's decision concerning how to arrange the chapters of the assessment and their headings. The discussion was postponed to item 4 in the agenda. No other comments on the report.

3.2 There were no comments to the documents distributed from the Chairman to the Working Group members since last meeting.

3.3 The present members of the Working Group got copies of the Chairman's correspondence with Chairmen of other Committees and Working Groups. These copies will also be distributed to those of the members who were not present at the informal meeting.

The Working Group noted from the correspondence that:

(a) the Chairman of the WGMPNA was concerned about the structure of the assessment;

(b) the Chairman of the MCWG was concerned that the conditions in the area were limited to the water according to terms of reference, and pointed out the necessity of also including the sediments;

(c) the Chairman of the MEQC suggested planning a long-term monitoring programme;

(d) the Chairman of the ICES/SCOR Working Group stated that the Baltic Group includes Kattegat in its interest, and therefore suggested a back-to-back or overlapping meeting, if possible.

The Working Group discussed the answers and concluded as follows:

(a) Will be discussed under item 4 of the agenda;

(b) The Working Group felt that the sediments have to be included in the assessment. Therefore, steps will be taken to contact the ICES Working Group on Marine Sediments in Relation to Pollution;

(c) The Working Group felt that the suggested planning of a monitoring programme is a part of the terms of reference which will be discussed at the next ordinary meeting;

(d) The Working Group found it would be useful to have a back-to-back or overlapping meeting with the ICES/SCOR Working Group on the Baltic, and asked the Chairman to take action for preparing such a meeting. (NB. See item 5.)

3.4 On-going research programmes. At the first meeting it was decided to review all on-going national projects in the relevant area. At the informal meeting the Norwegian and Swedish contributions were presented and distributed. It became clear that both the Norwegian and the Swedish contributions needed some supplements, and that the Danish contribution still needed some time. It was therefore decided that all contributions should be ready by 15 December 1983 and sent to the Chairman. Mr. A. Nielsen will be responsible for the Danish contribution, Dr. B.I. Dybern for the Swedish additional notes, and Mr. P Hognestad for the Norwegian Supplement. The contributions presented so far will be distributed to the members who were not present at the meeting. All the contributions will be considered at the next meeting in Copenhagen.

4. OUTLINE FOR ASSESSMENT. GUIDELINES. FURTHER WORK

4.1 The Chairman informed about comments to the first meeting of the Working Group from the ACMP meeting in Copenhagen 30 May - 3 June 1983. The Working Group discussed guidelines for the assessment (ICES, C.M.1982/E:22).

The Working Group felt that the intentions with the guidelines are very good, and found it important that the guidelines could be tested for comparison with future regional environmental assessments.

It was pointed out that there might be a need for modifications in the text heading each chapter, and that there could be a need for submitting sub-headings, etc. In spite of the conclusions reached at the first meeting (page 7-8, ICES, C.M. 1983/E:29), it was now an unanimous agreement to follow the guidelines which have been accepted by ICES (ICES, C.M. 1983/E:22). The Working Group felt that the suggested outlines prepared by Mr Rosenberg could be incorporated without severe difficulties in the accepted guidelines.

4.2 To make progress in the work, the Working Group came to agreement on leaving the responsibility for each chapter to various persons who should write drafts and have them ready by 1 March 1984 for distribution. During the work the responsible persons should collaborate with relevant colleagues, and not hesitate to consult skilled bodies. The responsible persons will be:

Chapter 2.1 and 2.2 (Phys. oceanography)	:	A Svansson
Chapter 3.1 and 3.2 (Marine chemistry)	:	A Nielsen and L Føyn
Chapter 4.1 (Biology and fisheries)	:	B Dybern and P Hognestad
Chapter 4.2 (Biol. disturbances)	:	K Vagn Hansen

5. NEXT MEETING

5.1 The next meeting is to be held in Copenhagen. At the informal meeting there was no information about the exact date. At the MEQC meeting on 14 October 1983, the Environmental Officer informed that the next meeting was planned for 10-13 April 1984, overlapping a meeting in the ICES/SCOR Working Group for the Baltic.

6. ANY OTHER BUSINESS

As there was no other business, the Chairman thanked the participants for their fruitful discussion and positive attitude. The Chairman then closed the meeting at 10.30 hrs.

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ANNEX 1

A G E N D A

1. Opening of the meeting
2. Approval of the agenda
3. Miscellaneous
   - 3.1 Report of the first meeting, ICES, C.M. 1983/E:29
   - 3.2 Circulations to the members of the Working Group
   - 3.3 Correspondence with Chairmen of other Committees and Working Groups
   - 3.4 Contributions about on-going research programmes
4. Outline for assessment. Guidelines. Further work.
5. Next meeting
6. Any other business

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ANNEX 2

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ANNEX 4

RECOMMENDATIONS

Recommendation 1

The Working Group on Pollution-Related Studies in the Skagerrak and Kattegat (Chairman: Mr. P.T. Hognestad) recommends that it meet for three days in February or April 1985 in Lund, Sweden, to carry out the following:

(1) to review and finalize the draft assessment of the environment of the Skagerrak-Kattegat area,

(2) to consider priorities in studies in this area, taking into account national and international resources, and

(3) to discuss proposals for future research on a cooperative basis.

The Environment Officer should take part in this meeting.

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