

**REPORT OF THE
STUDY GROUP ON MARINE HABITAT MAPPING**

**Oban, Scotland, United Kingdom
6–10 September 1999**

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1 INTRODUCTION

At its 86th Statutory Meeting, the ICES Council decided to establish a Study Group on Marine Habitat Mapping (SGMHM) [ICES C.Res.1998/2:39]. Although habitat mapping and classification are specifically mentioned in the remits of the Marine Habitat Committee, it was felt that at present there is not enough expertise in the Committee itself to link this kind of work effectively with initiatives that have already started. SGMHM was to ensure wider expert participation to help MHC to fulfill their tasks in an efficient way. The Study Group was to meet for 4 days in 1999 at a venue to be decided.

2 TERMS OF REFERENCE

The terms of reference for the 1999 meeting of the Study Group on Marine Habitat Mapping were to:

- (a) explore whether a habitat classification for the ICES area can be achieved through cooperation with OSPAR IMPACT or another international group, or a particular ICES habitat classification system is required. Emphasis will be put on the following points:
 - i. whether the EUNIS (BIOMAR) classification type under construction is adequate to the needs of ICES,
 - ii. if it is useful, how it can be extended or tailored to the needs of ICES;
- (b) propose how the contribution of ICES to developing a habitat classification system for the ICES area can be organised;
- (c) review the usefulness of GIS systems in this work;
- (d) prepare a plan of action to be decided upon by the Marine Habitat Committee at its 1999 meeting;
- (e) assist the Marine Habitat Committee in its contribution to ICES Strategic Planning in the following tasks:
 - i. formulating tactics to achieve the six objectives adopted by the Committee,
 - ii. suggesting and/or developing activities and products to fulfill the objectives,
 - iii. estimating the resources required for each activity according to categories that will be supplied.

SGMHM will report to the Marine Habitat Committee at the 1999 Annual Science Conference.

3 OVERVIEW

As a first step in the activities of SGMHM, information was gathered on initiatives of OSPAR IMPACT and the European Environment Agency (EEA) in the field of habitat mapping and classification. Noting that the terms of reference for OSPAR IMPACT and SGMHM had very much in common, the ICES Secretariat was informed about the outstanding chances to ensure wider expert participation in the work of the Marine Habitat Committee. After some discussion, it was decided to establish a cooperation in the field of habitat classification by holding a joint OSPAR/ICES/EEA Workshop on Habitat Classification and Biogeographic Regions (WKCLAS). This Workshop was held in Oban, Scotland from 6–10 September 1999. It was organised by the Joint Nature Conservation Committee (JNCC) and hosted by Dunstaffnage Marine Laboratory in Oban, Scotland.

The Workshop was well attended, with approximately 35 participants.

During and immediately after the closing of the Workshop, a meeting of SGMHM took place to review the outcome of the Workshop from an ICES perspective. The results of this review are presented below. It should be noted that this report is not a full Workshop report; therefore, it should be read in conjunction with the Oban Workshop report (OSPAR, 1999).

The SGMHM meeting was attended by participants from Canada, Germany, the Netherlands, Norway, Portugal, Spain, the United Kingdom, and the United States. The list of participants is attached as Annex 1.

Eric Jagtman opened the first meeting of SGMHM and introduced the field of work of the Study Group. He explained that the Study Group was formed to help the ICES Marine Habitat Committee to fulfill its strategic objectives. As it was felt that there is not enough expertise in the field of habitat mapping and classification in the MHC itself, SGMHM was asked to effectively link expertise from the outer world to ICES activities. The Study Group may thus help to develop a clear view on the benefits of habitat classification and mapping for ICES requirements.

Though the attendance at the meeting of SGMHM was promising (totalling 17 participants), it appeared that only a few participants were actual nominated members of the Study Group. Eric Jagtman urged the participants at the meeting to propose that their national delegates nominate them to become members of the Study Group, since it had appeared from the Workshop that there is a certain amount of enthusiasm to undertake joint efforts. The role of SGMHM in this regard could be, apart from forming a platform for scientific discussion, the coordination of activities in the field of habitat classification and mapping.

This report reviews the outcome of the Oban Workshop from an ICES perspective. The WKCLAS report will be made available (through OSPAR) to ICES. For this reason, SGMHM refrains from giving a detailed description of the discussions held during the Workshop. This report will comment on the outcome of the Oban Workshop in relation to the terms of reference of the Study Group.

4 EUNIS CLASSIFICATION ADEQUATE TO THE NEEDS OF ICES

This section deals with items (a) and (b) of the terms of reference. The plenary discussions were chaired by Dr David Connor from the JNCC (UK).

At the Workshop the geographical scope of the current EEA-EUNIS classification was discussed in relation to the ICES and OSPAR areas of responsibility. It was recognised that ICES interests include American and Canadian Atlantic waters. However, for the purposes of the Workshop, it was agreed to focus the development of classification on the OSPAR area, as initiatives on habitat classification on the western side of the Atlantic are still in a preliminary stage.

The applicability of the EEA-EUNIS classification was discussed in three parallel sub-groups dealing with rocky habitats, sediment habitats, and deep-sea habitats.

From the report of the deep-sea group, it was concluded that the current classification is very poorly developed for deep-sea habitats. A more detailed and re-structured classification was developed by the sub-group, including preparation of some habitat descriptions.

In the sediment sub-group, there was considerable discussion about the descriptors 'infralittoral' and 'circalittoral', which were considered too difficult to define consistently. The sub-group therefore proposed a revised definition of rock and sediment in the classification.

The rocky habitats sub-group concluded that the current classification to level 3 is acceptable, but that some new classification types may be required at level 4, especially for deep rock.

In summary, the Workshop participants considered the EUNIS classification to level 3 generally acceptable for the OSPAR area. Difficulties were encountered, requiring lengthy discussion, but the Workshop report concludes that considerable progress was made and agreement reached on the outline structure of the classification. Some important modifications to the structure of the classification are required, together with the addition of new habitats, particularly at level 4. Furthermore, it was concluded that a validation of biotopes at level 4 should take place. The ICES Benthos Ecology Working Group (BEWG) was mentioned as a group having sufficient expertise to undertake this task.

In the subsequent meeting of SGMHM, participants were explicitly asked to comment on the applicability of the EUNIS classification for their own geographical area. From this it was learned that the United States, Canada, and Portugal are willing to consider the feasibility of adopting the EUNIS classification for their own Atlantic regions. In the United States the Aquatic Restoration and Conservation (ARC) Partnership will discuss this subject in a workshop in October 1999. Dr Rebecca Allee declared that she was willing to inform SGMHM about the outcome of this workshop.

We can conclude that in SGMHM there is considerable support for the EUNIS classification up to level 3, but there is need for further development, detailing, and validation. Below level 3 (i.e., levels 4 and 5), discussions have not yet led to final conclusions. The question of whether the EUNIS classification is suitable to the needs of ICES will have to be answered in the future.

A prolonged cooperation with OSPAR is considered to be useful, and it was proposed to use future joint meetings for further elaboration of certain parts of the classification.

5 USE OF GIS IN HABITAT CLASSIFICATION; FEASIBILITY OF HABITAT MAPPING

This section deals with item (c) of the terms of reference. During the Workshop a half-day session was dedicated to developments in marine habitat mapping. There was limited time available for discussion, but this session produced some interesting proposals for ICES. We were unable, with the time limitations, to address the subject of the use of GIS in habitat classification in sufficient detail. This item will be dealt with in future meetings of SGMHM.

The session was chaired by Eric Jagtman (Netherlands, Chair of SGMHM) who briefly highlighted issues of interest for a discussion on the subject of marine habitat mapping. He pointed out that, in summary, he felt that there were two main points to be dealt with in the session:

- a) the technical feasibility of habitat maps;
- b) the question of whether participants are willing to produce, in a joint effort, habitat maps within or for the OSPAR or ICES area.

At the session Dick Pickrill made a presentation on the Canadian approach to habitat mapping and assessment, combining multi-beam seabed mapping with biological sampling and digital imaging.

He demonstrated that combining these techniques resulted in a powerful tool for resource management, which proved beneficial, for instance, in the field of scallop fishing.

After that a number of short presentations on existing mapping projects were made from the UK (4), the USA, Norway, and the Netherlands. The discussion can be summarised under three major headings, as outlined below.

1) Opportunities for further developments

It was felt that there should be a greater emphasis on the quantitative aspects of mapping techniques, i.e., the need to:

- a) quantify video and photographic studies;
- b) establish the precision and accuracy of techniques.

There are numerous photographs available on the seabed that should be secured by digitization, cataloguing, and geo-referencing. These photographs might come in very useful for characterising biotopes, e.g., at the EUNIS 3 level.

2) Points of interest to OSPAR and ICES

There was a common understanding that:

It is not yet feasible nor useful to produce detailed (i.e., below level 3) habitat maps on the full scale of the OSPAR area. However, depending on the resolution of the underlying physical data and data availability, large-scale habitat maps can be produced—the North Sea was identified as an area for which a joint mapping effort could be conducted.

Acoustic bathymetric mapping (multi-beam survey) data provide a solid basis for mapping. By overlaying these data with biological data (ROV video, grab samples, etc.), useful habitat maps can easily be produced. These techniques allow us to overcome the issue of the scale of maps by benefiting from the high resolution of seabed maps.

Intertidal surveys will still require significant work on intertidal and shallow water habitats.

3) Options for implementation; recommendations

Three proposals, designed to advance developments in marine habitat mapping, were brought forward which, in the opinion of SGMHM, can advance developments in marine habitat mapping:

- a) To produce a detailed habitat map of the North Sea using existing data. This would test data access and cooperation among Contracting Parties.
- b) To carry out a joint cooperative comparison of deep-sea survey technologies and to explore the possible development of standards in this field.
- c) To carry out a pilot project for habitat mapping to EUNIS level 3 for the entire OSPAR area. This would be an effective test of the EUNIS classification.

Annexes 14–16 of the Oban Workshop report (OSPAR, 1999) contain more detailed information on these proposals. The proposals need to be carried forward within the OSPAR, ICES, and EEA frameworks. As habitat mapping has received regular attention in the ICES Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (WGEXT) it was emphasised that new initiatives should be developed in close coordination with WGEXT.

It was recognised that there is considerable benefit in developing maps across the whole or parts of the area, especially in integrated approaches with physical and biological data. It was further pointed out that such maps have great potential for improved management, nature protection, and fisheries interests.

At the meeting of SGMHM it was generally concluded that all three proposals offer important opportunities for making progress in relation to the terms of reference for the SGMHM. It was felt that, rather than choosing one of the proposals mentioned, one should try to launch these initiatives simultaneously, with close coordination between the options mentioned.

It was recommended that OSPAR and ICES support these three new initiatives and work being done under the auspices of OSPAR or ICES. Alternatively, components of these initiatives might be incorporated in an EU Concerted Action. Any backing from ICES and OSPAR in this respect will be greatly appreciated.

6 CONTRIBUTION TO THE STRATEGIC OBJECTIVES OF THE MARINE HABITAT COMMITTEE

The following strategic objectives were of importance to the Study Group.

6.1 Objectives of Relevance to Marine Habitat Mapping

The work of the Study Group fully covers objective 1 of the Marine Habitat Committee, i.e., the development of a classification system for marine habitats. Furthermore, the work of SGMHM relates to:

- Objective 2: Development of a marine habitat quality tool.
- Objective 4: Knowledge on effects of human-induced habitat change.
- Objective 5: Knowledge on the effects of anthropogenic pollutants/contaminants on habitat and depending living resources.

At the Workshop, some information was mentioned that will be helpful in realising the objectives specified above.

With regard to human-induced changes, OSPAR is involved in a 5-year programme reviewing the effects of sand and gravel extractions, cable lanes, etc. WGEXT is actively involved in this process and will provide OSPAR with information.

In the UK MarLin Project, dossiers on human impacts on habitats will be prepared for all types of habitats fed into the classification system for marine habitats.

Although none of the people present at the SGMHM meeting had participated in the Scheveningen Workshop on Ecological Quality Objectives (EcoQOs) for the North Sea, it was assumed that this workshop might contribute to the development of a marine habitat quality tool, or at least provide insight into the present knowledge in this field.

Last, SGMHM felt that developing initiatives in habitat mapping will be beneficial to objective 5 of the Marine Habitat Committee.

7 RECOMMENDATIONS

The Study Group on Marine Habitat Mapping:

Recognising that there is considerable support for the EUNIS classification system up to level 3 to be used as a framework for the classification of marine habitats;

Recognising that the current classification does not give full coverage of the ICES area, and that a further extension should be aimed for;

There is also a need for further elaboration of the levels 4 and 5 of this classification, as well as a need for validation of the biotopes already proposed;

Feeling that undertaking joint efforts in habitat mapping may be beneficial to the interests of ICES;

That active participation of nominated members with sufficient expertise in the field of marine habitat classification and habitat mapping is essential to SGMHM to be able to progress;

That progress made should be communicated to the larger public, thus contributing to a common understanding about the meaning of habitat classification and mapping to present-day management of the marine environment.

7.1 Terms of Reference for 2000

ICES C.Res.1999/2E06

The **Study Group on Marine Habitat Mapping** [SGMHM] (Chair: Dr E. Jagtman, Netherlands) will meet in The Hague, Netherlands from 10–13 April 2000 to:

- a) review recent developments in marine habitat classification, in particular, review in detail the outcome of the OSPAR/ICES/EEA Workshop on Habitat Classification and Biogeographic Regions (WKCLAS) and the Aquatic Restoration and Conservation (ARC) Workshop on Habitat Classification; this review should be passed to WGEXT;
- b) report on progress made in the joint OSPAR/ICES/EEA proposals on habitat mapping projects (habitat map of the North Sea or Wadden Sea, deep sea map, OSPAR area map to level 3 of the EUNIS classification system) made at WKCLAS, and discuss whether SGMHM can coordinate the proposed projects;
- c) work closely with WGEXT to comment on present-day mapping technologies in relation to the requirements of ICES;
- d) assess whether further development of (parts of) the standing classification is feasible, provided that there is enough expertise within SGMHM, and if so, take action to build further on this classification;
- e) assess whether and how BEWG should be involved in validating the biotopes already proposed;
- f) finalise details of a Theme Session at the 2000 Annual Science Conference on Classification and Mapping of Marine Habitats.

SGMHM will report to the ACME before its June 2000 meeting and to the Marine Habitat Committee at the 2000 Annual Science Conference.

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Justifications

- a) *Develop a basis for work in ICES on marine habitat classification building on work already in progress in other organisations.*
- b) *The OSPAR/ICES/EEA Workshop on Habitat Classification and Biogeographic Regions (WKCLAS) resulted in three proposals for future cooperative habitat mapping projects: i) production of a habitat map for the North (or Wadden) Sea on the basis of existing (ICES?) data, ii) a joint deep-sea survey workshop to develop standards in bottom-mapping techniques, iii) comprehensive habitat map of the OSPAR area with varying resolution of all parameters required to match level 3 EUNIS classification.*
- c) *There are a number of technologies that are useful for marine habitat mapping; their characteristics and usefulness need to be reviewed.*
- d) *Habitat mapping should be directly linked to a habitat classification system in order to ensure consistent interpretation of data.*
- e) *Cooperation with other relevant ICES Working Groups should be established and their respective roles defined.*
- f) *A Theme Session on this topic will serve to bring together useful information and stimulate greater interest in marine habitat classification and mapping.*

8 REFERENCES

- OSPAR. 1999. Summary Record of the OSPAR/ICES/EEA Workshop on Habitat Classification and Biogeographic Regions. Oban, Scotland, UK. 6–10 September 1999.

ANNEX 1: LIST OF PARTICIPANTS

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ANNEX 2: LIST OF OBAN WORKSHOP (WKCLAS) PAPERS RELEVANT TO SGMHM

- CLAS 99/1/2-E The EUNIS marine habitat classification (July 1999). Submitted by the European Environment Agency. Original document: European Environment Agency, European Topic Centre on Nature Conservation, EUNIS Habitat Classification, draft final report (July 1999) by Cynthia E. Davies and Dorian Moss.
- CLAS 99/2/1-E The MNCR BioMar marine biotope classification (submitted by the United Kingdom). Original document: Connor, D.W. 1997. Marine biotope classification for Britain and Ireland. Version 97.06. JNCC, Marine Nature Conservation Review.
- CLAS 99/2/2-E Guidance on proposing new habitats for the classification.
- CLAS 99/2/3-E Correlation of habitat classifications for the OSPAR area. Submitted by the United Kingdom.
- CLAS 99/2/4-E Biological Inventory (Portuguese Coast). Submitted by Portugal. Report prepared by M.T. Guerra and M.J. Gaudencio, IPIMAR, Lisboa, Portugal.
- CLAS 99/2/5-E Rebecca Allee (USA) The ARC Partnership Phase 1 Implementation: Marine and Estuarine Habitat Classification.
- CLAS 99/3/1-E Biogeographic regions in the OSPAR area. Submitted by Germany. Original document: Biogeographical units of the OSPAR-maritime area. Discussion paper prepared by W. Dinter, German Federal Agency for Nature Conservation.
- CLAS 99/5/1-E Marine benthic habitat mapping activities in the Atlantic Canada. Submitted by Canada. Original document: Boudreau, P.R., Gordon Jr., D.C., Hackett, J., Lawton P., McCullough, D. Pickrill, R. Rangeley, R.W., and Todd, B.J. Marine Benthic Habitat Mapping Activities in Atlantic Canada.
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