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Agenda Item 5.2: **Further survey and research needs**

Report of the Nordic sub-Group on Research Priorities for ASCOBANS, Charlottenlund, 14th February 2001

Submitted by: **Secretariat**

ASCOBANS

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1. The group participants (Annex 1) included: Liselotte W.Andersen (Denmark), Arne Bjørge (Norway), Genevieve Desportes (Denmark), Christina Lockyer (Denmark), Jonas Teilmann (Denmark) and Håkan Westerberg (Sweden). Lockyer acted as convenor and chairperson for the meeting.
2. The terms of reference for the group were to examine the need for a new ASCOBANS area survey for harbour porpoise similar to SCANS in 1994 (Hammond *et al*, 1995), and also look into other research matters related to population structure, and provide guidance and recommendations to the main Nordic Group. Both these items are mentioned in the form of requests for action by parties in Resolution 5 of the report of the Third Meeting of Parties (MOP3) to ASCOBANS, July 2000.
3. The sub-group had available reference and working documents as listed in Annex 2.
4. **SCANS 2.**

4.1. The sub-Group noted 1) that a major survey similar to SCANS (1994) was important and needed because nearly 7 yr have elapsed since the first survey, 2) that the same areas should be surveyed, even if extended to the west or elsewhere, 3) that estimates of total abundance should be obtained, 4) that information on distribution should be derived in such a way that it can subsequently be related to known population structure, and 5) that the main question to be addressed was - has population size of harbour porpoise changed.

4.2. The need for a survey was very important now because 1) Resolution 3 from MOP3 called for a by-catch level of <1.7% of population – an unrealistic demand without up-to-date total abundance estimates, and 2) for an evaluation of the status of the harbour porpoise population, regular abundance estimates are essential. Power analysis in Hammond *et al* (1995) shows that in order to detect a trend in population decline of 6% or more, an interval of 5 or more years is required between surveys.

4.3. The main objectives of a new SCANS should as originally stated be:

- to identify major summer concentrations of harbour porpoises and other small cetaceans in the North Sea and adjacent waters;
- to estimate the abundance of harbour porpoises and other small cetaceans in the area;
- to provide information essential to conservation and management of the species, and to serve as the second abundance estimate in a continued monitoring of population trends.

4.4. The sub-Group supported the main content of the specially solicited working paper on a pre-proposal for a new SCANS survey authored by Hammond (Annex 3), with the exception of items headed Organisation and Funding which were not considered relevant at this time, and recommends that a steering committee be set up as soon as possible under Phil Hammond to plan the next SCANS 2 survey. The group emphasised the importance of having continuity and comparable data with SCANS 1994, and that to this end, appointing Phil Hammond (the SCANS 1994 co-ordinator) as SCANS 2 co-ordinator with back-up from the Research Unit for Wildlife Population Assessment in St Andrews for methodology, would assure success.

4.5. The sub-Group noted that it is important that ASCOBANS supports this new survey both politically and financially, and that there should be full EU-funding (perhaps through the Life programme), together with matching national support from parties and other states where relevant.

4.6. During the planning phase for this survey, co-operation and exchange of information should take place with other survey groups e.g. NASS/NILS-2001 and NASS/NILS-future for minke and large whales (NASS/NILS-2001 surveys in June/July 2001 will cover the northern North Sea and areas to the north and west of Scotland), and annual national surveys in the Norwegian fjords for porpoise between 2001 –2003. Involvement of such survey groups in the new SCANS planning is desirable and may facilitate possible integration and exchange of data.

4.7. Some sub-Group discussion focused on the SCANS survey blocks (Hammond *et al*, 1995, p.127), and one suggestion was to extend Block X to the east, based on new information on animal movements (satellite tagging), as well as re-configure Block I noting the apparent stock separation between Kattegat and Skagerrak. However, these details should be considered by the SCANS steering committee.

4.8. The sub-Group recommended that the SCANS steering committee maintain comparability with the original survey, but take into consideration new information obtained since 1994 on movements (from satellite tagging data), population structure, by-catch hot-spots, and overall management needs.

4.9. Matters relating to survey methodology, vessels and other logistics should be addressed by the SCANS 2 steering committee.

4.10. Country participation as suggested by Hammond (Annex 3) was acceptable to the sub-Group, but other parties/ countries such as Belgium, Poland and Ireland may be interested in participation.

4.11. The sub-Group was made aware of recent recommendations on surveys in the Baltic in the ABDG report (Table 2, points 4, 7, 8 and partly 9) and welcomes and encourages any possible collaboration with a future SCANS survey using diverse techniques including aerial survey, shipboard survey, acoustic survey and fixed-listening stations. It was noted that the Baltic represents a special case where traditional SCANS survey methods may not be generally applicable.

4.12. With respect to the combined visual/acoustic surveys recommendation in the ABDG report (Table 2, point 8), the sub-Group noted that, alone these would not provide absolute abundance, and that the stationary listening devices need further development. However, use of click detectors or T-PODs in SCANS 2 could be used to provide a calibration of these devices, which could subsequently be used to estimate abundance in the Baltic and other survey areas. In the long term these devices may provide the cheapest technology and best return of distributional information for the low-density areas of the Baltic say north of lat. 56^{o}N.

4.13. The use of such devices should be considered by the SCANS 2 planning committee. They may be of potential use in other areas such as the English Channel also. At least two areas for doing calibration studies could be selected from the existing SCANS (1994) survey blocks, and a Nordic block would be desirable.

5. **Population structure.**

5.1. The sub-Group considered the most current situation regarding genetic studies in the ASCOBANS area. Andersen presented a paper (listed in Annex 2) which described a comprehensive study of the population structure of the harbour porpoise based on a 12 polymorphic DNA micro-satellite loci study. A total of 807 porpoises collected in West Greenland, the Barents Sea, North Sea north and south off the Norwegian west coast, Belts, Swedish Baltic Sea, Kattegat, Skagerrak and Danish North Sea, Shetland, east Scotland, east England, Netherlands and Ireland/Wales were used in the analysis. The results indicated six genetically differentiated populations/sub-populations after pooling sub-samples within the regions: West Greenland, Norwegian west coast, Irish Sea/Wales, British North Sea, Danish North Sea and Inner Danish waters (IDW). Furthermore, genetic drift and gene flow mediated by male dispersal and counterbalanced by female

philopatry where females return to their natal breeding area to reproduce were the main evolutionary forces responsible for the population differentiation.

5.2. In Norway, large scale population structure in the North Atlantic region is being investigated, and variation in the mitochondrial DNA (mtDNA) of 370 porpoises was compared from six locations (Gulf of Maine, Gulf of St. Lawrence, Newfoundland, West Greenland, Iceland, and Norway). The largest significant difference occurred between Norway and the Gulf of Maine suggesting a very limited amount of trans-Atlantic gene flow. The difference between areas indicated a discontinuity between Iceland and Norway with Iceland more similar to the western Atlantic populations. The population structure on a finer geographical scale was investigated by comparing genetic sequence variation in mtDNA of porpoises from the Norwegian Barents Sea, Norwegian North Sea and British North Sea waters. An analysis of molecular variance showed no difference between males in these regions. A significant difference in haplotype frequencies was revealed between the Barents Sea and British North Sea female porpoises (when adjusted for multiple comparisons). Haplotype frequencies showed significant difference between North Sea Norway and British North Sea female porpoises only when porpoises from the Shetland Islands were removed from the British North Sea sample. These results suggest that Barents Sea porpoises and British North Sea porpoises should be within separate management units. The difference between Norwegian North Sea and British North Sea may also indicate the relevance of separate management units within the North Sea area. The programme of examining porpoises incidentally-caught in commercial fishing gear in Norway will continue. Samples for further studies of population structure will be collected and stored. However, there are at present no plans for immediate genetic analysis for these samples.

5.3. It was thus noted that while information had increased greatly, there were gaps in our knowledge of the population structure in the Baltic region; also historically. The recommendation on stock structure in the ABDG report (Table 2, point 11) was supported; in particular that further research be conducted as a collaborative effort.

5.4. In connection with the Baltic stock structure questions, Andersen presented a research proposal (listed in Annex 2), which in part addresses this particular aspect. The sub-Group therefore, supported her proposal and recommend that the Nordic Group give it serious consideration. Regarding the use of strandings and / or by-catches as a sample source, it was recommended that care be taken in establishing the true origins of the carcases.

5.5. The sub-Group also noted the ABDG's recommendation regarding satellite tagging as a potential method for refining stock structure (Table 2, part of point 9). Teilmann provided a summary of the past and future planned work within Nordic waters. Over the past 4 years, about 30 porpoises trapped in pound-nets have been successfully tagged in Danish waters. Subsequent movements have included one from the Great Belt to the Baltic proper, and several from the Belts to the Skagerrak and the North Sea. So far tag duration has been up to 300 days. In the next two years, it is anticipated that another 20 porpoises could be tagged. The sub-Group recommended that satellite tagging be used in other waters where feasible.

5.6. The sub-Group was informed about tagging programmes in Norway. Since 1999, five harbour porpoises have been tagged in Varangerfjord , in the Barents Sea. The movements of porpoises showed that some animals tagged in Varangerfjord, moved east along the north coast of the Kola Peninsula. Others moved offshore into the Barents Sea. Thus, the preliminary results indicate mixing of coastal and offshore porpoises in this area. The programme for satellite tagging in the Varangerfjord will be continued in the summer of 2001. From 2002 onwards, depending on funding of the existing programme

Synopsis, a tagging effort may be attempted in Southern Norway to investigate movements of porpoises in Norwegian coastal and North Sea waters.

5.7. The sub-Group noted that other methods apart from genetics on which ASCOBANS has been focused, may yield useful information on population structure. These could include such diverse methods as contaminant types and concentrations in tissues, life history parameters, tooth ultrastructure, dietary fatty acids in blubber, parasites, morphology and satellite tagging. Each method has different merit, and may provide a different aspect of population structure and time-scale of stock separation. An integration of several methods is advised. It is recommended that a "managers' guide" be prepared on all the different methods, and what methods are more suitable to certain management questions.

5.8. From the Nordic perspective, the sub-Group recommended that in connection with Andersen's research proposal (point 5.4), the Danish biopsy sampling of up to 50 porpoises from tagging experiments (point 5.5), provides a unique opportunity to integrate data on both individual movements and genetic data, to investigate how tagging information and suggested sub-population affiliation revealed by the genetic data are in agreement.

5.9. Recent studies of porpoise tooth ultrastructure have also revealed population structure over a wide geographical area (Lockyer, 1999). Sectioned teeth of animals from different geographical regions throughout the North Atlantic were examined for nine different characteristics in both dentine and cementum. Significant differences in several characters were detected between tooth samples from Canadian east coast and West Greenland, between Iceland, the Celtic Shelf and North Sea, as well as sub-divisions within the North Sea, and between the North Sea, Skagerrak, Kattegat, IDW and the Baltic Sea. The method was promising for differentiating between groups of harbour porpoises, if used on groups of known geographic origin. However, individual tooth assignment to a particular geographic group, when selected randomly, could not be assured. This study is relatively inexpensive and can be done in tandem with age determination studies.

5.10. Regarding other possible use of morphological characters in population structure, the sub-Group noted that many museums in the Baltic states may house skulls and teeth from Baltic Sea specimens of porpoise. These may present a resource for further studies on the Baltic stock questions. Furthermore, the tooth material may be useful in genetic analyses.

5.11. The sub-Group noted the current POLLUTION 2000+ multi-national programme. The sub-Group recommend that a request be made to the present Chairman of the ASCOBANS A.C., Peter Reijnders who is also a co-ordinator of this project, that the results from this study might also be made available for population structure investigation (which may require a modification of sampling strategy).

5.12. The sub-Group noted that many research projects requiring samples from carcases rely heavily on and are only feasible if monitoring and carcase collection schemes continue. This is especially important in Andersen's project proposal, but is also a general requirement in many other specialist studies that do not themselves have a budget for sample collection. It therefore recommended that ASCOBANS countries be urged to continue financing such programs.

6. **<u>Other studies noted</u>**.

Bjørge informed the sub-Group about Norway's future plans to collect ecological information about the genus *Lagenorhynchus* during surveys The main objective was to assess the relative biomass in the ecosystem. It was noted that there may be possibilities to recover biopsies and/ or other samples on these occasions for population structure studies.

7. The report will be finalised and forwarded to the Nordic Group for consideration at the meeting on 23rd March.

Annex 1

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Annex 2

Documents and papers available to the sub-Group

References not circulated:

Andersen, L.W., Ruzzante, D.E., Walton, M., Berggren, P., Bjørge, A. and Lockyer, C. Conservation genetics of harbour porpoises, *Phocoena phocoena*, in eastern and central North Atlantic. (paper submitted for publication.)

Anon. Final Report of the ASCOBANS Baltic Discussion Group (ABDG), from 26-28th January 2001, Charlottenlund

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Lockyer, C. 1999. Application of a new method to investigate population structure in the harbour porpoise, *Phocoena phocoena*, with special reference to the North and Baltic seas. *J.Cetacean Res. Manage.* 1 (3):297-304.

Working papers circulated:

Andersen, L.W. Spatial and temporal variation in the population structure of harbour porpoises in the Inner Danish Waters and Baltic Sea. 6pp.

Hammond, P.S. Small cetacean abundance in the North Sea and adjacent waters: a pre-proposal for a survey to update and extend knowledge. 3pp.

Annex 3

Small Cetacean Abundance in the North Sea and adjacent waters: a pre-proposal for a survey to update and extend knowledge

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Introduction

In summer 1994, a major international survey for small cetaceans was conducted to study the distribution and abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters (Hammond *et al.* 1995). The study, known as SCANS (Small Cetacean Abundance in the North Sea), attracted support from the European Commission, from the governments of Denmark, France, Germany, Ireland, Norway, the Netherlands, Sweden and the UK, and from WWF Sweden.

The SCANS survey was highly successful, providing the first North Sea wide estimates of abundance for the three most common cetacean species: the harbour porpoise; the minke whale and the whitebeaked dolphin. Estimates were also obtained for the Kattegat, Skagerrak and Celtic Sea. The Baltic Sea was included in the SCANS survey but inadequate coverage of this area precluded the calculation of an abundance estimate. A subsequent survey in the Baltic Sea in summer 1995 achieved better coverage but was still unable to survey all areas where porpoises are known to occur and the limited survey effort resulted in an abundance estimate of poor precision. The waters to the west of Britain and Ireland have never been surveyed systematically. These waters are rich in cetacean life; in particular, there are known to be substantial numbers of harbour porpoises in inshore waters. Areas to the north of the North Sea have been surveyed as part of the North Atlantic Sightings Surveys (NASS) in 1987, 1989 and 1995 and by the Norwegian Independent Line transect Survey (NILS) in 1995. These waters will be surveyed again in NASS-2001.

The main aim of project SCANS was to provide information on distribution and abundance that was essential to the conservation and management of harbour porpoises, and to serve as a baseline for their future monitoring. The abundance estimates have been used to assess the potential impact of cetacean bycatch in the North Sea and the Celtic Sea. Bycatches of porpoises also occur in the Irish Sea, in waters to the west of Britain and Ireland, and in the Baltic Sea. The impact of these bycatches cannot be assessed until there are reliable estimates of porpoise abundance in these areas.

It is now approaching seven years since the first SCANS survey. Incidental sightings data have been collected from platforms of opportunity in the North Sea and adjacent waters before and since that time. Methods have been developed recently that allow indices of abundance to be calculated from these data (Bravington 2000); these indices are an important source of information for assessing the status of small cetacean populations in these areas (Pout *et al.* 2001). However, it has always been recognised that future surveys similar to SCANS would be required to monitor absolute abundance at infrequent intervals. It is now time to initiate planning for a second SCANS survey.

Aims and objectives

The aim of SCANS-II should be to re-estimate the abundance of harbour porpoises and other small cetaceans in the North Sea and adjacent waters and to extend these adjacent waters to include the Baltic Sea and the previously unsurveyed waters to the west of Britain and Ireland. Results from this survey, together with results from NASS-2001 will allow total abundance of harbour porpoises in European waters to be estimated for the first time.

There are plans to survey the Baltic Sea in 2001 and if this results in an adequate estimate of harbour porpoise abundance it may not be necessary to include the Baltic Sea in SCANS-II.

Methods

The survey should be conducted in mid-summer to provide the best opportunity for success and to be comparable with SCANS-94 and other surveys (NASS and NILS). The survey should broadly follow the design, methodology and logistics of the SCANS survey. Some areas of the North Sea and adjacent waters are difficult to survey because, for example, of the convoluted coastline. In SCANS-94, these areas (and areas where particularly high densities were expected) were surveyed by aircraft. This should also be the case for SCANS-II. Other areas should be surveyed by ship.

The success of SCANS-94 was in part because standardised protocols were developed and applied over the entire survey increasing the power of data analysis. SCANS-II must also adopt standardised methodology across all shipboard surveys and across all aerial surveys. The data collection and analytical methodology developed as part of SCANS-94 (Borchers *et al.* 1998; Hiby & Lovell 1998) should form the basis for SCANS-II. Recent developments for shipboard surveys (e.g. Palka & Hammond in press) and aerial surveys (Hiby pers comm) should be accommodated.

Organisation

SCANS-94 was co-ordinated by the Sea Mammal Research Unit (Hammond), based at that time in Cambridge, UK. The Research Unit for Wildlife Population Assessment, University of St Andrews was contracted to develop data collection and analysis methodology and assist with survey logistics. Other partners included laboratories in Denmark, France, Germany, The Netherlands, Norway and Sweden.

It is proposed that overall co-ordination of SCANS-II is also undertaken by Hammond at SMRU, now located at the University of St Andrews, Scotland. Because SCANS-II as envisaged would be a significantly larger project that SCANS-94, it is proposed that the survey be sub-divided into three sub-projects, each with a co-ordinator, based on survey area. For example, Area 1 could be the North Sea proper; Area 2 the coastal and shelf waters west of Britain and Ireland; and Area 3 the Baltic Sea, Belt Seas, Kattegat and Skagerrak.

It is recognised that two kinds of partners will be necessary in this project: scientific partners and logistics partners. Scientific partners should include the University of St Andrews (SMRU and RUWPA) and other laboratories that will provide significant scientific input, for example through the provision of cruise leaders or as sub-project co-ordinators. Logistics partners should include agencies and organisations that are able to interact with governments that are providing support in the form of funding, survey vessels, personnel, etc.

Funding

SCANS-94 cost approximately Euro 1.4M. SCANS-II will save on some costs (methodological development, experimental survey) but will likely cost more overall because of the larger area proposed to be surveyed. Exact costings have not been worked out, but it is reasonable to expect that SCANS-II will cost at least Euro 1.5M and possibly up to Euro 2M. Funding will need to be obtained from the European Commission and from the governments of countries bordering the survey area (as was the case for SCANS-94. Additional funding may also be obtained from the oil and gas industry (particularly for areas west of Britain and Ireland) and environmental organisations (e.g. WWF).

Next steps

The following next steps seem appropriate:

1. Project co-ordinator (Hammond) to approach potential partners.
2. Potential partners to lobby for support for the project in respective countries (funding, survey vessels, personnel, etc).
3. Project co-ordinator to investigate EC interest in supporting project (funding, appropriate target for proposal).
4. Project co-ordinator to prepare proposal to present to meeting of ASCOBANS Advisory Committee (April 2001).
5. Plan for meeting of proposed partners to develop full proposal to EC and other potential sources of support (summer 2001).
6. Aim for submission of full proposal to EC in October 2001 with a view to conducting survey in summer 2002?

The timetable for progression will depend on responses over the next 3-6 months. It may become clear during this period that, for various reasons, it is overly optimistic to plan for the survey in 2002 and that it should be planned for 2003.

References

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