REPORT ON THE MEETING OF THE

ASCOBANS
BALTIC DISCUSSION GROUP

Charlottenlund, Denmark

24 - 26 January 2001

Report of the ASCOBANS Baltic Discussion Group (ABDG)

CONTENTS

BACKGROUND

During the 4th ASCOBANS Advisory Committee Meeting, 30 June-2 July 1997, Texel, The Netherlands, it was decided that a feasibility study on the most cost-effective way to carry out research in the Baltic should be conducted as soon as possible (ASCOBANS, 1997a).

The ASCOBANS Secretariat funded the contract study and the report of that study (Clarke *et al.* 1997) was submitted to the Meeting of Parties in November 1997 (ASCOBANS, 1997b). The report was not discussed, but referred to the 5th Advisory Committee Meeting held in April 1998. The ASCOBANS Secretariat had established the ASCOBANS Baltic Discussion Group (ABDG) in late February 1998, with the following terms of reference:

(1) To evaluate the report of the contract study provided by Clarke *et al.* (1997) in the light of the Terms of Reference for that study.

(2) To develop draft recommendations for consideration by the 5th Advisory Committee Meeting.

The ABDG reviewed the report of the contract study and identified a number of items where correction, clarification or expansion was needed. These were taken into consideration by the authors of the contract study in preparing a revised version of their report presented at the 5th Advisory Committee Meeting (Clarke *et al.* 1998).

The ABDG did not, however, have time to agree on a set of recommendations for the 5th Advisory Committee Meeting, and requested that funds were made available for the ABDG to hold a meeting to draft these recommendations. The funds became available in 2000 through a contribution from the Swedish government.

The meeting was held 24-26 January 2001 at the Danish Institute for Fisheries Research, Charlottenlund Castle, Charlottenlund, Denmark.

1-4. INTRODUCTORY ITEMS

The Chairman of the ABDG, Finn Larsen, welcomed the members of the ABDG to the Danish Institute for Fisheries Research. He noted that the first term of reference had been completed (Clarke *et al.*, 1998) as described above and that the meeting would therefore focus on the second i.e. developing draft recommendations to be considered by the Advisory Committee. The ASCOBANS Executive Secretary, Rüdiger Strempel, thanked Larsen for convening the meeting and the members of the ABDG for their participation. He thanked the Swedish Government for funding the meeting and the Danish Institute for Fisheries Research for hosting it. A list of participants is given in Appendix 1.

The adopted Agenda is given as Appendix 2. Donovan, Hammond and Palka agreed to act as rapporteurs, with assistance from the Chairman. A number of documents were available to the ABDG and these are referenced in the text.

The ABDG reiterates that this report only addresses the second term of reference - to determine research and, where appropriate, management recommendations. In addition it does not provide a detailed review of knowledge on Baltic Sea harbour porpoises - such information can be found elsewhere (e.g. Donovan and Bjørge, 1995; Clarke *et al.* 1998).

5. OPTIONS FOR ASSESSING THE STATUS OF HARBOUR PORPOISES IN THE BALTIC SEA[1]

Under this item, the ABDG reviewed a number of approaches that had been proposed for assessing the status of harbour porpoises in the Baltic Sea. The aim was not to choose one of the approaches as the best, but rather to briefly review general methodology and data requirements to develop recommendations under Items 6 and 7.

[1] The ABDG adopted the definition of the Baltic Sea accepted by the IWC-ASCOBANS meeting, i.e. the waters in ICES Division IIId east of the Darss and Limhamn Ridges (IWC, 2000) – see Item 5a.

5a The Clarke *et al.* (1998) approach

This approach focuses on obtaining: (1) reliable estimates of bycatch and (2) estimates of abundance and suggests a way in which this information can be used to determine whether the bycatch is at a level such that further management action is required. With respect to (1) the authors outlined methodology for designing an independent observer scheme to estimate the total bycatch in the Baltic. They noted that the main difficulty was to obtain sufficient information and data on Baltic Sea fisheries. With respect to (2), they examined the use of dedicated surveys and the effort necessary to determine whether the current abundance was sufficient to sustain bycatches of various levels. They noted that such surveys were not appropriate for monitoring trends in abundance given the low densities of porpoises in the Baltic. Finally, they presented a method to estimate the sample size (percentage of fishing trips) that an observer scheme would need to achieve for a given estimated population size to determine whether the bycatch is above or below a maximum allowable level.

In discussion, the ABDG agreed that the approach outlined by Clarke *et al.* to assess status is reasonable. However, the methods for estimating total bycatch may be difficult to implement given the practical difficulties in establishing an independent observer scheme or schemes with the necessary coverage of all relevant fisheries. This is discussed further under Item 6d.

5b The Bravington (2000Ms) approach

Bravington (2000Ms) presumes that the nature of the problems in the Baltic (e.g. the small size of vessels in some key fisheries; large number of vessels/effort related to low absolute numbers of bycatches) means that it will not be possible to establish independent observer schemes to estimate bycatch reliably. The author therefore proposed an approach that involved using existing data on bycatch rates from other areas (such as the North Sea) in addition to information on net density to obtain a *per-capita* mortality rate per unit of fishing effort (net km-hour). Then, taking into account both temporal and geographical variation, the proposal was to combine this with information on relative porpoise distribution to estimate the total annual bycatch *rate* for the Baltic. The author also proposed this method could be used to identify potential bycatch 'hotspots', which could be used to target mitigation methods.

The ABDG thanked the author for his contribution to its work, even though he was unable to attend the meeting. It noted that much of the information required to implement the approach was not currently available, particularly with respect to fishing effort in certain fisheries and a relative density map of harbour porpoise distribution. These issues are discussed further under Items 6d and 6c, respectively, as is the question of establishing observer schemes. The ABDG emphasised the value of determining bycatch 'hot spots' and this is considered further under Item 6d.

5c Population modelling

A joint IWC-ASCOBANS working group had been established in 1998 to provide scientific assistance to ASCOBANS on issues relating to the assessment of harbour porpoises in the North Sea and adjacent waters (IWC, 2000). The group had developed the outline of a model that could be used to determine whether certain removal rates would allow harbour porpoises in the ASCOBANS area to reach and/or be maintained at 80% of carrying capacity (i.e. the ASCOBANS conservation objective – ASCOBANS, 1997b).

Hammond briefly summarised progress in a project to developing such a model. The details will be submitted to the next IWC Scientific Committee meeting in July 2001. The method uses Bayesian sequential importance sampling to fit a stochastic population model to the available data. These data are: a series of relative abundance estimates from platform of opportunity data; a single estimate of absolute abundance from the 1994 SCANS survey; a series of observed bycatches from Danish and English fisheries; fishing effort for these same fisheries; and the age at death of the bycaught porpoises.

The modelling explored two scenarios for spatial structure; that the North Sea contains

one or two populations. In addition, the sensitivity of the results to underreporting of bycatch was explored in the single population model.

The models predicted estimates of current population size (250,000-310,000) and bycatch (6,600-7,800; 3-4% of population size) are consistent with the available data, giving confidence that the estimation of model parameters is robust. The estimated instantaneous rates of change are not significantly different from 1.0 in either the one or two population case. It is clear that the two population model requires further work, including assessing whether or not the implemented method of formulating this is the best approach.

The ABDG welcomed the progress that had been made in modelling the North Sea harbour porpoise population. It noted that the approach as currently implemented requires series of several kinds of data (relative abundance, bycatch, fishing effort) that are not available for the Baltic Sea; as such the method would not be useful for assessing status in the Baltic at the present time. The ABDG suggested that the sensitivity of the approach to areas where data were sparse, as in the Baltic Sea case, could usefully be explored to determine the relative importance of obtaining abundance and bycatch data from the Baltic Sea. This is discussed further under Item 7b.

5d Potential Biological Removals (PBR) or allowable mortality

Palka summarised how the PBR approach (Wade, 1998a) has been used to assess the status of marine mammal populations found in US waters. For a population, its status is determined by the relationship between the estimated mortality level and the calculated potential biological removal (PBR) level. PBR is intended to be a removal level that, if taken from the population, would still allow the population to recover to, or remain above its maximum net productivity level (MNPL). PBR is the product of three numbers, N_{min}, the minimum abundance estimate for the population, R_{max}, the maximum theoretical or estimated net productivity of the population at a small population size, and F_R, a recovery factor set between 0.1 and 1.0. If the mortality level is greater than PBR, then the population is classified as "strategic" and procedures initiated to design mitigation methods to reduce the mortality levels.

In a general discussion of the PBR approach it was noted that the approach is most easily implemented for a specific point in time. If it is to be implemented for a period of time, a number of associated practical decisions have to be taken about, e.g., the time frame for when conservation goals should be achieved. It was also noted that the PBR approach does not explicitly take into account uncertainty in stock structure, which could be a serious problem in some applications.

The PBR approach has been used by Berggren *et al.,* (in review) in the context of what is known of Baltic Sea harbour porpoises. They estimated potential limits to anthropogenic mortality for harbour porpoises in the Baltic region (Skagerrak, Kattegat and the Great and Little Belt Seas, the Kiel and Mecklenburg Bights, and the Baltic Sea) using the 80%K conservation objective set by ASCOBANS (see Item 5c). The latter was achieved by estimating an appropriate value for the uncertainty factor (this is in practice the recovery factor referred to above). The authors explored a variety of assumptions regarding stock structure, errors in bycatch estimates and errors in population estimates. The minimum number of known bycatches exceeded the calculated mortality limits for all the stock structure hypotheses tested, indicating that such catches will not allow the ASCOBANS conservation objective to be achieved. The authors suggest that immediate management actions are necessary to reduce the magnitude of by-catches to meet the ASCOBANS conservation objectives.

The ABDG welcomed this analysis and made a number of comments and suggestions with respect to the paper. It noted that the paper explores the effect of using a PBR approach over a long time period in order to take into account the ability to meet ASCOBANS conservation objective. As for the other approaches, data quality is an important factor, particularly with respect to bycatch estimates

and population abundance (see items 6d and 6c, respectively).

5e Population viability analysis (PVA)

PVA is a population modelling approach commonly used to estimate the status and probability of extinction of populations (Gilpin & Soulé 1986). It is usually applied to small populations but has also been applied to harbour porpoises in the Gulf of Maine/Bay of Fundy region (Wade, 1998b). The method uses available information to construct a population model that is simulated repeatedly to project population size forwards in time. Stochasticity in population dynamics, uncertainty in population parameter estimates and environmental variation can be incorporated. In addition, alternative scenarios for present and future patterns of incidental mortality can be investigated. The output from the simulations is usually expressed as a probability of extinction (or decline to a pre-defined very low population size) within a specified time frame (e.g. 20, 50 or 100 years). Additional output includes the estimated current rate of population change with associated uncertainty.

The ABDG agreed that such an analysis should be undertaken to quantify the critical state of the harbour porpoise population in the Baltic Sea where the available evidence clearly points to a population that is in serious danger (see Item 7). In order to illustrate this more clearly the ABDG **recommends** that a PVA be conducted using known minimum bycatches and estimates (and plausible ranges) of current abundance to quantify the probability of extinction over short- and long-time periods under different scenarios. Berggren undertook to organise this.

6. RESEARCH NEEDS

6a Population structure

In 1999, the IWC-ASCOBANS Working Group had examined the available evidence on stock identity for eastern North Atlantic harbour porpoises (IWC, 2000). With respect to the Baltic region, they concluded that a precautionary approach was to treat the animals in the Baltic Sea as a separate stock. However, they recognised that there may be mixing between animals in the Baltic and inner Danish waters as well as population sub-structure within the Baltic. The ABDG noted that there are no new data that would alter the conclusion of the IWC-ASCOBANS Working Group and **agrees** that the animals in the Baltic Sea should be treated as a single population. However, in order to clarify the remaining possibilities, the ABDG **recommends** that the available data be examined and new data collected to determine whether there is (a) sub-stock structure within the Baltic Sea; and (b) interchange with animals (genetic or distributional) to the west of the Baltic Sea. Ideally this should be carried out as one collaborative study to ensure comparability of methods and results. Previous genetic studies show that mtDNA analyses are the most appropriate (e.g. Tolley *et al.*, 1999; IWC, 2000). Any analyses conducted should consider the temporal distribution of the samples to ensure that between-season movements do not mask the stock structure.

6b Movements

Larsen presented data on the movements of 17 harbour porpoises in Danish and adjacent waters that were studied using satellite telemetry. The porpoises were caught in pound nets in 1997-99 in the Danish Belt seas. Contact remained with the animals for 14 to 255 days. Most animals were followed during the spring and summer months, but one animal was followed during the whole winter. Immature animals were found to disperse further away from the tagging site while mature animals stayed within the region of the Danish islands. The tracks went from the southeast coast of Norway, through the Kattegat and the Danish Belt seas. One animal was tracked to Øland in the Baltic Sea. Such a study had been recommended by the IWC-ASCOBANS Working Group (IWC, 2000).

The ABDG welcomed this information and noted that these data can be used to estimate relative density distributions, and, with the use of ancillary data, relative time spent in different behaviours, such as feeding or diving. It was noted that there are no animals known

to be trapped alive in pound nets or other fisheries in the Baltic Sea.

Despite the obvious practical difficulties, the information that can be obtained from satellite-tagged animals from the Baltic Sea would be of great value in determining seasonal movements and high risk entanglement areas as well as improving abundance survey design and refining stock structure hypotheses. The ABDG **recommends** that every effort be made to find ways to satellite tag porpoises in the Baltic Sea. However, it draws attention to the need to ensure that any methods developed involve minimal risks to the animals.

6c Abundance

Estimates of abundance exist for a number of geographical areas in the North Sea and adjacent waters from the Small Cetacean Abundance in the North Sea (SCANS) Survey conducted in July 1994 (Hammond *et al.*, 1995). Two of these areas are in the Baltic region: the Skagerrak Sea-Kattegat Sea-Great Belt, where an abundance of 36,046 (CV 0.34) animals was estimated from ship-based surveys; and the Little Belt-Kiel Bight, where aerial surveys resulted in an estimated abundance of 588 (CV=0.48) porpoises (Hammond *et al.*, 1995).

The abundance of harbour porpoises in the Baltic Sea was estimated during a line transect aerial survey in July 1995 (Hiby and Lovell, 1996). The survey used the same methodology (both in track line design and to generate abundance estimates), aircraft and observers as were used in the SCANS survey. The survey covered a 43,000 km^2 area (corresponding to ICES Sub-division 24 and 25, but excluding a 22 km corridor along the Polish coast) and yielded an estimate of 599 animals (CV=0.57, 95%CI 200-3,300). The abundance estimate for the Baltic Sea was based on sightings of only three groups, each containing a single animal. Although, the 15.4 hours of tracklines surveyed gave enough coverage of the survey area to allow for the calculation of an abundance estimate, this was inevitably accompanied by a large confidence interval.

The same crew also covered the Kiel-Mecklenburg Bights area in July 1995 and the resultant estimate was 817 animals (CV=0.48, 95%CI 300-2400) (Hiby and Lovell, 1996).

The ABDG **agrees** that the 1995 abundance estimate is a valid estimate for the area of the Baltic Sea surveyed. However, it recognises that this represents a downwardly biased estimate for the entire Baltic population because it did not cover an area of Polish waters where harbour porpoises are known to occur. The poor precision results from the low number of detected animals on the survey.

Given that the present abundance estimate has wide confidence intervals and did not cover one known area of harbour porpoise distribution, the ABDG **recommends** that a new aerial survey should be undertaken with fuller area coverage to reduce bias and with sufficient effort to achieve improved precision. It noted that plans to carry out such a survey using the same plane and observers are being developed and that partial funding of £25,000 is available. It **agrees** that a detailed proposal should be submitted to the ASCOBANS Secretariat for circulation to the Parties. It **recommends** that member states provide any necessary additional funds. It further **recommends** that the ASCOBANS Secretariat and member states make every effort to ensure that the necessary flying permissions are received. The ABDG recognised that such surveys are unlikely to be useful in terms of detecting trends in abundance given the expected precision of the estimate.

The ABDG also discussed alternative methods to estimate abundance and trends in abundance, including those involving use of acoustics. It **agreed** that acoustic surveys (e.g. Leaper and Scheidat, 1998; Gordon et al, 1998; 2000) hold great potential for determining relative abundance, absolute abundance, distribution, seasonal variation, and for short- and long-term monitoring. However it noted that a concerted effort is needed to refine the theoretical basis for analysing such data, particularly with respect to obtaining estimates of absolute abundance. It **recommends** that this be undertaken as soon as possible, including analysis of existing visual and acoustic data from other areas (for example from the joint visual/acoustic survey held in the Gulf of Maine in 1999).

The ABDG noted that there were plans in Germany to carry out a joint visual/acoustic survey this summer. It welcomed this initiative and **recommends** that it be carried out. It also noted a working draft proposal to carry out an acoustic survey for porpoises in the Baltic Sea (Gordon, 2001)

The ABDG **agreed** that other methods for long-term monitoring of the population should be investigated. These will include approaches that use a combination of frequently collected relative abundance estimates with infrequently collected absolute abundances. It noted the value of the large incidental/platform of opportunity sightings database used in the modelling exercise described under Item 5c. Relative abundance information could come from passive acoustic surveys or long series of visual surveys from platform of opportunities, for example ferries or research vessels used in other studies. If passive acoustics are to be used, then during the absolute abundance surveys, both visual and passive acoustic surveys should be conducted simultaneously in appropriate areas to estimate a conversion factor between relative density estimates from acoustic surveys and absolute abundance estimates from visual surveys.

Finally, it was noted that fixed-point acoustic monitoring (e.g. using PODs or pop-ups) could be used as a way to discover whether porpoises are found in areas and seasons identified as potentially high-risk areas based on fishing gear/effort (see 6d below). The ABDG **recommends** that this be explored.

6d Removals

The ABDG noted the need for reliable estimates of bycatches and/or accurate fishery statistics as highlighted in the discussions of all of the approaches under Item 5. It was noted that there have been some improvements in the collection of statistics since the review presented in Clarke *et al.* (1998).

Appendix 3 provides fishing effort (tonnes landed) for several fisheries within the Baltic Sea that were summarised by ICES sub-divisions and type of fishery. It was recognised that data from some of the fisheries known to catch porpoises were not summarised in this working paper - there are a number of other fisheries in which the data are either not submitted to ICES or are not even collected. The nature of some of these fisheries is such that landings data will be difficult or impossible to collect. The fishing effort on a smaller scale and in different metrics *(i.e.*, numbers of nets) would be valuable (if it exists).

The ABDG noted that the available information on fishing effort in the Baltic Sea is highly variable and incomplete. For some fisheries (e.g. Swedish gillnets) very detailed statistics exist (number of net km.hrs per ICES rectangle by month) whereas for others (e.g. German and Polish small boat gillnet fisheries) no official effort statistics are available. However, information from collected bycaught porpoises in Germany, Poland and Sweden show that large mesh gillnet fisheries (e.g. cod and salmon fisheries) are responsible for almost all reported bycatches in the Baltic Sea (Berggren, 1994; Kock and Benke, 1996; Anon., 1997). Further, bycatches in Swedish waters occur year round with no apparent peak season (Berggren, 1994), whereas bycatches in Poland are more frequent during the months March and December (Anon., 1997). The ABDG noted that in the collection of bycatch data, appropriate stratification is important (e.g. by fishery and season).

Although recognising the limitations of the fisheries data available, the ABDG **recommends** that a collation be made (to the level of detail possible) of the distribution of high-risk fishing gear and any associated effort for the Baltic. This should be integrated into a relative potential entanglement risk map of the Baltic in order to try to identify potential target areas for concentrating research effort and for mitigation strategies. Berggren agreed to work with the ASCOBANS Secretariat on this.

The ABDG also **recommends** that ASCOBANS Parties and Range States begin or continue to collect data on fishing effort and submit this information to the ASCOBANS Secretariat, as decided by the 7th Meeting of the ASCOBANS Advisory Committee (ASCOBANS, 1998).

The importance of reliable estimates of bycatch is clear. The ABDG notes that it is generally accepted that independent observer schemes represent the best way of achieving these. If placing independent observers on the fishing vessels themselves is not possible, alternative independent methods (such as using observers on independent vessels) to estimate bycatch may be possible. Some members believed that in some fisheries no independent schemes would be possible. Whilst recognising the difficulties in establishing such schemes in small-boat fisheries, the ABDG **recommends** that every effort be made to obtain such estimates. The practicalities of this should be addressed at the September Workshop discussed under Item 7. Such schemes must also monitor the level of success of any mitigation measures put into place.

The ABDG noted that there are some observer schemes in existence for certain Baltic Sea fisheries but it did not have information on coverage or reporting requirements for harbour porpoises. It **recommends** that the ASCOBANS Secretariat collates information on existing schemes for presentation to the Workshop referred to under Item 7.

6e Biological parameters

The ABDG noted that a number of studies (e.g. using population modelling) require biological parameters as input data. It noted that no new information on biological parameters for harbour porpoises has been published since the IWC-ASCOBANS meeting in 1999.

The ABDG noted that other potential threats to harbour porpoises in the Baltic Sea included pollutants. It noted that ASCOBANS has already endorsed the IWC initiative POLLUTION 2000+ which is investigating cause-effect relationships in cetaceans (the harbour porpoise is one of the target species). The ABDG **recommends** that ASCOBANS continues to support this initiative and that every opportunity be taken to collect and archive samples from Baltic Sea animals following the POLLUTION 2000+ protocols.

6f Research related to mitigation measures.

The ABDG notes the need to reduce bycatches towards zero as quickly as possible. It **recommends** that the fishing industry and fishing authorities take urgent steps to develop and test porpoise-safe fishing gear and practices to replace those currently in use where bycatches occur.

The ABDG recalls and agrees with the IWC Scientific Committee that acoustic alarms (pingers) alone will not reduce bycatch to zero and thus cannot be considered alone as an effective solution for populations thought to be at low levels where the bycatch should be zero, e.g. harbour porpoises in the Baltic Sea (IWC 2000). As noted under Item 6d any mitigation methods used must be monitored to ensure their efficacy.

7. CONCLUSION AND RECOMMENDATIONS

Despite the improvements that can and should be made in terms of *inter alia* refining estimates of absolute abundance (Recommendation 4) and bycatch (Recommendations 1, 6) in terms assessing the status of Baltic Sea[2] harbour porpoises, the ABDG **agrees** that

> **(1) the available evidence (abundance estimate, bycatch levels, stock identity) clearly points to a population that is in serious danger (and see recommendation 3); and**
>
> **(2) as a matter of urgency, every effort be made to reduce bycatches towards zero as quickly as possible.**

In considering the recommendations, the ABDG recognised two main categories in the context of a research strategy for the future:

(I) research that will further document and refine knowledge of the status of this population;

(II) research that will enable appropriate management actions to be implemented and their performance evaluated.

[2] The Baltic Sea is defined as the waters in ICES Division IIId east of the Darss and Limhamn Ridges

Whilst both of these are important, and recommendations for both have been developed, the ABDG **agrees** that the highest priority must be accorded to the latter category. It **strongly believes** that the need for further research under category (I) above should not be seen as a reason for delaying immediate and highest priority action under (II).

The ABDG was informed that ASCOBANS is intending to host an Interdisciplinary Workshop (Recommendation 2) to develop a recovery plan for Baltic harbour porpoises in September 2001. The Workshop will include biologists, fishermen, gear technologists, NGO representatives and others. The ABDG **welcomes** this initiative and **strongly recommends** that a steering group be established immediately to determine precise terms of reference and to ensure that the necessary expertise and data/analyses are available to give the Workshop the maximum chance of success. It notes that input from a number of the recommendations given in Table 1 will aid the Workshop.

Table 1 summarises recommendations developed during the meeting (which are discussed in detail under the relevant Agenda Items) along with their relevance to the two research categories noted above. All of these recommendations are important. However, the ABDG agreed that given the present status of this population, it was important to assign levels of priority to the research recommendations as shown in Table 1.

7a Short-term management

Records of deaths suggest that most non-natural mortality is associated with entanglements in fishing gear. Despite advances in mitigation measures, it is unlikely that any measures other than a complete ban throughout the Baltic on certain gear types would immediately accomplish a goal of zero mortality (see Read 2000). The ABDG recognises that such total restrictions are not feasible; research is urgently needed to identify the most appropriate fisheries, areas and seasons for the most effective targeting of mitigation measures (e.g. see Recommendation 5). The need to carry out research aimed at developing additional research mitigation measures (e.g. alternative gear) is also emphasised (see Recommendation 1). Nevertheless, the ABDG **strongly emphasises** that here is no need to wait for further research before implementing any currently available management actions that can reduce bycatches in those fisheries where they are already known to occur (Swedish, German and Polish gillnet fisheries for cod and salmon). Such measures must be monitored to determine their efficacy (see Recommendation 6).

7b Longer-term management

It is essential that any longer-term management plan developed for the Baltic (see Recommendation 2), must be monitored adequately. It is for this reason that the ABDG emphasises the need to (a) ensure adequate monitoring of bycatch levels and the efficacy of mitigation methods (see Recommendation 6); and (b) the development of techniques to monitor trends in abundance (e.g. see Recommendation 7) to supplement surveys to estimate absolute abundance (see Recommendation 4).

The ABDG noted the work of the IWC-ASCOBANS Working Group discussed under Item 5c, which is exploring ways to model the effects of bycatch rates in the context of ASCOBANS conservation objectives. The ABDG **recommends** that the work of this group continues.

Table 1.

Summary of recommendations made by the ABDG.

	Item	Research Category	Priority*	Agenda item (s)	Likely time-scale†
1	**Bycatch mitigation:** noting the need to reduce bycatches towards zero as quickly as possible, the ABDG **recommends** that the fishing industry and fishery authorities take urgent steps to develop and test porpoise-safe fishing gear and practices to replace those currently in use where bycatches of porpoises occur. Any mitigation measures developed must be monitored to determine their efficacy.	II	1	6f	Short term
2	**Recovery plan**: the ABDG notes plans to hold a Workshop to Develop a Recovery Plan for Baltic Sea Harbour Porpoises. It **supports** this initiative and **recommends** that a steering group be established immediately to determine precise terms of reference and to ensure that the necessary expertise and data/analyses are available to give the Workshop the maximum chance of success. The ABDG further **recommends** that sufficient funds are made available through ASCOBANS for the Workshop.	I, II	1	7	Short – to be held in September 2001
3	**Status of harbour porpoises:** the available evidence clearly points to a population that is in serious danger. In order to illustrate this more clearly the ABDG **recommends** that a PVA be conducted using estimates (and plausible ranges) of the current estimated abundance and bycatch data to quantify the probability of extinction over short- and long-time periods under different scenarios. Berggren undertook to organise this.	I, II	1	5e	Short – available for the April Advisory Committee meeting
4	**Abundance**: the present abundance estimate has wide confidence intervals and does not cover one area of known harbour porpoise distribution. The ABDG **recommends** that a new aerial survey should be undertaken with fuller area coverage to reduce bias and sufficient effort to achieve improved precision. It noted that plans to carry out such a survey have been developed and that partial funding of £25,000 is available. It **agreed** that a detailed proposal be submitted to the ASCOBANS Secretariat for circulation to the Parties. It **recommends** that member states provide any necessary additional funds. It further **recommends** that the ASCOBANS Secretariat and member states make every effort to ensure that the necessary flying permissions are received.	I, II	1	6c	Short – if possible summer 2001
5	**High-risk areas**: although recognising the limitations of such data, the ABDG **recommends** that a collation be made (to the level of detail possible) of the distribution of high-risk fishing gear and any associated effort for the Baltic. This should be integrated into a relative potential entanglement risk map of the Baltic in order to identify potential target areas and seasons for concentrating research effort and for mitigation strategies. Berggren agreed to work with the ASCOBANS Secretariat on this.	I, II	1	6d	Short - available for the September Workshop
6	**Removals**: the importance of reliable estimates of bycatch is clear. The ABDG notes that it is generally accepted that independent observer schemes represent the best way of achieving these. Whilst recognising the difficulties in establishing such schemes in small-boat fisheries, the ABDG **recommends** that every effort be made to obtain such estimates. The practicalities of this should be addressed at the September Workshop. Such schemes must also monitor the	II	1	6d	Short to long – discuss at September Workshop

	level of success of any mitigation measures put into place. The ABDG also notes that there are some observer schemes in existence for certain Baltic Sea fisheries but that it does not have information on coverage or reporting requirements for harbour porpoises. It **recommends** that the ASCOBANS Secretariat also collates information on existing schemes for presentation to the Workshop.				
7	**Trends in abundance**: acoustic surveys hold great potential for relative abundance, absolute abundance, distribution, seasonal variation, and short- and long-term monitoring. A concerted effort is needed to refine the theoretical basis for analysing such data. The ABDG **recommends** that this be undertaken, including analysis of existing visual and acoustic data from other areas.	I, II	2	6c	Short to long-term
8	**Combined visual/acoustic surveys:** the ABDG noted that there were plans in Germany to carry out a joint visual/acoustic survey. The ABDG welcomes this initiative and **recommends** that it be carried out. It also **recommends** that the ASCOBANS Secretariat contacts relevant organisations (e.g. ICES) to determine whether there are suitable surveys being carried out where either acoustic and/or visual cetacean data could also be collected.	I, II	2	6c	Short
9	**Movements**: The ABDG **recommends** that every effort be made to find ways to satellite tag porpoises in the Baltic Sea in a manner that involves minimal risk to the animals. Despite the obvious practical difficulties, if it is successful the information obtained will be of great value in determining seasonal movements, high-risk entanglement areas, improving abundance survey design and refining stock structure.	I, II	2	6b	Short to medium
10	**Distribution:** in addition to acoustic surveys (see recommendation 7), fixed-point acoustic monitoring (e.g. using PODs or pop-ups) could be used as a way to discover whether porpoises are found in areas and seasons identified as potentially high-risk areas based on fishing gear/effort (see recommendation 5). The ABDG **recommends** that this be explored.	II	2	6c	Short to medium
11	**Stock structure**: The ABDG **recommends** that the available data be examined and new data collected to determine whether there is (a) sub-stock structure within the Baltic Sea; and (b) interchange with animals (genetic or distributional) to the west of the Baltic Sea. Ideally this should be carried out as one collaborative study to ensure comparability of methods and results.	I	2	6a	Medium to long-term
12	**Biological parameters**: the ABDG noted that other potential threats to harbour porpoises in the Baltic Sea included pollutants. It noted that ASCOBANS has already endorsed the IWC initiative POLLUTION 2000+ which is investigating cause-effect relationships in cetaceans (the harbour porpoise is one of the target species). The ABDG **recommends** that ASCOBANS continues to support this initiative and that every opportunity be taken to collect and archive samples from Baltic Sea animals following the POLLUTION 2000+ protocols.	I, II	3	6e	Long

* Although all recommendations are important, the ABDG agreed that given the present status of this population, it was important to assign levels of priority to the research recommendations.

† This may include information on when the work should commence, when it should be completed and/or the likely period for which the results will be applicable.

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Appendix 1

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Appendix 2

Agenda

1. Welcome and opening remarks
2. Appointment of rapporteurs
3. Adoption of agenda
4. Review of documents
5. Options for assessing the status of harbour porpoises in the Baltic
    a. The Clarke *et al.* (1998) approach
    b. The Bravington (2000Ms) approach
    c. Population modelling
    d. Potential Biological Removals (PBR) or allowable mortality
    e. Population Viability Analysis (PVA)
6. Research needs:
    a. Population structure
    b. Movements
    c. Abundance
    d. Removals
    e. Biological parameters
    f. Research related to mitigation measures
7. Conclusion and recommendations
    a. Short-term management
    b. Longer-term management

Appendix 3

Total landings (in tonnes) of fish from large mesh gill nets in the Baltic in 1998 by quarter

Sub-division	Fishery	1. Quart	2. Quart	3. Quart	4. Quart	TOTAL
22	Danish cod gill nets	1322	507	664	1010	3503
Sum 22		**1322**	**507**	**664**	**1010**	**3503**
24	Danish cod gill nets	235	69	105	176	585
24	Finnish gill nets	2	2			4
24	Latvian cod gill nets	4	6		3	13
24	Polish cod/flounder gill nets	73	36	142	311	562
24	Swedish cod gill nets	242	150	206	130	728
24	Swedish other fisheries**	1272	5	16	13	1306
Sum 24		**1828**	**268**	**469**	**633**	**3198**
25	Danish cod gill nets	965	869	741	681	3256
25	Finnish gill nets	138	86	20	284	528
25	Latvian cod gill nets	101	92	221	407	821
25	Polish cod/flounder gill nets	1574	1182	1236	2466	6458
25	Swedish cod gill nets	2406	979	704	1579	5668
25	Swedish other fisheries**	117	654	193	67	1031
Sum 25		**5301**	**3862**	**3115**	**5484**	**17762**
26	Danish cod gill nets	25			49	74
26	Finnish gill nets	127	67	13	58	265
26	Latvian cod gill nets*	766	520	640	1624	3550
26	Polish cod/flounder gill nets	648	909	359	834	2750
26	Swedish cod gill nets	63	36	105	166	370
26	Swedish other fisheries**	41	57	9		107
Sum 26		**1670**	**1589**	**1126**	**2731**	**7116**
27	Finnish gill nets			22	12	34
27	Swedish cod gill nets	143	166	51	109	469
27	Swedish other fisheries**	18	121	237	38	414
Sum 27		**161**	**287**	**310**	**159**	**917**
28	Finnish gill nets	10	3	91	117	221

28	Latvian cod gill nets*	131	137	101	420	789
28	Swedish cod gill nets	32	35	140	151	358
28	Swedish other fisheries**	7	34	79	19	139
Sum 28		**180**	**209**	**411**	**707**	**1507**
29	Finnish gill nets	105	570	314	206	1195
29	Swedish cod gill nets	1	7			8
29	Swedish other fisheries**	30	179	60	13	282
Sum 29		**136**	**756**	**374**	**219**	**1485**
30	Finnish gill nets	92	525	455	198	1270
30	Swedish other fisheries**	32	938	300	82	1352
Sum 30		**124**	**1463**	**755**	**280**	**2622**
31	Finnish gill nets	33	88	188	123	432
31	Swedish other fisheries**	20	197	420	331	968
Sum 31		**53**	**285**	**608**	**454**	**1400**
32	Finnish gill nets	52	84	76	84	296
Sum 32		**52**	**84**	**76**	**84**	**296**
Grand total		**10827**	**9310**	**7908**	**11761**	**39806**
	Danish salmon gill net / hook					**485**

*includes bycatch of flounders

**dominated by gill netting for turbot and salmon

FISHERIES NOT INCLUDED

Polish salmon drift netting

German cod gill netting (small fishery)

Russian fisheries

Lithuanian fisheries

Estonian fisheries

Data are from "Report of the study group on estimation of the annual amount of discards and fish offal in the Baltic Sea (SGDIB)", 23-25 February 2000