

**Agenda Item 5.2: Further survey and research needs
 Preparations for SCANS II and other surveys**

Per Berggren, "Proposal for Baltic Sea harbour porpoise abundance survey"

Submitted by: Secretariat



ASCOBANS

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Proposal for Baltic Sea harbour porpoise abundance survey

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Background

Harbour porpoises are found in the Baltic Sea throughout the year (Berggren 1994; Berggren and Arrhenius 1995a). Studies of harbour porpoise relative abundance in Swedish waters of the Skagerrak, Kattegat and Baltic Sea show that the species has declined drastically between the 1960s and 1980s (Berggren and Arrhenius 1995a) with no subsequent recovery (Berggren and Arrhenius 1995b).

The population structure of harbour porpoises has been investigated using morphological, genetic and contaminant studies and results have shown that harbour porpoises in the Baltic Sea are distinct from animals in the Skagerrak-Kattegat Seas (Börjesson and Berggren 1997; Wang and Berggren 1997; Tiedeman et al. 1996; Huggenburger 1997; Berggren et al. 1999a). The genetic studies also showed that the porpoises in the Baltic Sea have little genetic variation, indicating a depleted population (Wang and Berggren 1997). The harbour porpoise is listed as vulnerable in the Kattegat and Skagerrak Seas and considered endangered in the Baltic Sea (Gärdenfors 2000).

No observer programmes have been conducted in the Baltic Sea to estimate the magnitude of bycatch in this area. However, calculations of potential limits to anthropogenic mortalities for harbour porpoises in the Baltic Sea show that reported bycatches in this area are non-sustainable (Berggren et al. 1999b).

Contaminants have been studied in harbour porpoises from Swedish waters and the results show that animals in the Baltic Sea have high levels of PCBs, within the range that could cause adverse health effects (Berggren et al. 1999a).

Estimates of abundance exist for a number of geographical areas in the North Sea and adjacent waters from the Small Cetacean Abundance Survey (SCANS) conducted in July 1994 (Hammond et al. 1995). The abundance of harbour porpoises in the Baltic Sea was estimated during aerial surveys conducted in a 43,000 km² area in 1995. These surveys resulted in an estimate of 599 porpoises (CV=0.57; CI 200-3300) in the southern Baltic Sea (ICES areas 24 and 25 excluding Polish territorial waters) (Berggren et al. in prep.; Hiby and Lovell 1996). This estimate is based on only three sightings of porpoises which explains the relatively large CV and CI estimates. However, the effort during the survey gave sufficient coverage of the survey area to generate an abundance estimate.

Justification for the survey and its organisation

It is considered a top priority to generate a new abundance estimate for the Baltic Sea harbour porpoise population that includes the currently known range of the population in the area. This estimate is crucial for the current and future efforts to conserve this threatened population and for the development of a recovery plan for this threatened population. The need for a new survey in the Baltic has been expressed by the Agreement on the Conservation of Small Cetaceans in the Baltic and North Seas (ASCOBANS 2000), the Scientific Committee of the International Whaling Commission (IWC 1996) and the ASCOBANS Baltic Discussion Group (ASCOBANS 2001).

The 1995 survey was co-ordinated by Berggren at Stockholm University. The survey design and data analysis was contracted to Conservation Research Ltd, UK (Hiby & Lovell). It is proposed that the co-ordination of the new survey is also undertaken by Berggren with assistance from an environmental consultant specialised in survey design and analysis (e.g. Conservation Research Ltd, UK or the Research Unit for Wildlife Population Assessment, University of St Andrews, UK).

Methods/implementation

The proposed survey will be conducted during the month of July 2001. The survey will be conducted in the area that represents the currently known distribution range of the Baltic Sea harbour porpoise population (ICES rectangles 24 and 25 and the westernmost part of 26). The east limit of the survey area is defined by a line between the city Kalmar in south east of Sweden and the border between Poland and Russia in Gdansk Bay. The total size of the survey area is 54,000 km². The survey area includes Swedish, Danish, German and Polish territorial waters and aerial survey permits will be required for each country. Berggren will arrange for the Swedish permit, Danish Air Survey will apply the permit for Denmark, Iwona Kuklik has agreed to take care of the Polish permit and the ASCOBANS Secretariat will be asked to help with the German permit.

The survey will be conducted using the same aircraft (Partenavia observer) used during SCANS and the 1995 Baltic survey. There will be two observers aboard the aircraft each scanning one side of the track lines flown. A modified line transect methodology will be used (as during SCANS and the 1995 Baltic survey) (Hiby & Hammond 1989; Buckland *et al.* 1993; Hiby & Lovell 1998). The transect lines will be picked randomly from a pool of possible transects covering the survey area. This will result in a statistical data set that can be used for calculating an abundance estimate of porpoises in the survey area in the Baltic Sea. Transects will be entered into a GPS which the pilot use for navigating along the chosen transects. A portable computer connected to the GPS will be used to store the transect data (date, time and position) every 5 seconds in an Excel file, using a custom developed logging programme. When the observers have a sighting of a porpoise they will record the time, declination angle (using a declino meter) and group size onto a tape recorder. Weather conditions and sea state will also be registered along transects as this can significantly affect the possibility for the observers to detect porpoises.

After consultation with Research Conservation Ltd UK (L. Hiby) it is estimated that approximately 50 hours of flying will be necessary to achieve enough coverage to generate an abundance estimate for the proposed survey area. The precision of the estimate depends both on the number of sightings of porpoises during the survey and the coverage of the area that will be achieved.

The 1995 estimate (599 porpoise pods (CV = 0.57)) was based on three sightings during 15,4 hours of survey. The proposed survey area is 25% larger than that surveyed in 1995. Surveys will only be initiated on days when weather is optimal for sighting porpoises (Beaufort sea state 0-2). If it is assumed that 75% of the survey time (50 hours) are on tracks flown during those days that actually meet the Beaufort 0-2 requirement and accounting for that the proposed survey area is 25% larger, the resulting effort should be approximately twice that of the 1995 survey. As long as the sighting rate is not lower than in 1995, the new survey should result in an abundance estimate with a greater precision.

In order to calculate the abundance it is necessary to estimate the efficiency of the observers (how many of the available porpoises they detect and how far out from the trackline they can detect the animals). If the observers that participated in the SCANS and the 1995 survey are available for the proposed survey then the estimates for these two factors could be taken from the previous surveys (if it is assumed that their efficiency has not changed over time). If these observers are not available and instead we have to use other observers, the detection factors need to be estimated from additional trials conducted in an area with high porpoise densities (e.g. Great Belt in Denmark). In order to accomplish this it is estimated that an additional 10 hours of survey time needs to be added to the budget (see budget comment below). Initial enquires indicate that the observers from SCANS and 1995 aerial surveys may not be available.

Budget outline

Salary for project co-ordination (planning, logistics and report writing) 2 months at 4,000 Euro (incl soc ins.)	8,000 €
Salary fo two observers for one month at 4,000 Euro (incl. soc. ins.)	8,000 €
Field allowance for two observers during 30 days (40 Euro/day)	2,400 €
Accommodation (house rental) for observers and pilot (1 month)	2,300 €
Car rental for one month	1,200 €
50 hours aerial survey at 500 Euro per hour (Danish Air Survey)	25,000 €
Field allowance for pilot	1,200 €
Equipment rental for the survey	1,200 €
Data analyses contracted to an environmental consultant	5,500 €
Subtotal	54,800 €
Overhead and tax compensation Stockholm University (34.3%)	18,796 €
Total	73,596 €
	-37,000*
Remaining funds needed to conduct the survey	36,404 €

*WWF-Sweden has announced that they are prepared to cover half of this total budget (37,000 euro).

Comment on the budget

As it is unlikely that the same observers used in SCANS and the 1995 survey will be available. An additional 10 hours of air charter will be needed to estimate the efficiency of the new observers in a high porpoise density area. This would also add about one week to the total duration of the field time with associated costs for salary etc.

10 extra hours aerial survey at 500 Euro per hour (Danish Air Survey)	5,000 €
One week extra salary, house, allowance and accomodation etc.	3,200 €
Overhead and tax compensation Stockholm University (34.3%)	2,800 €
Total budget experimental survey	11,000 €
Outstanding funds required (including one week experiment)	47,404 €

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