ASCOBANS
11th Advisory Committee Meeting
Jastrzebia Góra, Poland, 27 - 29 April 2004

Document AC11/Doc. 13(P)
Dist. 6 April 2004

Agenda Item 5.1: **ASCOBANS Baltic Recover Plan ("Jastarnia Plan") Implementation**

Seasonal and geographical variation of harbour porpoise (*Phocoena phocoena*) habitat use in the German Baltic Sea monitored by passive acoustic methods (PODs)

Submitted by: **Germany**

NOTE:
IN THE INTERESTS OF ECONOMY, DELEGATES ARE KINDLY REMINDED TO BRIN G THEIR OWN COPIES OF THESE DOCUMENTS TO THE MEETING

Seasonal and geographical variation of harbour porpoise (*Phocoena phocoena*) habitat use in the German Baltic Sea monitored by passive acoustic methods (PODs)

Ursula K. Verfuss, Christopher Honnef, Harald Benke

German Oceanographic Museum, Katharinenberg 14/20, 18439 Stralsund, Germany

Abstract

Harbour porpoises were known to be very common in the Baltic Sea. Since several decades, the abundance and distribution decreased drastically, leading to national and international agreements on the protection of this species. Plans for offshore windmill constructions and proposals for marine protection areas to implement Natura 2000 led to an increased research effort on the harbour porpoise in the German part of the North and Baltic Sea. Within this scope, the harbour porpoise habitat use of the German Baltic Sea was investigated by passive acoustic methods (Porpoise detectors, PODs), registering harbour porpoise echolocation click trains.

Comparison of the POD data from different measuring stations located throughout the Baltic Sea revealed a decrease of porpoise density from the west of the island of Fehmarn to the east of the island of Rügen. Seasonal variation of habitat use, and therefore of relative porpoise density, was seen around the island of Fehmarn and the Kadet channel, with many days of porpoise registrations in the summer and fewer registration days in winter months.

The results proved the importance of the area around Fehmarn and of the Kadet channel for harbour porpoises in German waters and the high endangerment of the Baltic Proper harbour porpoise subpopulation.

1. Introduction

Harbour porpoises (*Phocoena phocoena*) have been very common in the North Sea and Baltic Sea up to the middle of the 20th century (Schulze 1996). Since several decades, a drastic decrease in their population size was registered (Benke & Siebert 1994, Kinze 1995, Kröger 1986, Reijnders 1992, Siebert et al. 1995), leading to the endangerment of the porpoise population (e.g. ICES/ACME 1997). Nowadays harbour porpoises are protected by a variety of national and international agreements (ASCOBANS, HELCOM, OSPARCOM, Red list of mammals, Germany (Boye et al. 1998)).

The research of abundance and distribution of harbour porpoises (Benke et al. 1998, Hammond et al. 2002, Heide Jørgensen et al. 1993, Sonntag et al. 1999) did not give a complete picture of the distribution pattern nor any seasonality of harbour porpoises in the German Baltic Sea. Plans for constructing offshore windfarms and proposals for marine protection areas to implement the European habitat directive Natura 2000 led to an increased research effort on the harbour porpoise in these areas. Recent aerial surveys investigated the spatial distribution of harbour porpoises in the German part of the North and Baltic Sea (Scheidat et al. 2003, Scheidat et al. 2004). Parallel to this, a net of passive acoustic monitoring devices, the PODs (Porpoise Detectors), where deployed on measuring stations throughout the German Baltic Sea. In contrast to aerial surveys, where snapshots of harbour porpoise sightings are used to determine distribution and abundance, PODs are long term monitoring devices. They register harbour porpoise echolocation click trains, which proved to be a sensitive method for investigating the habitat use. This method is of special value in areas, where sightings during surveys are rare or absent due to low harbour porpoise densities.

This paper presents the results of the first year (August 2002 to August 2003) of monitoring the German Baltic Sea by means of a passive acoustic method on a 24 hours basis.

2. Methods

PODs are self-contained data loggers for cetacean echolocation clicks (details see www.chelonia.demon.co.uk/PODhome.html), consisting of a hydrophone, filter and memory (fig. 1). They register, in a 10 µsec resolution, the presence and length of high frequency click sounds matching a specific criteria, logging for 24 hours a day in an 8 – 10 week period. After this period, data are to be downloaded and batteries have to be replaced.

Up to 28 PODs (TPOD Version V2 and V3) where used to operate a net of 19 measuring stations throughout the Baltic Sea (fig. 2). A mooring consists of a 30 kg anchor, connected to several surface buoys via a rope (fig. 3). Loss of moorings led to a paired anchoring system spaced 30 m apart. One POD per station was deployed 5 to 7 m under the water surface.

The listening criteria of the PODs were set to “porpoise only high sensitivity” as given in the TPOD-programme. Where background noise did not allow this sensitive settings, ratio was set to 6 (see TPOD-programme).

The click sounds registered from the PODs where scanned for trains of clicks with a specific signal pattern by means of a Train Detection algorithm (V2.2), which is included in the TPOD-software. Click trains classified as ‘high probability cetacean click trains’ up to ‘very doubtful trains’ were manually reviewed for harbour porpoise echolocation click trains.

For further analysis, porpoise positive days, defined as a day with at least one registered and classified porpoise click train, were determined from each data set. The percentage of porpoise positive days from the number of monitored days per month was calculated for each station.

3. Results

Table 1 shows an overview over the number of monitored days per month and the corresponding percentage of porpoise positive days for each measuring station. Non of the measuring stations could be monitored for the whole time due to logistical reasons and loss of moorings in some cases.

The results show a geographical as well as a seasonal variation of the percentage of porpoise positive days obtained. Whereas the maximum percentage of positive days obtained around Fehmarn is 100%, it is 80% for the Kadet channel and adjacent coastal stations. Further east, at the first stations east of the Darss ridge, the days with porpoise encounters decreases down to 40% (station 16) and 60% (station 17) (fig. 4). North and eastward of Ruegen island, the maximum percentage of porpoise positive days decreases further from 30% for station 18 at Arkona to 0% for station 23 at the Oderbank.

The data of station 1 west of Fehmarn as well as the results of station 8 and station 10 in the Kadet channel show a seasonal variation in the percentage of porpoise positive days per month (fig. 5). At Fehmarn, on nearly 100% of the monitoring days from October and November 2002, porpoises were registered. The percentage of porpoise positive days drops below 50% for December 2002 to February 2003, with a minimum of 23% in February. In March 2003, the proportion of days with porpoise registrations increases again to 50%, and hit 100% in April to June 2003. For the Kadet channel, the maximum percentage of porpoise positive days are around 75% for August to November 2002. At station 8, this number drops down passing 20% in December 2002 to nearly 3% in January and February 2003, and starts to increase to 16% for March 2003. For Station 10, the percentage of porpoise positive days keeps its level around 7% in March and April 2003, and increases slowly to above 60% between Mai and July 2003.

4. Discussion

The harbour porpoise, like other odontocete species, emit short pulsed high frequency click sounds for echolocation purposes (Au 1993). As an active sensory system, echolocation in porpoises is used for orientation as well as for foraging (Verfuss and Schnitzler 2003). Harbour porpoise echolocation clicks are very distinct and different from dolphin echolocation clicks (Au 1993). Their main energy is focused on a small frequency bandwidth around 130 kHz (Goodson et al. 1995, Kamminga et al. 1999). Echolocation is the main sensory system of harbour porpoises, very efficient and well adapted to the underwater world of the porpoises. Porpoises use their sonar even in easy orientation tasks during daylight in a well known environment (Verfuss and Schnitzler 2002).

The method of passive acoustic monitoring with PODs takes advantage of the highly sophisticated sonar system of porpoises. The distinct and easy distinguishable click structure provides a good opportunity to specifically monitor for harbour porpoises.

Not every porpoise being within a 400 m diameter range of a POD is registered (Verfuss et al. in prep.), probably due to the very narrow focused sound beam of the harbour porpoise (Au et al. 1999), and / or due to quiet moving porpoises, which is assumed by the authors to be less likely. Still the harbour porpoise density is high enough in most of the German Baltic Sea to record porpoise echolocation click trains.

Aerial and ship based absolute abundance estimates, conducted in the SCANS-project in 1994, resulted in an estimate of nearly 41.900 harbour porpoises for the Kattegat and the western Baltic Sea (SCANS-area I, I', X) (Hammond et al. 2002). From these animals, only 588 were calculated for SCANS-area X, which includes the German Kiel Bight, with a population density of 0.101 animals per km². For the German part of the Baltic proper and adjacent Swedish waters (within SCANS-area K), subsequent aerial surveys, conducted by Berggren et al. (in prep.) (cited in Vesper & von Dorrien 2001), delivered a number of nearly 600 animals, with 0.014 animals per km². The POD data support the difference in harbour porpoise density, assuming that the percentage of porpoise positive days correlates with the harbour porpoise density. The latter should be logical, as with an increasing number of porpoises, the likelihood of registering their echolocation sound should increase. In fact, no absolute densities can be obtained by PODs, but the method seems to dissolve relative density distributions in a smaller scale than visual surveys can deliver in such low porpoise densities. Thus, the decrease in the maximum obtained percentage of porpoise positive days per month of each station from west to east might be explained by a gradually decreasing relative density of porpoises in those areas. A gradual decrease of harbour porpoise density in the Baltic Sea is also proposed by Scheidat et al. 2004 for their aerial surveys in 2002 and 2003.

Aerial surveys conducted by Scheidat et al. (2003) from May to August 2002 resulted in 0 to 0.5 harbour porpoise sightings per km survey around Fehmarn. In the Kadet channel, no porpoise was sighted. In contrary, more than 1 sighting per km survey was discovered locally on May and July flights in the Pomeranian Bight including the Oderbank. This number was caused by aggregations of up to 10 porpoises. In

September 2002 a single porpoise was sighted, but in the following surveys in 2002 and 2003 no porpoises were sighted (Scheidat et al. 2004).

Comparison of the number of sightings per km survey in the Baltic Sea and the amount of porpoise positive days from POD data show, that the method of aerial surveys in such a low porpoise density area reaches its limits. Whereas the PODs for example registered harbour porpoises on 60% to 80% of the monitored days in the Kadet Channel in August 2002, no porpoise was sighted during the surveys of Scheidat et al. (2003) in this area. Here, the advantage of a permanent passive monitoring of the area becomes obvious.

During the 2002 surveys, when Scheidat et al. (2003) observed aggregations of harbour porpoises in the Pomeranian Bight, no POD was deployed in this area. PODs where deployed from November 2002 on and showed no harbour porpoise registrations. Scheidat et al. (2004) also registered no sighting in the Pomeranian Bight during their surveys after September 2002.

Morphological and genetic studies revealed the existence of a separate subpopulation of harbour porpoises in the Baltic proper, i.e. easterly of the Darss and Limhamn underwater ridge (Huggenberger et al. 2002, Tiedemann et al. 2001). The assumed, and by Berggren et al. (in prep) as well as Scheidat et al. (2003) documented, low density of this population raises deep concern, which is especially emphasised by the recovery plan of ASCOBANS for Baltic harbour porpoises (Jastarnia Plan). The POD-results show a decrease of harbour porpoise registrations starting east of the Darss underwater ridge towards the Polish border. The POD-data confirm a very low density of harbour porpoises in the German part of the Baltic proper. The registrations on the PODs close to the eastern side of the Darss ridge might be caused by offshoots from the western subpopulation of harbour porpoises. Any negative influence by anthropogenic disturbances on this very small and therefore highly endangered subpopulation might sooner or later lead to its extinction.

Until mid of the 20th century, migration of harbour porpoises was documented for the North and Baltic Sea (reviewed in Koschinski 2003): In spring, the porpoises followed movements of herring, passing Danish waters into the Baltic Sea. In late autumn and winter, when the Baltic tended to freeze over, the porpoises migrated back out of the Baltic Sea. Nowadays, the porpoise stocks are too small to easily prove such migrations. Teilmann et al. (2003) could prove seasonality in the use of areas in Danish waters with the help of satellite tags on porpoises. Siebert et al. (in prep) showed a seasonality in incidental sighting and stranding rates in the German Baltic Sea, with a peak in the summer months. The data of incidental sightings might be biased by a lower effort of platforms of opportunities in winter (e.g. less sailing boats), whereas stranding events can be biased by the inverse relationship of submersion time of carcasses and water temperature (Moreno 1992, in Siebert et al. (in prep.)). The PODs confirmed a seasonal use of the Baltic Sea in the areas around Fehmarn and the Kadet channel.

The results of this work proved the importance of the area around Fehmarn and the Kadet channel for harbour porpoises in German waters and the high endangerment of the Baltic Proper harbour porpoise subpopulation.

5. Literature

Au W W L. The sonar of dolphins. Springer-Verlag, New York, Berlin, Heidelberg 1993.

Au W W L, Kastelein R A, Rippe T, Schooneman N M. Transmission beam pattern and echolocation signals of a harbour porpoise (*Phocoena phocoena*). J Acoust Soc Am 1999; (106): 3699-3705.

Benke H, Siebert U. Zur Situation der Kleinwale im Wattenmeer und in der südlichen Nordsee. In: Warnsignale aus dem Wattenmeer. (Eds.Lozán JL, Rachor E, Reise K, von Westernhagen H, Lenz W). Berlin: Blackwell Wissenschaftsverlag, 1994; 309-316.

Benke H, Siebert U, Lick R, Bandomir B, Weiss R. The current status of harbour porpoises (*Phocoena phocoena*) in German waters. Arch Fish Mar Res 1998; (46): 97-123.

Berggren P, Sonntag RP, Benke H, Hiby L, Hammond PS. Harbour porpoise abundance estimates from aerial surveys in the Baltic in 1995. In prep. (cited in: Vesper H, von Dorrien, C. Frische Fische – Tote Wale. Analyse zur Situation der Schweinswale in Nord- und Ostsee und ihrer Bedrohung durch hohe Beifangraten in der Fischerei. WWF Deutschland 2001: 1-27.)

Boye P, Hutterer R, Benke H. Rote Liste der Säugetier. Schriften-Reihe für Landschaftspflege und Naturschutz 1998; (55): 33-39.

Goodson A D, Kastelein R A, Sturtivant C R. Source levels and echolocation signal characteristics of juvenile harbour porpoises (*Phocoena phocoena*) in a pool. In: Harbour porpoises - laboratory studies to reduce bycatch. (Eds.Nachtigall PE, Lien J, Au WWL, Read AJ). Woerden, The Netherlands: De Spil Publishers, 1995; 1: 41-53.

Hammond P S, Berggren P, Benke H, Borchers D L, Collet A, Heide-Jorgensen M P, Heimlich S, Hiby A R, Leopold M F, Oien N. Abundance of harbour porpoise and other cetaceans in the North Sea and adjacent waters. Journal of Applied Ecology 2002; (39): 361-376.

Heide-Jørgensen M P, Teilmann J, Benke H, Wulf J. Abundance and distribution of harbour porpoises *Phocoena phocoena* in selected areas of the western Baltic and the North Sea. Helgoländer Meeresuntersuchungen 1993; (47): 335-346.

Huggenberger S, Benke H, Kinze C C. Geographical variation in harbour porpoise (*Phocoena phocoena*) skulls: support for a separate non-migratory population in the baltic proper. Ophelia 2002; (56): 1-12.

ICES/ACME. Report of the ICES Advisory Committee on the marine environment. 222, 1-210. 1997. Copenhagen, ICES. ICES Cooperative Research Report.

Kamminga C, Engelsma F J, Terry R P. An adult-like sonar wave shape from a re-habilitated orphaned harbour porpoise (*Phocoena phocoena*). Ophelia 1999; (50): 35-42.

Kinze C C. Exploitation of harbour porpoises (*Phocoena phocoena*) in Danish waters: a historical review. In: Biology of the Phocoenids. (Eds.Bjorge A, Donovan GP). Cambridge: Black Bear Press, 1995; 141-153.

Koschinski S. Current knowledge on harbour porpoises *(Phocoena* phocoena) in the Baltic Sea. Ophelia 2003; (55): 167-197.

Kröger R. The decrease of harbour porpoise populations in the Baltic and North Sea. Final report on the Swedish-German harbour porpoise project. 1-55. 1986.

Moreno P, Benke H, Lutter S. Behaviour of harbour porpoise (*Phocoena phocoena*) carcasses in the German Bight: surfacing rate, decomposition and drift routes. In: Bohlken, H. and Benke, H. Untersuchungen über Bestand, Gesundheitszustand und Wanderung der Kleinwalpopulationen (Cetacea) in deutschen Gewässern. 1992. Institut für Haustierkunde, Universität Kiel, Germany.

Reijnders P J H. Harbour porpoises *Phocoena phocoena* in the North Sea: numerical responses to changes in environmental conditions. Neth J Aquatic Ecol 1992; (26): 75-85.

Scheidat M, Kock K-H, Siebert U. Summer distribution of harbour porpoise (*Phocoena phocoena*) in the German North and Baltic Sea. 2003. Working paper presented at the 2003 ASCOBANS meeting.

Scheidat M, Gilles A, Siebert U. Erfassung von Meeressäugetieren und Seevögeln in der deutschen AWZ der Nord- und Ostsee (EMSON) - Teilvorhaben: Erfassung von Meeressäugetieren. Zwischenbericht für das Bundesamt für Naturschutz, F+E Vorhaben FKZ: 802 85 260, 1-32. 2004. Forschungs- und Technologiezentrum Westküste der Christian-Albrechts-Universität zu Kiel.

Schulze G. Die Schweinswale. Westarp-Wissenschaften, Magdeburg 1996.

Siebert U, Benke H, Schulze G, Sonntag R P. Über den Zustand der Kleinwale. In: Warnsignale aus der Ostsee. (Eds. Lozán JL, Lampe R, Matthäus W, Rachor E, Rumohr H, von Westernhagen H). Berlin: Parey Buchverlag, 1996; 242-248.

Siebert U, Gilles A, Lucke K, Ludwig M, Benke H, Kock K-H, Scheidat M. Review of occurrence of the harbour porpoise (*Phocoena phocoena*) in German waters – Analyses of aerial surveys, incidental sightings and strandings. In prep.

Sonntag R P, Benke H, Hiby A R, Lick R, Adelung D. Identification of the first harbour porpoise (*Phocoena phocoena*) calving ground in the North Sea. J Sea Res 1999;1-8.

Teilmann J, Dietz R, Larsen F, Desportes G, Geertsen B. Seasonal migrations and population structure of harbour porpoises (*Phocoena phocoena*) in the North Sea and inner Danish waters based on satellite telemetry. 17th conference of the European Cetacean Society abstract book. 2003.

Tiedemann R. Stock definition in continuously distributed species using molecular markers and spatial autocorrelation analysis. SC/53/SD3, 1-4. 2001. London. Paper presented to the Scientific Committee of the International Whaling Commission.

Verfuß UK, Schnitzler H-U. F+E Vorhaben: Untersuchungen zum Echoortungsverhalten der Schweinswale (*Phocoena phocoena*) als Grundlage für Schutzmaßnahmen. FKZ-Nr.: 898 86 021, 1-53. 2002. Tübingen, Eberhard Karls Universität Tübingen, Lehrstuhl Tierphysiologie. Endbericht.

Verfuß UK, Honnef C, Benke H. Endbericht über das F+E Vorhaben: Untersuchungen zur Nutzung ausgewählter Gebiete der Deutschen und Polnischen Ostsee durch Schweinswale mit Hilfe akustischer Methoden. FKZ: 901 86 020. Stralsund, Deutsches Meeresmuseum. In prep.

6. Acknowledgements

This work was funded by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), including the Investment-in-future program (ZIP) as part of the project MINOS, and by the Federal Agency for Nature Conservation (BfN). These data would have not been obtained without the administrative help of the Federal Maritime and Hydrographic Agency, the Coastguard Service, the Federal Border Guard, the Water and Shipping Authorities Stralsund and Lübeck. Following people where highly involved in data acquisition and analysis: Ines Baresel, Annette Kilian, Anja Meding and Peter Leopold. We thank Anita Gilles for reviewing the paper.

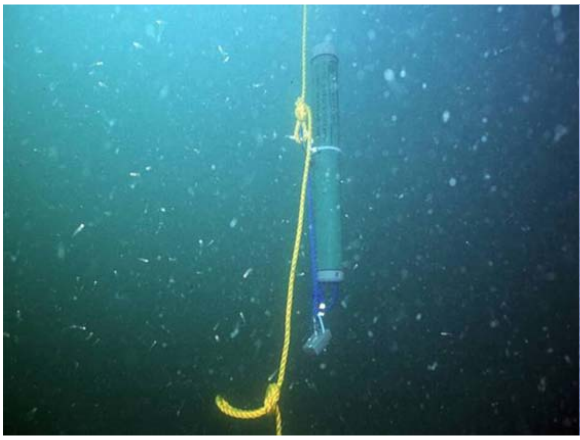

Fig. 1 : A POD moored under water.

Fig. 3 Surface markers of a TPOD mooring in the Baltic Sea.

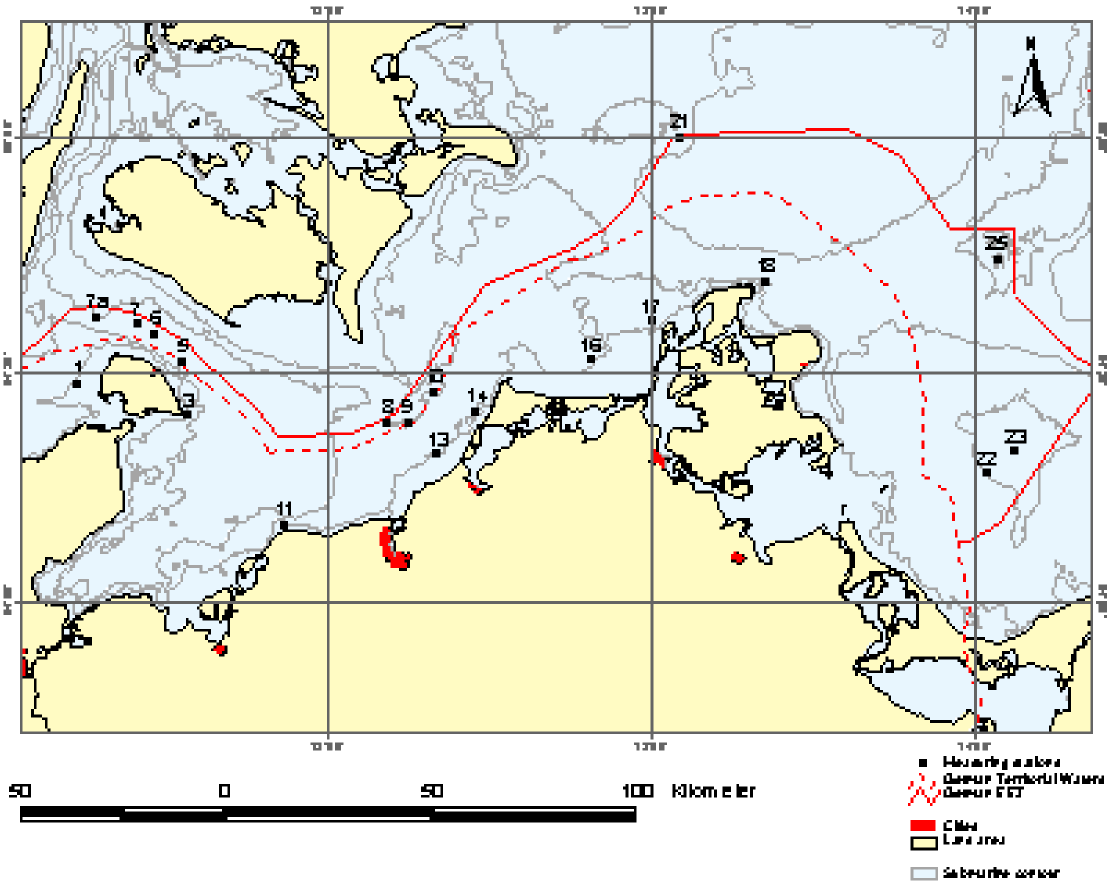

Fig. 2 Locations of all utilised POD-measuring stations in the Baltic Sea.

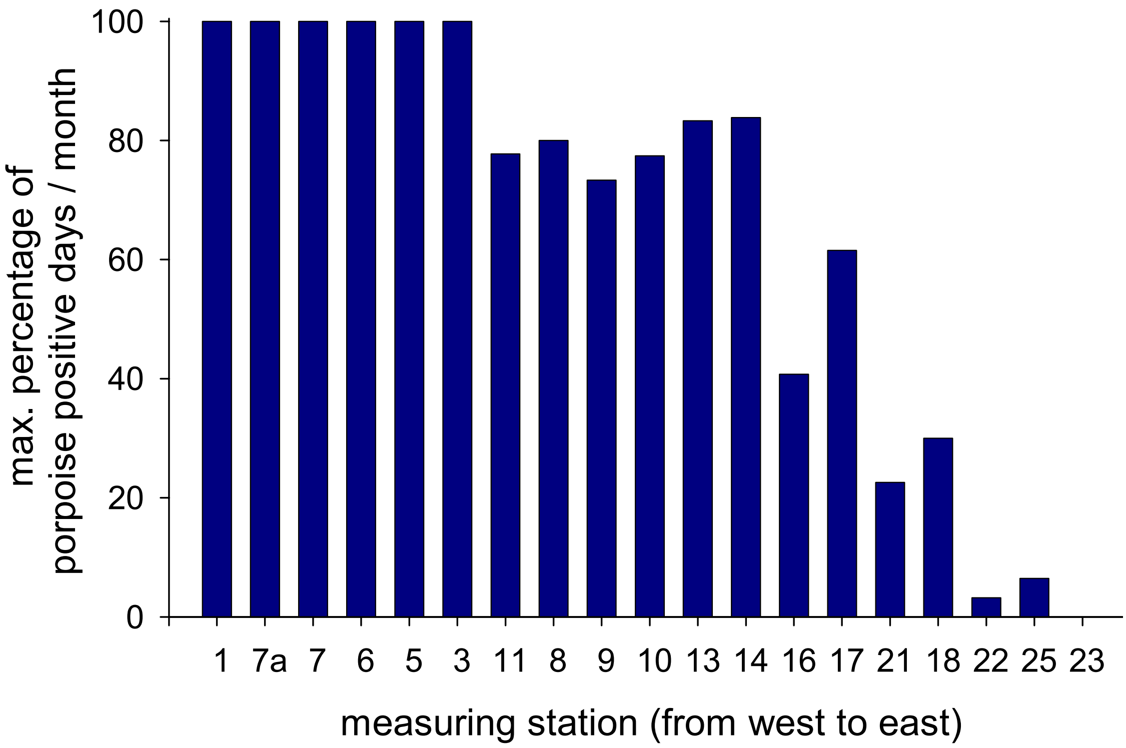

Fig. 4 Maximum percentage of porpoise positive days per month from each utilized POD-measuring station, obtained within the time frame given in table 1. The data are ordered by longitude position from west to east.

			measuring station																		
year	**month**	**data**	**1**	**3**	**5**	**6**	**7a**	**7**	**8**	**9**	**10**	**11**	**13**	**14**	**16**	**17**	**18**	**21**	**22**	**23**	**25**
2002	aug	obs days						12	31	31	31			31							
		% pp days						75,0 %	64,5 %	64,5 %	77,4 %			83,9 %							
	sep	obs days						30	30	30	30	18	18	15		13					
		% pp days						86,7 %	80,0 %	73,3 %	66,7 %	77,8 %	83,3 %	66,7 %		61,5 %					
	oct	obs days	9	9	23			17	31	22	31	19	16	16		30	10				
		% pp days	100,0 %	100,0 %	95,7 %			100,0 %	58,1 %	45,5 %	64,5 %	52,6 %	62,5 %	62,5 %		33,3 %	30,0 %				
	nov	obs days	30	30	18	18			30		4	8		4			30			15	16
		% pp days	96,7 %	90,0 %	100,0 %	94,4 %			73,3 %		75,0 %	12,5 %		25,0 %			0,0 %			0,0 %	0,0 %
	dec	obs days	31	17	18	18			31			31					31	19		26	31
		% pp days	41,9 %	52,9 %	88,9 %	94,4 %			19,4 %			0,0 %					22,6 %	5,3 %		0,0 %	3,2 %
2002 obs days total			**70**	**56**	**59**	**36**		**59**	**153**	**83**	**96**	**76**	**34**	**66**		**43**	**71**	**19**		**41**	**47**
2002 % pp days			**72,9 %**	**80,4 %**	**94,9 %**	**94,4 %**		**88,1 %**	**58,8 %**	**62,7 %**	**69,8 %**	**32,9 %**	**73,5 %**	**71,2 %**		**41,9 %**	**14,1 %**	**5,3 %**		**0,0 %**	**2,1 %**
2003	jan	obs days	13						31			11					31	31		31	31
		% pp days	38,5 %						3,2 %			9,1 %					9,7 %	22,6 %		0,0 %	6,5 %
	feb	obs days	26						28								28	28		28	28
		% pp days	23,1 %						3,6 %								3,6 %	14,3 %		0,0 %	0,0 %
	mar	obs days	31						12		14			14			18	10		31	31
		obs days	51,6 %						16,7 %		7,1 %			0,0 %			11,1 %	0,0 %		0,0 %	0,0 %
	apr	obs days	30		16	16	16				30			30		5	30	30		30	30
		% pp days	100,0 %		100,0 %	100,0 %	100,0 %				6,7 %			0,0 %		0,0 %	0,0 %	0,0 %		0,0 %	0,0 %
	may	obs days	31		31	31	31				31			16	6	31	31	31		31	31
		% pp days	100,0 %		100,0 %	100,0 %	100,0 %				12,9 %			18,8 %	0,0 %	0,0 %	3,2 %	0,0 %		0,0 %	0,0 %
	jun	obs days	20		30	30	30				30				30	30	29	30		30	11
		% pp days	100,0 %		100,0 %	100,0 %	96,7 %				43,3 %				23,3 %	13,3 %	13,8 %	0,0 %		0,0 %	0,0 %
	jul	obs days	14		31	2	2		11		31	11		17	31	20	31	31		14	
		% pp days	100,0 %		96,8 %	100,0 %	100,0 %		54,5 %		61,3 %	36,4 %		70,6 %	29,0 %	10,0 %	6,5 %	3,2 %		0,0 %	
	aug	obs days	31		31	17			31		31	15		23	27	28	31	31	31		
		% pp days	100,0 %		90,3 %	94,1 %			48,4 %		77,4 %	53,3 %		82,6 %	40,7 %	39,3 %	19,4 %	9,7 %	3,2 %		
2003 obs days total			**196**		**139**	**96**	**79**		**113**		**167**	**37**		**100**	**94**	**114**	**229**	**222**	**31**	**195**	**162**
2003 % pp days			**78,1 %**		**97,1 %**	**99,0 %**	**98,7 %**		**22,1 %**		**37,7 %**	**35,1 %**		**34,0 %**	**28,7 %**	**14,9 %**	**8,3 %**	**6,8 %**	**3,2 %**	**0,0 %**	**1,2 %**
obs days total			**266**	**56**	**198**	**132**	**79**	**59**	**266**	**83**	**263**	**113**	**34**	**166**	**94**	**157**	**300**	**241**	**31**	**236**	**209**
% pp days			**76,7 %**	**80,4 %**	**96,5 %**	**97,7 %**	**98,7 %**	**88,1 %**	**43,2 %**	**62,7 %**	**49,4 %**	**33,6 %**	**73,5 %**	**48,8 %**	**28,7 %**	**22,3 %**	**9,7 %**	**6,6 %**	**3,2 %**	**0,0 %**	**1,4 %**

Table 1 Number of days monitored (obs days) and percentage of porpoise positive days (%pp days) for the monitoring period of August 2002 to August 2003 for all utilised POD-measuring stations (1 to 25) in the Baltic Sea

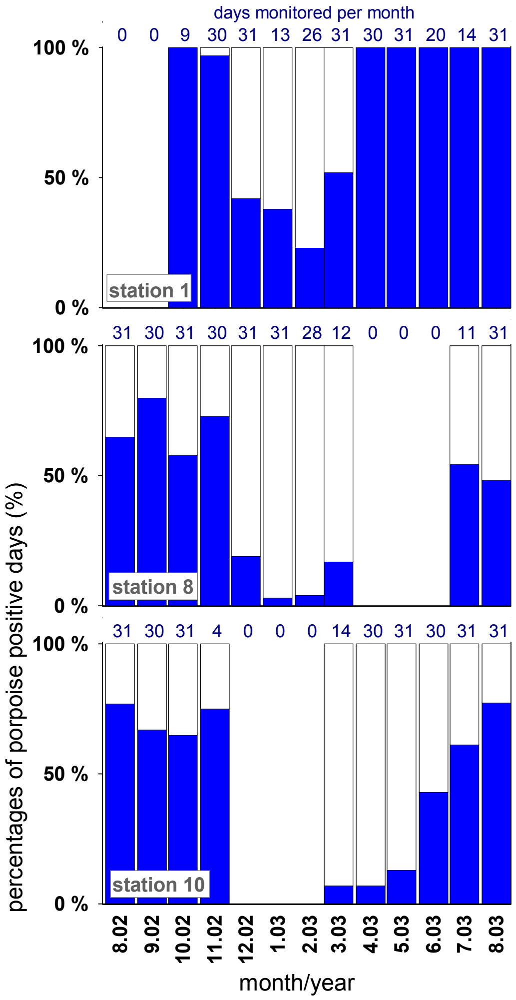

Fig. 5 Percentage of porpoise positive days per month (blue bars) for station 1 (placed west of Fehmarn), station 8 and station 10 (placed in the Kadet channel). White bars fill up the blue bars as days with no porpoise registration (porpoise negative days). On top of each bar, the number of days monitored is given.